

Clinch Park Waterscape Evaluation

July 31, 2014



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Water Technology Project # 13399.01

Project Description: The Traverse City Water Feature was conceived as an interactive, educational water playground for citizens and visitors to downtown Traverse City, MI. Designed and constructed during 2012/2013, the Water Feature is located in Clinch Park, a waterfront park in downtown Traverse City. Part of Clinch Park's bay front plan, the Water Feature work was part of a more general scope which included landscape areas, a concessions & bathhouse building, an accessible kayak launch, a playground, walkways, decks and civil improvements. The intent of the Water Feature is to provide an inter-active, educational water feature for the public to play in. (Photo 01) The design of the Water Feature is intended to emulate the natural water cycle. (Photo 02)

It is understood that the Water Feature opened in late 2013, and experienced multiple issues and concerns immediately. Water Technology, Inc. was engaged in early 2014 to review project documentation and to conduct a site visit for the limited purpose of commenting on issues and offering options for restoration/renovation. The scope of this review is limited to the Water Feature, its features and systems. Other aspects of the project, such as buildings, playgrounds, and other siteworks are outside the scope of this review.

Facts: The Water Feature is intended for public use, therefore its design and construction are governed by the Michigan Department of Environmental Quality Water bureau (MDEQ) Public Act and Rules Governing Public Swimming Pools (CODE)

Documents Reviewed:

Drawings:



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Drawing #	Title	Date	Notes
NA	Cover	06.28.12	
1-1	Survey	2.2012	
C1.1	General Development	06.28.2012	From "As -Built" Set, No Date change on drawing, No clouding of revisions.
C5.1.1	Materials Plan East	06.28.2012	
C5.4	Enlargement Plan	06.28.2012	
C6.4	Grading Plan	6.28.2012	PRI 9.12.12, as constructed 07.24.13 No clouding of revisions
C6.4	Grading Plan	06.28.2012	
C7.1	Utility Plan	06.28.2012	S.P.Revisions 7.24.13 (revisions clouded)
C7.1	Utility Plan	06.28.2012	7.12.13
C7.2	Utility Plan	06.28.2012	
C8.4	Site Details	06.28.2012	
C8.5	Site Details	06.28.2012	
C8.6	Site Details	06.28.2012	
C8.7	Site Details	90% Owner Review 4.13.12	
		100% Owner Review 05.4.12	
		100% DNR Review 05.29.12	
		100% DNR Review 06.07.12	
E2	Electrical Floor Plan	06.28.2012	
E3	Electrical Schedule	06.28.2012	
ME1	Mechanical and Electrical Site Plan	06.28.2012	
P2	Plumbing	06.28.2012	
W1.1	Water Feature Schematic	06.28.2012	From "As Built" set, No date change on drawings (revisions clouded)
W1.1	Water Feature Schematic	06.28.2012	

Specifications:

Project Manual for Clinch Park Phase - 1

6/28/2012

Submittals:

Clinch Park Fountain – Fountain People

10/24/2012

Data Sheets -

10/24/2012

Other:

MDEQ – EQC 1753 (01/2005) Public Swimming Pools (CODE)	
DEQ Construction Permit Application	06/05/2012
Letter to Mr. Brett Davis from MDEQ	07/22/2013
MDEQ Inspection Report	08/27/2013
Letter to MDEQ from David H. Graves, PE	Not Dated
Photographs	Various
Fountain People – Website – For Feature Information	

The Project Team Consists of:

Design:

Hamilton Anderson Associates	Landscape and Prime Consultant
Fleis and Vanderbrink -	Civil Engineer
Soils and Structures, Inc.	Geotechnical
Nealis Engineering	MEP
SDI Structures	Structural

Construction:

Lightning Turtle Landscape	Water Feature Construction
The Fountain People	Water Feature Equipment

Issues:

- 1. The Water Feature area and pad floods in moderate to heavy rains:** The Water Feature is located adjacent to the Traverse City Marina, near a parking lot and kayak launch at the edge of West Grand Traverse Bay. The site is relatively flat, with grades on drawing C6.4 ranging from 583.80 to 587.30. The rim elevation of the Water Feature is generally 584.0, placing it at a lower point on the site (Photo 03). Site grading generally slopes towards the Water Feature, including paved walkways. The grading plan indicates the site sloping to the North and East, the sidewalk has an edge along it's east side, sloping towards the Water Feature, a landscape berm and seat wall trap run off water onto the

Water Feature along the north side (Photo 04). There are no provisions to shed site water away from the Water Feature and it's immediate surroundings

Comments:

The location and grade elevation selection of the Water Feature does not meet MDEQ code requirements:

"R325.2121 Sites

"(d) Have drainage that is adequate to prevent flooding, drainage and nuisance."

"(f) Avoid the pollution of the swimming pool."

The Water Feature's site location, grade elevation and detailing do not meet the code requirements. During rain events, city staff stated that leaves, grass clippings, mulch and other debris flood onto the surface of the Water Feature and into its circulation system.

Recommendations:

The best way to mitigate the flooding and debris to the system is to prevent its entry on the Water Feature in the first place. Options to accomplish this include:

- Lowering landscape and turf grades adjacent to the Water Feature, providing a 4" to 6" curb to prevent water and debris washing onto Water Feature. This is a typical industry detail. (Photo 05)
- Developing landscape berms to direct site watershed around and away from the Water Feature.
- Installing trench drains along walks to collect and remove the water sheeting across the walks and decks. These drains would require a piping system to remove the water to a suitable location.
- Develop a drainage "barrier" around the spray pad. This would include a walk way of approximately 4' minimum, sloped away from the pad, around the Water Feature. Loose rocks in the landscape area would be grouted in, the center landscape area would be lowered and provided with a landscape area drain, piped to a suitable location. Increasing the apron size would provide the additional benefit of area for observers and other activities such as stroller parking.

2. Concrete curbs were added to select locations to contain and direct the water flow, in lieu of the domed finish surface described in 1/C8.4:

Approximately 45 LF of 6" x 8" concrete curb was installed at the east and west

junctions of the water feature runnels (troughs)(Photo 06). It was represented by city staff that the curb was installed at the recommendation of Hamilton Anderson in “trade” for the domed finish which consisted of 12 each 4’ radius rebar circles and 17 each 4’ partial rebar circles embedded into the domed surface. A circular pattern is also indicated on the drawing, but not described. A Change Order, Change Directive or Work Order adjusting the contract terms was not included in the documentation provided.

Comments: The concrete curbs, as installed, present a safety concern in the form of trip and fall hazard and sharp corners (Photo 07). The domed surface described in the contract documents is extremely intricate and labor intensive, if the “trade” for the curbs is what happened, the city did not receive an equal value in this trade.

Recommendations: The curbs should be reviewed and leading edges and sharp protrusions should be ground down. A better detail would have been a curb flush with the Water Feature’s edge, tapering to provide a curb away from the play area. The City should reconcile values for work traded.

- 3. The domed surface is slippery when wet.** The domed surface is described on C8.4 as an 8” shotcrete domed surface (Photo 08). As mentioned previously, #4 reinforcing (1/2” bars) were intended to be installed in circles; the reinforcing “stamped ½ of bar diameter (1/4”) into shotcrete.” There are also series of concentric circles shown on the drawing, these circles are not defined. The Project Manual lists two concrete sections in the specifications, 033000 Cast In Place Concrete and 033713 Shotcrete. Section 033000, part 3.8 B. requires a float finish, further describing the finish as “..left with a uniform, smooth, granular texture.” Section 033713, part 3.8 C.1. describes a medium sandblast finish, 3.8 C.2. requires that the contractor verify the finish suitability with a mockup. This section further requires “concrete sidewalk with sandblast finish to meet minimum ADA coefficient of friction requirements. 0.6 minimum.”

Comments: The domed surface, based upon its intended use, should be a non-slip surface. The drawings do not describe the concrete finish on the dome. There is no note on the drawings referencing “non-slip” or providing a non-slip criteria. The connective circles shown may have been etched rings or ridges, but are not detailed. The reinforcing steel embedment may have helped, but were not installed. The detailing of the embedded reinforcing steel is not clear; two issues which would have arisen include the circles not conforming to the curve of the dome, and how to resolve the intersections of the reinforcing circles. Another

issue with this detail would have occurred later, as the reinforcing bars rusted and expanded, damaging the adjacent concrete.

Recommendations: The domed surface can be acid etched or sand blasted to provide a non-slip surface. Water Technology, Inc. recommends that a small test area be used to establish how aggressive the surface needs to be. Care should be taken to protect the grating, which may be affected by the acid wash method.

4. **The “Arched Rain Bar” feature does not work properly.** The feature is intended to provide two 17’ -0” long curtains of water in a rain like effect. The water is to fall onto the dome and wash down the surface to the perimeter surface grating. When started, the Arched Rain Bar (ARB) created the effect unequally, showering one end of the bar, leaving approximately 1/2 of the dome with little water effect (Photo 09).

Comments: The Arched Rain Bar feature, as conceived and detailed could not create the effect intended. The ARB consists of two intersecting 8” pipe arcs, with 315 ea. ¼” holes drilled into the underside of each arched pipe. The intended effect was that of rain falling across the 17’ – 0” span of the area with the holes drilled (see 8/C8.4). The feature’s water supply is from one side and consists of a single 4” pipe connected to the ARB manifold (P2, ME1, and W1.1). Drawing P2 defines the pipe size as 4”, drawing ME1 routes the pipe to one end of the feature, drawing W1.1 shows the 4” pipe splitting into two 3” feeds. Drawing C8.4 requires baffled ends, a detail shows a 3” threaded pipe coupling at baffled ends, a leader line for this note goes to one end. A simple calculation reveals that the number of ¼” holes equals 30.92 in² of open area. A 4” pipe has 12.73 in² of open area. This in-balance results in the feature having water at one end, and being starved at the other end. According to Staff, the Aquatic’s subcontractor, “Lightning Turtle” has plugged some of the ¼” openings (Photo 10), in order to get the feature working.

The feature is listed in the project manual as an “Arched Water Feature”, item# AM-RPWF/S304, manufactured by West Gate Sheet Metal. A phone conversation with Tom Sterling of West Gate revealed that West Gate bid on the project, but was not successful. Tom did not know who fabricated the piece. Detail 8/C8.4 has a note requiring the manufacturer to provide specifications and design for approval prior to fabrication. No submittal for this feature was included in the reviewed documents. No information was provided in the design documentation as to the feature water requirements.

Recommendations: The Contractor has attempted to balance the feature and create the effect intended by plugging approximately one half of the opening with plastic plugs (Photo 10). This strategy has proven somewhat successful. Reducing the open area of the feature will allow the feature pipe to “fill”, and create the effect intended. The balance of the feature in this manner will be by trial and error. Water Technology, Inc. recommends plugging approximately 2/3 of the holes of the first third of the supply side of the feature, the middle row of the center third of the feature, and every other hole the downslope third of the feature as an initial balance point. A second solution would be to add an additional water supply, symmetrical to the first to balance the supply. It should be noted that this second supply would over-take the existing feature pumps, piping and reservoir capacity. The additional water supply (4”) is not sufficient to balance the open area of the holes, but would significantly reduce the in-balance. A third option would be to plug all of the openings, and provide new openings in a level plane along the sides of the pipes. Thus the feature pipe would “fill” to an equal point, and then spill equally across the openings. A fourth option would be to tap the openings, and replace with a threaded ¼” reducer, reducing the hole size to 1/8”.

5. **The “Arch Rain Bar Feature” is climbable.** The ARB consists of two 8” stainless steel pipes, curved to a 24.5’ radius, which starts at grade and is 10’ above the top of the domed surface at its apex (See 2/C8.6). Stainless steel lettering spelling “William G. Milliken WaterScape” are welded to the sides of the pipe.

Comments: The ARB pipe finish is listed in the specifications as “SSPC- SP-6”. This standard is the “Society of Protective Coatings” standard. The standard covers the use of blast cleaning abrasives to achieve a defined degree of cleaning of steel surfaces prior to the application of a protective coating or lining system. The primary functions of blast cleanings before coatings are:

- (a) Remove material from the surface that can cause early failure of the coating system and
- (b) to obtain a suitable surface roughness and to enhance the adhesion of the new coating system. (From sspc-sp6/NACE No.3 Appendix A; A1).

There is no finish specified for this feature. The combination of the low arc of the arch, the fact that it springs from grade, and the surface roughness of the piping make the feature an attractive challenge to climb. Staff reported seeing parents assisting their children in starting to climb the feature. The feature’s maximum height of 10’ above the concrete surface makes a fall a serious issue. The

lettering which is welded to the piping poses both a cut and strangulation hazard (Photo 11). Additionally, the feature low arc leaves very little headroom at the perimeter of the dome where the arches rest. At the outside edge of the dome, the clearance is about 24". A clear headroom of 7' – 0" is not met until 7' inside of the edge of the dome play area.

Recommendations: Due to the obvious nature of the hazards presented by the feature, Water Technology, Inc. recommends immediately placing signage at the feature stating "No Climbing" & "Fall Hazard". The feature should also be reviewed by the City's risk management and insurance administrators. The following recommendations should also be reviewed by these risk management personnel prior to implementation.

- A) Paint the ARB with a gloss finish, making it slippery and less likely to be climbed. The finish will have the added benefit of protecting the steel. Additionally, if some of the holes are to be permanently filled (see #4 above), the paint finish will reduce the visual impact.
- B) Remove the lettering, replace with lettering that is flush with pipe surface.
- C) Protect area under rain arches to reduce head clearance issues. Options include barriers, large rocks (although these likely will still be climbed) an un-walkable surface (such as grouted stones) or surface warnings.
- D) Remove the ARB, replace with a standard feature designed for this use.

6. **The LED light on the ARB are inappropriate for an interactive water feature, and are operationally difficult to winterize.** Located below each side of the ARB are 8 LED Light Fixtures. The fixtures are specified as" LED- 180N: Lumen 180 18" Linear LED light with 30' underwater cable and stainless steel niche housing with rock guard." The fixture appears to be manufactured or sourced through "The Fountain People", as well as the fixture enclosure.

Comments: Staff reported three concerns with the lighting: sharp edges of the slots in the "rock guard" cover (Photo 12), heat of the fixture and cover when in operation, and the winterization of the fixture, which requires disconnecting the wire junction for each light and re-wiring every spring. The sharp edges of the rock cover were also noted by the inspecting MDEQ official (see MDEQ Report of 08/27/13, item 17./12.), requiring staff to install a plexi- glass plate between the rock guard and the fixture(Photo 13). This has the added benefit of preventing water and debris from collecting in this void. It is unclear from the manufactures literature if the fixture is intended for use as a "dry" fixture. Winterization instruction prepared by The Fountain People (O&M P12732) states, under the heading "Winterizing Niche Type Underwater Light Fixtures" to "disconnect wire connections". The O & M manual also states that "Only persons qualified and

authorized should be allowed to operate or maintain this electrical equipment,” placing an operational burden on the City.

Recommendations: Staff’s action of installing plastic guards has mitigated an obvious concern. The City should contact the manufacturer to establish if this installation impacts the fixture’s operation or warranty in any way. If concerns are expressed by the manufacturer, an alternate cover should be requested. During the next operating season, the City should also measure the surface temperature of the stainless guard to establish if operating with the lights is feasible. It is also recommended that the City investigate the potential of installing waterproof plugs on the fixtures to simplify winterization. It should be noted that the current LED-180N offered on The Fountain People’s website is equipped with an IP68 waterproof connector. The addition of a waterproof connector may be done by a local electrician, or by returning the fixture to the manufacturer. If this installation is contemplated, developing a test cable with the plug is suggested, so that it can be established that the plug can make the pulls in the spring. Another option may be to pull the wire and have the plugs field installed at the niche location. This should be verified with the manufacturer and against code requirements. Alternate solutions would be to abandon the in deck lighting and develop an alternate lighting plan, or to abandon lighting the feature.

7. The perimeter stream trough does not flow properly, has areas that pond water, and traps debris.

The perimeter stream trough is made up of iron gates with a decorative pattern(Photo 14). Specified in the project manual as “Water Weir Trough” by West Gate Sheet Metal, the installed product has an IRON AGE stamp, it is presumed that the grates were manufactured by IRON AGE DESIGNS of Burien, WA(Photo 15). This was confirmed with a search of the IRON AGE WEBSITE, which contained a drawing labeled “Clinch Park”.

Comments: The perimeter stream trough is intended to imitate a stream, with water running along the stream, conveyed by the trough to the eight drains located at the perimeter of the Water Feature area. The trough is made up of a series of cast iron “gutter” plates (See 2-7/C8.4). The gutter plates are a custom fabrication from IRON AGE, as the website describes the product as their Janis radial trench grating, 1” thick, with no openings greater than ½”. The gutter is made up of grating of this pattern without any openings. This grating (with openings) was originally installed over the drain locations, staff reported that

there was inadequate open area, causing flooding of the Water Feature (Photo 16). Staff replaced the grating with plastic for the initial season and made custom grates from the gutter product for the next season (Photos 17 & 18). The gutter material's pattern and fabrication result in it having depressions which trap debris and water. Drawing C6.4 documents the slope of the gutter, which has a high point of 584.79 to a low point of 584.0 (a 1.48% slope) for the dome area gutter. The gutter around the landscape area falls .64', providing a 1.25% slope. There is ponding water in two areas of the trench (Photo 19). The reduced slope around the landscape area, combined with its longer run, means very little water will run in this portion of the gutter (Photo 20). The reduced water flow, with a very shallow slope and a gutter material likely to trap debris and water makes ponding almost inevitable. With the amount of landscaping and vegetation immediately adjacent to the water feature, organics are likely to be trapped in the ponding areas, providing opportunity for bacteria growth.

Recommendations: The combination of low slope with a patterned corrugated surface, makes the trapping of debris and ponding areas likely. Corrective actions could include: replacement of the cast plates with a smoother gutter trough material; "filling" portions of the voids in the pattern with a material to reduce the voids while leaving the top of the pattern intact. Another potential solution would be to introduce additional water flow into the landscape channel. Increasing the water in this channel will increase its flow reducing the likelihood of stagnation. The ponding area in this channel should be corrected.

Additionally, it is recommended that the loose rock area inside the channel be grouted in, leaving a limited number of loose rocks selected for inter-active play. The most likely solution will be a combination of these recommendations, after review of the impact and feasibility of each recommendation.

8. Concrete around the spray ring is cracking and deteriorating.

There are seven "Water Cages" on the spray area of the feature, shown on drawing 1/C85.5. Detailing is limited to 1/8" scale plan and section, with a note to see water feature specifications. The specifications refer to this item as W012: "Water Cage constructed from 1.5" red brass pipe, (30) machined stainless steel jets with domed head, (30) jet construction covers, anchor bolts with hardware, 1.5" NPT connections, creating a 48" diameter effects pattern." This information corresponds with a spray ring feature manufactured by "The Fountain People", specifically the EPR – 30, with 2.5' ring and 30 jets (Photo 21). This spray ring has a 2.5' diameter, placing the nozzles at 3.14" o.c. around the ring. There is

no detailing of the concrete at this feature. From the product cut-sheet, it appears that the manifold ring is 1 1/2" brass pipe, and that the nozzles are approximately 1/2" tall. The nozzles provided to the City appear to be standard dome head stainless steel bolts with a holes drilled in them(Photo 22).

Comments: The "water cage" or spray ring feature appears to be a fountain product adapted to an interactive spray pad. The product cut sheet shows the product installed in water, the manifold ring is shallow for a concrete installation. Detailing the installation with a control joint connecting the nozzles would have helped. Staff noted that winterization of the feature involves removing the 210 "nozzles" from the feature and replacing them with plugs. Staff further stated that some of the nozzles are very difficult to remove, as the threading of the "nozzle" goes through concrete(Photo 23).

Recommendations: Essentially this condition is the result of the wrong application of a product intended for another use. Given the project's shallow depth to the manifold and the limited spacing between nozzles, the concrete deterioration is not surprising. Winterization difficulties also highlight the fact that the product is not designed for this application. Corrective actions include removal of concrete around the rings and replacing with a joint between nozzles, re-furbishing the spray rings with a bushing that would be flush to the concrete finish, but recesses the nozzles, or placing a safety surface over the splash area of the feature to cover the concrete.

- 9. Plant clippings, mulch, sand and other debris clog the system, requiring frequent cleanings by staff.** Staff reported system shut-downs for strainer cleaning as frequent as every 1/2 hour on busy days. The frequent shut-downs irritate patrons, and require inordinate staff resources. Shut downs are required to remove, clean and replace the strainer baskets in the filtration loop and the activity loop.

