Rutherford High School
Pool Investigation Report

for the

RUTHERFORD BOARD OF EDUCATION

Rutherford Public Schools, 176 Park Avenue, Rutherford, NJ 07070
PSA Project Number 7984

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09 April 2019 (Record Edition)

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9 April 2019
(Final Report Issue)

Mr. Joseph P. Kelly
Business Administrator
Rutherford Board of Education
176 Park Avenue
Rutherford, New Jersey 07070

Re: 7984 – Rutherford Board of Education
2019 **Rutherford High School Pool Study**

Dear Mr. Kelly,

The Rutherford School District is presently managing the existing High School pool facility, but has only nominal use by the swim team at selected periods in each year between November and the following February. The substantial use of the facility is by the YMCA for a pool program that they arrange and operate. The District has requested an evaluation of the pool facility for the purpose of identifying any existing deficiencies or other issues needing correction, and is seeking cost information related to such potential corrective work.

A report on the pool has been compiled which includes examination of the pool systems as well as the enclosing structure with its various building systems. The report begins with an Executive Summary in Section 1, followed by report Sections 2 through 6 on each of the building aspects along with the team's professional observations and professional opinions. Based on those observations, the report contains a cost summary in Section 7 relating to the report recommendations for potential corrective action. The last Section 8 has partial floor plans showing the part of the High School containing the swimming pool, for reference while reviewing the report observations.

The recommended actions from the various report sections listed in Section 7 Rehabilitation Cost Summary have also been assigned a Priority Rating from 1 to 5. Priority 1 is an action of Highest Priority, and a rating of 5 would be assigned to Deferrable Tasks that can be postponed if desired.

Regards,
Parette Somjen Architects, LLC

By: Kellen M. Chapin, AIA, LEED AP | Senior Project Architect

cc: Jack Hurley, Superintendent of Schools
Anthony Paterno, Director of Buildings and Grounds
Frank Morano, High School Principal
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Professional Team

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Aquatic Systems	**Atlantic Aquatic Engineering, Inc.** 1823 Deep Run Road Pipersville, PA 18947 John D. Bray, LEEDap / President
Structural Engineer	**Persimmon Engineering, LLC** 100 Hanover Avenue, Suite 402 Cedar Knolls, NJ 07927 David M. Bush, PE / Managing Partner
Mech./Elec. Engineer	**Premier Engineering Group, Inc.** 439 Route 46 East Rockaway, NJ 07866 Gregory Cheney, PE / Executive Vice President

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SECTION 1:

Executive Summary

by Parette Somjen Architects

for the

Rutherford High School Pool Investigation Report
56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

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1.1 EXECUTIVE SUMMARY

A. **Study Purpose:** The Rutherford Board of Education has requested an assessment of their High School Pool Facility. The purpose of the study is to identify any observable deficiencies, and to estimate repair or renovation costs that would be necessary to address discovered issues. The report starts with the basic assumption that it is desired by the Owner, in general, to keep and maintain the existing building attributes as they have been built, and not seek any large scale alterations or upgrades. The District owns the pool facility, but pool use is understood to be as follows:
   1. The High School does not operate any swimming instruction program.
   2. Use of pool by the RHS Swim Team is seasonal between each November and the following February, for limited periods. Some hosting of several competitions each season is reported.
   3. Primary user of the pool facility throughout each year is the YMCA. Pool use includes utilization of the lower level boys' and girls' locker rooms located below the 230 Gym. Provision of staff to supervise pool use is by the YMCA, as coordinated with their hours in the facility.
   4. Required water quality testing and filter system maintenance is arranged by the YMCA, including purchase and use of chemicals, and maintenance of necessary records.
   5. The Rutherford School District provides heat for the water and the pool spaces, power for lighting and all electrical equipment, and fire alarm system operation.

B. **Section 2 Background Information:** This report is arranged in sections that pertain to the various building components or systems that support the overall pool facility. **Section 2** simply outlines the basic background information about the 1980 Pool Addition to the Rutherford High School. The written information is supplemented with a photo exhibit that illustrates and describes specific issues which the team observed.

   That Section 2 graphic material is then followed by Sections 3 through 6, with each one reporting the observed conditions in relation to the important aspects of each system. The detailed reports are then followed by Section 7, which is the summary of the probable costs pulled from each system report, and consolidated into the part of the report concerned with budget concerns.

C. **Section 3 Evaluation of the Pool System, by Atlantic Aquatic Engineering, Inc.:** The evaluation provided by Mr. John Bray of Atlantic Aquatic Engineering, Inc. describes the design choices that were made for this facility, and recommends prudent choices for the ongoing management of the pool. The pool was provided with a relatively high quality stainless steel gutter system, when it was built 39 years ago, and that feature is remaining in functional condition, although it needs cleaning. Mr. Bray made several other observations:
   1. In general, the pool system itself is fully operational, and the water is being maintained in clear usable condition. The last full cleaning was in August of 2018.
   2. However, the general appearance of the natatorium is poor. Finishes, both in the pool and around it have some deterioration. The lighting is dimmer than the illumination levels in applicable reference standards. The overall effect is not inviting.
   3. The pool shell has been painted, which means that it needs to be maintained as a painted shell going forward. Faded line graphics and shell paint need renewal at the next full draining cycle.
   4. The Filtration System was found to be operational and performing at near to the code required circulation rate.
   5. The report on pool systems provides a discussion about the existing chemistry system, including concerns about the observed conditions, and the detailed comments are not summarized here.
   6. Air quality is an issues that could be better managed. The existing acid pump was not functioning, although it was reported to have a replacement on order. Other than getting this system back on line, there are other actions that would improve the situation by reducing chloramines described in the Section 3 Conclusions and Recommendations.

7. The Conclusions and Recommendations list on the third page of the pool report contains 9 issues that can be improved, ranging from just cleaning, to modifying selected elements, to replacing items of equipment with an improved approach.
8. Page 4 of report section 3 concludes with the list of upgrades or beneficial actions, labelled with their projected net costs. The net item budgets are factored up by 25% to account for necessary soft costs to derive the overall project budget allowances appearing in the later Section 7 Cost Summary.

D. **Section 4 Evaluation of the Pool Enclosure Structural System, by Persimmon Engineering, LLC:** The existing structural systems were examined by David M. Bush, PE. As observed and according to existing drawings, the structure of the 39 year old building uses a bearing block wall construction except for steel columns along part of one side where the addition abuts the exterior wall of the original 230 Gymnasium. A pattern of large steel girders supports the wood roof joists and plywood roof deck over the pool space, bearing on concrete masonry unit (CMU) pilasters, except at the steel columns against the 230Gym wall. The adjacent support space roofs also bear on the CMU walls, but the steel roof deck is spanning to open web joists. Both steel deck and metal structural members are corroded from effects of the corrosive atmosphere.
1. In general, the existing structure is sound and stable. Some wall cracks were observed, and it is recommended that the various cracks be repaired.
2. The other recommended type of corrective action regarding structure involves protection of metal components. Corrosion is not being adequately managed based on the visible deterioration of most metal surfaces. Correction of contributing causes for the corrosion in the pool systems will certainly help this problem, but surface preparation and application of effective high performance coatings on structural members and other metal surfaces will preserve the viability of metal elements in the future.

E. **Section 5 Evaluation of Mechanical and Electrical Systems, by Premier Engineering Group, Inc.:** Since the pool is enclosed, it has mechanical and electrical systems to create suitable conditions for the Natatorium occupancy. The Boiler supplies heat for the heat exchanger that heats the pool water, heat for the air handler that delivers heated air to the pool space and other rooms, and domestic hot water for the Elliott Wing of the High School. This third use of this boiler is unrelated to the pool facility heat requirements.
1. Electrical components are being affected by accelerated corrosion, which is being exacerbated by the exposure to caustic substances, with moisture present. Revisions to be made for continued functionality and improved safety involve replacing damged devices, either in place with properly selected NEMA rated equipment, or with relocation of panels or other electrical components to a less vulnerable location.
2. Correction of lighting levels is recommended by replacing the existing fluorescent fixtures with corrosion resistant fixtures designed for this natatorium function.
3. The third area of mechanical, electrical, and plumbing (MEP) work involves alteration of the HVAC equipment. The mechanical system for a natatorium needs to be effective at thermal control, humidity control, and ventilation under a series of very challenging conditions. The equipment needed is the type that is specifically engineered for this application. The report section recommends such specialized new equipment to address the air system conditions that the existing equipment does not resolve. Presently, the equipment affects humidity only by increased exhaust quantity without energy recovery. Ideal temperature of the air is not maintained. The exhaust intake located at the roof is highly ineffective at clearing excess chloramines (heavier than air) that collect near the water surface, yielding poor air quality at the occupied zone. As a related issue to the possible change in HVAC approach, the discussion contemplates taking the pool boiler out of domestic hot water service to the Elliott Wing, by putting in a new commercial hot water heater in that other boiler room? This would make the pool boiler a dedicated separate system for only pool energy use.