Comments: The Clinch Park water feature is located in an urban beach front park. A sand beach is located less than 300' from the water feature. The water feature is surrounded by large trees and extensive landscaping, including a landscape island inside one of the gutter troughs. The water feature operates two distinct water systems, a filtration loop and an activities loop. Both systems are re-circulation systems, operating from a 2000 gallon reservoir. The reservoir consists of a single fiberglass tank. Water is collected from the spray features by 8 drains and conveyed to the reservoir via two 8" pipes (C8.5). The pipe sumps are covered by grating (see previous discussion items #7). There are two pumps

drawing water from the reservoir; a filtration pump (Hayward Tristar series, # SP3220EE) and an activity pump (PACO model 40957 LC, 604 GPM @ 40 TDH) Each pump has a strainer with a single strainer basket. As discussed previously, debris from the adjacent landscape area collects onto the feature. Staff reported that lawn mowing operations, plant fall, foot borne sand, grass and mulch are all found in the system..

Recommendations: There are several issues related to debris contamination: environment control, patron education and control and debris collection. Environment control, as discussed in issue #1, involved material which can be kept off the activity surface by controlling the area. This can be done by providing physical separation from plantings and mulch to the activity surface. The use of curbs, reduced-shedding plants and decks are recommended. A shower control station between the feature and beach is also suggested. Patron education and control is principally effected through signage. Advising patrons to rinse feet prior to using the feature, not allowing pets in the feature and asking for assistance in keeping the feature clean can be beneficial.

The final defense in debris control is to collect it. In line strainers will collect this material prior to the pump. A simple way to reduce the feature's downtime is to provide a spare strainer basket. The shut-down time is minimized to the basket substitution, cleaning the basket can be done after the system is re-started. A spare strainer basket is required by code (R325.2145 4(c)) for the filtration pump and is usual and customary for all pool and water activity strainer systems. An additional option would be to add a second strainer in parallel on the activity system, allowing the operator to switch between strainers for cleaning, and not shutting the activity off. The filtration pump has an integral strainer as part of the pump; installing a larger strainer in line to pre-strain may allow longer runs between strainer cleanings.

Preventing debris from entering the system initially is the best practice. Staff has attempted to do this with customized debris strainers inserted into the gutter dropouts (Photos 24 & 25). This attempt has had minimal success reported, as staff still needs to clean strainer baskets and backwash every ½ hour. As discussed previously, proper spatial design between debris sources (plantings) and the feature is required. The creation of seating areas and walkways would benefit this effort. Another option would be the installation of a pre-screen settlement tank, which would allow for initial screening of debris and sand settlement.

10. Spray ring nozzles clog frequently. Staff reported that the nozzles of the spray rings clog with debris.

Comments: As discussed in issues 1 and 9, the feature's system collects debris from its surroundings. Features with a small orifice will clog when used in a spraypad setting. Typical strainer baskets will not catch the small debris which is capable of blocking the spray ring nozzle orifice.

Recommendations: In conjunction with recommendations 1, 9 and 13 (following), the best way to mitigate the clogging is to send more finely treated water to the rings. One method to do this would be, in conjunction with a filtration addition, to send filtered water to the spray rings. Another way to accomplish this would be to add filters onto the activity loop.

11. The water feature uses excessive amounts of water. As mentioned previously, the Clinch Park Water Feature is a recirculation system, re-using the water in the system.

Comments: Staff reported water usage in excess of 7420 gallons last year over the 10 days the feature was open. Staff also expressed concern that the system may be competing with itself, the autofill adding water after morning start-up, and dumping this water at evening shut-down. Loss due to excessive winds should be negligible due to the features anemometer control. Staff reported no knowledge of leaks in the system.

The reservoir tank total volume represents less than three minutes of the feature's flow. While there are no published national standards defining the sizing of the reservoir (recommendations range from a minimum of 4 times the flow to PWTAG's technical advisory of 20 times the flow), ASTM F2461-09 (6.5A) provides guidance that the reservoirs or holding tank sizing must consider and incorporate calculations for transit time, pipe size velocity and draw down due to external conditions and overflow.

Water Technology, Inc. uses the greater of 4 times the flow rate or 4000 gallons to determine the operating volume of the reservoir. A reserve capacity of 1" of water over the feature area is recommended. Based on these criteria, the Clinch Park reservoir should be 4620 gallons. The existing Clinch Park reservoir is likely undersized by a factor of 2.5 times, if one considers that the overflow line reduces the tank's usable volume by about 10%, and the fill volume of the arched water feature another 5%.

Recommendations: Contrary to some opinion, a small reservoir volume is not beneficial to water feature operations. A reduced reservoir volume limits the dilution effect on containments, and makes chemical control and balance more difficult. Increasing the size of the reservoir to at least 4700 gallons is recommended. Given location of the feature, and debris experienced, a three stage tank is recommended. The first stage would be a settling stage to allow sand to settle out, the second stage would be a gravel strainer, and the third stage would be the suction chamber. The gravel strainer would act as the primary debris collector. Cleaning of the gravel strainer would consist of partial flooding of the second stage, and using a pool net to “Skim” Debris on a scheduled basis. At the end of the season this process would be used, as well as draining the tank and evacuating the sand.

- 12. Installed piping is not code compliant.** MDEQ requirements state that piping is all able to withstand operating pressures of 160 pounds per square inch. Exposed feature piping in the mechanical room is labeled “Not pressure rated” (Photo 26).

Comments: MDEQ (R325.2137) (1)(E) requires that “ all pool water piping is of the following. (e) rated to withstand operating pressures of not less than 160 pounds per square inch”

Project specifications do not establish requirements for feature piping. Section 131500 lists applicable codes and standards, but does not include MDEQ'S code in this list. Plumbing specifications do not reference PVC pipe standards, nor does the water feature piping under products. Neither section requested submittals on water feature piping and valves. Water feature general notes, found on sheet W1.1, does state that the installation shall comply with local plumbing codes (Note 1), and that interconnecting pipe and fittings... “Shall be of copper, minimum schedule 40 PVC, stainless steel or fiberglass” (Note 4). Again these notes do not address or necessarily meet MDEQ requirements. This issue was addressed during the permit review process, cited in MDEQ’s letter to Mr. Davis (Issue #6 of the 7/22/13 letter). The response from David Graves, PE states that “Schedule 40 pipe used was specified, and used for the work has a rating higher than 160 psi”. While it is impossible to know what each installed pipe is, some exposed piping in the mechanical room bears a manufactures label “Non-Pressure Rated.” This piping in the feature’s mechanical room does not meet code requirements.

Recommendation: Excavate and evaluate piping, replace non-compliant piping.

13. **The filtration seems undersized, requiring backwash of system every ½ hour on busy days.** Staff reported that during hot days the feature must be backwashed frequently. Backwash water is sent to a 150 gallon holding tank which acts as a retention basin, releasing water at a metered rate through a 1.5” pipe (Photo 27). Backwashing frequencies of every ½ hour were reported.

Comments: The filtration loop consists of the filter pump, a filter, Ultra Violet (UV) treatment and chemical treatment. Specific equipment includes:

- Filter pump, Hayward Tristar Model SP 3220EE; 79GPM@80TDH
- Filter Hayward pro-series, Model S310T@, 4.91 SQFT Filter Area
- UV Delta EP series, Model EP20, 30MJ/CM² at max flow rate of 70 gpm.
- Chemical Controller, Chemtrol Model 250

MDEQ does not specifically address interactive water playgrounds such as the Clinch Park water feature. The closest MDEQ comes to addressing this type of feature is requiring a 1 hour turnover for a wading pool. Review of adjacent Mid-Western state codes provides the following:

Code	Interactive Spray Feature	Wading Pool
Indiana		1 hour
Illinois	2	1 hour
Wisconsin	.5 hour	

The Model Aquatic Health Code (MAHC), currently in draft form, requires that the ratio of feature water to filtered water shall be no greater than 3:1 in order to maintain the efficiency of the filtration system. The Clinch Park Water Feature designer chose a .5 hour turnover (From DEQ Public Swimming Pool Construction Permit Application); basing their calculations on the 2000 gallon reservoir. The 79 GPM design flow will turn the 2000 gal tank and a 10% piping allowance in 30 minutes. The filter is operating at 16.09 GPM/SF, which is above the midpoint of its operating range (11 – 20 GPM, the lower the number, the more efficient the filter and the greater the capacity of the filter as related to filtration flow).

Given the location and proximity to landscaping a more conservative 11 GPM/SF would have been appropriate. Comparing the design to the MAHC requirements generates a 201 GPM filtration rate, at 11 GPM/SF the required filter area would be 18.3 SQFT, or four of the filters currently installed.

The UV system (Delta EP 20) is undersized with a 70 GPM maximum flow rate, which is below the design flow rate of 79 GPM. UV dosage effectiveness is based upon power and time, the installed system is not meeting the manufactures minimum dosing requirements, rendering the UV system essentially useless.

Recommendations: At a Minimum, the addition of a second filter of equal filter area to the existing is recommended. If other recommendations are implemented, (Specifically pipe replacement) Increasing the filtration to the MAHC standard is advisable along with the addition of two S360T2 filters, with 7.06 SQFT of filter area each. An alternative solution, worth considering in conjunction with #10 and #11 previous, would be to replace the existing filtration system with a combination reservoir/vacuum sand system. An engineering analysis of the cost of this system to a “parts” replacement method is recommended to evaluate the costs and benefits. Replacing the UV with a properly sized unit is also recommended.

14. **The auto-fill for the water feature is difficult to monitor and repair.** The water features auto fill consists of an 18” rod and float valve located in the reservoir tank (Photo 28). The MDEQ code requirement (R325.2126(b)) for a backflow device is provided in the mechanical room with a backflow preventer.

Comments: The only contract references to the auto-fill are found in the specifications (131500-2.3 C.7), which references a “mechanical water fill system w/quick fill valve “under part FWR-12732, 2000 reservoir system. In order to repair this valve, or utilize the “quick fill” valve, staff must enter the tank through the hatch and ladder, requiring staff to follow OSHA confined space procedures. There is no way to monitor the tank level without opening the tank. See also issue #10 above.

Recommendations: During design, a simple solution would have been to route two PVC lines to the mechanical room (1 for fill, one stilling) and placed the auto fill with an air gap in this room. This would have eliminated the need for a backflow preventer (and its yearly maintenance) and confined space entry. It is

WTI's recommendation that the auto-fill be re-located, specifically in conjunction with #'s 10, 11 mentioned previously.

- 15. The Water Feature's storm water evacuation is limited to 38 gpm.** Water features require a method to remove excess water which they collect, typically from rain events. The design documentation originally planned for this by providing a 4" pipe connecting the reservoir tank to the sanitary sewer. In addition to being a code violation (MDEQ R 325.2126), this cross connection led to a backflow / contamination incident. The corrective action was to add an additional set of float controls to the sump pump (Photo 29) in the reservoir tank, which ejects water to a sump in the mechanical building. Staff reported the capacity of this pump as 38 gpm.

Comments: The pump's capacity of 38 gpm represents the equivalent of .025" of rain per minute over the feature's area. Staff expressed concern that the pump's float valve may be at the autofill set point, resulting in conflict between the autofill and the sump pump. It is also noted that this has been allowed by MDEQ as a temporary solution, because the pump discharges into the sanitary sewer.

Recommendations: The sump pump capacity is adequate for the water feature area itself, for the average rain events expected in Traverse City. As noted in issue #1 above, the feature's present drainage area is much greater than the feature itself, reducing the sump pump's adequacy. The pump's effectiveness is also limited in that it requires power to operate, it may be unavailable in a storm. City staff has investigated a "drywell" option, consisting of two 1200 gallon tanks, and approximately 3200 cubic feet of infiltration rock. This system will perform well, as long as the required backflow prevention is addressed.

- 16. Chemical treatment reservoirs are difficult to monitor and fill, require service 3 times per week.** The water feature is treated with two chemicals; liquid chlorine as a sanitizer and muriatic acid as Ph balance. The chemicals are each kept in an in- ground vat located outside and to the west of the mechanical building (Photo 30). The chemical vats are listed in the specifications as PWA-30, and PWC 30, Dual application in ground or free-standing chemical storage tank and states that it shall meet "double wall" requirements. The chemical treatment reservoirs come complete with metering pumps and a lockable hasp.

Comments: Staff expressed concern with access to the chemical tanks, both from a service standpoint and that they are exposed to park patrons. Located in a landscape area, the surrounding plantings render access to the units difficult (Photos 31 & 32). The units are accessed 3 times weekly to check chemical

levels and to fill. It can be anticipated that access will only get more constrained as the plants grow.

Recommendations: Re-Locate chemical reservoirs to inside the mechanical room. Construct two chemical closets to house the units, vented separately to exterior. This will allow City staff to easily monitor the usage. If demand warrants, this will allow the City to easily upsize chemical capacity to a two week supply. A two week supply is WTI's design standard.

17. Pump skids are not grounded.

Comments: It was noted during the site observation that the pump skids have grounding lugs, which do have grounding wires attached.

Recommendations: Test pump skids for grounding, if needed, provide grounding.

18. The water feature requires on site staff during all operational hours. Staff reported that in order to keep the feature operational, personnel are required on site to backwash, clean strainers and monitor systems.

Comments: There is no national metric for water feature operational staffing that Water Technology is aware of. Staff reported that a person is required on-site to operate the feature during all open hours of operations. WTI is unaware of any other spraypad with this type of operational burden.

Recommendations: Operational improvements will be dependent on selection and implementation of many of the recommendations contained in this report. Specifically, addressing items 1,9,10,13, 14 16 and 16 will provide the most operational benefit.

Referenced Photographs

Clinch Park

Traverse City, MI

Final Report 7-31-14



Photo 01

WILLIAM G. MILLIKEN WATERSCAPE

As Traverse City's beloved native son and Michigan's longest serving Governor, William G. Milliken enacted some of Michigan's most historic and ground-breaking environmental protection laws. Under his leadership, the natural beauty and cherished resources of Michigan became central priorities in the state's public policy.

During his term as Governor, Milliken banned harmful chemicals such as DDT to protect Michigan's wildlife. He helped restore the quality of Michigan's water resources by passing laws limiting the use of phosphorus in detergents. Ahead of his time, he also required the recycling of beverage containers to help preserve the natural beauty and allure of Michigan for future generations.

Governor Milliken's environmental stewardship was heavily influenced by the scenic beauty of Northern Michigan's Traverse City area.

The William G. Milliken Waterscape celebrates the legacy of the former governor and his commitment to Michigan's beauty and treasured natural resources. It is dedicated to engaging, educating and inspiring the next generation of environmental stewards.

The DTE Energy Foundation is the proud underwriter of the William G. Milliken Waterscape and offers this interactive water feature to the City of Traverse City, the place that shaped the values and fed the spirit of Michigan's first environmental steward.



"The quality of **human life in Michigan depends on nature.** The natural beauty of our state is much more than a source of pleasure and recreation. **It shapes our values, molds our attitudes, and feeds our spirit.** Unless we move without delay to halt the deterioration of our land, our water and our air, **our own children may see the last traces of earth's beauty crushed beneath the weight of man's waste and ruin.**" William G. Milliken, Governor of Michigan (1961-1962)

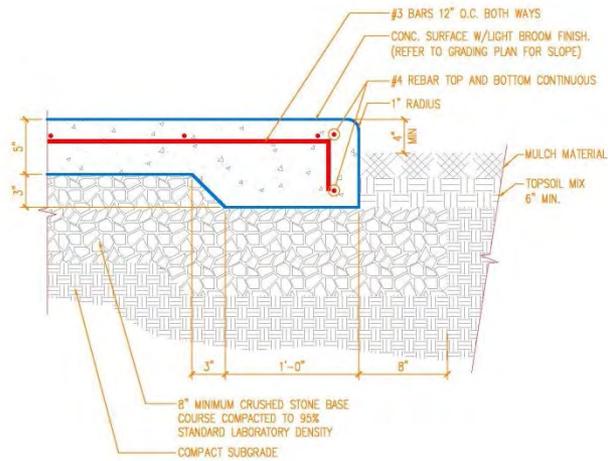
Photo 02



Photo 03



Photo 04



DECK AT LANDSCAPE DETAIL



Photo 05



Photo 06



Photo 07



Photo 08



Photo 09



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14



Photo 15



Photo 16



Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24



Photo 25



Photo 26



Photo 27



Photo 28



Photo 29



Photo 30



Photo 31



Photo 32

Issues Matrix



Wisconsin

100 Park Avenue
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Ph: 1.920.887.7375
Fx: 1.920.887.7999

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Fx: 1.972.919.6120

www.wtiworld.com

Traverse City Clinch Park Evaluation

7/30/2014

Issue	Potential Cost range		Comments
	Low	High	
1 The Water Feature area and pad floods in moderate to heavy rains:			
a Lower landscape areas	3000	8000	
b Develop berms	5000	8000	
c Install trench drains	12000	15000	
d Develop drainage barrier area	15000	25000	
2 Concrete curbs were added to select locations to contain and direct the water flow, in lieu of the domed finish surface described in 1/C8.4:			
a Cut & grind existing curbs	2800	4000	
b Replace existing curbs	3500	8000	
3 The domed surface is slippery when wet.			
a Acid etch domed surface	1200	4500	
4 The "Arched Rain Bar" feature does not work properly.			
a Continue plugging select holes with plastic plugs	0	500	Does not include tank
b Add second water supply	6500	11500	
c Add new holes along level plane	7500	20000	
d Add nozzles	12000	15000	
5 The "Arch Rain Bar Feature" is climbable.			
a Add warning signage	500	1500	
b Paint the ARB	2500	8000	
c Replace lettering with flush lettering	2500	5000	
d Protect low clearance areas	1500	5000	
e Replace ARB	20000	65000	
6 The LED light on the ARB are inappropriate for an interactive water feature, and are operationally difficult to winterize.			
a Investigation; plastic & temperature	200	500	
b Install waterproof plugs	1200	3500	
c Relight feature	6500	10000	
d Abandon lighting	0	2500	
7 The perimeter stream trough does not flow properly, has areas that pond water, and traps debris.			
a Replace gutter material & correct areas	15000	40000	
b Fill gutter material	4500	9500	
c Add water flow	8500	12000	
d Grout rock bed	2000	3500	
8 Concrete around the spray ring is cracking and deteriorating.			
a Remove & replace concrete around rings	15500	22500	
b Refurbish spray rings	6000	12000	
c Add safety surfacing	12000	35000	
9 Plant clippings, mulch, sand and other debris clog the system, requiring frequent cleanings by staff.			
a Add signage	500	2500	
b Adjust Landscaping	2500	8000	
c Add shower control	6500	10000	
d Add deck area	15000	30000	
e Add spare strainer basket	0	2500	
f Add second strainer	4500	8500	
g Add prescreen settlement tank	30000	50000	
10 Spray ring nozzles clog frequently.			
a Add filter on activity loop	15000	22000	
11 The water feature uses excessive amounts of water.			
a Replace reservoir tank	7000	15000	
b Replace reservoir tank with separator feature	30000	50000	
12 Installed piping is not code compliant.			
a Investigate and correct piping	4000	50000	
13 The filtration seems undersized, requiring backwash of system every ½ hour on busy days.			
a Add filtration to existing	6000	25000	
b Add filtration to activity loop	6000	25000	
c Replace filtration with vac-sand system	35000	65000	
14 The auto-fill for the water feature is difficult to monitor and repair.			
a Re-locate auto fill to mechanical room	2000	4500	
15 The Water Features storm water evacuation is limited to 38 gpm.			
a Add drywell	10000	15000	
16 Chemical treatment reservoirs are difficult to monitor and fill, require service 3 times per week.			
a Relocate chemical tanks	1500	3500	
b Provide larger capacity chemical tanks	2000	4000	
17 Pump skids are not grounded.			
a Test grounding and bonding	500	1500	
b Grounding and bonding if required	1500	3500	
18 The water feature requires on site staff during all operational hours.			

Note: The above cost projections are preliminary. Costs are presented in isolation, and have not been evaluated for concurrence impact, and are not necessarily cumulative.