F. **Section 6 Observation of the Pool Facility Enclosure & Interior, by Parette Somjen Architects, LLC**: The exterior envelope consists of the low-slope roof, enclosing walls, with doors, and the floors in the various spaces. This pool addition does not have windows. The structure is about 39 years old. One essential finding is that the enclosing envelope finishes exposed to the weather are in need of maintenance in the near future (next several years).

1. In the case of the roof, there is some discretion in terms of timing of roof work, but the available solution is unfortunately in the class of a whole roof system renewal being necessary, at least over the main pool space itself. The supporting mechanical and office spaces already had their roofs renewed in 2009 along with the Elliott Wing roof, and all those heavily insulated sections of white reflective heat welded roofing membrane have a 30-year warranty. The existing roof over the pool itself, by contrast, has very little insulation now, so the potential for significant energy savings is available to the District when the roof does get replaced. Roof replacement also grants the opportunity to correct any deficiencies in the assumed existing vapor barrier that should be located on top of the roof deck, between the elevated humidity of the pool environment and the roof system insulation layer that can be damaged by the concentrated moisture source from the high humidity in the air over the pool.
2. The exterior concrete masonry unit (CMU) walls need some crack repair and then complete wall surface recoating on the interior side with a low-perm, high performance coating. That would help retard the vapor migration horizontally toward the exterior wall finish. It would also address the paint finish deteriorated zone low on the enclosing walls of the pool space (about 2 feet up from the pool deck), and improve wall appearance throughout the spaces.
3. Wall exteriors of both painted CMU and applied EIFS both need rehabilitation. The bare single-wythe CMU walls and the minimally insulated EIFS covered walls are not energy efficient. The recommendation to use the newer drainable EIFS design at both wall types would fix the existing delamination issues and the poor energy profile.
4. Metal materials and finishes associated with multiple systems are corroding. Duct support frames and fasteners leave rust tracks on the walls. Door hardware is rusting. Door frames are pitting. Protective coatings and selective replacements would address these.
5. The balance of the architectural upgrades have to do with improving appearance of surfaces and finishes to address the degraded appearance of the space.

G. **Section 7. Rehabilitation Cost Summary.** The attached chart in this section illustrates the aggregate costs for rehabilitating existing deficiencies, derived from the various report sections. It is not necessary that all scopes represented need to be done in one contract arrangement. The summary only tallies the costs for the purpose of understanding the gross amount of deficiency correction that may become necessary within the next three to five year period. The recommendations for rehabilitation work are ultimately subject to overall budget constraints and the rate at which any advancing deterioration is progressing. For example, corrosion in certain electrical components located within the filter room has already required replacement of devices. More electrical device replacements will be needed, but for now, systems are remaining functional.

Priority. The professional team has assigned priority values (on a scale from 1 to 5, running from most urgent to least important). This was done to aid administrators in planning of possible actions in a way that could address the most important corrections first. Assuming that several needed repair items described as being in the works are in fact being done, the team observed that the pool facility is basically in an operable condition, with no urgently needed actions. Appearances may not be attractive, discomforts may be tolerable, and condition of various items are less than ideal, but the pool is still being kept in usable condition.

The budget for the complete action list from each section for all priority levels is summarized below.

In Section 3 for the pool systems, some items are for improving operation ease, and some might not be deemed to be high concerns, at least from the perspective of just achieving adequate facility maintenance. Some ideas like the scoreboard and timing system restoration are only essential in a competition setting. Such an improvement is not a typical building maintenance item. It would be an athletic programs adequacy issue, perhaps having a different priority rating than we have assigned to it.

Section 4 for Structural Deficiencies is the smallest group. They essentially have to do with keeping existing structural components in viable condition. The cited actions would fix minor defects or protect metal surfaces that are suffering from corrosive exposure. A moderately paced maintenance program could accomplish these relatively minor steps. The listed cost items do not include any major structural alterations that might come from any potential HVAC alterations, since new systems designs have not been made or possible equipment locations decided.

Section 5 for the mechanical system upgrades is the most costly group. Correcting deficiencies in the majority of points involves changing major pieces of existing equipment to ones that were designed for natatorium applications. Most are interrelated to the other elements of a given system, resulting in there to be no inexpensive option because the alteration is actually a related series of corrections that are all interdependent. The existing mechanical equipment is being maintained, and is currently performing its function to the extent that it can. Heat is being produced, outside air is being introduced into the space, and air is being exhausted, at least form the top of the space.

Section 6 for the Pool Enclosure has listed deficiencies that are categorized as maintenance and refurbishment, with a few upgrade actions. The potential actions are of moderate importance, and not urgent. In the case of roof system and wall EIFS replacements, the two actions are somewhat related where they intersect at the roof edge fascia.

Budget Summary for aggregate lists of possible corrective actions, detailed in Section 7. Refer to Section 7 itself to see the full detail behind these summary totals.

Section	**Description**		**Project Budget for Hard and Soft Costs**
3.0	Pool Systems		$ 347,710.00
4.0	Structure		$ 81,000.00
5.0	Mechanical and Electrical		$ 793,750.00
6.0	Pool Enclosure, Architectural		$ 514,320.00
	Aggregate Total		**$ 1,736,780.00**

H. **Section 8**. Plan Diagrams of the High School Pool Facility, for reference.
1. Overall Pool Facility Floor Plan
2. Large Scale Detail Plan of Support Spaces

SECTION 2:

Background Information

by Parette Somjen Architects

for the

Rutherford High School Pool Investigation Report
56 Elliott Place
Rutherford, NJ 07070

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2.1 BACKGROUND INFORMATION

A. The Rutherford High School original section facing Elliott Place was built in approximately 1922. The overall floor plan has a configuration shaped like an E. The wing of that structure on the southern end contains the 230 Gymnasium, with boys' and girls' locker rooms below it on the lower level. The High School subsequently had additions constructed in 1938 on the east side toward the play field, and a major addition along Mortimer Avenue was constructed in 1957. It remained at that size until 1980.

B. At or about **1980**, a **Natatorium Addition** was built up against the southeast corner of the 1922 building southern wall of the 230 Gym. That brick wall surface is visible within the enclosed pool space, and has been painted. There is no fire wall separation between the pool space and the main school building. The former Gym window openings were blocked up at their lower sections when the addition was put onto the building, but remain as windows into the gym with their raised sills being above the Natatorium roof level. The Natatorium space has limited metal three tier bleacher seating sections on one side only against the Gym wall.

C. A corridor was constructed to provide access from the pool space to the existing locker rooms on the adjacent lower level. Ramps were required to match up the floor levels of the locker rooms and the new Pool Room. Users of the pool are granted access to the locker rooms with their shower facilities to accommodate the requirement at public pools that showers be taken before entering the pool water.

D. The pool facility and its supporting spaces are not equipped with fire sprinkler systems.

E. The pool facility does have three exit doors: two doors exit directly from the pool space (single door toward the field, and a double door toward Elliott Place), and one double door leads to the double door exit at the adjacent corridor.

F. Rutherford HS Swimming Pool. Reported maintenance and repair actions include:
- Last full draining and surface cleaning (08/2018)
- Repair of corroded Electrical components in Filter Room (2015)
- Replacement of Pool Filter (2003)
- Repair in Boiler Room following localized fire (2016)

Water quality maintenance operations are under the management of the YMCA, including the record keeping requirements that are mandated for public swimming pool facilities.

G. Present Usage Conditions
1. The High School does not operate any swimming instruction program.
2. Use of pool by the RHS Swim Team is seasonal, for limited periods.
3. Primary user of the pool facility is the YMCA.
4. Required water quality testing is arranged by the YMCA.

H. Pool Facility Existing Room Areas:

1.	Pool Room	6,342 sq. ft.
2.	Pool Office	81 sq. ft.
3.	Filter Room	402 sq. ft.
4.	Boiler Room	261 sq. ft.
5.	Mechanical Room	132 sq. ft.
6.	Corridor to vestibule	135 sq. ft.

I. Photos of Existing Conditions

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2.2 EXTERIOR PHOTOS

Photo 1: The 1980 Pool Addition was built up against the south wall of the 230 Gym that had been built in 1922. This is the wall facing Elliott Place. The pool exit doors are at the far edge.

The wall finish is Exterior Insulation and Finish System (EIFS). The central zone of this wall has become delaminated, and the stucco like surface can be physically moved if you push on it.

Photo 2: Just inside the double doors in the photo above, the 239 Gym exterior wall has been painted. The columns supporting the main girders above are located up against the original building's exterior wall.

Photo 3: The top edge of three wall shown in Photo 1 has been mechanically fastened over the delaminated zone to prevent gross separation until the wall system can be replaced.

Photo 4: The south wall is very close to the fence at the property line, providing only limited narrow access to the surface for maintenance or renovation work.

Photo 5: The east wall faces the field with distance to the fence line restricting access at this side also.

Photo 6: Backing up from the previous view, the wall of the Boiler Room and Filter Room beyond are exposed concrete masonry (CMU) walls, painted. They do not have the EIFS applied finish like the pool enclosing walls have.

Photo 7: Eastern part of Pool Addition Roof: Roof over the pool space is the high portion beyond, in this view. The round roof top exhaust fan over the pool is visible. The lower section nearer and visible in this view is the area over the filter rom before the white roof was put on in 2009.

Photo 8: View of the new roofs over support spaces as they neared completion with the white reflective membrane. The replacement occurred only over the support spaces, and not over the main pool roof.

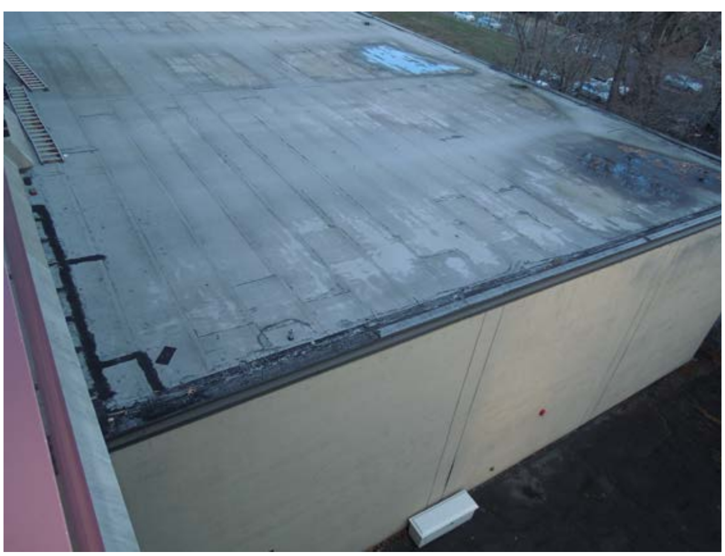

Photo 9: Western section of the main pool roof as it is today. Dark seam repairs are visible in lower left corner, and ponding is observed at the southern edge. The lighter shading strips running perpendicular to the roll lap lines are the high points above the steel girders below. Those lines of less deflection in the roof deck make the ponds occur in localized depressions between the main girder lines. A new roof application could utilize tapered insulation along with local sump kits at the drains to eliminate the ponding.

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2.3 INTERIOR PHOTOS

Photo 10: Main Pool Space Interior View: Main girders cross the space. Wood roof rafters span to ledger blocks on the beam sides. The pool has six lanes, with the starter platforms visible at the far pool end. Three tiers of metal bleachers are just off the photo to the left side. Existing supply ductwork is wall mounted at both side walls. General lighting is located only along the edges, where the fixtures can be serviced from the side deck areas.

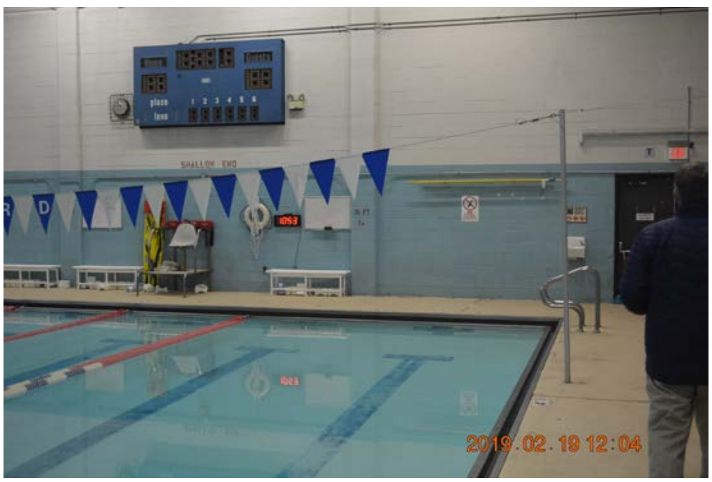

Photo 11: Opposite End wall, with Scoreboard: Note the pole supporting the cross pool flag line cable. The guy cable extending from pole top to the right side is actually fastened to the wall mounted duct work that is just outside the photo edge. It really should be routed properly to a wall anchor point, like that on the other side.

Photo 12: Single point exhaust register at roof. This system pulls out room air with its odors and heat. The existing exhaust setup has no means for recovering the thermal energy in the air being pulled out and exhausted to the exterior.

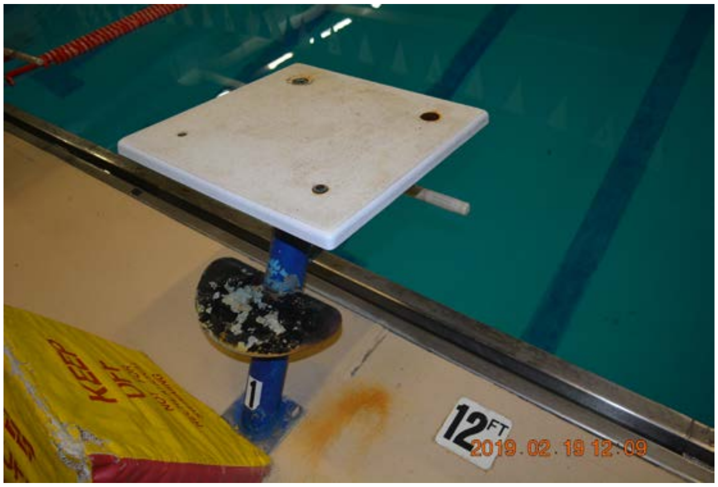

Photo 13: Typical starter platform. These are of rigid permanent type, non-removable. Finish on bases are in poor condition. Hardware is corroded. Foam safety cps are in poor condition also.

Photo 14: Filter Room, view of filter and water quality equipment arrangement.

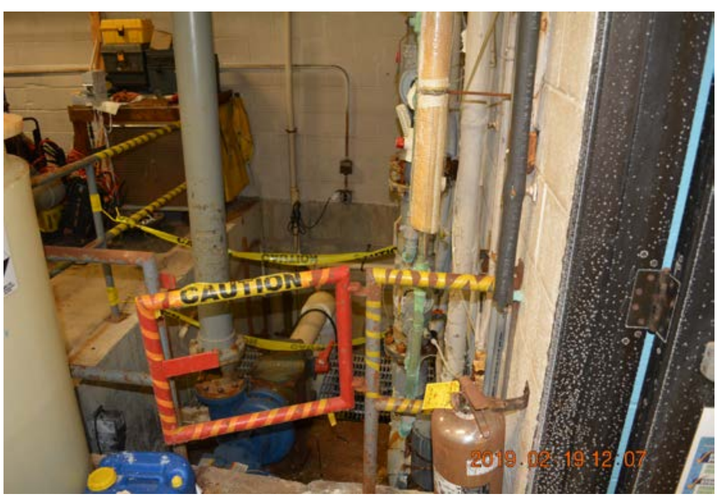

Photo 15: Filter Room sump area.

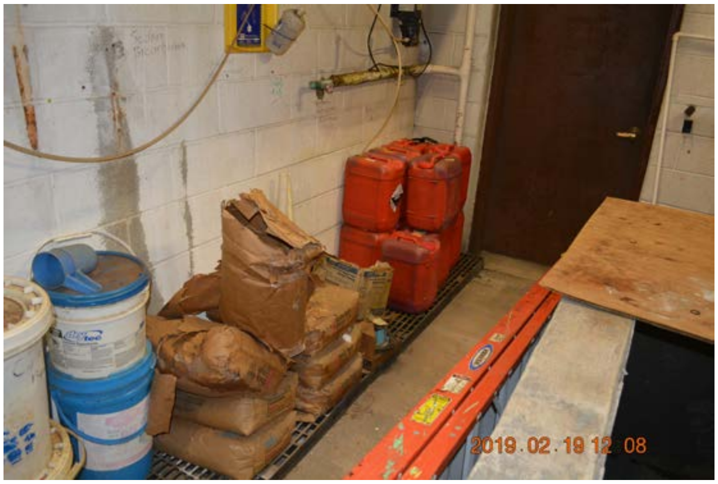

Photo 16: Exposed chemical storage area in the filter room.

Photo 17: Electrical Center within the Filter Room, immediately adjacent to the chemical storage location. Metal components are incurring extreme corrosion. Replacement of selected devices has become necessary in the past in order to restore functionality.

Photo 18: Boiler Room. This unit supplies heat for pool water, pool space room air heating, and it also supplies domestic hot water to the Elliott wing of the High School.

Photo 19: The existing air handler machine room is only accessible form the exterior door shown here. Minimal space is available around the equipment, barely sufficient to squeeze along one side and one end. Serviceability is impaired.

Photo 20: Air handler room limited access around equipment. Replacement would require partial removal of the exterior wall.

Photo 21: Existing corridor out to Locker Rooms and Showers, located through the end doors and to the left down a second ramp. Rubber flooring with raised disc tread pattern is moderately worn.