Drawings

THE CITY OF TRAVERSE CITY BAYFRONT PLAN: CLINCH PARK PHASE 1 TRAVERSE CITY, MI

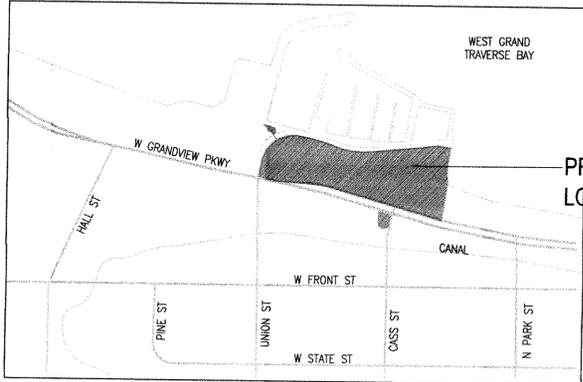
BIDS 6.28.12

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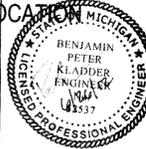
hamiltonanderson

architecture landscape architecture
urban planning civil engineering
interior design graphic design

LOCATION MAP



PROJECT
LOCATION



DESIGN TEAM

OWNER

CITY OF TRAVERSE CITY
400 BOARDMAN AVE
TRAVERSE CITY, MI 49684

CIVIL ENGINEER

FLEIS & VANDENBRINK ENGINEERING
3491 HARTMAN ROAD
SUITE B
TRAVERSE CITY, MI 49685
P 231 932 8600

GEO TECHNICAL ENGINEER

SOILS & STRUCTURES INC.
3914 JUPITER CRESCENT DRIVE
TRAVERSE CITY, MI 49685
P 800 933 3959

**ARCHITECT
LANDSCAPE ARCHITECT**

HAMILTON ANDERSON ASSOCIATES
1435 RANDOLPH
SUITE 200
DETROIT, MI 48226
P 313 964 0270
F 313 964 0170
www.hamilton-anderson.com

MEP ENGINEER

NEALIS ENGINEERING
830 COTTAGEVIEW DRIVE
SUITE 102
TRAVERSE CITY, MI 49684
P 231 933 0510

STRUCTURAL ENGINEER

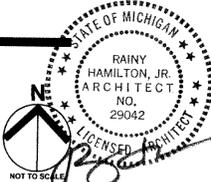
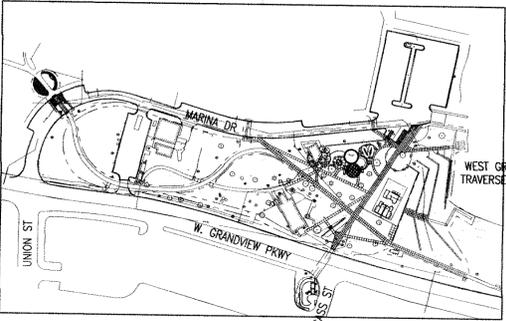
SDI STRUCTURES
275 EAST LIBERTY
ANN ARBOR, MI 48104
P 734 213 6091

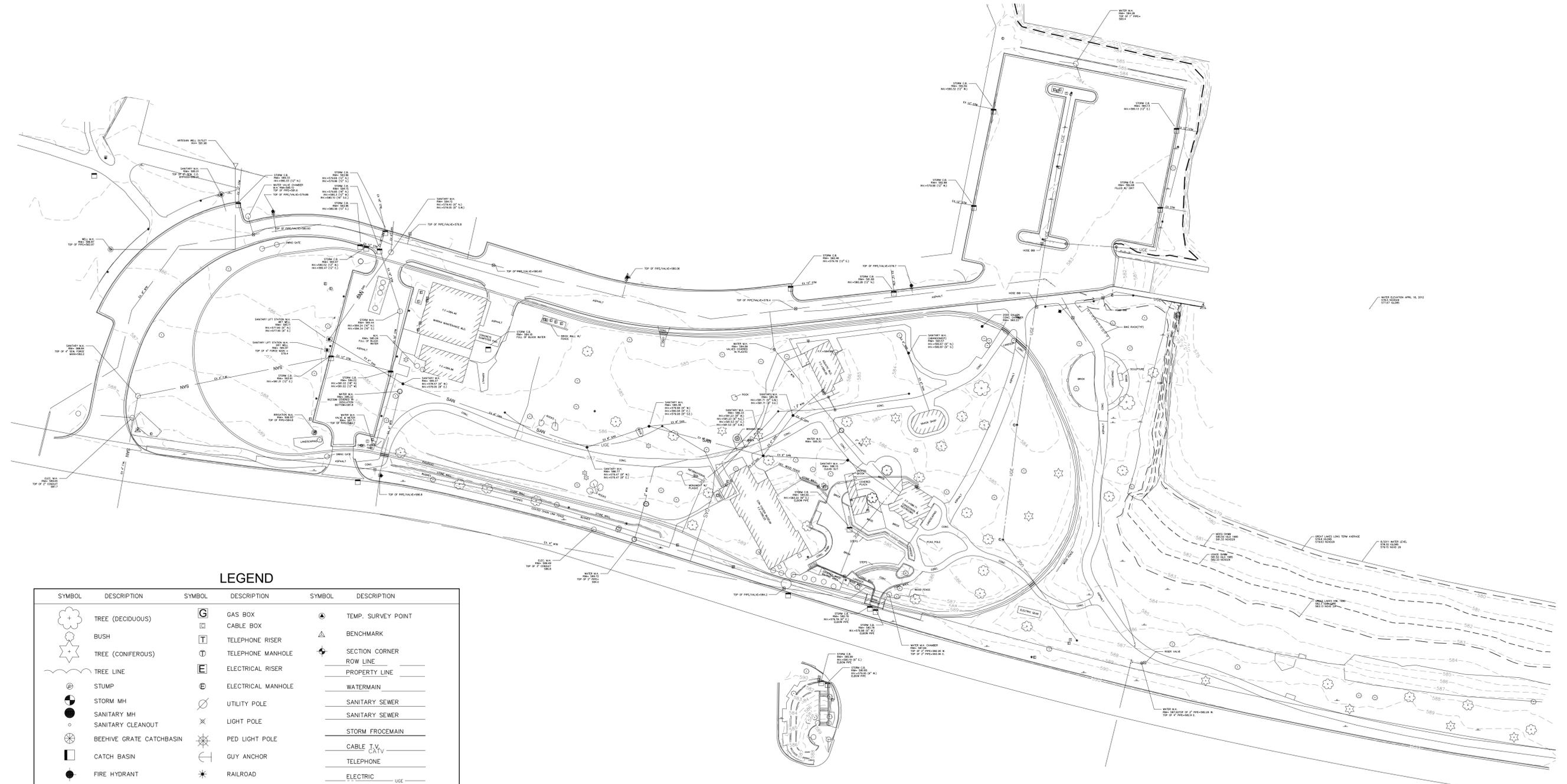
BIDS 6/28/12

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SITE MAP





LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	TREE (DECIDUOUS)		GAS BOX		TEMP. SURVEY POINT
	BUSH		CABLE BOX		BENCHMARK
	TREE (CONIFEROUS)		TELEPHONE RISER		SECTION CORNER
	TREE LINE		TELEPHONE MANHOLE		ROW LINE
	STUMP		ELECTRICAL RISER		PROPERTY LINE
	STORM MH		ELECTRICAL MANHOLE		WATERMAIN
	SANITARY MH		UTILITY POLE		SANITARY SEWER
	SANITARY CLEANOUT		LIGHT POLE		SANITARY SEWER
	BEEHIVE GRATE CATCHBASIN		PED LIGHT POLE		STORM FROCEMAIN
	CATCH BASIN		GUY ANCHOR		CABLE T.V. CATV
	FIRE HYDRANT		RAILROAD		TELEPHONE
	WATER VALVE		YARD LIGHT		ELECTRIC
	CURB STOP & BOX		SIGN		GAS
	WELL		MAILBOX		OVERHEAD LINES
	WATER MANHOLE		GUARD POST		FENCE
	WATER METER		FOUND CONC. MONUMENT		WOODLINE
	SOIL BORING		FOUND IRON ROD		CULVERT (UNDER 10')
	MONITORING WELL		SET IRON ROD		CULVERT (10' AND UP)

NOTE: ALL ITEMS LISTED ON THE LEGEND MAY NOT BE PRESENT ON DRAWING.

NO.	REVISIONS	DATE

CITY OF TRAVERSE CITY
 CLUNCH PARK DEVELOPMENT 2012
 TRAVERSE CITY, GRAND TRAVERSE COUNTY, MICHIGAN
TOPOGRAPHIC SURVEY

PROJECT MGR.	DATE
M.R.G.	FEB., '12
DRAWN BY	DATE
S.A.D.	FEB., '12
ENGINEER	DATE
M.R.G.	FEB., '12
CAD FILE	809580 Topo 2012
EDIT	bank 050412
SCALE	1=1
DRAWING	

- CIVIL ENGINEER Consultant FLEIS & VANDENBRINK ENGINEERING 3491 HARTMAN ROAD, SUITE B TRAVERSE CITY, MI 49685 P 231 932 8600
- MEP ENGINEER Consultant NEALS ENGINEERING 830 COTTAGEVIEW DRIVE, SUITE 102 TRAVERSE CITY, MI 49684 P 231 933 0510
- GEO TECHNICAL ENGINEER Consultant SOILS & STRUCTURES INC. 3914 JUPITER CRESCENT DRIVE TRAVERSE CITY, MI 49685 P 800 933 3959
- STRUCTURAL ENGINEER Consultant SDI STRUCTURES 275 EAST LIBERTY ANN ARBOR, MI 48104 P 734 213 6091

Client
**CITY OF TRAVERSE CITY
400 BOARDMAN AVE
TRAVERSE CITY, MI
49684**

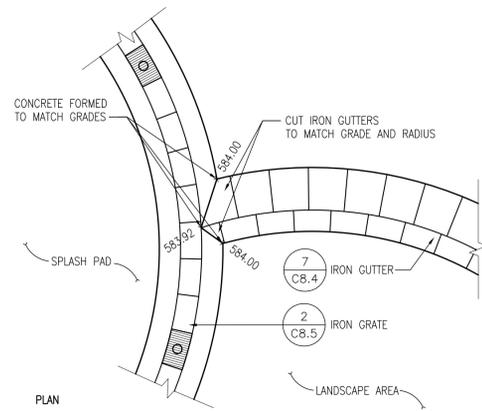
Registration Seal

Project
**THE CITY OF TRAVERSE CITY
BAYFRONT PLAN:
CLINCH PARK PHASE 1**
Drawing Title
SITE DETAILS

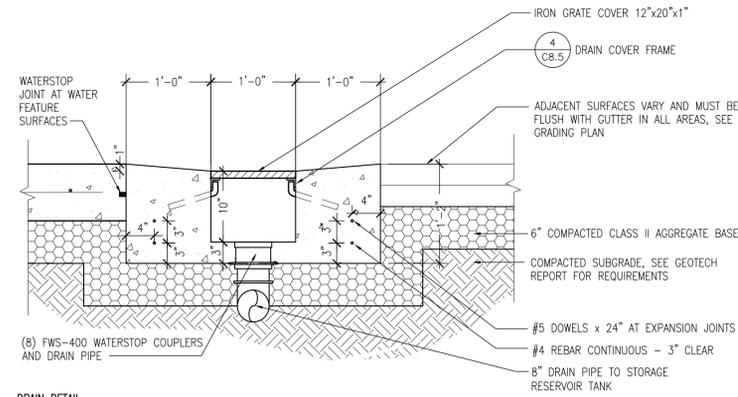
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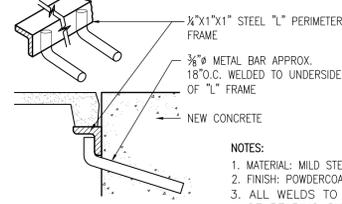
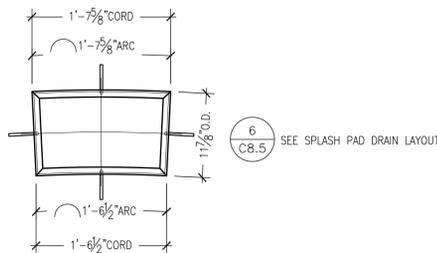
PLAN
5 GUTTER INTERSECTION 'B'
SCALE: 1/4"=1'-0"



DRAIN DETAIL

- NOTE:
- 1) EXPANSION JOINTS AT 40'
 - 2) CONTROL JOINTS AT 10'
 - 3) INSTALL GUTTERS PRIOR TO AND PROTECT SPLASH PAD INSTALLATION
 - 4) DRAINS TO BE SEALED WATER TIGHT
 - 5) GUTTERS ARE TO BE STAINED PER SPECIFICATIONS

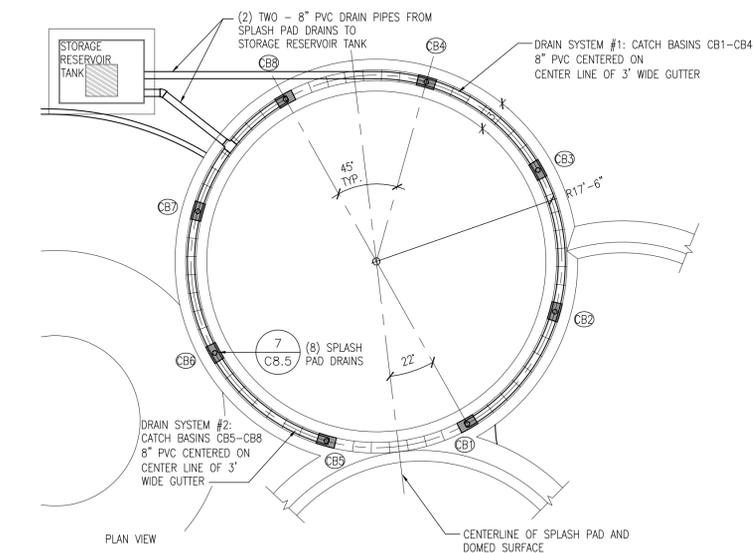
- NOTE:
- EXISTING ON SITE MATERIAL CAN BE LEFT IN PLACE OR USED FOR COMPACTED CLASS II AGGREGATE IF IT MEETS MDOT CLASS II SPECIFICATIONS. SEE GEOTECH REPORT.



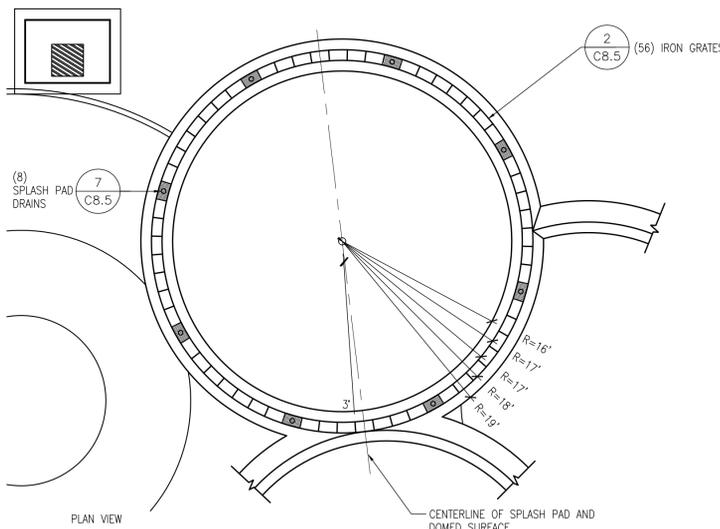
- NOTES:
1. MATERIAL: MILD STEEL OR OPTIONAL STAINLESS STEEL
 2. FINISH: POWDERCOAT
 3. ALL WELDS TO BE KEPT OUTSIDE OF BEARING SURFACES OR GROUND SMOOTH

PLAN
4 DRAIN COVER FRAME
1"=1'-0"

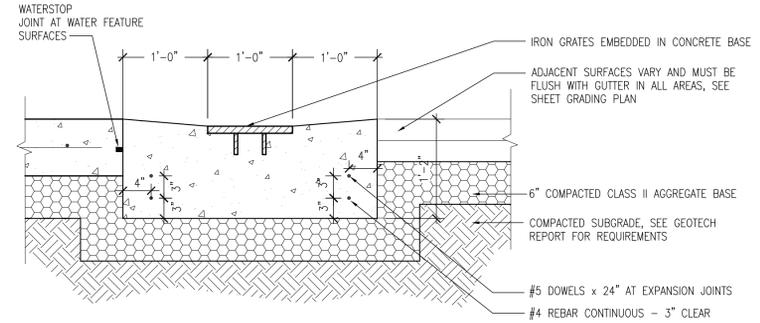
PLAN
7 SPLASH PAD DRAIN
1"=1'-0"



PLAN
6 SPLASH PAD DRAIN LAYOUT
1/8"=1'-0"



PLAN
3 SPLASH PAD IRON DRAIN GRATE LAYOUT
1/8"=1'-0"



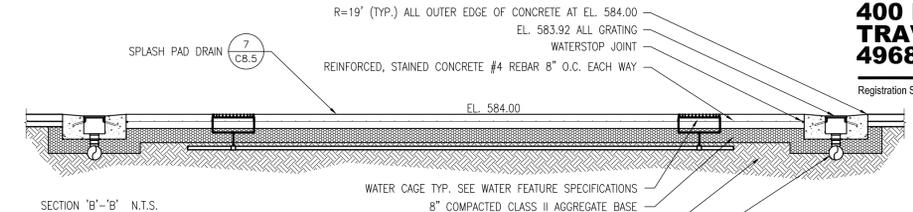
NOTE:

- 1) EXPANSION JOINTS AT 40'
- 2) CONTROL JOINTS AT 10'
- 3) INSTALL GUTTERS PRIOR TO AND PROTECT SPLASH PAD INSTALLATION
- 4) DRAINS TO BE SEALED WATER TIGHT WITH APPROVED MATERIAL
- 5) GUTTERS ARE TO BE STAINED PER SPECIFICATIONS

NOTE:

- EXISTING ON SITE MATERIAL CAN BE LEFT IN PLACE OR USED FOR COMPACTED CLASS II AGGREGATE IF IT MEETS MDOT CLASS II SPECIFICATIONS. SEE GEOTECH REPORT.

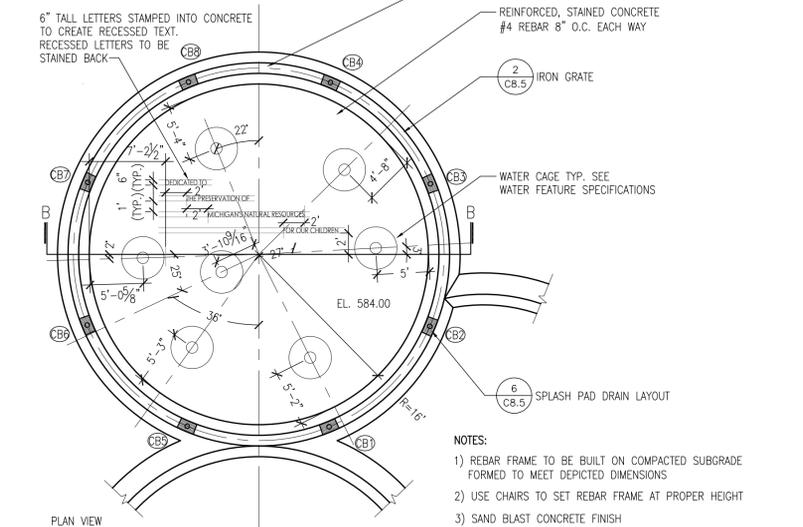
PLAN
2 IRON GRATE
1"=1'-0"



SECTION 'B'-'B' N.T.S.

NOTE:

- EXISTING ON SITE MATERIAL CAN BE LEFT IN PLACE OR USED FOR COMPACTED CLASS II AGGREGATE IF IT MEETS MDOT CLASS II SPECIFICATIONS. SEE GEOTECH REPORT.