Photo 22: Pair of exit doors toward Elliott Place. Door hardware base metal suffers in the corrosive atmosphere. In cool weather, the refrigerated metal surfaces have water freely condensing on all surfaces.

Photo 23: Exit door toward field. Condensed moisture is readily visible. Any carbon steel base metal items quickly corrode under this aggressive condition.

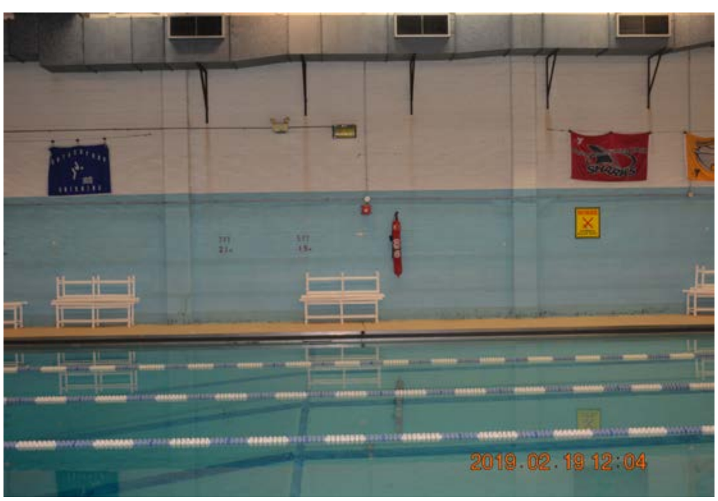

Photo 24: All metal items and fasteners suffer from corrosion as can be seen by the rust streaks below the duct support brackets on the opposite wall.

Also note the wall finish damage along the base course of masonry from the adverse effects of chemical vapors in the room air. The vapors are heavier than the room air, and collect close to the water elevation.

Wall paints in this application need to be industrial protective coatings, not standard interior wall paint.

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PARETTE SOMJEN ARCHITECTS

SECTION 3:

Evaluation of Pool Systems

by Atlantic Aquatic Engineering

for the

Rutherford High School Pool Investigation Report
56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

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9 April, 2019 (Record Edition)

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Aquatic Facility Inspection Report

Date of Inspection: 19-FEB-19

Location: Rutherford High School Natatorium

Perspective & General Appearance

The District is considering various options for its future aquatics programs and facilities and wishes to assess the condition and renovation opportunities of its existing natatorium as part of such consideration.

The general appearance of the natatorium is poor. The deck coating is badly deteriorated, the wall paint is worn and outdated, the exposed, tarnished galvanized steel ductwork is oppressive, the exposed wooden roof structure is unsightly and the overhead lighting (averaging 23.6 foot-candles vs. 2015 ISPSC[1] minimum requirement of 30 fc) is inadequate. Based on our experience a level of at least 50 fc is preferred, especially at the ends on the pool. Combined with the deteriorated interior pool finish (discussed below) the conditions offer a dilapidated, unwelcoming environment.

The starting platforms are outdated, deteriorated and unsightly but based on our visual inspection, they are safe to use. The other deck equipment, (grabrails, lifeguard chairs, etc.) were in apparent good condition.

The existing scoreboard is said to be functional but without a corresponding timing system. This means that during meets, officials must use stopwatches for recording times and results must be entered manually into the scoreboard for display. Such a system is archaic and ineffectual since swimmers' times are often just a fraction of a second apart, certainly beyond the ability of an official to accurately record with a stopwatch. We show the approximate cost of a new, very basic scoreboard with integrated timing equipment below in our cost opinion segment.

The original diving board has been removed thereby exposing the make-up water fill spout as a tripping hazard.

Pool Shell

The pool was full during our inspection and based on our non-invasive observations, we found the structure to be in good condition. The stainless-steel perimeter system and railings were variously tarnished or marked with mineral deposits but otherwise appeared to be in good condition.

The pool interior finish appeared to be painted. It could not be determined whether the interior finish was originally plaster, which would have been customary with this type of pool construction, or whether it has always been painted. The paint, particularly the racing lane markings, is in poor condition.
The existing main drain grates appear to be compliant with current Federal anti-entrapment codes. The expiration date on the grates should be reviewed annually to insure proper replacement when required.

<u>Filtration System</u> (located in adjacent mechanical space)

The pool mechanical room generally exhibits a moderate state of decline with heavy corrosion on pipe supports, fasteners, ferrous metal hair and lint strainer and most other ferrous metal components. We also noted an active drip at a temperature sensor connection.


Filter Tank


Recirculation Pump

The existing filtration system is a high-rate sand type with a capacity to filter all of the pool water once every 6.16 hours. The current code requires a capacity to filter the water in six hours, making the system marginally compliant. The filter is not original to the project and, insofar as could be determined, is in fair to good condition.

The recirculation pump is not original to the project and, insofar as could be determined, is in fair to good condition.

<u>Water Chemistry System</u>

There are two chemicals that must be monitored and added on a routine basis; chlorine to address waterborne pathogens and acid to control the pH (acidity/alkalinity) of the water. The addition of liquid chlorine (a very basic material) continually drives the pH up and since chlorine is most effective at destroying (actually oxidizing) pathogens when the pH is between 7.2 and 7.6, an acid must be added to counteract the effects of the chlorine. Since the amount of chlorine required for proper sanitation varies with usage, the most practical way to control the chlorine level and pH is through the use of an automatic water level controller, which continuously monitors both levels and activates relevant feed pumps to add chemicals when needed.


Chlorine Feed Pump


Bulk Chlorine Tank

All of the water chemistry components have been replaced, probably multiple times over the years. The current installation is functional put generally unprofessional. Chlorinator tubing is hung haphazardly around the room instead of being conducted in protective conduit or converted to rigid PVC pipe. The chlorine feeder shows signs of frequent leakage and accumulated dried chlorine deposits. The feed pump for the acid (pH control) was not operational. (Staff reported that a replacement was on order). A bulk chlorine storage tank is on site with the required primary and secondary containment. Filling such tanks safely is typically performed by a bulk truck and trained delivery driver. The awkward juxtaposition of the filter room vs. the nearest truck access, combined with the presence of 5-gallon chlorine containers warrants confirmation from staff that the tank is indeed filled by tank truck and that the 5-gallon containers are on hand for emergencies. Filling the bulk tank manually from 5-gallon containers would be very dangerous and if it were learned that this is happening, an alternative chlorine program should be developed immediately.

The automatic water chemistry controller was on line and appeared to be functioning properly during our visit. The unit is among the less sophisticated available but is nevertheless perfectly suitable for the task.


Automatic Water Chemistry Controller

Air Quality


Deteriorated Paint

Staff reported air quality problems within the natatorium during periods of heavy use. The air quality problems are caused by nitrogen trichloride (trichloramine) off-gassing from the pool water, which is a result of chlorine reacting with the organic matter introduced by bathers (see attached white paper). Nitrogen trichloride is much heavier than air and initially stratifies near the deck and water surfaces.
It is highly corrosive and deleterious to building components as well as human lung tissue. Evidence of long-term nitrogen trichloride pollution may be observed in the deteriorated paint at the base of the natatorium walls.

Maintenance Concerns/Recommendations (within five years)

- The acid pump (said to be on order) must be replaced since without it, acid must be added to the pool manually which is very dangerous. Off-gassing from open acid containers in the filter room may be the cause of much of the referenced ferrous metal deterioration in that space. Consideration should be given to a change to carbon dioxide gas for pH control. CO_2 is <u>much</u> safer for staff and is not corrosive.
- The leaking temperature sensor tubing connection must be repaired.
- Replace rusted pipe supports and ferrous metal components.
- Clean accumulated rust stains, properly support tubing and generally upgrade filter room appearance and functionality to professional standards.
- Refurbish or replace starting platforms.

Conclusions & Recommendations

1. While there doesn't appear to be anything wrong with the existing unit, we recommend the addition of an upgraded water chemistry controller that can monitor other operational parameters such as water temperature, filter flow, chlorine residual as well as the capabilities on the existing unit (oxidation reduction potential (ORP) and pH). Such units can be adapted by various means for remote monitoring such as through the school's local area network so that facilities personnel can conduct many of their routine checks from a desktop PC., tablet, smart phone, etc.
2. In order to help control the chloramines that result from chlorine use, which are particularly harmful to bathers with repertory difficulties and often cause deterioration of building components, a new, medium pressure, ultra violet light disinfection system should be installed to help control chloramine accumulation in the water thereby making the pool environment safe and comfortable for staff and bathers and friendly to building components. Additionally, a UV system will destroy any chloramine-resistant pathogens that pass through the filter system.
3. Even with the UV system, chloramines will evolve into a non-soluble state quickly during periods heavy use (see attached white paper). Ideally, a source-capture chloramine removal system should be added as an auxiliary HVAC component. Another option would be an enzyme program to help control the organics brought into the water by bathers.
4. A new automatic or semi-automatic water level control system should be installed so that make-up water can easily be added directly to the pool piping in the filter room to replace loss due to evaporation and splash-out. To accomplish this, a reduced-pressure-zone (RPZ) type backflow preventer must be added to the domestic water supply in the filter room along with other components. This type of system would eliminate the unprotected fill spout which should be removed and the open pipe threads plugged.
5. The existing grab rails and other deck equipment should be thoroughly cleaned.
6. The existing scoreboard and any related appurtenances should be removed. We have included the replacement of the timing system and scoreboard, since conducting of some competitions at this pool was reported.
7. The existing stainless-steel gutter system will likely last the life of the building. However, it should be thoroughly cleaned.
8. Depth markings are required inside the pool. The easiest solution is to place vinyl appliques on the gutter backsplash.
9. At the time the pool was built, open-channel gutters were common. Today they are considered hazardous and we'd recommend adding a grating over the gutter channel.

Below we list our preliminary opinion of the costs to implement the primary recommendations noted above. Depending on the actual scope of work, some economies of scale could lower the cost so a more accurate estimate could be formed during design development should there be a decision to renovate the facility. This opinion of cost does not include any associated natatorium architectural, electrical or mechanical work that may have been mentioned in our report.

Item	Estimate
New CO2 feeder	$2,200.00
Replace rusted pipe supports and ferrous metal components	$6,000.00
Filter room upgrade (tubing supports & misc. clean-up)	$2,000.00
Refurbish or replace starting platforms	$15,000.00
New water chemistry & UV systems	$58,000.00
New Chloramine (source-capture) exhaust system (not including any other HVAC upgrades)	$80,000.00
Enzyme treatment system	$3,500.00
Automated make-up water system	$2,500.00
Clean deck equipment	$2,500.00
Remove scoreboard	$1,500.00
Clean gutter	$3,000.00
Backsplash depth markers	$750.00
Gutter grating	$19,200.00
New interior pool paint & lane markings	$26,000.00
New 6-line scoreboard and timing system including touch-pads	$56,000.00
Total	**$278,150.00**

Respectfully submitted 3 April 2019 by;

John D. Bray, LEEDga, President

(1) ISPCS – 2015 International Pool and Spa Code establishes the code requirements for pool in New Jersey

ATLANTIC AQUATIC ENGINEERING, INC.

What's that smell?

We've all been there - walk into a natatorium or even through the front door of a hotel and there it is – the pool smell! So, what exactly do we smell? …… **Chloramines!**

"Chloramines" is a generic term for a family of partially oxidized organic compounds caused by a chemical reaction between chlorine and organic compounds (urine, sweat & body oil) introduced by bathers. The family is "born" when chlorine (which is essentially just an oxidizer) tries to oxidize the organics and fails because the chlorine levels we normally keep in pool water to fight (oxidize) waterborne pathogens is too low to oxidize organics, so the result of incomplete oxidation is monochloramines. Monochloramines (soluble in pool water) quickly evolve into Dichloramines (also soluble in pool water) and then, within minutes into Trichloramines (nitrogen trichloride - not soluble in pool water and four times heavier than air).

The trichloramines are the real problem in terms of air quality. The least bit of turbulence in the water, even flow over a gutter lip, is enough to release them and the more bathers in the water, the more organic material introduced and the more trichloramines created and released into the environment. The action of water features or slides is particularly effective in promoting the release of trichloramines into the atmosphere.

To make matters worse, trichloramines are so much heavier than oxygen that the air right over the pool is rich with them along with carbon dioxide exhaled by bathers which is also heavier than oxygen. That's why regular swimmers have respiratory illness like "swimmer's lung", and why competitive swimmers have to use respirators and sometimes take breaks for coughing fits. It's also why the deck equipment and building components in the pool area becomes corroded, especially low or near the water because trichloramines create a very acidic and toxic environment.

So now that we've figured out what the problem is, what do we do? We know that medium pressure UV systems destroy chloramines but they treat only those that make it to the filter room (remember it only takes minutes for trichloramines to evolve and the typical turnover time for pool water is six hours). That's why many pools so equipped still have problems, particularly during heavy bather loading like swim team practice. It doesn't help to introduce more than the required amount of fresh air into the room because most pool room HVAC systems are designed to collect air from near the ceiling and introduce it back into the room around the perimeter to keep the walls and windows warm and free of condensation, leaving the air over the water unaffected by the air turnover in the room. Opening doors or windows doesn't really help and it obviates the work of the HVAC system to control room temperature, humidity and air pressure.

We believe that there are two basic paths to a solution, one includes a permanent "marriage" between the pool equipment and the natatorium HVAC system and the other involves a chemical approach. These two basic solutions can be undertaken separately or together.

Permanent Solution: Source-Capture Technology (our preference)

The permanent solution is to capitalize on the fact that trichloramines are initially heavy and "lethargic", essentially loitering around (stratified) just above the water surface, waiting to be rounded up and handled. *Source-Capture Technology* has been developed to create a low-velocity, linear air flow across the water surface, pulling the trichloramines into a special exhaust air plenum. The fan connected to the plenum sends them out of the building. In some cases, energy from the exhaust air can be recovered and transferred to the fresh make-up air.

If the system is installed in a new facility, the mechanical engineer can select equipment that is designed to receive air from a source-capture plenum and provide a separate air path outdoors, thereby ensuring that polluted air is not mixed with recirculated air. If the system is installed in an existing facility, the existing HVAC equipment can be fine-tuned so that the total amount of room air exhausted and replaced does not increase. Depending on the type and age of existing HVAC equipment, this new technology can save energy as well.

With new construction, Atlantic Aquatic Engineering, Inc. can design air quality management solutions that are built into the pool wall along one side or end. With existing pools, Atlantic Aquatic's affiliate, *Swimair Technologies*, *Inc*. www.swimair.com, can develop a project-specific plenum that can be placed along the outside edge of the deck.

Chemical Solution: Preventive Measures & Enzyme Technology

We often use the following analogy for trichloramine-related air pollution; imagine that the trichloramines are "smoke". Smoke needs two things to form, heat and fuel. In this analogy, chlorine is the heat and the organic load in the water is the fuel. Anything that an operator can do to minimize the organic load will help control the "smoke". Measures include requiring bathers to shower with soap to remove body oil before entering the pool and engendering a cooperative effort among bathers to avoid urinating while in the water. Most facility operators struggle with such measures, often with limited success. In such cases the introduction of a systematic enzyme program to eliminate the organics combined with more moderate chlorine residual settings will significantly reduce trichloramine pollution. The enzyme action can be boosted by introducing oxygen microbubbles into the water. Enzyme technology and oxygen microbubble generators must be installed and maintained by a qualified commercial swimming pool service company. It must be remembered that the efficacy of the "chemical solution" described in the foregoing paragraph will last only so long as it is maintained. Changes in staff, cyclical budget cuts and other factors tend to compromise such programs over time which is why the permanent source-capture solution is our preference.

PARETTE SOMJEN ARCHITECTS

SECTION 4:

Evaluation of the Structural System

by Persimmon Engineering, LLC

for the

Rutherford High School Pool Investigation Report

56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

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Rockaway, NJ 07866
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9 April, 2019 (Record Edition)

April 3, 2019

Mr. Kellen Chapin
Parette Somjen Architects, LLC
439 Route 46 East
Rockaway, NJ 07866

Re: Evaluation of Existing Structure
Rutherford High School Pool Area
Rutherford Board of Education
Persimmon Job #19007

Dear Kellen,

As requested we performed a site visit to review the existing structural conditions in the pool facility at the Rutherford High School. Our inspection was visual and non-destructive in nature and limited to those areas accessible at the time of our site visit.

Additionally our effort did not include a structural analysis or testing of the existing framing or foundation and the findings in this letter report are based on our visual evaluation and professional opinion to determine an overall condition assessment of the existing structure.

Existing Structure Description

The referenced area was constructed as an addition to the existing high school structure and consists of the pool area of approximately 104'x63' and a pump and mechanical room of approximately 22'x20'. The original construction plans dated January 22, 1979 were available for our review and indicate the structural framing.

The roof framing of the pool area consists of 5 equal bays of 2x12 wood joists @ 16" o.c. with ¾" plywood decking that spans between steel wide flange beams spanning over the pool and bear on the masonry end walls. Along the portions of the pool addition which abuts the original structure the wide flange beams bear on square steel tube columns. At the opposite wall and the wall between the pool area and pump roof the beams bear on masonry pilasters constructed with the exterior wall.

Over the pump room and mechanical room the roof structure consists of metal roof deck on steel open-web joists spanning between the masonry walls.

The foundations for the walls and columns were not indicated on the original construction plans however the plans indicate the pool itself was constructed with cast-in-place concrete.

Observations and Recommendations

In general it is our opinion the structure in this area is in fair condition, no area of imminent structural concern were noted, however, there were some locations which exhibited deterioration which are noted below. Photos are attached in the pages following the letter report.