PLAN
1 SPLASH PAD
1/8"=1'-0"

NOTES:

- 1) REBAR FRAME TO BE BUILT ON COMPACTED SUBGRADE FORMED TO MEET DEPICTED DIMENSIONS
- 2) USE CHAIRS TO SET REBAR FRAME AT PROPER HEIGHT
- 3) SAND BLAST CONCRETE FINISH
- 4) STAIN CONCRETE SPLASH PAD AND GUTTER PER SPECIFICATIONS
- 5) ADJACENT SURFACES VARY; ALL SURFACES MUST MATCH GRADE AT OUTER EDGE OF VALLEY GUTTER
- 6) CATCH BASINS #1-#4 ARE TIED TOGETHER BY 8" PVC AND CATCH BASINS #5-#8 TIED TOGETHER BY 8" PVC. SEPARATE SYSTEMS DRAIN TO STORAGE RESERVOIR SEE WATER FEATURE SPECIFICATION

MDEQ Code



PUBLIC SWIMMING POOLS

**Public Act and Rules Governing
Public Swimming Pools**

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PUBLIC SWIMMING POOLS

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PUBLIC HEALTH CODE (EXCERPT)
Act 368 of 1978

AN ACT to protect and promote the public health; to codify, revise, consolidate, classify, and add to the laws relating to public health; to provide for the prevention and control of diseases and disabilities; to provide for the classification, administration, regulation, financing, and maintenance of personal, environmental, and other health services and activities; to create or continue, and prescribe the powers and duties of, departments, boards, commissions, councils, committees, task forces, and other agencies; to prescribe the powers and duties of governmental entities and officials; to regulate occupations, facilities, and agencies affecting the public health; to regulate health maintenance organizations and certain third party administrators and insurers; to provide for the imposition of a regulatory fee; to provide for the levy of taxes against certain health facilities or agencies; to promote the efficient and economical delivery of health care services, to provide for the appropriate utilization of health care facilities and services, and to provide for the closure of hospitals or consolidation of hospitals or services; to provide for the collection and use of data and information; to provide for the transfer of property; to provide certain immunity from liability; to regulate and prohibit the sale and offering for sale of drug paraphernalia under certain circumstances; to provide for the implementation of federal law; to provide for penalties and remedies; to provide for sanctions for violations of this act and local ordinances; to provide for an appropriation and supplements; to repeal certain acts and parts of acts; to repeal certain parts of this act; and to repeal certain parts of this act on specific dates.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;--Am. 1985, Act 198, Eff. Mar. 31, 1986 ;--Am. 1988, Act 60, Eff. Aug. 1, 1989 ;--Am. 1988, Act 139, Imd. Eff. June 3, 1988 ;--Am. 1993, Act 361, Eff. Sept. 1, 1994 ;--Am. 1994, Act 170, Imd. Eff. June 17, 1994 ;--Am. 1998, Act 332, Imd. Eff. Aug. 10, 1998 ;--Am. 2002, Act 303, Imd. Eff. May 10, 2002 ;--Am. 2003, Act 234, Imd. Eff. Dec. 29, 2003;--Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004

The People of the State of Michigan enact:

ARTICLE 12. ENVIRONMENTAL HEALTH
PART 125. SWIMMING POOLS (EXCERPTS)

333.12521 Definitions used in §§ 333.12521 to 333.12524.

Sec. 12521. As used in sections 12521 to 12534:

- (a) "Department" means the department of environmental quality.
- (b) "Local health department" means that term as defined under section 1105.
- (c) "Person" means a person as defined in section 1106 or a governmental entity.
- (d) "Public swimming pool" means an artificial body of water used collectively by a number of individuals primarily for the purpose of swimming, wading, recreation, or instruction and includes related equipment, structures, areas, and enclosures intended for the use of individuals using or operating the swimming pool such as equipment, dressing, locker, shower, and toilet rooms. Public swimming pools include those which are for parks, schools, motels, camps, resorts, apartments, clubs, hotels, mobile home parks, subdivisions, waterparks, and the like. A pool or portable pool located on the same premises with a 1-, 2-, 3-, or 4-family dwelling and for the benefit of the occupants and their guests, a natural bathing area such as a stream, lake, river, or man-made lake or pond that uses water from natural sources and has an inflow and outflow of natural water, an exhibitor's swimming pool built as a model at the site of the seller and in which swimming by the public is not permitted, or a pool serving not more than 4 hotel, motel, apartment, condominium, or similar units is not a public swimming pool.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;-- Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004

Compiler's Note: For transfer of powers and duties of the division of environmental health, with the exception of the food service sanitation program and the shelter environment program, from the director of the department of public health to the director of the department of environmental quality, see E.R.O. No. 1996-1, compiled at § 330.3101 of the Michigan Compiled Laws.

333.12522 Public swimming pool; review of design, construction, and operation; rules.

Sec. 12522. (1) The department shall review the design, construction, and operation of public swimming pools to protect the public health, prevent the spread of disease, and prevent accidents or premature deaths.

(2) The department shall promulgate rules to carry out sections 12521 to 12534.

History: 1978, Act 368, Eff. Sept. 30, 1978

Administrative Rules: R 325.2111 et seq. of the Michigan Administrative Code.

333.12523 Construction and operation of public swimming pools; supervisory and visitorial power; control.

Sec. 12523. The department has supervisory and visitorial power and control as limited in sections 12521 to 12534 over persons engaged in the construction and operation of public swimming pools.

History: 1978, Act 368, Eff. Sept. 30, 1978

333.12524 Public swimming pools; periodic inspections; right of entry.

Sec. 12524. (1) The department, its agents or representatives, or representatives of a designated local health department shall make periodic inspections of public swimming pools.

(2) The department, its agents or representatives, or representatives of a designated local health department may enter

upon the swimming pool premises and other property of a person at all reasonable times for the purpose of inspecting the swimming pool and carrying out the authority vested in the department under sections 12521 to 12534.

History: 1978, Act 368, Eff. Sept. 30, 1978

333.12525 Construction or modification of public swimming pool; review and approval of plans and specifications; fee; permit; responsibility of applicant or owner; nuisance or hazard to health or safety; description of swimming pool system and auxiliary structures.

Sec. 12525. (1) A person intending to construct a public swimming pool or intending to modify an existing public swimming pool shall submit plans and specifications for the proposed installation accompanied by a fee specified in section 12527a to the department for review and approval and shall secure a permit for the construction. A person shall not start or engage in the construction of a public swimming pool or modify an existing public swimming pool until the permit for the construction is issued by the department.

(2) Sections 12521 to 12534 or an action of the department shall not relieve the applicant or owner of a public swimming pool from responsibility for securing a building permit or complying with applicable local codes, regulations, or ordinances not in conflict with sections 12521 to 12534. Compliance with an approved plan does not authorize the owner constructing or operating a public swimming pool to create or maintain a nuisance or a hazard to health or safety.

(3) Plans and specifications submitted for the purpose of obtaining a construction permit shall include a true description of the entire swimming pool system and auxiliary structures or parts thereof as proposed to be constructed and operated.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;-- Am. 1980, Act 522, Imd. Eff. Jan. 26, 1981 .

333.12526 Examination of plans and specifications; determination; issuance of permit; notice of deficiencies; resubmission of documents; duration of permit; written approval of change.

Sec. 12526. (1) The department shall examine the plans and specifications and determine whether the swimming pool facilities, if constructed in accordance therewith, are or would be sufficient and adequate to protect the public health and safety. If the plans and specifications are approved, the department shall issue a permit for construction. If the plans and specifications are not approved, the department shall notify the applicant or the applicant's representative of the deficiencies. The applicant may have the plans and specifications amended to remedy the deficiencies and resubmit the documents, without additional fee, for further consideration.

(2) A construction permit shall be valid for not more than 2 years after the date of issuance unless a written time extension is granted by the department.

(3) Each public swimming pool shall be constructed or modified in accordance with the approved plans and specifications unless written approval of a change is granted by the department.

History: 1978, Act 368, Eff. Sept. 30, 1978

333.12527 Public swimming pool; license required; fee; display; expiration; renewal; replacement.

Sec. 12527. (1) A public swimming pool shall not be operated without a license.

(2) A person engaged in the operation of a public swimming pool shall obtain a license to operate the swimming pool from the department, its agent or representative, or a representative of a designated local health department and shall pay an initial or renewal fee as specified in section 12527a.

(3) A license shall be displayed by the owner in a conspicuous place on the premises.

(4) A license shall expire December 31 of every third year if the annual renewal fee is paid or as stipulated on the license, whichever is sooner.

(5) A license shall be renewed upon receipt of a proper application, an annual renewal fee as specified in section 12527a, and evidence that the public swimming pool is being operated and maintained in accordance with sections 12521 to 12534 and the applicable rules and regulations.

(6) A license shall not be transferred to another person but it may be replaced by another license upon receipt of a proper application and the fee specified in section 12527a.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;-- Am. 1980, Act 522, Imd. Eff. Jan. 26, 1981 ;-- Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004

333.12527a Fees.

Sec. 12527a. (1) The fees related to swimming pool regulation under this part are as follows:

(a) Construction permit fee for a swimming pool with a surface area as follows:

(i) 500 square feet or less	\$550.00
(ii) 501 to 1,500 square feet	\$700.00
(iii) 1,501 to 2,400 square feet	\$800.00
(iv) 2,401 to 4,000 square feet	\$1,300.00
(v) More than 4,000 square feet	\$1,800.00
(b) Construction permit fee for modification of an existing swimming pool	\$275.00

(c) Initial license fee for a swimming pool with a surface area as follows:

(i) 500 square feet or less	\$550.00
(ii) 501 to 1,000 square feet	\$600.00
(iii) 1,001 to 1,500 square feet	\$625.00

(iv) 1,501 to 2,000 square feet	\$650.00
(v) 2,001 to 2,500 square feet	\$700.00
(vi) 2,501 to 3,500 square feet	\$800.00
(vii) 3,501 to 4,500 square feet	\$900.00
(viii) More than 4,500 square feet	\$1,000.00
(d) Initial license fee for a modified swimming pool	\$275.00
(e) Annual renewal license fee, to December 31	\$55.00
(f) Late annual renewal license fee, after December 31 through April 30	\$100.00
(g) Lapsed annual renewal license fee, after April 30	\$150.00
(h) Replacement license fee for transfer to another person	\$50.00

(2) The department may adjust the amounts prescribed in subsection (1) every 3 years by an amount determined by the state treasurer to reflect the cumulative annual percentage change in the Detroit consumer price index and rounded to the nearest dollar.

(3) A person that has a valid, current permit to operate a public swimming pool on the effective date of the amendatory act that added this subsection is not required to pay an initial license fee as specified in this section.

History: Add. 1980, Act 522, Imd. Eff. Jan. 26, 1981 ;-- Am. 1985, Act 19, Eff. Mar. 31, 1986 ;-- Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004

333.12527b Public swimming pool fund; creation; remaining balance; expenditures; use; annual report.

Sec. 12527b. (1) The public swimming pool fund is created in the state treasury and shall be administered by the department. The state treasurer shall credit to the public swimming pool fund all fees collected by the department under section 12527a and all money, gifts, and devises received by the fund as otherwise provided by law.

(2) The unencumbered balance remaining in the fund at the close of the fiscal year shall remain in the fund and shall not revert to the general fund.

(3) The money in the public swimming pool fund shall be expended only as provided in this section. The department shall use the fund to implement this part and to carry out its powers and duties under sections 12521 to 12534. The department shall not use the money in the public swimming pool fund for inspections of any mobile home parks licensed under the mobile home commission act, 1987 PA 96, MCL 125.2301 to 125.2349.

(4) The department shall annually prepare a report containing an accounting of revenues and expenditures from the public swimming pool fund. This report shall include details of the departmental costs and activities of the previous year in administering this public swimming pool program. This report shall be provided to the senate and house of representatives appropriations committees, the standing committees of the senate and house of representatives with jurisdiction over issues pertaining to natural resources and the environment, and the senate and house of representatives fiscal agencies.

History: Add. 2004, Act 408, Imd. Eff. Nov. 29, 2004

333.12528 Denial of license; grounds; notice; failure to correct deficiencies or noncomplying items.

Sec. 12528. If upon investigation, the department, its agent or representative, or a representative of a designated local health department finds that a public swimming pool was not constructed or modified in accordance with the approved plans and specifications, the department, its agent or representative, or a representative of a designated local health department shall give written notice to the applicant that the license will not be issued, citing the deficiencies or noncomplying items that constitute the reasons for not issuing the license and a date by which the licensee shall comply. An applicant who fails to correct the deficiencies or noncomplying items within the time specified shall be denied a license.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;-- Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004

333.12529 Revocation of license; grounds; reissuance.

Sec. 12529. The department may, in accordance with the administrative procedures act of 1969, revoke the license upon a finding that the pool is not being operated or maintained in accordance with sections 12521 to 12534 or the rules. A person aggrieved by a decision of the department or its authorized representative to revoke the license may appeal to a court of competent jurisdiction as provided by the administrative procedures act of 1969. A license that has been revoked shall be reissued only when the department determines the deficiencies are corrected.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;--Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004 .

333.12530 Periodic reports covering operation of public swimming pools.

Sec. 12530. The department shall provide for a system of periodic reports covering the operation of the public swimming pool so that the department may readily determine compliance with sections 12521 to 12534 and the rules.

History: 1978, Act 368, Eff. Sept. 30, 1978

333.12531 Ordering owner or operator to prohibit use of swimming pool.

Sec. 12531. If the department, its agent or representative, or a representative of a designated local health department considers that conditions warrant prompt closing of a swimming pool until sections 12521 to 12534 and the rules are complied with for the protection of the public health and safety, the department or designated local health department may order the owner or operator of the swimming pool to prohibit an individual from using it until corrections are made to protect adequately the public health and safety.

History: 1978, Act 368, Eff. Sept. 30, 1978

333.12531a Use of life jacket in public swimming pool.

Sec. 12531a. A person shall not prohibit the use of a coast guard approved life jacket in a public swimming pool by an individual who has in his or her possession a statement signed by a licensed physician stating that the individual has a physical disability or condition that necessitates the use of a life jacket. An individual assumes the risk of any injury to himself or herself caused by the use of a life jacket as provided in this section which is not otherwise caused by the pool operator's negligence.

History: Add. 1989, Act 153, Imd. Eff. July 19, 1989

333.12532 Payments to local health departments; additional fees.

Sec. 12532. (1) The department may approve payments for each public swimming pool granted an initial license and each renewal license to a designated local health department when the fees are collected by the state from the designated local health department's respective area, as follows:

(a) Initial license fee for a swimming pool	\$100.00
(b) Annual renewal license fee	\$30.00
(c) Late annual renewal license fee	\$45.00
(d) Lapsed annual renewal license fee	\$70.00

(2) The state treasurer shall make the payments upon receipt of approval from the department.

(3) A designated local health department may collect additional fees as provided under section 2444 from the owner of a swimming pool for services provided under sections 12521 to 12534.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;-- Am. 1980, Act 522, Imd. Eff. Jan. 26, 1981 ;-- Am. 1985, Act 19, Eff. Mar. 31, 1986 ;-- Am. 2004, Act 408, Imd. Eff. Nov. 29, 2004

333.12533 Violation as misdemeanor; each day of violation as separate violation; prosecution.

Sec. 12533. A person who violates sections 12521 to 12531a or a rule promulgated under those sections is guilty of a misdemeanor. Each day upon which a violation occurs is a separate violation. The attorney general or local prosecuting attorney shall be responsible for prosecuting a person who violates sections 12521 to 12531a.

History: 1978, Act 368, Eff. Sept. 30, 1978 ;-- Am. 1989, Act 153, Imd. Eff. July 19, 1989

Administrative Rules: R 325.2111 et seq. of the Michigan Administrative Code.

333.12534 Action for injunction or other process.

Sec. 12534. Notwithstanding the existence and pursuit of any other remedy, the department, its agent or representative, or a representative of a designated local health department may maintain an action in the name of the state for injunction or other process against a person to restrain or prevent the construction or modification of a public swimming pool without a construction permit, or the operation of a public swimming pool without an operation permit, or in a manner contrary to law.

History: 1978, Act 368, Eff. Sept. 30, 1978

DEPARTMENT OF ENVIRONMENTAL QUALITY

DRINKING WATER AND RADIOLOGICAL PROTECTION DIVISION

PUBLIC SWIMMING POOLS

(By authority conferred on the department of environmental quality by sections 2226, 2233, and 12522 of 1978 PA 368, MCL 333.2226, 333.2233, and 333.12522)

PART 1. GENERAL PROVISIONS

R 325.2111 Definitions.

Rule 1. As used in these rules:

- (a) "Code" means 1978 PA 368, MCL 333.1101 et seq.
 - (b) "Department" means the department of environmental quality.
 - (c) "Diving pool" means a swimming pool that is deep enough throughout for diving as required by R 325.2133.
 - (d) "Modification" means any alteration to a swimming pool that results in a change from previously approved construction.
 - (e) "Poolside slide" means a short slide structure which is more than 4 feet in height, which is not regulated under R 408.814, which is located near the edge of a swimming pool, and which is used by swimmers to slide by gravity into a pool.
 - (f) "River ride pool" means a swimming pool that is designed to convey swimmers with or without flotation devices around a closed loop channel using an artificially created current.
 - (g) "Spa pool" means a swimming pool which is designed for use by more than 2 people at one time and which is not necessarily intended for swimming. A spa pool will typically have seating, agitation of the water, and water temperatures different than what is normal in pools for swimming.
 - (h) "Special purpose pool" means a swimming pool that has design features which are not specifically covered in Part 2 of these rules.
 - (i) "Swimming pool" or "pool" means a public swimming pool as defined in section 12521 of the code. The following are examples of swimming pools:
 - (i) Cold plunge pools.
 - (ii) Diving pools.
 - (iii) Hot tubs.
 - (iv) Scuba diving pools.
 - (v) Spa pools.
 - (vi) Training tanks wading pools.
 - (vii) Water slide pools.
 - (viii) Wave pools.
 - (ix) Other special purpose pools.
 - (j) "Wading pool" means a swimming pool that is shallow enough throughout for wading.
 - (k) "Water slide pool" means a swimming pool that includes 1 or more flumes in which bathers are transported by moving water to a landing area and which is used only to exit the water slide.
 - (l) "Wave pool" means a swimming pool that is equipped to generate waves.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2113 Plans and specifications; construction permit application.

Rule 3. (1) Plans and specifications submitted for a construction permit for a new swimming pool or modification of an existing swimming pool shall meet all of the following requirements:

(a) Be prepared by, and bear the seal of, a professional engineer or architect licensed in this state if a new swimming pool and related facilities or a modification costs \$15,000.00 or more. A person shall obtain a construction permit under section 12525 of the code regardless of the project cost.

(b) Be submitted in triplicate to the department and be accompanied by completed construction permit application forms as prescribed and provided by the department.

(c) Be accompanied by the fee prescribed by the code payable to: "State of Michigan."

(2) Plans and specifications submitted for a construction permit for a new swimming pool shall meet both of the following requirements:

(a) Include a plot plan showing all of the following:

- (i) Plan north or true north.
- (ii) Property boundaries and location description.
- (iii) Adjacent streets.
- (iv) Pertinent buildings on the site.
- (v) Pertinent site grades, including floodplain contour, if applicable.
- (vi) Utility lines.

(b) Show, in detail, the swimming pool and related facilities areas, including all of the following:

- (i) The swimming pool enclosure and enclosure entrances.
 - (ii) The enclosure design, door or gate designs, and entrance hardware.
 - (iii) The walkway and deck materials, finishes, and slopes.
 - (iv) The swimming pool tank and related facilities.
 - (v) The swimming pool water treatment and recirculation equipment and piping.
 - (vi) Dressing rooms, locker rooms, shower rooms and toilet rooms.
 - (vii) Storage rooms.
 - (viii) Offices.
 - (ix) Mechanical equipment rooms.
 - (x) The source of, and basis of design for, the water supply.
 - (xi) Wastewater disposal system and the basis of design, including stormwater discharges.
- (3) Plans and specifications submitted for a construction permit for modification of an existing swimming pool shall show both the proposed modifications and the pertinent existing facilities.
- (4) If plans and specifications are submitted to the department, then an applicant shall concurrently submit 1 set of plans and specifications to the appropriate local health department.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2113a Compliance with state or local code or requirement.

Rule 3a. Compliance with these rules does not relieve a pool owner from complying with a state or local code or requirement that is not in conflict with these rules.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2114 Design and construction variances.

- Rule 4. (1) The department may grant a variance from part 2 of these rules if the department determines that the variance will not affect the safe and healthful operation of the swimming pool and that strict compliance will cause unusual practical difficulties and hardships or will conflict with a special purpose intended for the pool.
- (2) A person who files a request for a variance from these rules shall do so in writing. The request shall state the specific reasons for the variance and shall include adequate proof that an item, material, feature, or method will perform the intended function so as to produce a safe and healthful swimming pool.
- (3) The department shall review the variance request and take either of the following actions:
- (a) Grant the variance in writing, including any specific terms, conditions, and limitations.
 - (b) Deny the variance in writing and state the specific reasons for denial.
- (4) A swimming pool which is not in compliance with the specific provisions of these rules on their effective date, but which is in compliance with the rules in effect when the pool was installed and which is in good repair, is exempt from the provisions of these rules that require major structural or mechanical changes until pertinent modifications are made. If a swimming pool is modified, the pool owner shall bring the portion modified into compliance with applicable provisions of these rules, unless a variance is granted by the department.
- (5) This rule does not preclude the department from requiring changes where necessary to correct a threat to public health or an unsafe condition associated with a swimming pool. The pool owner shall establish a schedule of compliance for any required changes that is acceptable to the department or local health department.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2115 Operation permit application.