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PERSIMMON
engineering

Condition 1:
Some areas of water staining were observed on the plywood roof sheathing over the pool area, specifically in the area by the exterior door on the southwest corner of the enclosure. Note we did not have a lift or other access to the area but from our visual observations it did not appear to be an active leak but possible signs of a past roof issue which was addressed by re-roofing.
Recommendation 1:
As indicated the roof was likely repaired or replaced to address this issue, however the roof structure as a whole should be monitored for and signs of leaks or water infiltration.

Condition 2:
On the exterior wall with the pilasters at the joint between the pilaster and the masonry wall, a crack was observed for nearly the full height. This was observed on both sides of all four pilasters on the exterior wall. The crack did not appear to propagate into the pilaster or into the wall itself which indicates it is likely a thermal crack. Access to the exterior face of the wall was not possible due to the dryvit panels on the exterior of the building. See Photo 1.
Recommendation 2:
While these cracks appear to be thermal and not structural (the crack is affecting the capacity of the wall or pilaster). We do recommend routing out these cracks and filling them with an epoxy joint sealer to prevent any possible water infiltration from the exterior as well as a sealing the inside from pool water or moisture getting into the wall.

Condition 3:
At the base of one of the pilasters on the exterior wall there is a crack and damage in the lower 3 courses of block. While we cannot be certain this appears to be a result of impact damage as the crack does not continue to propagate thru the pilaster as a settlement or stress crack would likely do. See Photo 2.
Recommendation 3:
This area should be repaired by removing the deteriorated masonry and installing new to match the existing.

Condition 4:
In the pool deck at the end where the original plans indicate a diving board was installed. There is a repair in the slab, which is not flush with the adjoining area and has started to spall. While not necessarily structural in nature it does present a potential tripping hazard from an uneven surface and there is a potential for further deterioration over time from water getting into the improperly repaired area. See Photo 3
Recommendation 4:
The existing repair area should be removed by saw-cutting a square or rectangular area just wider that the existing area and patching with concrete flush to the existing surface.

Condition 5:
In the northwest corner of the pool area there was a vertical crack in the corner of the masonry walls. See Photo 4.
Recommendation 5:
The crack should be routed out, cleaned, and filled with an epoxy joint sealer.

Condition 6:
The metal roof deck in the pump room has two areas where moderate corrosion and pitting of the underside of the galvanized deck was noted. It is unknown if this corrosion was caused by water infiltration from the roof or the corrosive chemical in the pump room.
Recommendation 6:
It does not appear that the deck has lost its load-carrying capacity at the time of our inspection; however, corrosion in metal accelerates rapidly once it has started. Regardless of the cause, with the storage and use of corrosive chemicals in this room the deck should be addressed. Given the construction of this area, the most efficient way to repair the deck is remove the roofing this area needs and either remove existing metal deck removed and replaced or new metal deck matching the exiting profile nested in to the existing and fastened to the existing joists. We understand this may not be feasible due to the presence

of rooftop mechanical equipment so a solution such as welding clips to the open-web joists and installing new sections to the underside of the existing deck may need to be investigated as a potential option.

Condition 7:
In general the steel open web joists supporting the roof over the pump room exhibit heavy surface scale, our visual observations do not indicate section loss.
Recommendation 7:
These joists should be cleaned and repainted since they will continue to be exposed to the corrosive chemicals stored in the pump room.

Please feel free to contact me with any questions or if you require additional information.

Sincerely,
PERSIMMON ENGINEERING, LLC

David M. Bush, PE
Managing Partner

Photos

Photo 1 – Crack between pilaster and masonry. Typical at pilasters on exterior side of pool enclosure

Photo 2 – Damage at base of pilaster

Photo 3 – Repair in pool deck with start of spall.

Photo 4 – Northwest corner, note crack in corner of walls.

PARETTE SOMJEN ARCHITECTS

SECTION 5:

Evaluation of the Mechanical System

by Premier Engineering

for the

Rutherford High School Pool Investigation Report

56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

439 Route 46 East
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9 April, 2019 (Record Edition)

PREMIER ENGINEERING GROUP, INC.

MECHANICAL | ELECTRICAL | PLUMBING

April 3, 2019

Parette Somjen Architects, LLC
The Aviary
439 Route 46 East
Rockaway, NJ 07866

Attention: Mr. Kellen Chapin

Reference: Rutherford High School
Pool Investigation - Mechanical

Kellen:

The following represents our report of the mechanical system review of the pool facility at Rutherford High School.

If you have any questions or require additional information please do not hesitate to contact our office.

Thank you.

Very truly yours,

PREMIER ENGINEERING GROUP, INC.

Gregory Cheney, P.E.
Executive Vice President

GWC
Rutherford Pool Investigation – Final Report
Enc,l.

Existing Conditions

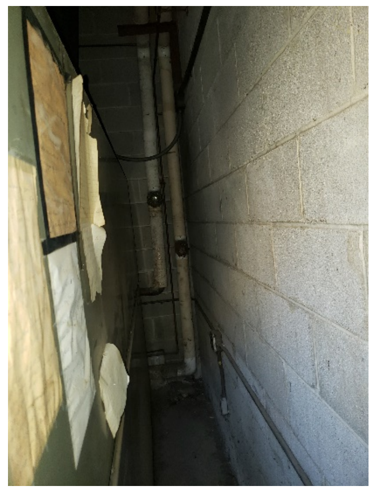
The swimming pool room is approximately 6324 square feet in size and approximately 21 feet in height. Of this space, approximately 3690 square feet is water surface of the pool.

HVAC

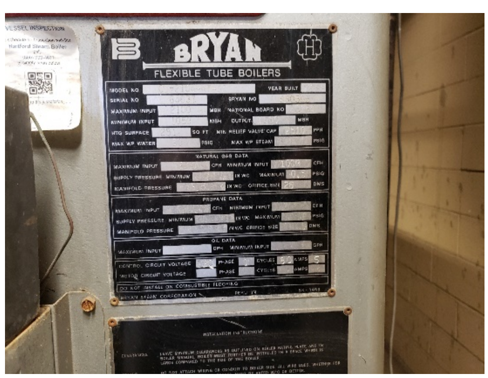
The space is served by a heating and ventilating unit. The unit is located in a mechanical room located outside the pool building. We were unable to verify the unit size as there is not sufficient access in the mechanical room to maneuver around the unit. On the door side of the room, there is approximately 1.5' of access and there is even less on the remaining three sides.


Mechanical Room


Air Handler


Air Handler

The unit has an outside air duct (going to the roof of the mechanical room), a return air duct and a supply air duct. It is heated with a hot water coil. The hot water coil is fed from a boiler that serves the pool room space heating, the pool water heating and the domestic hot water for the Elliot wing. The boiler is a nominal 50 HP boiler with a natural gas input of 2100 MBH and heating output of 1680 MBH (80% efficient).




Supply Duct


Outside Air and Return Ducts


Outside Air Duct

The supply ductwork then routes through the wall, above the corridor, enters the pool room and travels along the ceiling to the far (east) wall. The ductwork then splits into two branches running along the east wall and is distributed into the space through eight supply diffusers. The return duct is routed along the west wall of the space and returned to the air handler through six return registers. A single exhaust fan is mounted on the roof and has a single duct drop into the space for exhaust.


Supply Air Duct

Return Air Duct and Exhaust Inlet

During our visit on February 19, 2019 the space conditions were the following:

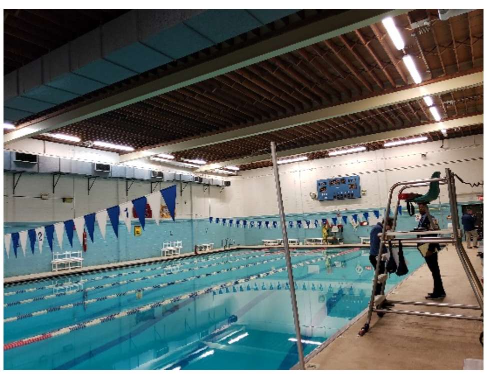
Temperature:	69 ^{o}F
Relative Humidity:	57%
Dew Point:	53 ^{o}F

The ventilation in the filter room is not sufficient, as evidenced by the corrosion on the exposed copper pipes and the hand rails. A small wall exhaust fan is located near the ceiling on the north wall and discharges outside.

Electrical

The electrical disconnects located in the filter room are corroding from the chemical usage in the room.

Lighting is provided by 1’x8’ fluorescent fixtures mounted to the underside of the roof joists. The lights are arranged directly above the pool edge. Light level readings were taken along the deck on all sides of the pool. Light levels ranged from 13.3 foot-candles (fc) to 21.4 fc, representing a uniformity index of 1.6:1.



Recommended Natatorium Design Considerations

A natatorium should be a comfortable, healthy space with good air quality. The environment within a natatorium should be designed with the following key aspects in mind: air temperature, the relative humidity of the air, pool activity levels, air distribution, ventilation (outside) air, exhaust air and pool treatment.