- Rule 5. (1) An applicant for an operation permit shall submit an application to the department on the forms prescribed and provided by the department.
- (2) An applicant shall submit the fee prescribed by section 12527a of the code together with the application. An applicant shall make payment payable to: "State of Michigan."
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2116 Violation of code or rules; notice of noncompliance; stop-work order.

- Rule 6. (1) If a representative of the department or of a local health department inspects a swimming pool and finds a violation of the code or these rules, then the department or local health department representative shall issue a written notice of noncompliance to the owner or the owner's representative that specifies the corrective action to be taken and shall allow an appropriate time period for correction.
- (2) If construction is being performed contrary to the code or these rules, then the department or local health department representative may issue a written stop-work order. If a stop-work order is issued, the construction shall stop, except for work that is necessary to correct an unsafe condition.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2117 Closing of swimming pools; reasons.

Rule 7. (1) A representative of the department or of a local health department may order the owner or operator of a swimming pool to close the pool and prohibit any person from using it, until correction, for any of the following reasons:

- (a) A condition of the swimming pool equipment, structure, area, or enclosure that jeopardizes the health or safety of the persons using or operating the pool.
 - (b) The lack of properly functioning equipment or proper material for recirculating, treating, or testing the swimming pool water.
 - (c) The lack of supervisory personnel, as required by R 325.2197, or lifeguards, as required by R 325.2198.
 - (d) The presence of a pollutant or of a hazardous object or substance in the swimming pool.
 - (e) Failure to meet a water quality standard prescribed by R 325.2194 or R 325.2195.
 - (f) Failure to operate and maintain the swimming pool as prescribed by R 325.2191 to R 325.2199.
 - (g) Failure to comply with the terms and provisions of an order or schedule of compliance.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2118 Closing of swimming pools; procedure.

Rule 8. (1) The department or local health department shall issue an order under R 325.2117 in writing and shall ensure that the order complies with all of the following provisions:

- (a) States that the pool shall close immediately.
 - (b) Specifies the corrective action necessary to bring the pool back into compliance.
 - (c) Is served upon the owner, operator, owner's representative, or person in charge of the swimming pool. The person on whom the order is served shall close the swimming pool immediately and shall prohibit any person from using it. The order may require the owner or operator or owner's representative to post 1 or more signs to inform any person that the swimming pool is closed until further notice.
- (2) After the specified corrective action has been taken, the owner or operator or owner's representative shall notify the agency issuing the closing order.
- (3) If upon reinspection the corrective action has not been taken, then the owner or operator shall keep the swimming pool closed and out of use until corrective action has been taken and the swimming pool has been reinspected and approved.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2118a Reopening inspections.

Rule 8a. (1) Before the reopening of a swimming pool for seasonal use or for use after the expiration of an operation permit, an owner or operator shall prepare the swimming pool facilities for use according to all of the following provisions:

- (a) All violations of the code or these rules shall be corrected.
 - (b) The swimming pool water shall meet the water quality standards prescribed by R 325.2194.
 - (c) The owner or operator shall notify the department or local health department when the swimming pool is ready for use.
- (2) A representative of the department or local health department may inspect the facilities before authorizing seasonal use of a swimming pool.
- (3) A representative of the department or local health department shall inspect the facilities before authorizing the use of a pool after the expiration of an operation permit.
- (4) If a reopening inspection reveals a condition listed in R 325.2117, then a representative of the department or a local health department may order the owner or operator of the swimming pool to prohibit any individual from using the pool until adequate corrections are made.
- History: 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2118b Swimming pools not in use.

Rule 8b. The owner of a swimming pool which is not in use or for which an operation permit is not in effect shall maintain the pool in a condition that prevents its creating a hazard to health or safety.

History: 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2119 Rescission.

Rule 9. The rules entitled "Construction and Alteration of Public Swimming pools," being R 325.391 to R 325.395 of the Michigan Administrative Code and appearing on page 2254 or the 1954 volume of the Code, and the rules entitled "Operation and Use of Public Swimming Pools," being R 325.401 to R 325.406 of the Michigan Administrative Code and appearing on pages 2254 and 2255 of the 1954 volume of the Code, are rescinded.

History: 1954 ACS 67, Eff. Mar 24, 1971.

PART 2. CONSTRUCTION

R 325.2121 Sites.

Rule 21. The site for a swimming pool shall meet all of the following requirements:

- (a) Have pertinent public utilities available or have an on-site water supply and on-site sewage disposal system approved by the department or local health department.
- (b) Not be detrimental to safe access to the swimming pool or to the safe and healthful use of the swimming pool.
- (c) Be accessible by vehicles.
- (d) Have drainage that is adequate to prevent flooding, damage, and a nuisance.
- (e) Not be detrimental to the proper operation and maintenance of the swimming pool.

- (f) Avoid pollution of the swimming pool.
- (g) Allow for the swimming pool to be safely emptied when necessary.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2122 Construction shapes, materials, surfaces, and loads.

Rule 22. (1) A swimming pool owner shall ensure that the pool and appurtenances are shaped and arranged so that the maintenance of safe and sanitary conditions and the recirculation of the water are not impaired. Nothing shall extend into or above a swimming pool tank so as to create a safety hazard.

(2) A swimming pool owner shall ensure that a pool and appurtenances are constructed of materials that are inert, nontoxic to humans, impervious, durable, and strong enough to withstand structural stresses.

(3) A pool owner shall ensure that a finished surface of a swimming pool wall or floor does not have sharp edges, open cracks, or open joints and is slip-resistant, easily cleanable, nonabsorbent, and light-colored, except that a dark marking may be inserted against a light background.

(4) A swimming pool owner shall ensure that a pool tank is designed and constructed to withstand all anticipated loadings for both full and empty conditions. If a swimming pool tank is subject to external hydrostatic pressure, then the pool owner shall provide means to relieve the pressure.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2123 Walls, floors, ledges, and underwater seating.

Rule 23. (1) Where the water depth is 6 feet or less, a swimming pool owner shall ensure that a swimming pool wall meets 1 of the following provisions:

- (a) Is vertical.
- (b) Slopes uniformly down to the point of curvature at not more than 1 horizontal in 5 vertical.

(c) Falls entirely within a plane sloped 1 horizontal in 5 vertical from the waterline down to the point of curvature where the wall cannot slope uniformly due to the necessary structural support of the upper wall.

(2) Where the water depth is more than 6 feet, a swimming pool owner shall ensure that a pool wall meets 1 of the following requirements:

- (a) Is vertical.
- (b) Is vertical to a water depth of not less than 64 inches and then curves to the floor with a radius of not more than the difference between the floor depth at that point and the depth at the point of curvature.

(c) Is vertical to a water depth of not less than 64 inches and then slopes down to the floor at 1 horizontal in 2 vertical or steeper.

(d) Is vertical to a water depth of not less than 68 inches and then slopes down to the floor at 1 vertical in 2 horizontal or less steep for a horizontal distance of not more than 6 feet from the pool wall. Add 1 inch to the vertical wall water depth for each additional 2 inches of total water depth deeper than 6 feet.

- (e) Slopes uniformly down to a water depth of not less than 6 feet at not more than 1 horizontal in 5 vertical.

(f) Falls entirely within a plane sloped 1 horizontal in 5 vertical from the waterline down to a water depth of not less than 6 feet where the wall cannot slope uniformly due to the necessary structural support of the upper wall.

(3) A swimming pool owner shall ensure that the junction between a pool wall and the floor is coved with a radius according to the following requirements, as applicable:

- (a) Not less than ½ of an inch.
- (b) Not more than 8 inches where the water depth is 6 feet or less.
- (c) Not more than 75 inches where the water depth is more than 6 feet.

(4) A swimming pool owner shall ensure that the entire swimming pool floor slopes down toward the main outlets according to the following requirements:

(a) Where the water depth is 4 feet or less, the swimming pool floor shall be sloped uniformly at not more than 1 vertical in 12 horizontal, where the water depth is 4 feet or less, except on the deeper side of a change of slope.

(b) Where the water depth is between 4 feet and 6 feet, the floor shall be sloped uniformly at not more than 1 vertical in 3 horizontal on the deeper side of a change of slope to a water depth of not more than 6 feet.

(5) Where the water depth is less than 6 feet, a swimming pool owner shall plainly mark the pool bottom at a change of floor slope with a color contrasting from the background color to allow the change of slope to be clearly visible. A swimming pool owner shall also extend the marking vertically up each sidewall at the change of slope.

(6) The department may approve other floor slopes for special purpose pools, for scuba diving pools, or for the transition from the side of a diving area to a more shallow area.

(7) A swimming pool owner shall ensure that a ledge does not protrude into a pool unless it is essential to support an upper wall. If a ledge is provided, then a swimming pool owner shall ensure that the ledge meets all of the following requirements:

- (a) Is not more than 4 inches in width.
- (b) Slopes downward from the wall.
- (c) Is designed to prevent its use as a walkway.
- (d) Is marked with a color contrasting from the background color to allow the ledge to be clearly visible.

(8) A swimming pool owner shall ensure that underwater seating at a swimming pool other than a spa pool meets all of the following requirements:

- (a) Is located where the water depth is 4 feet or less.
- (b) Is located in a recessed area that provides for the safety of swimmers.
- (c) The front edge of the seating is plainly marked in a color contrasting from the background color to allow the seat to be clearly visible from in the pool and on the walkway near the seat.
- (d) The walkway adjacent to the underwater seating is marked in a manner that warns of the location of the submerged seat.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2124 Handholds.

Rule 24. (1) A swimming pool owner shall ensure that a swimming pool, other than a spa pool, wading pool, or a water slide pool, has a continuous handhold that is not more than 6 inches above the water surface.

(2) A swimming pool owner shall ensure that a spa pool has handholds that are not more than 4 feet apart and not more than 6 inches above the water surface.

(3) A swimming pool owner shall ensure that a water slide pool has a continuous handhold, except at the flume entry into the pool.

(4) A swimming pool owner shall ensure that a handhold provides a positive, safe, and slip-resistant grip and allows persons using the swimming pool to easily hold onto the edge of the pool.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2125 Water supplies.

Rule 25. (1) A swimming pool owner shall ensure that the water serving a swimming pool and all plumbing fixtures are obtained from a type I public water supply, if available. If a type I water supply is not available, then a swimming pool owner shall ensure that water is obtained from a supply that meets the requirements for type II public water supplies. The water supply types are classified in R 325.10502.

(2) A swimming pool owner shall ensure that the supply of water is adequate for service to all plumbing fixtures and for furnishing the swimming pool with not less than 1 gallon per minute per 1,500 gallons of the swimming pool volume. A swimming pool owner shall ensure that water at a temperature of not less than 90 degrees nor more than 110 degrees Fahrenheit is supplied to each required shower and lavatory.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2126 Water supply backflow.

Rule 26. (1) A swimming pool owner shall ensure that a potable water supply system that serves a swimming pool and all plumbing fixtures is protected against backflow. A swimming pool owner shall ensure that potable water which is introduced into the swimming pool or recirculation system is supplied through permanent piping and either of the following:

(a) An acceptable air gap consisting of an unobstructed vertical distance through the atmosphere of not less than 2 diameters of the water supply pipe between the lowest free-flowing discharge of the water supply pipe and the overflow level of the receiving pipe, tank, or vessel.

(b) An approved reduced pressure zone backflow preventer which is installed where it is readily accessible for inspection and maintenance, which is not subject to flooding, and which does not have a direct connection between the drain port and a wastewater system.

(2) A swimming pool owner shall ensure that a water supply fill spout is located so that it is not a safety hazard.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2127 Wastewater disposal systems.

Rule 27. (1) A swimming pool owner shall ensure that a swimming pool has a wastewater disposal system that serves the entire swimming pool facility. A swimming pool owner shall ensure that the wastewater disposal system has sufficient capacity to prevent flooding during the swimming pool filter cleaning cycle and during draining of the swimming pool.

(2) A swimming pool owner shall ensure that wastewater from a swimming pool is discharged through permanent piping to a public sewerage system if it is available.

(3) A swimming pool owner shall ensure that the disposal of wastewater from a swimming pool does not create a threat to public health or safety, a nuisance, or unlawful pollution of the waters of the state. A swimming pool owner maybe required to obtain a permit for the disposal of wastewater under 1994 PA 451, MCL 324.101 et seq.

(4) A swimming pool owner shall ensure that a swimming pool and its recirculation system is protected against backflow from a wastewater disposal system. A swimming pool owner shall ensure that a pipe from the swimming pool or its recirculation system to a sewer discharges through an air gap of not less than 2 pipe diameters, unless the department approves the elimination of the air gap.

(5) A swimming pool owner shall ensure that the wastewater disposal system enables emptying of the swimming pool.

(6) A swimming pool owner shall ensure that the sump for receiving pool wastewater is properly trapped.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2128 Enclosures.

Rule 28. (1) A swimming pool owner shall completely enclose a swimming pool facility by a wall, fence, or other protective enclosure. A swimming pool owner shall ensure that the entire enclosure, including doors and gates, is not less than 4 feet

high as measured on the outside, does not provide ready footing for climbing, and is designed to prevent passage through or under the enclosure. A swimming pool owner shall ensure that a sliding-type door is not installed as part of the protective enclosure.

(2) A swimming pool owner shall ensure that the enclosure specified in subrule (1) of this rule has at least 1 entrance. A swimming pool owner shall ensure that each entrance has a door or gate equipped with a self-closer, a latch, and a lock. A swimming pool owner shall ensure that a sliding-type door is not installed as an entrance. A swimming pool owner shall ensure that an entrance for bathers leads to the shallowest area of the swimming pool.

(3) A swimming pool owner may enclose 2 or more swimming pools within a single enclosure, except that an owner shall enclose a wading pool separately.

(4) A swimming pool owner shall provide a barrier between a permanent spectator area and an area used by bathers.

(5) A swimming pool owner shall ensure that a balcony within 10 feet of or overhanging any portion of the swimming pool water surface is completely enclosed or is designed to prevent diving into the swimming pool.

(6) A swimming pool owner shall ensure that an active recreation area which is adjacent to a swimming pool and which is provided for the use of persons within the swimming pool enclosure is separated by a barrier.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2129 Walkways and decks; "walkway" and "deck" defined.

Rule 29. (1) "Walkway" means the area around and immediately adjacent to the edge of a swimming pool. A swimming pool owner shall provide a continuous, unobstructed walkway as follows:

(a) It shall be not less than 4 feet wide and extend out to any deck drainage if located beyond 4 feet from the edge of the pool.

(b) It shall extend completely around a swimming pool other than a spa pool, water slide pool, or river ride pool.

(c) It shall be not more than 9 inches above the water surface, except at a water slide pool or a wave pool.

(d) It shall be not less than 4 feet wide by not less than 10 feet long at a spa pool and be located at a means of egress from the spa pool.

(e) It shall be not less than 4 feet wide at the side and behind a piece of diving or permanent deck equipment.

(f) It shall be provided on at least 1 side of a river ride pool.

(g) It shall be continuous for a water slide pool, except for the flume entry into the pool.

(h) It shall be not less than 10 feet wide at the main means of egress from a water slide pool.

(2) A swimming pool owner shall ensure that a walkway between 2 swimming pools is not less than 6 feet wide. A swimming pool owner shall ensure that a common wall between a swimming pool and a spa pool is not more than 18 inches thick, not more than 12 feet long in any 1 direction, not more than 24 feet long in total, and designed to prevent a person from walking on the wall.

(3) "Deck" means the remaining area from the edge of the swimming pool walkway to the swimming pool enclosure.

(4) A swimming pool owner shall effectively seal a junction between a walkway or paved deck and a wall to allow for easy cleaning.

(5) A swimming pool owner shall effectively seal a joint between the swimming pool coping and the walkway with a flexible waterproof sealant.

(6) A swimming pool owner shall equip an opening in the walkway with a locking-type cover that is flush with the deck or walkway surface.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2129a Walkway and deck materials; drainage.

Rule 29a. (1) A swimming pool owner shall pave the entire walkway around a swimming pool.

(2) A swimming pool owner shall ensure that the walkway surface materials are durable, slip-resistant, easily cleanable, and nonabsorbent. Acceptable materials include any of the following:

(a) Concrete.

(b) Ceramic tile.

(c) Quarry tile.

(d) Other paving materials acceptable to the department.

(3) A swimming pool owner shall ensure that the remaining deck area is constructed and maintained to prevent surface drainage, dirt, and other harmful material from being carried into the pool. Acceptable deck materials include any of the following:

(a) Materials specified in subrule (2) of this rule.

(b) Wood.

(c) Grass.

(d) Shrubbery and other landscaping.

(e) Other materials acceptable to the department.

(4) A swimming pool owner shall ensure that the walkway and deck are effectively drained to prevent the accumulation of standing water.

(5) A swimming pool owner shall ensure that a walkway slopes away from the swimming pool for not less than 4 feet.

(6) A swimming pool owner shall ensure that a coping or other means is provided to prevent water flow from a walkway into the swimming pool.

(7) A swimming pool owner shall ensure that a deck drain discharges to waste only.

(8) A swimming pool owner shall ensure that roof drainage is not routed onto a swimming pool walkway or deck.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2131 Drinking fountains.

Rule 31. (1) A swimming pool owner shall provide a drinking fountain at a swimming pool.

(2) A swimming pool owner shall ensure that a drinking fountain is an angle jet-type fountain and is located where it is readily accessible to the bathers and is not a safety hazard.

(3) A swimming pool owner shall ensure that wastewater from a drinking fountain is routed to waste in accordance with R 408.30701 et seq.

(4) A swimming pool owner shall ensure that a drinking fountain is not located in a toilet area or shower area.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2132 Water depths; depth markings; lifelines.

Rule 32. (1) A swimming pool owner shall ensure that the following maximum water depths are complied with:

(a) Not more than 5.25 feet in a swimming pool which is smaller than 800 square feet in water surface area and which has a shallow area for walking or standing.

(b) Not more than 1.5 feet in a wading pool.

(c) Not more than 4 feet in a spa pool.

(2) A swimming pool owner shall plainly mark the depth of water in a swimming pool on the walkway next to the swimming pool.

(3) A swimming pool owner shall provide depth markers as necessary to indicate the depth of water as follows:

(a) At each side and at each end of the pool.

(b) At the maximum and the minimum depths.

(c) At a change in the floor slope between shallow and deeper areas.

(d) At other critical points.

(e) At intermediate points not more than 25 feet apart measured peripherally, except at a river ride pool.

(f) At each means of egress at a river ride pool.

(4) A swimming pool owner shall ensure that a depth marker is in compliance with all of the following requirements:

(a) Has legible numerals.

(b) Is not less than 4 inches high.

(c) Is a color that contrasts with the background.

(d) Indicates the units of measure.

(e) Indicates the water depth from the minimum operating water level to the bottom of the pool at that point.

(5) A swimming pool owner shall place the words "no diving" between the depth markers on the walkway where the water depth is less than 5 feet at a swimming pool. A swimming pool owner shall ensure that the words meet the requirements of subrule (4) of this rule.

(6) A swimming pool owner may place "no diving" symbols that are not less than 4 inches high on the walkway in place of the words "no diving" required by subrule (5) of this rule.

(7) A swimming pool owner is not required to place depth markers at the zero depth end of a pool.

(8) A swimming pool owner is not required to place "no diving" markers at a spa pool, wading pool, scuba diving pool, or at the zero depth end of a pool.

(9) A swimming pool owner shall place a sign in a scuba diving pool enclosure which states that the pool is for scuba diving only.

(10) A swimming pool owner shall provide a lifeline at a swimming pool, other than a water slide pool or a wave pool, at a change in floor slope where the water depth is less than 5 feet or at the 5-foot depth if the slope does not change.

(11) A swimming pool owner shall ensure that the lifeline has floats and anchors in both sidewalls near the water level.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2133 Diving areas and facilities; "plummet" defined.

Rule 33. (1) A swimming pool owner shall not install a diving facility unless the department approves in writing before the installation.

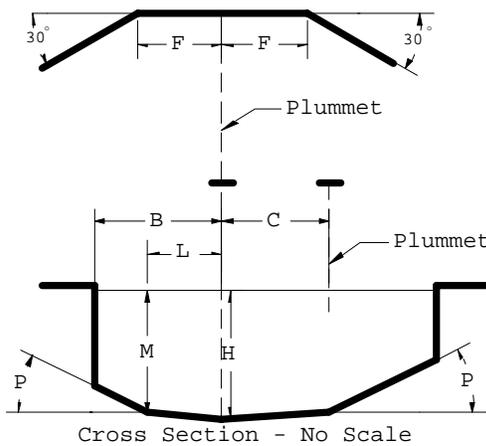
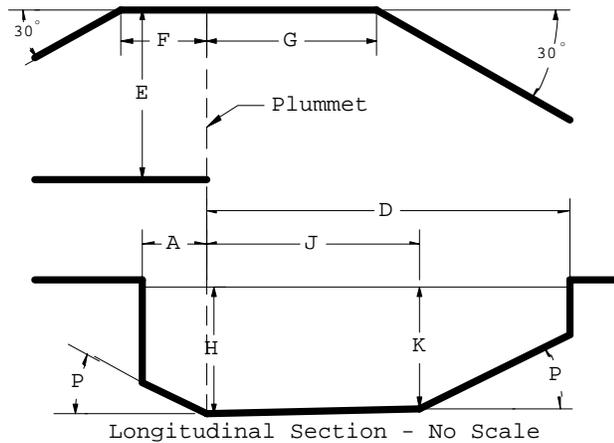
(2) A swimming pool owner shall ensure that a diving area conforms to table 1 and figure 1 of this rule.

(3) Table 1 and figure 1 read as follows:

Table 1
Diving Areas

Letters below refer to Figure 1		Board height in meters	0.5 Meter	1.0 Meter	3.0 Meters
		Board height (feet)	1'8"	3'4"	9'11"
		Board length (feet)	10'0"	16'0"	16'0"
		Board width (feet)	1'8"	1'8"	1'8"
		Minimum dimensions in feet			
A	Distance from plummet back to pool wall	2'0"	5'0"	6'0"	
B	Distance from plummet to pool wall at side	8'3"	8'3"	11'6"	
C	Distance from plummet to adjacent plummet	7'1"	7'1"	8'3"	
D	Distance from plummet to pool wall ahead	26'0"	29'7"	33'8"	
E	Height from board to ceiling at plummet and distances F and G	16'0"	16'0"	16'0"	
F	Clear overhead distance behind and each side of plummet	8'0"	8'0"	8'0"	
G	Clear overhead distance ahead of plummet	16'0"	16'0"	16'0"	
H	Depth of water at plummet	8'6"	11'0"	12'0"	
J	Distance ahead of plummet to depth K	12'0"	16'5"	19'9"	
K	Depth at distance J ahead of plummet	8'3"	10'9"	11'9"	
L	Distance at each side of plummet to depth M	8'0"	5'0"	6'7"	
M	Depth at distance L on each side of plummet	8'3"	10'9"	11'9"	
N	Maximum slope to reduce height E	30 degrees	30 degrees	30 degrees	
P	Maximum floor slope to reduce depth ahead of K, to the sides of M, or back to pool wall behind H	1:3	1:2	1:2	

Figure 1
Diving Areas



(4) "Plummet" means a vertical line which passes through the end of, and which is at the center line of, a diving board or diving platform.

(5) A swimming pool owner shall install diving equipment in compliance with this rule and the equipment manufacturer's recommendations.

(6) A swimming pool owner shall ensure that a diving board, platform, and appurtenances meet all of the following requirements:

- (a) Be constructed to ensure stability and safely carry the maximum anticipated loads.
- (b) Be constructed of corrosion-resistant, easily cleanable, nonabsorbent, and slip-resistant materials.
- (c) Have handholds on both sides of the ladder or stairway to a diving board or diving platform.
- (d) For a diving stand or platform 1.0 meter or higher above the water, have guard railings on both sides of the diving board which extend to a position above the edge of the water and which are equipped with intermediate rails. A diving stand or platform used exclusively for competitive purposes is exempt from this subdivision.

(7) A swimming pool owner shall consider the safety of swimmers and divers in the location and orientation of diving facilities. A swimming pool owner shall locate all diving boards and diving platforms at a pool on the same wall.

(8) For pools that have diving facilities which were constructed before the effective date of this rule and which do not comply with this rule, the department may approve the diving facilities for competitive purposes. For competitive purposes, a swimming pool owner shall ensure that the pool diving depths and facilities meet the requirements in effect on March 24, 1971 and shall operate the facilities in accordance with R 325.2198.

(9) If a pool is not in compliance with the requirements of this rule, and if the department has issued a correction order to remedy an unsafe condition under R 325.2114, then a swimming pool owner shall remove a diving facility or bring it into compliance with this rule.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2134 Ladders, stairways, and ramps.

Rule 34. (1) A swimming pool owner shall equip a swimming pool with ladders, stairways, or similar means of egress in compliance with all of the following provisions:

- (a) Have at least 1 means of egress at each end of a pool, other than a wading pool, water slide pool, or a spa pool, that is less than 30 feet wide.
- (b) Have not less than 2 means of egress located at opposite sides and at each end of a pool, other than a wading pool or a water slide pool, that is 30 or more feet wide.
- (c) Have at least 1 means of egress for a water slide pool or a spa pool.
- (d) Have a means of egress consisting of a ladder, stairway, or ramp for a pool other than a water slide pool or a spa pool.
- (e) Have a means of egress consisting of a stairway or ramp for a water slide pool or a spa pool.
- (f) Have at least 1 ladder for each diving board in a diving area.

(2) A swimming pool owner shall ensure that the distance from any point in a swimming pool to a means of egress is not more than 50 feet, except that a wave pool may have more than 50 feet to a means of egress where the water depth is less than 3.5 feet.

(3) A swimming pool owner shall ensure that a swimming pool ladder is corrosion-resistant and sturdy and has slip-resistant treads, side rails extending over the deck, and not more than 6 inches of clearance to the swimming pool wall. A swimming pool owner shall ensure that a recessed ladder has stepholes which drain into the swimming pool and which are easily cleanable and has a grab rail at each side of the ladder.

(4) A swimming pool owner shall ensure that a stairway leading into a swimming pool is in compliance with all of the following provisions:

- (a) Has slip-resistant treads.
- (b) Has uniform size treads that are not less than 12 inches deep and uniform size risers that are not more than 10.5 inches high for a swimming pool other than a spa pool.
- (c) Has uniform size treads that are not less than 11 inches deep and uniform size risers that are not more than 12 inches high for a spa pool.
- (d) Has the front edge of each step marked in a color that contrasts with the background.
- (e) Is located where the water depth is either not more than 4 feet or is in a diving area and is located where the stairway will not be a hazard to swimmers.

(f) Has 1 sturdy handrail per 12 feet of the stairway width or fraction of 12 feet or in accordance with other applicable codes and is reachable for the length of the stairway. The stairway may have the top tread wider and the top or bottom riser shorter than the others.

(5) A swimming pool owner shall ensure that a ramp leading into a swimming pool is in compliance with all of the following provisions:

- (a) The slope is not steeper than 1 in 12 from the horizontal.
- (b) Terminates where the water depth is 3.5 feet or less.
- (c) Is located where the ramp will not be a hazard to swimmers.
- (d) Is slip-resistant.
- (e) Has a sturdy handrail along each side of the ramp which is reachable for the length of the ramp.

(6) A swimming pool owner shall ensure that a stairway or ramp for a water slide pool is wide enough to accommodate the expected usage and, preferably, as wide as the exit end of the pool.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2135 Starting platforms.

Rule 35. (1) After the effective date of this rule, if starting platforms are provided at a swimming pool, then a swimming pool owner shall ensure that the platforms are in compliance with the following water depth and platform height requirements, as applicable:

- (a) For water depths less than 79 inches, starting platforms shall not be installed.
- (b) For water depths 79 inches and deeper across all swimming lanes, the front edge of the starting platforms shall be not higher than 30 inches above the water surface.
- (2) A swimming pool owner shall ensure that a starting platform meets all of the following requirements:
 - (a) Is installed where the minimum water depth is maintained for a distance from 2 feet to not less than 19 feet out from the edge of the pool across all swimming lanes.
 - (b) Is installed with the front edge extending to the edge of the water.
 - (c) Is easily removable without tools when located at a water depth of less than 8.5 feet.
- (3) A swimming pool owner shall ensure that a starting platform that was installed before the effective date of this rule and has water depths less than 60 inches is brought into compliance with subrules (1) and (2) of this rule or is permanently removed.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2136 Water circulation.

Rule 36. (1) A swimming pool owner shall equip a swimming pool for continuous, uniform circulation of treated water within the swimming pool tank and for continuous removal, treatment, and reuse of the water.

(2) A swimming pool owner shall ensure that the water recirculation and treatment system is adequate for recirculating and treating the entire volume of water as follows:

- (a) In 6 hours or less for a swimming pool.
- (b) In 1 hour or less for a wading pool.
- (c) In 1 hour or less for a spa pool.
- (d) In 2 hours or less for a river ride pool.
- (e) In 1 hour or less for a water slide pool.
- (f) In 4 hours or less for a wave pool.
- (g) In less time than specified in subdivisions (a) to (f) of this subrule if necessary to meet the hydraulic design requirements for the surface skimmer system required by R 325.2144.
- (h) In less time than specified in subdivisions (a) to (f) of this subrule if necessary to remedy water quality, clarity, or other operational problems.

(3) The swimming pool owner shall ensure that the entire volume of a special purpose pool is recirculated and treated at a rate acceptable to the department.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2137 Swimming pool water piping.

Rule 37. (1) A swimming pool owner shall ensure that swimming pool water piping is all of the following:

- (a) Nontoxic material.
- (b) A potable water grade.
- (c) Durable.
- (d) Resistant to corrosion.
- (e) Rated to withstand operating pressures of not less than 160 pounds per square inch.
- (2) A swimming pool owner shall ensure that plastic pipe is equivalent to either of the following types of piping, as determined by the department:
 - (a) Piping certified for potable water by NSF International or other nationally recognized certifying agency.
 - (b) Schedule 40 polyvinyl chloride or heavier piping.
- (3) A swimming pool owner shall ensure that plastic piping is not used for the piping from 5 feet upstream to 5 feet downstream from a water heater, unless the heater manufacturer's written recommendations approve the use of shorter piping or a specific pipe product.
- (4) A swimming pool owner shall ensure that the piping is designed to carry the required quantities of water at velocities of not more than 5 feet per second in suction piping and 10 feet per second in pressure piping, unless greater velocities are warranted.
- (5) A swimming pool owner shall ensure that the piping meets all of the following requirements:
 - (a) Is protected against erosion, corrosion, mechanical damage, and other deterioration.
 - (b) Is provided with fittings necessary for disassembly of any part.
 - (c) Is arranged to allow ready, safe, and proper operation and maintenance of the swimming pool facilities.
- (6) A swimming pool owner shall mark exposed pool piping with labels and arrows showing the normal direction of water flow.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2138 Flow controls; rate-of-flow indicators.

Rule 38. (1) A swimming pool owner shall provide a valve for regulating the rate of flow through a swimming pool in the recirculation pump discharge piping.

(2) A swimming pool owner shall provide a rate-of-flow indicator on the pump discharge piping before or after the filter.

(3) A swimming pool owner shall ensure that a rate-of-flow indicator meets all of the following requirements:

(a) Is the proper size and design for the pipe and system on which it is installed.

(b) Has a durable scale that is graduated in gallons per minute.

(c) Is sized to operate as close as practical to the midrange of the indicator at the design recirculation flow rate.

(d) Is installed where it is readily accessible for reading and maintenance.

(e) Is installed with straight pipe upstream and downstream from the indicator to any fitting or restriction in accordance with the manufacturer's recommendations.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2141 Inlets.

Rule 41. (1) A swimming pool owner shall ensure that a swimming pool water inlet system has inlets adequate in design, number, and location to ensure uniform distribution of treated water throughout the swimming pool.

(2) A swimming pool owner shall ensure that an inlet meets all of the following requirements:

(a) Is equipped for flow rate adjustment.

(b) Does not extend from the swimming pool wall or floor so as to create a hazard.

(c) Is not less than 12 inches below the water level or is not less than 6 inches below the water level and designed to direct the flow downward.

(3) A swimming pool owner shall ensure that a pool has the following number of inlets:

(a) Not less than 2 inlets.

(b) Not less than 1 inlet per 20 lineal feet of swimming pool periphery, except at a river ride pool.

(c) More inlets than required in subdivision (a) or (b) of this subrule if necessary for the uniform circulation of water.

(4) A swimming pool owner shall ensure that the location of inlets for a swimming pool other than a river ride pool or a water slide pool is as follows:

(a) For a wall inlet system, inlets shall be spaced not more than 20 feet apart as measured along the swimming pool wall.

(b) For a floor inlet system, inlets shall be uniformly spaced not more than 20 feet apart and there shall be an inlet not more than 15 feet from each wall.

(c) Where water circulation might be impaired, there shall be at least 1 inlet located in each recessed stairwell, underwater seat, or other space.

(5) A river ride pool or water slide pool owner shall provide a pool with 1 or more inlets adequate in number and location to provide and maintain flow rates and water quality in accordance with R 325.2194.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2142 Main and other outlets.

Rule 42. (1) A swimming pool owner shall ensure that a swimming pool has 2 or more main outlets for the recirculation system pump for continuous removal of water for treatment and for emptying the pool.

(2) A swimming pool owner shall ensure that the main outlets for the recirculation system pump meet all of the following requirements:

(a) Are designed and located to ensure the complete draining of the pool.

(b) Are designed and located to prevent entrapment and to prevent the restriction of flow by the simultaneous covering of all outlets on the system by 1 person.

(c) Do not extend from the swimming pool floor or wall so as to create a hazard.

(d) Are covered with a grate which is not hazardous to bathers, which is secured in place, and which is removable only with tools.

(e) Have an open area for each grate large enough to assure water entrance velocities of not more than 2 feet per second, with as close as practical to equal flow through each outlet grate.

(f) Have the total open area for all main outlet grates large enough to assure water entrance velocities of not more than 1 foot per second.

(g) Are interconnected with unrestricted piping that does not contain valves.

(3) If another pump or pumps are provided, then a swimming pool owner shall ensure that the same outlet system supplying water to the pumps complies with the requirements of subrules (2)(b), (c), (d), (e), (f), and (g) of this rule.

(4) A swimming pool owner shall ensure that all outlet openings meet both of the following requirements:

(a) Are not less than 3 feet nor more than 20 feet from another outlet as measured center to center.

(b) Are provided not more than 15 feet from a sidewall for a main outlet.

(5) A swimming pool owner shall ensure that all outlet discharge piping is valved in the equipment room as close as practical to the pump suction.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2143 Overflow systems.

Rule 43. (1) A swimming pool owner shall ensure that a swimming pool is equipped with an overflow system to remove floating material from the water surface. A swimming pool owner shall ensure that a swimming pool that is not more than 2,400 square feet in water surface area has either a perimeter overflow system or surface skimmers or that a swimming pool which is more than 2,400 square feet in water surface area has a perimeter overflow system.

(2) A swimming pool owner shall ensure that a perimeter overflow system meets all of the following requirements:

(a) Extends completely around the swimming pool, except for a spa pool, river ride pool, water slide pool, a special purpose pool, or a location where the design and construction of the perimeter overflow system must change due to construction limitations.

(b) Has the overflow lip as level as practical, plus or minus 1/8 inch.

(c) Has a minimum opening of 6 inches or has a covering adequate to prevent entrapment of any part of the bather's body.

(d) Permits ready inspection, cleaning, and repair.

(e) Is designed for removal of the water at a rate of not less than 100% of the design flow rate.

(f) Provides for discharging the water for treatment and reuse.

(g) Provides a handhold for bathers.

(h) Effectively removes floating materials from the water surface.

(3) A swimming pool owner shall ensure that a perimeter overflow system extends as follows:

(a) Around a spa pool or a water slide pool in a manner acceptable to the department.

(b) Around a river ride pool at major changes of direction acceptable to the department.

(c) Around a special purpose pool in locations acceptable to the department where the shape of the pool may cause practical difficulties in the construction of a continuous perimeter overflow system.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2143a Overflow system open tanks and surge capacity.

Rule 43a. (1) A swimming pool owner shall equip a swimming pool equipped with a perimeter overflow system with an open tank for containing the free discharge of water from the perimeter overflow system for treatment and reuse.

(2) A swimming pool owner shall ensure that an open tank meets all of the following requirements:

(a) Has a capacity from the design operating level of the surge tank to the tank overflow elevation of not less than 2 minutes of flow from the filtration pump.

(b) Has an automatic means to supply potable water to the pool or to the open tank that is activated based on the water level in the pool or in the open tank.

(c) Has tank overflow piping that meets both of the following requirements:

(i) Is sufficiently lower than the perimeter overflow system lip to assure continuous flow at the design flow rate.

(ii) Is designed to prevent flooding of the equipment room or other areas in case of mechanical failure.

(d) Has a means to automatically regulate the main outlet system flow rate based on the variation of water level in the open tank or perimeter overflow system.

(e) Has a means to completely drain the open tank when necessary.

(3) A swimming pool owner shall ensure that a pool which has a perimeter overflow system has surge capacity of not less than 1 gallon per square foot of pool water surface area. A swimming pool owner shall ensure that total surge capacity is the sum of the open tank capacity and either of the following if capacity is available:

(a) Capacity in the perimeter overflow system.

(b) Capacity in the pool of not more than 50% of the required surge capacity if the perimeter overflow system is equipped with surge weirs.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2144 Surface skimmers and surge weirs.

Rule 44. (1) A swimming pool owner shall ensure that a swimming pool, other than a spa pool, which is equipped with surface skimmers or a perimeter overflow system that has surge weirs has at least 1 surface skimmer or surge weir for every 500 square feet of water surface area or fraction of 500 square feet. A swimming pool owner shall provide additional surface skimmers or surge weirs if necessary for effective skimming or to meet the surface skimmer hydraulic design requirements.

(2) A swimming pool owner shall ensure that a spa pool has 1 surface skimmer for every 250 square feet of surface area or fraction of 250 square feet.

(3) A swimming pool owner shall not provide a spa pool, a river ride pool, or a wave pool equipped with a perimeter overflow system with surge weirs.

(4) A swimming pool owner shall ensure that a surface skimmer or surge weir is in compliance with both of the following provisions:

(a) Is designed to effectively remove floating material from the water surface.

(b) Is located to ensure proper skimming of the entire water surface with minimum interference and minimum short-circuiting.

(5) A swimming pool owner shall ensure that a surface skimmer meets all of the following requirements:

(a) Has an automatically adjustable weir.

(b) Has an easily removable and cleanable strainer basket.

- (c) Has a flow rate control device.
 - (d) If an equalizer pipe is provided, the pipe has a device that will remain tightly closed under normal operating conditions.
 - (e) Is built into the swimming pool wall and does not create a safety hazard.
 - (6) A swimming pool owner shall ensure that a swimming pool recirculation system is designed for a flow of 37.5 gallons per minute per surface skimmer with 80% of the flow (30 gallons per minute) to be directed through the skimmer and 20% of the flow (7.5 gallons per minute) to be directed through the main drain.
 - (7) A swimming pool owner shall ensure that a surface skimmer piping system is equipped with a means to adjust the flow through each skimmer either in each skimmer or in the equipment room as close as practical to the pump suction to provide for uniform surface skimming and to allow balancing of flow between the skimmer system and the main outlet system.
 - (8) A swimming pool owner shall ensure that a surge weir for a perimeter overflow system meets all of the following requirements:
 - (a) Is designed to effectively skim the water surface.
 - (b) Is designed for a minimum flow rate of 50 gallons per minute and for 20 gallons per minute per lineal foot of weir.
 - (c) Is designed to effectively close during periods of use when rim flow is necessary.
 - (d) Is built into the perimeter overflow system and does not create a safety hazard.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2145 Recirculation pumps.

Rule 45. (1) A swimming pool owner shall ensure that a recirculation system is equipped with a single pump that has a sufficient capacity for recirculating the swimming pool volume of water within the time period required in R 325.2136 and for providing flow adequate for cleaning the filters.