The HVAC design shall incorporate all of the above listed factors to provide a proper environment within a natatorium. The temperature of the space should be targeted at 2 ºF above the water temperature with a relative humidity (RH) of 50% - 60%. This provides optimal temperature comfort and provides an environment to minimize the evaporation of the pool water into the space. Assuming the pool is maintained at 82 ºF, the following table represents the range of design parameters (with a range of +/- 2 ºF from the 84 ºF set point):

Space Temp (ºF)	82 ºF		84 ºF		86 ºF	
RH (%)	50%	60%	50%	60%	50%	60%
Dew Point (ºF)	62 ºF	67 ºF	63 ºF	69 ºF	65 ºF	71ºF

Dehumidification of the space is a critical control point to maintain comfort, optimize energy usage and reduce corrosion. A dehumidification system designed for natatoriums can also reduce cooling loads for the HVAC system.

Air distribution should be designed to handle a variety of micro-climates with the space. Depending on building construction, it is important to provide a wash of air along the walls and especially on any windows and doors to prevent condensation. If a surface temperature is below the dew point of the space, condensation will form. Preventing condensation will also minimize corrosion.

Air distribution also needs to be designed to provide the proper ventilation to the occupied areas – just above the pool's surface (for the swimmers), the deck and the spectator areas. Additional air distribution should be provided to prevent stratification of the air.

Just as important as the supply air distribution is the exhaust design. In general, the pool space should be keep at a slightly negative pressure (0.05 to 0.15 inches of water column) relative to adjacent spaces and the outside environment. The exhaust system is design to handle two distinct air streams. The first air stream is to exhaust contaminants in the space. The most common contaminate is a group of similar products – chloramines. Chloramines are formed in pool water when there is an insufficient amount of chlorine to address nitrogen-containing compounds brought into the water by swimmers. The chloramines in the water will off-gas into the airspace. Chloramines have a strong attraction to the humidity in the air and will bind with the air molecule to form an acidic compound. This acid compound is capable of corroding steel, including stainless steel.

The second air stream to be exhausted will include the remaining ventilation air (air not already exhausted along with the contaminants) and an additional air flow (approximately 10% of the supply air flow) to maintain the negative pressure.

The ideal design for the design of the exhaust of contaminants is to have low level exhaust registers located along the wall to pull a sweep across the pool surface. This will capture the majority of the chloramines and exhaust them out the building. Any additional exhaust air required to maintain the proper airflow balance may also be exhausted by the same exhaust fan (and could be picked up at a different level) or may be brought back to the air handler with the return air and exhausted through the unit.

Materials of construction for all components of the natatorium's HVAC system need careful consideration due to the higher potential of corrosion. The recommended ductwork design will include ducts made of aluminum. Air handlers' interior surfaces, including walls, floors, roofs, and component, such as dampers, fan wheels and heat exchangers should be made of aluminum. Coils should be coated with a baked epoxy or phenolic coating.

Lighting of an indoor pool facility should follow the recommendations of the Illuminating Engineering Society of North America (IESNA). These recommendations include the following lighting levels (the highlighted levels are recommended for this pool):

Class	**I Professional Class**	**II Collegiate Class**	**III Intermediate Class**	**IV Recreational Class**
Pool (fc)	75 fc	50 fc	30 fc	30 fc
Deck (fc)	50 fc	20 fc	10 fc	10 fc
Pool Uniformity (u)	1.7:1 max/min	2.5:1 max/min	3:1 max/min	4:1 max/min
Deck Uniformity (u)	2.5:1 max/min	4:1 max/min	4:1 max/min	4:1 max/min

fc = foot candles
u = uniformity

RECOMMENDATIONS

The following are the mechanical and electrical recommendations for the indoor pool facility at Rutherford High School.

1. ***Condition – Electrical Components***

The electrical disconnect switches in the filter room are corroded. The following are two mutually exclusive options to consider:

Recommendation 1A

Relocate the power from the filter room and the office to a location that does not contain pool chemicals (either in liquid form or airborne). Install a new power panel in the new space. Install HVAC equipment disconnect switches in the new location. Replace the chemical feed system disconnect switches in the filter room with enclosures made from corrosion-resistant materials (i.e. NEMA 4X enclosures).

Estimated Cost = $50,000

Recommendation 1B

Replace the electrical disconnect switches and control panels with enclosures made from corrosion-resistant materials (i.e. NEMA 4X enclosures) in the existing filter room.

Estimated Cost = $35,000

2. ***Condition – Lighting Levels***

The lighting level in the pool space are below recommended levels

Recommendation

Demo existing lighting and provide new lighting to meet recommended foot-candle levels on the deck and on the pool surface. Use corrosion-resistant LED lighting fixtures that will also provide directional lighting to the pool surface, while still being installed over the pool deck to allow for maintenance.

Estimated Cost = $50,000

3. ***Condition – HVAC***

The current HVAC system does not provide sufficient heating of the space, humidity control of the space or any cooling of the space. In addition, the ventilation system is not designed to properly remove contaminants, such as chloramines, from the pool surface. The ventilation rate appears to be less than required. Maintenance access to the air handler is difficult at best and does not meet the manufacturer's service clearance requirements.

Recommendation

Properly size a HVAC/Dehumidification system for the pool room. Incorporate the proper outside air for ventilation and exhaust as required. Provide new duct layout for proper distribution of air and exhaust air. A single rooftop mounted unit, designed specifically for natatorium applications, will provide all of the HVAC requirements (see attached brochure). The unit will provide the outside air requirements, the exhaust requirements, heating and cooling requirements and dehumidification requirements. The unit also incorporates an energy recovery process to pre-heat the outside air in the winter and pre-cool the outside air in the summer through a heat exchanger with the exhaust air. This single unit will manage the natatorium's environment by itself. The unit will require a new power feed and an extension of the gas service.

This system will also de-couple the space heating from the pool water heating, allowing for a more efficient use of the boiler for the pool water.

Estimated Cost = $550,000

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Would you like to provide a

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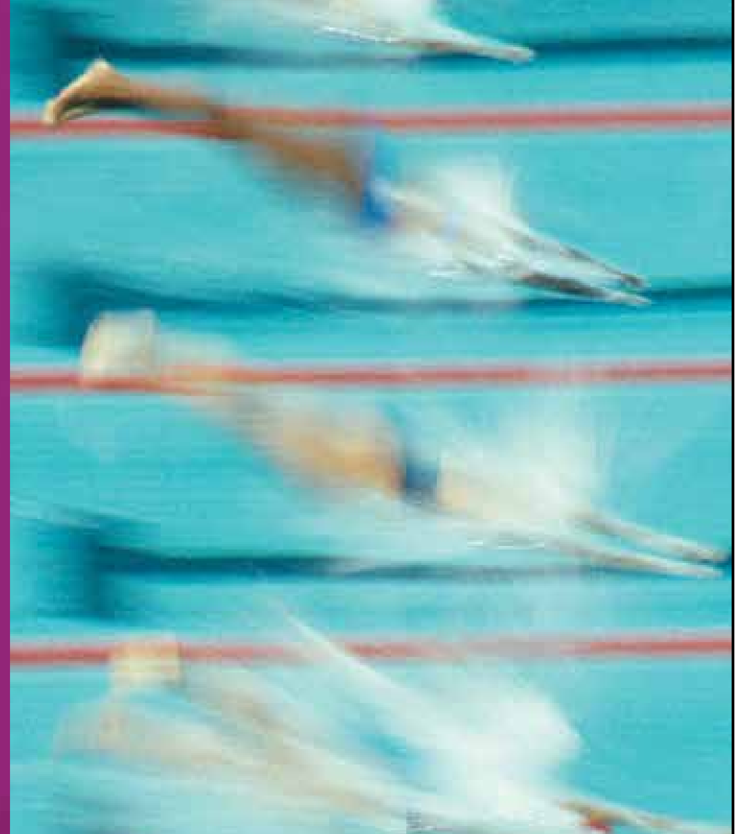
reducing its operating costs?



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Innovent's custom pool dehumidification and ventilation units.

Innovent has been successfully engineering customized pool dehumidification systems for nearly two decades for some of America's most unique natatoriums, indoor pools and waterparks. Our innovative, proven systems meet building owners' needs for energy efficiency and lower operating costs while delivering a healthier and more comfortable environment for swimmers and spectators. Traditional packaged mechanical dehumidifiers simply cannot match the comfort and overall energy efficiency of Innovent's P-Series pool dehumidification units.

Custom Engineered to Perform.

Every pool space is unique. Simply selecting or specifying an "off the shelf" dehumidification solution will not adequately address the building owner's needs nor the engineer's and architect's design goals. Innovent's customized pool units are designed to support and sustain all the distinctive qualities of your pool environment. We provide superior IAQ (Indoor Air Quality) by providing 40% – 60% more fresh air to the space than a traditional pool dehumidification system (typically called mechanical dehumidifiers). This makes the pool environment more comfortable for swimmers and spectators — and increases the building's longevity by reducing deterioration caused by recirculating chemically-laden air.