- (2) A swimming pool owner shall ensure that the pump and motor meet all of the following requirements:
 - (a) Are capable of continuous operation.
 - (b) Are self-priming if the pump or suction piping is above the swimming pool water level.
 - (c) Are manufactured of materials suitable for continuous exposure to water and normal concentrations of pool treatment chemicals.
 - (d) Are securely mounted to prevent strain on the piping.
 - (e) Are equipped with an emergency shutoff device.
 - (3) A swimming pool owner shall install a gauge to measure the pump discharge pressure.
 - (4) If the water is pumped from the swimming pool to the filters, a swimming pool owner shall provide a strainer on the suction side of the pump and shall ensure that the strainer meets all of the following requirements:
 - (a) Is corrosion-resistant, readily removable, and easily cleanable.
 - (b) Is equipped with valves to permit removal of the strainer basket without water flowing through the chamber.
 - (c) Is provided with a spare strainer basket .
 - (5) A swimming pool owner shall not install a timer to control the operation of the recirculation pump.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2146 Water agitation and other pump systems.

Rule 46. (1) If agitation of the water in a spa pool is provided or if other pump systems in a swimming pool are provided, then a pool owner shall ensure that the agitation or other water movement is accomplished with a pump separate from the water treatment and recirculation system pump.

- (2) A pool owner shall ensure that an electrical switch, timer, or emergency shutoff device to operate the agitation system pump is not reachable from the pool.
 - (3) A swimming pool owner shall equip a wave pool with not less than 2 emergency wave shutoff devices and shall locate 1 device on each side of the pool at a fixed lifeguard station.
 - (4) If an air induction system is provided, a pool owner shall ensure that the system meets both of the following requirements:
 - (a) Is designed to prevent water backup that could cause electrical shock hazards.
 - (b) Is designed so the air intake source does not permit the introduction of toxic fumes or other contaminants.
- History: 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2151 Filters.

Rule 51. (1) A swimming pool owner shall ensure that a swimming pool water treatment system has 1 or more filters for clarifying the water. A swimming pool owner shall ensure that a filter meets all of the following requirements:

- (a) Is capable of producing acceptable water clarity.
 - (b) Enables easy removal of the material filtered out.
 - (c) Is convenient to operate and maintain.
 - (d) Is installed with adequate clearance and facilities for ready and safe inspection, operation, maintenance, disassembly, and repair.
- (2) A swimming pool owner shall ensure that a filter system shall have sufficient filtration area to meet the required flow rate without exceeding the established maximum filtration rate demonstrated to produce acceptable water clarity.
- History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2152 Sand-type filters.

Rule 52. (1) A swimming pool owner shall ensure that a sand-type filter system is designed to operate at a maximum filtration rate of 20 gallons per minute-per square foot of filter area and a backwash rate of 15 gallons per minute per square foot of filter area. The department may approve other flow rates based on test data or other performance data that demonstrate compliance with R 325.2151.

(2) A swimming pool owner shall ensure that the backwash water is discharged to waste and that a means for viewing backwash water clarity is provided.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2153 Diatomaceous earth-type filters.

Rule 53. (1) A swimming pool owner shall ensure that a diatomaceous earth-type filter system meets all of the following requirements, as applicable:

- (a) Is designed to operate at a maximum rate of 1.5 gallons per minute per square foot of filter area.
- (b) Is designed to operate at a maximum rate of 2 gallons per minute per square foot of filter area if body feed equipment is provided that is capable of applying 0.1 pound of diatomaceous earth per square foot of filter area per 24 hours.
- (c) Is designed to discharge the precoat filter effluent to waste or to an open tank for recirculation through the filter and not to the swimming pool or through a closed recirculation system.

(2) A swimming pool owner shall provide a means for viewing the precoating effluent clarity.

(3) A swimming pool owner shall ensure that the filter allows the effective removal of the filter-aid and the filtered-out material from the septums and the filters to waste without disassembly of the filters.

(4) A swimming pool owner shall ensure that a pressure diatomaceous earth-type filter system shall have a precoat pot.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2154 Filter accessories.

Rule 54. (1) A swimming pool owner shall ensure that a filter system is equipped with valves and piping necessary to isolate the filters for maintenance and repair and to completely drain all parts of the filter system.

(2) A swimming pool owner shall ensure that a pressure-type filter system is equipped with a gauge to indicate the filter influent pressure and, if the filter system is lower than the swimming pool water surface, is equipped with a gauge to measure the filter effluent pressure.

(3) A swimming pool owner shall ensure that a pressure gauge meets all of the following requirements:

- (a) Is graduated in pounds per square inch (psi).
- (b) Has an appropriate range of readings.
- (c) Is a minimum of 2 inches in diameter.
- (d) Is located so it can be read easily.

(4) A swimming pool owner shall ensure that a pressure filter tank has a manual air release connected to the top of the tank, unless air can be expelled easily by another means.

(5) A swimming pool owner shall ensure that a vacuum-type filter system is equipped with a vacuum gauge in the piping between the filter and the recirculation pump.

(6) A swimming pool owner shall ensure that the vacuum gauge meets all of the following requirements:

- (a) Is graduated in inches of mercury in 1-inch increments.
- (b) Has an appropriate range of readings.
- (c) Is a minimum of 2 inches in diameter.
- (d) Is located so it can be read easily.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2155 Cartridge-type filters.

Rule 55. (1) A swimming pool owner shall ensure that a cartridge-type filter system meets all of the following requirements:

- (a) Is designed for a maximum flow rate of 3/8 of a gallon per minute per square foot of filter area.
- (b) Is equipped with a means to drain the filter tank to prevent equipment room flooding.
- (c) Is provided with a spare set of cartridges that is not less than 100% of the required filtration area.
- (d) Is provided with a means, on the premises and acceptable to the department, for cleaning the cartridges according to the manufacturer's recommendations.

History: 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2156 Disinfectants and other chemicals.

Rule 56. (1) A chemical manufacturer shall provide evidence to the department that a chemical or other additive for disinfecting or otherwise treating swimming pool water meets all of the following requirements:

- (a) Does not create objectionable physiological effects to bathers.
- (b) Does not impart toxic or other deleterious properties to bathers or to the water.
- (c) Is compatible in the water with other chemicals and processes normally used in swimming pool water treatment.
- (d) Is safely and simply handled and closely controlled in its usage.
- (e) Is measured by readily applied poolside tests to determine its concentration, residual, or effectiveness.

(2) The department may authorize the use of a disinfectant if the owner applies the disinfectant in a concentration that is appropriate, practical, and safe under normal pool conditions and if the disinfectant has been demonstrated, to the department, to be as effective in disinfection as both of the following:

- (a) A free available chlorine residual of 1.0 milligram per liter at a pH of 7.2.
- (b) A solution that has an oxidation-reduction potential equivalent to 650 millivolts or more as measured with a silver-silver chloride electrode.

(3) A swimming pool owner shall apply the disinfectant at a suitable point in the recirculation system for effective disinfection of the recirculating water.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2157 Chemical feeders.

Rule 57. (1) A swimming pool owner shall ensure that a swimming pool has a chemical feeder and auxiliary equipment for the safe, continuous, controlled application of a chemical for disinfection of the water and the production and maintenance of a suitable residual of the disinfectant.

(2) A swimming pool owner shall ensure that the chemical feeder meet all of the following requirements:

- (a) Has sufficient capacity for achieving the required disinfectant residual.
 - (b) Is easily adjustable in output rate.
 - (c) Is capable of continuous operation.
 - (d) Is resistant to corrosion or clogging from the chemicals intended to be used in it.
 - (e) Is easy and safe to disassemble and reassemble for cleaning and maintenance.
- (3) If a feeder for pH control is provided, then a swimming pool owner shall install the feeder in accordance with the manufacturer's recommendations in a manner acceptable to the department.
- (4) A swimming pool owner shall connect an electrically operated chemical feeder to an electrical outlet energized only when the filtration pump is operating.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2158 Liquid chlorine.

Rule 58. A swimming pool owner shall not use liquid chlorine (liquefied elemental chlorine gas) at a swimming pool.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2159 Chemical test equipment.

Rule 59. (1) A swimming pool owner shall provide, at a swimming pool, equipment for testing the disinfectant residual, the pH, and any other chemical characteristics of the water determined by the department to be important in the control of water quality which may include total alkalinity, calcium hardness, total dissolved solids, and cyanuric acid levels.

(2) A swimming pool owner shall ensure that a chemical test kit meets all of the following requirements:

- (a) Is durable under normal pool use and storage conditions.
 - (b) Has an appropriate range of accuracy.
 - (c) Has fresh reagents.
 - (d) Is safe and simple to use.
- (3) A swimming pool owner shall ensure that the pH test kit standards range from 6.8 to 8.0.
- (4) A swimming pool owner shall ensure that the disinfectant test kit standards range from 0.0 to 5.0 mg/l or higher and are readable to the nearest 0.5 mg/l.
- (5) A swimming pool owner shall use the n,n-diethyl-p-phenylenediamine (dpd) indicator or other generally accepted standard method for determining the disinfectant residual.
- (6) When a cyanurate is used for disinfectant stabilization, a swimming pool owner shall provide test equipment for the cyanuric acid level.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2161 Water heaters and thermometers.

Rule 61. (1) A swimming pool owner shall ensure that a swimming pool water heater piping system includes an external bypass of the heater if the swimming pool is larger than 3,000 gallons in volume or if the water heater is not designed for at least 100% of the required recirculation flow rate.

(2) A swimming pool owner shall not install a heating coil, pipe, or steam hose in a swimming pool.

(3) A swimming pool owner shall provide an automatic shutoff device for the heater that maintains pool water temperatures not to exceed those specified in R 325.2194.

(4) If a swimming pool has a pool water heater, then the owner shall provide a fixed thermometer at a point in the piping before the pool water heater to measure the temperature of the flowing water.

(5) A swimming pool owner shall ensure that a thermometer meets all of the following requirements:

- (a) Is graduated to indicate temperature to the nearest 2 degrees Fahrenheit in the operating range.
- (b) Is located to be read easily.
- (c) Is located where it will not be subject to damage.
- (d) Is located and installed in compliance with R 408.4001 et. seq.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2163 Vacuum cleaning systems.

Rule 63. A swimming pool owner shall provide a vacuum cleaning system that is capable of cleaning the swimming pool.
History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2165 Safety equipment.

Rule 65. (1) A swimming pool owner shall equip a swimming pool with an acceptable long spineboard that has a minimum of 3 ties, runners, and a head immobilizer.

(2) A swimming pool owner shall equip a swimming pool with a first aid kit which is used primarily to treat small cuts, bruises, and burns and which contains all of the following first aid materials or their equivalent:

- (a) Four units of adhesive bandages, 1 inch by 3 inches.
- (b) Two units of 2-inch bandage compress.
- (c) One unit of 3-inch bandage compress.
- (d) One unit of 4-inch bandage compress.
- (e) Two units of absorbent gauze pad, 3 inches by 3 inches.
- (f) One unit of gauze compress, 18 inches by 36 inches.
- (g) Two units of large gauze compress, 24 inches by 72 inches.
- (h) Two units of 4-inch gauze roller bandages.
- (i) Two units of triangular bandages.
- (j) One unit of scissors.
- (k) One unit of tweezers.
- (l) Two units of instant ice packs.
- (m) Two units of latex disposable gloves.
- (n) One unit of adhesive plaster tape.

(3) A swimming pool owner shall equip a swimming pool with a kit to clean up blood spills which consists of as a minimum, a pair of medical-grade latex gloves and an antimicrobial hand wipe.

(4) A swimming pool owner shall equip a swimming pool, other than a wading pool or a spa pool, with both of the following:

- (a) A 1-piece, 12-foot long rescue pole which has blunt ends and which may have a shepherd's crook.
- (b) A ¼-inch diameter throwing rope as long as 1 ½ times the maximum width of the swimming pool or 50 feet, whichever is less, with 1 end attached to an 18-inch diameter ring buoy or rescue bag.

(5) A swimming pool owner shall equip a pool at which lifeguard service is provided with all of the following:

- (a) A megaphone or public address
- (b) One whistle per lifeguard on duty.
- (c) One rescue tube per lifeguard on duty where the water depth is more than 3.5 feet.
- (d) One resuscitation mask per lifeguard on duty.

(6) When multiple swimming pools are in the same enclosure or in close proximity, the department or local health department may accept 1 set of safety equipment for all of the pools.

(7) A swimming pool owner shall keep all required safety equipment in the pool enclosure or at another location approved by the department or local health department and shall keep the equipment stocked, in good repair, and in ready condition.

(8) A swimming pool owner shall provide a telephone or other suitable means of communication for emergencies. The owner may locate the telephone or other means of communication in any of the following areas:

- (a) Within the pool enclosure.
- (b) In another location approved, in writing, by the department. If another location is approved, the owner shall post a sign indicating the location of the telephone within the pool enclosure.

(9) A swimming pool owner shall post a sign at the telephone that indicates the phone numbers for emergency response agencies and the name and address of the swimming pool to assist emergency personnel in locating the facility.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2171 Mechanical equipment rooms.

Rule 71. (1) A swimming pool owner shall ensure that a swimming pool mechanical equipment room meets all of the following requirements:

- (a) Is a properly lighted and ventilated structure constructed in accordance with the general rules of the construction code commission.
- (b) Affords the mechanical equipment protection from the weather.
- (c) Is readily accessible and convenient for operation and maintenance.
- (d) Prevents unauthorized access.
- (e) Is properly drained.
- (f) Enables servicing of the equipment.
- (g) Does not have a hatch-type opening located in a swimming pool enclosure.
- (h) Is easily accessible by a ramp or stairway if it is located at a floor level different from the pool enclosure.
- (i) Has a minimum ceiling height of 7 feet.
- (j) Has a sufficient usable floor area to permit servicing, removal, and replacement of all equipment, as follows:

- (i) Has the greater of 80 square feet or 6.25% of the pool surface area, plus 30 square feet.
- (ii) Has additional area equal to not less than 50% of the area calculated in paragraph (i) of this subdivision for an additional pool of equal or smaller surface area built at the same time or later.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2172 Storage areas; offices; other rooms.

Rule 72. (1) Suitable space shall be provided for the storage of chemicals, tools, equipment, supplies, and records where they will be readily available, adequately ventilated, and protected from weather. Physical separation of incompatible chemicals shall be provided.

(2) A storage area, office, mechanical equipment room, or other room adjacent to a swimming pool shall be arranged to minimize traffic by people in shoes across the deck.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983.

R 325.2174 Bathhouse facilities, location, and design.

Rule 74. (1) A swimming pool owner shall ensure that a swimming pool has a bathhouse with dressing, shower, and toilet facilities based on the maximum bather load prescribed by R 325.2193 and the fixture schedule prescribed by R 325.2175, except as follows:

- (a) Dressing and shower facilities are not required for a wading pool only.
- (b) The department may approve reductions in required poolside dressing, shower, and toilet facilities for a swimming pool located at establishments that have living units which are readily accessible from the swimming pool. If reductions in bathhouse facilities are approved, then the owner shall restrict the use of the swimming pool to residents or registered guests only. For apartments, condominiums, hotels, motels, manufactured housing communities, resorts, town houses, and similar establishments, the department may approve reductions in required facilities as follows:
 - (i) For a bather load of 100 persons or less, there shall be at least 1 nonenclosed poolside shower, 1 water closet for each sex, and 1 lavatory for each sex.
 - (ii) For a bather load of more than 100 persons, a 50% reduction in fixtures is permissible.
 - (iii) Dressing areas may be eliminated.
- (c) The department or local health department may approve nonenclosed poolside showers to replace enclosed shower facilities.
- (d) The department or local health department may approve a unisex toilet facility in place of facilities for each sex at swimming pools that have an anticipated maximum bather load of up to 25 persons. A swimming pool owner shall ensure that a unisex toilet facility is in compliance with R 408.30725b.
- (e) The department may approve other bathhouse fixture schedules for special purpose pools and other unusual situations.

(2) A swimming pool owner shall ensure that a bathhouse is designed to route swimmers directly onto the swimming pool walkway or deck.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2175 Bathhouse plumbing fixtures.

Rule 75. (1) A swimming pool owner shall ensure that a bathhouse has showers and toilet facilities that are in compliance with the specifications of table 2 of this rule.

(2) Table 2 reads as follows:

Table 2
Minimum Bathhouse Fixtures

Maximum Bather Capacity* per R 325.2193	Number of fixtures for each sex		Number of toilet fixtures toilet fixtures		
	Showers**	Lavatories	For males		For females
			Water closets	Urinals ***	Water closets
1-50	1	1	2	0	2
51-100	2	2	2	1	3
101-200	3	2	3	1	4
201-300	4	3	4	1	5
301-500	5	3	5	1	6
501-700	6	4	6	1	7
701-1,000	7	4	7	1	8

* In addition, a swimming pool owner shall provide 1 shower, 1 water closet, and 1 lavatory for each sex for each additional 300 persons, or fraction of 300 persons, starting at 1,001.

**At a swimming pool used by school classes, a swimming pool owner shall provide 1 shower for every 3 people in the largest class for each sex. A owner may substitute nonenclosed poolside showers for showers in accordance with R 325.2174.

***An owner may substitute urinals for not more than 1/2 of the required number of water closets.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2176 Bathhouse construction.

Rule 76. (1) A swimming pool owner shall ensure that a bathhouse is designed and constructed to promote safe and sanitary conditions.

(2) A swimming pool owner shall ensure that a bathhouse meets all of the following design and construction requirements:

(a) The floor is durable, slip-resistant, easily cleanable, and nonabsorbent and does not have unsealed seams, open joints, or cracks.

(b) A wall or partition is durable, easily cleanable, and nonabsorbent and does not have unsealed seams or cracks.

(c) A junction between the floor and a wall or partition is coved to provide for cleanability.

(d) The floor is sloped to drains.

(e) The ceiling is constructed and finished with moisture-resistant materials.

(3) A swimming pool owner shall ensure that a locker is of rigid construction, properly vented, and set on legs or on a properly designed base to allow cleaning.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2178 Nonenclosed poolside showers.

Rule 78. (1) A swimming pool owner shall provide a nonenclosed poolside shower in a swimming pool enclosure at locations necessary to prevent bathers from carrying dirt or debris into the pool.

(2) A swimming pool owner shall ensure that a nonenclosed shower is in compliance with all of the following requirements:

(a) Is supplied from the potable water system.

(b) Has a spray head which is not higher than 80 inches above the walkway and which is arranged to spray the bathers from head to feet during use.

(c) Is equipped with a conveniently located valve

(d) Has drainage to discharge the water immediately without ponding or creating a nuisance.

(e) Is located where it will be effective without creating an accident hazard.

(f) Is supplied with tempered water in accordance with R 325.2125.

(3) A swimming pool owner shall not install a footbath in which water can accumulate.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2179 Hose and hose bibs.

Rule 79. A swimming pool owner shall provide hose connections and hose adequate for cleaning the pool deck, walkway, and bathhouse.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2181 Lighting.

Rule 81. (1) A swimming pool owner shall provide a lighting system, natural or artificial, for a swimming pool. The system shall adequately illuminate the entire swimming pool and enclosure during all periods of use.

(2) A swimming pool owner shall illuminate a bathhouse, mechanical equipment room, or storage area.

(3) A swimming pool owner shall protect a lighting fixture against breakage.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2182 Heating, ventilation, and dehumidification.

Rule 82. (1) A swimming pool owner shall ensure that a bathhouse, mechanical equipment room, storage area, and an indoor pool enclosure are adequately heated and ventilated in accordance with R 325.2113a.

(2) A swimming pool owner shall ensure that swimmers cannot come in contact with a heating unit.

(3) A swimming pool owner shall ensure that room ventilation and dehumidification prevent direct drafts on swimmers and minimize condensation.

(4) A swimming pool owner shall ensure that condensate from a pool enclosure dehumidification system is routed to waste only and is not routed to the pool.

History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2183 Water slide pools.

Rule 83. (1) This rule applies to water slide pools, water slide flumes, and other types of swimming pools that have water slide additions. In addition, water slide pools shall meet the requirements of R 325.2113a.

(2) A swimming pool owner shall install a water slide flume at a swimming pool in accordance with R 408.801 et seq.

(3) A swimming pool owner shall ensure that a water slide pool is designed and installed with sufficient length, width, and depth to bring riders to a complete stop and allow them to exit the pool in a safe manner.

(4) A water slide pool owner shall equip a water slide pool with a flume surge reservoir tank or other means designed to maintain the landing pool skimming water level.

(5) A swimming pool owner shall ensure that a swimming pool to which a water slide flume is added meets all of the following requirements:

(a) Has a turnover time by pool type as required in R 325.2136.

- (b) Has an unobstructed walkway around the entire water slide flume support structure and which is within the pool enclosure.
 - (c) Has sufficient water surface area and volume so that the operational pool water level is not changed by more than 1 inch by the operation of all flume pumps. If the water surface area and volume is not sufficient, then the pool owner shall provide a means to maintain the skimming water level.
 - (d) Has a distance from the exit end of the flume to 1 or more means of egress located on the flume exit end wall or on an adjacent wall to facilitate the safe exit of riders from the pool.
 - (5) A pool owner shall ensure that a flume surge reservoir tank meets all of the following requirements:
 - (a) Has a surge capacity equal to a minimum of 2 minutes of combined flow from all pumps on the tank.
 - (b) Is accessible for cleaning and maintenance.
 - (c) Is protected from unauthorized entry.
 - (6) A pool owner shall ensure that flume pump suction meets both of the following requirements:
 - (a) Are designed to prevent entrapment.
 - (b) Are taken from the flume surge reservoir tank when the tank is provided.
- History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2184 Poolside slides.

Rule 84. (1) A pool owner shall not install a poolside slide without prior approval from the department. A pool owner shall ensure that the poolside slide design and construction features, ladders, and handrails conform to the requirements of the slide manufacturer.

(2) A pool owner shall ensure that the poolside slide is positioned relative to all of the following to provide for the safety of persons using the slide and the pool:

- (a) The edge of a swimming pool.
 - (b) Adjacent pool walls.
 - (c) Lifelines.
 - (d) Diving boards.
 - (e) Other poolside slides.
 - (f) Water slide flumes.
 - (g) Pool ladders.
 - (h) Stairways.
- (3) A pool owner shall ensure that the poolside slide meets all of the following requirements:
- (a) Is constructed in accordance with the manufacturer's recommendations.
 - (b) Has a runway height of not more than 10 feet above the walkway or deck.
 - (c) Has the exit end not higher than 18 inches above the normal pool water surface.
 - (d) Has the exit end overhang the edge of a pool not less than 6 inches.
 - (e) Has a water depth of not less than 4.5 feet at the exit end, which shall be maintained for a distance of not less than 10 feet out from the exit end and for 3 feet on either side of the projected centerline.
 - (f) Has a distance of not less than 16.5 feet from the exit end to a wall ahead.
 - (g) Has a distance of not less than 3.5 feet from the projected centerline of the exit end parallel to any of the following:
 - (i) A lifeline.
 - (ii) A pool sidewall.
 - (iii) The side of a diving board.
 - (iv) The side of a water slide flume.
 - (v) The side of another poolside slide.
 - (h) Has a distance of not less than 10 feet, measured along the projected centerlines, from the intersection of the exit end of any of the following:
 - (i) The poolside slide.
 - (ii) A diving board.
 - (iii) A water slide flume.
 - (iv) Another poolside slide.
 - (i) Has a distance of not less than 10 feet, measured along the projected centerline, from the exit end of the poolside slide to the intersection with a lifeline.
- (4) A pool owner shall permanently affix signs or labels to a slide, as provided by the manufacturer, warning against any of the following:
- (a) Headfirst sliding.
 - (b) Diving from anywhere on the slide.
 - (c) Other misuses of the slide.
- History: 2001 MR 2, Eff. Feb. 6, 2001.

PART 3. OPERATION AND USE**R 325.2191 Pool doors and gates; use of safety equipment; surface maintenance; storage of chemicals; suits and towels; soap; trampolines.**

Rule 91. (1) A swimming pool owner shall ensure that a door or a gate in a swimming pool enclosure is in compliance with all of the following provisions:

- (a) Is kept closed.
- (b) Is locked while the swimming pool and the deck are not open for use.
- (c) A service entrance door or gate is locked while the swimming pool is open for use.

(2) A swimming pool owner shall ensure that safety equipment is used only for its intended purpose and is not removed from its established location.

(3) A swimming pool owner shall keep a lifeline in its intended place, except when removed for supervised activity.

(4) A swimming pool owner shall keep all surfaces within a swimming pool enclosure, bathhouse, and related facilities clean, sanitary, and in good repair.

(5) A swimming pool owner shall store chemicals in the original container that has a label, away from flammables and heat, and in a clean, dry, and well-ventilated place which prevents unauthorized access to it and which prevents accidental spillage and mixing with other chemicals.

(6) If swimming suits or towels, or both, are furnished to swimming pool users, then the pool owner shall thoroughly launder the suits and towels after each use. The pool owner shall keep the supply of clean suits and towels separated in storage and handling from used, unlaundered suits and towels.

(7) A pool owner shall provide soap at each lavatory and at each shower.

(8) A pool owner may have a trampoline accessible for use only if the owner provides adequate supervision

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2192 Swimming pool use.

Rule 92. (1) A swimming pool owner shall ensure that a person who has any of the following medical conditions is excluded from a swimming pool, except that the person may be granted use of a swimming pool upon a written determination by the department, a personal physician, or a local health officer that the condition will not affect the health of other persons using the pool:

- (a) An infectious or communicable disease.
- (b) A possibly infectious condition, such as a cold, skin eruption, or open blister.

(2) A swimming pool owner or his or her representative may require a person who uses a swimming pool to take a cleansing shower before entering the swimming pool enclosure.

(3) A swimming pool owner shall ensure that the bathing apparel worn in a swimming pool is clean.

(4) A person shall not spit in, or otherwise pollute, swimming pool water or related facilities.

(5) A swimming pool owner shall ensure that running or boisterous or rough play, is not permitted in a swimming pool enclosure or bathhouse.

(6) A swimming pool owner shall ensure that a person wearing street clothes or shoes, is not permitted in a swimming pool.

(7) A swimming pool owner shall ensure that glass, other breakable materials, or an object or material that might create a hazardous condition or interfere with the efficient operation of the swimming pool are not permitted in a swimming pool enclosure. A swimming pool owner shall post a sign that prohibits glass, other breakable materials, and hazardous objects or materials in the pool enclosure.

(8) If the owner or operator allows food or drink and associated articles in a swimming pool enclosure, then the owner or operator shall comply with all of the following provisions:

- (a) Provide poolside control to maintain safe and sanitary conditions.
- (b) Not permit food preparation in a swimming pool enclosure.
- (c) Prominently display a sign conveying requirements for safe and sanitary disposal of all food wastes and precluding consumption of food and beverages within the pool.

(9) A swimming pool owner shall ensure that the consumption of alcoholic beverages in a spa pool is not permitted.

(10) A swimming pool owner shall prominently display, at the pool, a sign warning against the use of a pool after the consumption of alcoholic beverages.

(11) A swimming pool owner shall ensure that a pet or other animal, except for a trained guide dog accompanying a person who has a disability, is not permitted in a swimming pool enclosure. A guide dog is not permitted in a pool.

(12) A swimming pool owner shall ensure that diving is not permitted from the edge of a pool at any location where the water depth is less than 5 feet.

(13) A swimming pool owner shall remove starting platforms or make them physically unusable after any type of competitive usage, except as provided by R 325.2135. A swimming pool owner shall ensure that starting platforms are not used for any noncompetitive use.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2193 Bather capacity limits.

Rule 93. (1) A swimming pool owner shall ensure that the number of persons in bathing apparel within a swimming pool enclosure does not exceed the bather capacity limit established by the department or local health department.

(2) A swimming pool owner shall ensure that the bather capacity limit or maximum bather load is not more than the following number of persons, as applicable:

- (a) Seven persons per 100 square feet of water surface area where the water depth is not more than 5 feet.
 - (b) Four persons per 100 square feet of water surface area where the water depth is more than 5 feet.
 - (c) One person per 100 square feet of walkway and usable deck area within the swimming pool enclosure.
 - (d) One person for every 2 lineal feet of spa pool bench inner perimeter, excluding the means of egress.
- (3) The department may establish a smaller bather capacity limit for irregular conditions.
- (4) A swimming pool owner shall prominently display the bather capacity limit within the swimming pool enclosure.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2194 Water quality standards.

Rule 94. (1) A swimming pool owner shall maintain a suitable free available residual of the disinfectant throughout the swimming pool water.

(2) A swimming pool owner shall test the water before and during each period of swimming pool use, at a frequency of at least once per day, to assure the maintenance of pH and disinfectant residuals as established by table 3 of this rule.

(3) A swimming pool owner shall ensure that the minimum free available disinfectant residual maintained, in milligrams per liter, satisfies the specifications of table 3 of this rule.

(4) Table 3 reads as follows:

Table 3

Disinfectant Residuals (Milligrams per liter)		
Disinfectant	pH	
	7.2 to 7.5	More than 7.5 to 8.0
Bromine	2.0	2.0
Chlorine	1.0	2.0
Chlorinated cyanurate*	2.0	4.0

*At 20 to 40 parts per million (ppm) cyanuric acid (cya). For higher levels of cya, add 0.5 mg/l for each additional 20 ppm cya, or fraction of 20 ppm above 40 ppm.

(5) The minimum disinfectant residual maintained with a different disinfectant shall be that which is as effective as provided in R 325.2156.

(6) When a cyanurate is used, a swimming pool owner shall ensure that the cyanuric acid level of the swimming pool water is not more than 80 milligrams per liter and is tested at least once each week and more frequently if necessary.

(7) A swimming pool owner shall ensure that the water temperature of a swimming pool is not more than 104 degrees Fahrenheit.

(8) A swimming pool owner shall prominently display at the pool, a caution sign, acceptable to the department, stating the maximum operating water temperature, other pertinent health warnings, and warning against the use of the pool by young children when the normal water temperature is more than 86 degrees Fahrenheit.

(9) A swimming pool owner shall ensure that a swimming pool is used only when the water is sufficiently clear to readily discern either of the following from the edge of the pool:

- (a) The entire bottom of the pool.
- (b) The main outlet grating from a horizontal distance up to 30 feet.

(10) If a swimming pool becomes polluted with feces, vomit, sewage, or other material, then the owner shall immediately close the pool from use and take actions to mitigate the pollution and restore water quality. The owner or operator may reopen the pool according to the contingency plan adopted by the owner under R 325.2194a and available for review by the department or local health department, if there is no approved contingency plan, then the owner shall obtain approval to reopen the pool from the department or local health department.

(11) A swimming pool owner shall promptly remove visible dirt on the bottom of a swimming pool or floating on the water surface.

(12) A spa pool owner shall drain, clean, sanitize, and refill a spa pool at a frequency acceptable to the department or local health department as necessary to maintain sanitary conditions.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2194a Contingency and emergency response plans.

Rule 94a. (1) The owner of a swimming pool shall prepare and implement a contingency and emergency response plan. The owner of a swimming pool shall have the contingency and emergency response plan available for review at the pool.

(2) The contingency plan shall, at a minimum, outline a program for rapid mitigation of contamination or water quality deterioration according to R 325.2194.

- (3) The emergency response plan shall outline minimum topics including the following:
- (a) Rescues and submersions.
 - (b) Equipment failure.
 - (c) Injury requiring medical attention
 - (d) Other conditions or events that create a hazard to the health and safety of persons using the pool.
- History: 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2195 Collection and analyses of water samples for coliform bacteria.

Rule 95. (1) The owner of a public swimming pool shall be responsible for the collection and the examination of water samples for coliform bacteria at a frequency of a least once per quarter. The department or local health department may determine whether additional monitoring is needed if necessary to protect the public health.

(2) A swimming pool owner or operator shall ensure that all water samples are analyzed for total coliform bacteria at the state laboratory or a laboratory certified by the department or by the united states environmental protection agency to analyze drinking water.

(3) The presence of total coliform bacteria or pathogenic organisms in the water sample is unacceptable water quality. A heterotrophic plate count of more than 200 bacteria per milliliter in a sample is unacceptable water quality.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2196 Water treatment.

Rule 96. (1) A swimming pool owner or operator shall continuously recirculate, filter, and disinfect swimming pool water 24 hours per day at a flow rate sufficient to recirculate the swimming pool volume of water within the time period required by R 325.2136, without interruption, except for cleaning the filters or for other maintenance and repairs.

(2) A swimming pool owner or operator shall ensure that a swimming pool is not used when its water treatment equipment is not functioning properly.

(3) A swimming pool owner or operator shall maintain the water level in a swimming pool at an elevation suitable for continuous skimming flow into the overflow system without flooding it.

(4) A swimming pool owner or operator shall use only the chemical that a chemical feeder manufacturer specifies for application by the chemical feeder.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2197 Presence of person qualified to test water and operate water treatment equipment required; "qualified person" and "readily available" defined.

Rule 97. (1) A swimming pool owner shall ensure that a qualified person who is responsible for testing the water and for operating the water treatment equipment of a swimming pool is readily available when the pool is open for use.

(2) As used in this rule, "readily available" means any of the following:

- (a) In any of the following locations:
 - (i) The pool enclosure.
 - (ii) The mechanical equipment room.
 - (iii) Adjacent offices.
 - (iv) Other rooms adjacent to the pool enclosure.
 - (v) On the premises.
- (b) On-call within 15 minutes of travel time to the pool.
- (c) At another suitable location acceptable to the department or local health department.

(3) As used in this rule, "qualified person" means a person who is familiar with swimming pool operation and who is authorized by the owner to operate the pool mechanical equipment, close the pool when necessary, test the pool water, and adjust the pool water chemical parameters.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2198 Lifeguards.

Rule 98. (1) A swimming pool owner or operator shall provide lifeguard service at a swimming pool, other than a wading pool or a spa pool, if any of the following provisions apply to the swimming pool:

(a) The pool is owned or operated by a government, a governmental subdivision or agency, a public corporation, or a school.

(b) The total water surface area within the swimming pool enclosure is more than 2,400 square feet.

(c) A diving board is provided.

(2) If lifeguard service is required by subrule (1) of this rule, then a swimming pool owner or operator shall ensure that 1 lifeguard for every 75 people within the swimming pool is on duty in the enclosure when the swimming pool is open for use. The department may waive this requirement if a contingency plan has been adopted by the owner and approved by the department under R 325.2194a.

(3) A lifeguard shall meet all of the following requirements:

(a) Be a capable swimmer and be competent in lifeguarding techniques.

(b) Have satisfactorily completed a recognized course of instruction in adult, child, and infant cardiopulmonary resuscitation with training in 2-person and resuscitation barriers of the type offered by the american red cross, the american heart

association, or the national safety council. A swimming pool owner or operator shall post valid and current evidence of successful completion of the course at the swimming pool when it is open for use.

(c) At a minimum, have satisfactorily completed a nationally recognized course of instruction, such as any of the following:

- (i) The american red cross lifeguarding course.
- (ii) The young men's christian association lifeguard course.
- (iii) The national pool and waterpark pool lifeguard course.

(iv) An equivalent lifeguard training course approved by the department. A swimming pool owner or operator shall post valid and current evidence of successful completion of the course at the swimming pool when it is open for use.

(d) Be dressed in suitable swimming attire which allows the lifeguard to be suitably prepared to enter the water and act in an emergency and which allows persons in the enclosure to be able to readily identify the lifeguard.

(e) Ensure the proper supervision of instructional and recreational aquatic activities in the pool enclosure. Activities that would distract from the proper supervision of persons using the swimming pool or prevent immediate attention to a person in distress are prohibited. An instructor, teacher, or coach meeting the lifeguard requirements of this rule shall directly supervise swimming programs, such as any of the following:

- (i) Recreational swimming.
- (ii) Lap swimming.
- (iii) Competitive swimming.
- (iv) Water exercise classes.
- (v) Swimming lessons.
- (vi) Scuba lessons.
- (vii) Physical education classes.

If a supervising instructor, teacher, or coach does not meet the lifeguard requirements of this rule, then a swimming pool owner or operator shall provide a separate lifeguard who meets the requirements of this rule.

(f) Have the authority to enforce, and be responsible for enforcing rules pertaining to safety and sanitation.

(4) The department shall maintain a listing of cardiopulmonary resuscitation courses and lifeguarding courses that the department determines is equivalent to the type of course required by subrule (3)(a), (b), or (c) of this rule. The agencies offering the other courses are responsible for providing sufficient evidence to the department to determine course equivalency.

(5) At a swimming pool where lifeguard service is not required by subrule (1) of this rule and is not provided, a swimming pool owner or operator shall prominently display a sign warning that there is no lifeguard on duty. The owner or operator shall ensure that the sign has legible letters that are not less than 4 inches high.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

R 325.2199 Operation reports.

Rule 99. (1) A swimming pool operator shall record the following information daily on a report form furnished by or acceptable to the department:

- (a) Swimming pool operational data.
- (b) Information about rescues, submersions, and accidents given medical attention.

(2) The operator shall submit a completed operation report to the department or the local health department in compliance with either of the following provisions:

- (a) Within 10 days after the end of each month in which the swimming pool was in operation.
- (b) According to an alternative submission schedule approved in writing by the department or local health department.

History: 1954 ACS 67, Eff. Mar 24, 1971; 1979 AC; 1979 ACS 15, Eff. July 21, 1983; 2001 MR 2, Eff. Feb. 6, 2001.

Traverse City Clinch Park Evaluation

7/30/2014

Issue	Potential Cost range		Comments
	Low	High	
1 The Water Feature area and pad floods in moderate to heavy rains:			
a Lower landscape areas	3000	8000	
b Develop berms	5000	8000	
c Install trench drains	12000	15000	
d Develop drainage barrier area	15000	25000	
2 Concrete curbs were added to select locations to contain and direct the water flow, in lieu of the domed finish surface described in 1/C8.4:			
a Cut & grind existing curbs	2800	4000	
b Replace existing curbs	3500	8000	
3 The domed surface is slippery when wet.			
a Acid etch domed surface	1200	4500	
4 The "Arched Rain Bar" feature does not work properly.			
a Continue plugging select holes with plastic plugs	0	500	
b Add second water supply	6500	11500	Does not include tank
c Add new holes along level plane	7500	20000	
d Add nozzles	12000	15000	
5 The "Arch Rain Bar Feature" is climbable.			
a Add warning signage	500	1500	
b Paint the ARB	2500	8000	
c Replace lettering with flush lettering	2500	5000	
d Protect low clearance areas	1500	5000	
e Replace ARB	20000	65000	
6 The LED light on the ARB are inappropriate for an interactive water feature, and are operationally difficult to winterize.			
a Investigation; plastic & temperature	200	500	
b Install waterproof plugs	1200	3500	
c Relight feature	6500	10000	
d Abandon lighting	0	2500	
7 The perimeter stream trough does not flow properly, has areas that pond water, and traps debris.			
a Replace gutter material & correct areas	15000	40000	
b Fill gutter material	4500	9500	
c Add water flow	8500	12000	
d Grout rock bed	2000	3500	
8 Concrete around the spray ring is cracking and deteriorating.			
a Remove & replace concrete around rings	15500	22500	
b Refurbish spray rings	6000	12000	
c Add safety surfacing	12000	35000	
9 Plant clippings, mulch, sand and other debris clog the system, requiring frequent cleanings by staff.			
a Add signage	500	2500	
b Adjust Landscaping	2500	8000	
c Add shower control	6500	10000	
d Add deck area	15000	30000	
e Add spare strainer basket	0	2500	
f Add second strainer	4500	8500	
g Add prescreen settlement tank	30000	50000	
10 Spray ring nozzles clog frequently.			
a Add filter on activity loop	15000	22000	
11 The water feature uses excessive amounts of water.			
a Replace reservoir tank	7000	15000	
b Replace reservoir tank with separator feature	30000	50000	
12 Installed piping is not code compliant.			
a Investigate and correct piping	4000	50000	
13 The filtration seems undersized, requiring backwash of system every ½ hour on busy days.			
a Add filtration to existing	6000	25000	
b Add filtration to activity loop	6000	25000	
c Replace filtration with vac-sand system	35000	65000	
14 The auto-fill for the water feature is difficult to monitor and repair.			
a Re-locate auto fill to mechanical room	2000	4500	
15 The Water Features storm water evacuation is limited to 38 gpm.			
a Add drywell	10000	15000	
16 Chemical treatment reservoirs are difficult to monitor and fill, require service 3 times per week.			
a Relocate chemical tanks	1500	3500	
b Provide larger capacity chemical tanks	2000	4000	
17 Pump skids are not grounded.			
a Test grounding and bonding	500	1500	
b Grounding and bonding if required	1500	3500	
18 The water feature requires on site staff during all operational hours.			

Note: The above cost projections are preliminary. Costs are presented in isolation, and have not been evaluated for concurrence impact, and are not necessarily cumulative.