Operational costs also are reduced by using the drying capacity of the outdoor air, in conjunction with an efficient flat plate air-to-air heat exchanger, instead of running compressors all year long.

Why more outdoor air introduced to your pool environment results in

Recirculating too much indoor air, without adequate amounts of outdoor air, is unhealthy. Inadequate ventilation increases chloramine levels and leads to a strong odor, uncomfortable "red eye" conditions for swimmers and spectators, swimmer's cough, poor water quality and less effective chlorine that controls bacteria. According to the Centers for Disease Control and Prevention (CDC), eliminating chloramines from the pool space aids the effectiveness of pool water treatment and results in healthier indoor air.

What the CDC says about inadequate ventilation…*

"Breathing air loaded with irritants can cause a variety of symptoms depending on the concentration of irritants in the air and amount of time the air is breathed. The symptoms of irritant exposure in the air can range from mild symptoms, such as coughing, to severe symptoms, such as wheezing or aggravating asthma. It is also known that routine breathing of irritants may increase sensitivity to other types of irritants such as fungi and bacteria.

The buildup of these irritants in the air is partially due to poor air turnover. The poor movement of fresh air over the pool surface, combined with the use of air recycling devices to control heating costs, leads to poor air exchange. Recyclers remove the moisture from the air, but they do not necessarily take in much fresh air."

*Read the full CDC statement at http://www.cdc.gov/healthywater/swimming/pools/irritants-indoor-pool-air-quality.html

Built to Last.

Innovent's high-quality construction and simplified design ensure many years of reliable performance and easy maintenance in corrosive indoor pool environments.

1. Outside air and recirculation dampers adjust automatically to provide cost effective and independent delivery of ventilation air, temperature and humidity control.
2. Two-inch thick R12 foam-injected panels minimize energy loss, sound transmission and casing leakage.
3. Aluminum interior walls, flooring and dampers plus coated components extend the life of the equipment and save the owner money.
4. Pressure gages provided across the HX simplify the air balancing procedure.
5. All-aluminum flat plate air-to-air heat exchanger has a winter efficiency greater than 70%.
6. Units can be provided with DX or chilled water coils for dehumidification or with no cooling coil in dry climates.
7. Coils exposed to the pool air include a corrosion-resistant coating.
8. High efficiency, AMCA-certified direct drive fans are provided with aluminum wheels and TEFC motors.
9. Multiple heating options are available including gas furnaces, electric or steam coils.
10. Packaged air-cooled refrigeration available with staged, variable speed or digital compressors.
11. Full-height, hinged access doors provide easy access.

more comfort, more savings and better performance.

More outside air can provide significant operating cost savings. Our system provides reduced operational costs through dehumidification using outside air and advanced controls. Depending on climate and usage, an optimized outside air system can reduce operational costs up to 50% when compared to a traditional mechanical dehumidifier. This is achieved by taking advantage of the drying capacity outdoor air provides throughout the year.

Optimized Outside Air

- Minimum outside air operation dehumidifies natatorium:
  - 4-5 months for the southeast
  - 6-7 months in northern climates
  - 9 months in dry climates (Denver)
- Optimized outside air operation dehumidifies natatorium:
  - 6-8 months for the southeast
  - 9-10 months in northern climates
  - 12 months in dry climates (Denver)

Designed to Save Money

1. **Save initial equipment costs** by selecting Innovent's simplified system that automatically ventilates, controls temperature and dehumidifies by taking full advantage of outside air temperature and dryness. In some climates, the outdoor air has enough drying capacity throughout the year to completely eliminate the need for additional dehumidification.

2. **Save installation costs** by eliminating the installation of the many extraneous components required by mechanical dehumidifiers such as refrigerant-based pool water heaters, remote condensers, pumps, valves and piping from the unit to the pool. With Innovent, the pool water temperature can be maintained with any simple, dedicated system traditionally used to heat pool water.

3. **Save operating costs** because Innovent units lower fuel and electrical costs by reducing or even eliminating the need for mechanical cooling and refrigerant-based pool water heaters. Ventilation costs also are greatly reduced through the use of a 70%+ efficient flat plate air-to-air heat exchanger, direct-drive fans and VFDs.

4. **Save maintenance costs** by providing good access to internal components, using materials and coatings that can sustain the corrosive environment, and providing a simplified system that does not intermingle dehumidification, space heating and water heating.

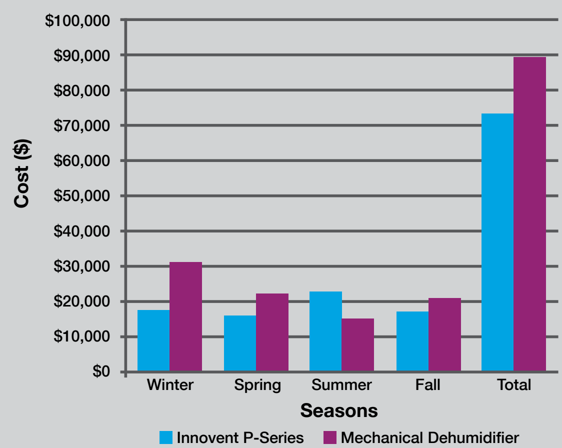
5. **Save replacement costs** due to the superior construction of Innovent's pool dehumidification system

How much can you **save?**

A 6,300 square foot competition pool in a 300,000 cubic feet natatorium maintained at 82°F and 60% RH can have the following operational cost reductions by using an Innovent pool unit instead of a mechanical dehumidifier:

- **50% in Denver (ASHRAE Climate Zone 7)**
- **40% in Minneapolis, Portland and Boston (ASHRAE Climate Zones 4, 5 & 6)**
- **30% in Washington DC and Kansas City (ASHRAE Climate Zone 4)**
- **25% in Los Angeles (ASHRAE Climate Zone 3)**
- **20% in Atlanta (ASHRAE Climate Zone 3)**
- **15% in Dallas (ASHRAE Climate Zone 3)**
- **Similar operating cost, but IAQ advantage in Houston (ASHRAE Climate Zone 2)**

Total Operating Costs



This chart compares the operational cost of the natatorium described above located in Atlanta. It includes the cost of pool water heating due to evaporation, space heating and dehumidification. Contact your Innovent sales representative to obtain a full energy model, showing this data and more, created for your natatorium project!

About Innovent.

Innovent® Air Handling Equipment has provided building ventilation solutions for over 30 years. More than 10,000 custom units are serving customers in a wide range of facilities across North America including educational, institutional, industrial, recreational, retail and healthcare. Building upon our expertise and focus on energy recovery and dedicated outdoor air systems, Innovent offers a broad portfolio of custom solutions that include custom air handling as well as dehumidification for applications like natatoriums and ice rinks.

Innovent Products:

- **Custom energy recovery units (Innovent E-Series)**
- **Custom air handlers (Innovent C-Series)**
- **Pool dehumidification units (Innovent P-Series)**
- **Desiccant dehumidification units (Innovent D-Series)**
- **Replacement air handlers (Innovent R-Series)**

Innovent is headquartered in Minneapolis, Minnesota at a 225,000-square-foot plant. A plant in Sacramento, California provides units to the Western United States. Distribution is through a network of carefully selected representatives, backed by expert factory support and training.

Headquarters in Minneapolis, Minnesota.

Innovent
Air Handling Equipment

Bringing the outside in.

www.innoventair.com

For more information, contact Innovent:

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Minneapolis, MN 55411
sales@innoventair.com

Phone 612.877.4800
Fax 612.877.4801

INV-SLB-04
March 2014

Innovent is a business of Unison Comfort Technologies | unisoncomfort.com

UNISON COMFORT TECHNOLOGIES

SECTION 6:

Observation of Pool Facility Enclosure and Interior

by Parette Somjen Architects

for the

Rutherford High School Pool Investigation Report
56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

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9 April, 2019 (Record Edition)

6.1 OBSERVATION OF POOL FACILITY ENCLOSURE AND INTERIOR

A. Roofing:

1. The existing roof over the Pool Space appears to be a modified bitumen membrane application, reported to be older than 15 years. This observation is consistent with a 39-year-old structure whose first roof system would have been expected to last 20 years, followed by a first cycle of renewal, that being the current membrane.
2. It is not known yet whether the visible top membrane is the only system in place, or whether it could have been executed as a "roof-over" application to upgrade roof performance without removing the original system. The judgment made following our visual inspection is that the current roof over the 6,500 sf pool space is nearing the end of its service life, and that it is a candidate for renewal of roofing system within the next three (3) to five (5) year period. Drainage slopes are poor and marks on the roof surface demonstrate that the surface has to tolerate standing water ponds in several areas on the side furthest away from the 230 Gym wall.
3. The conclusion was reached that sample coring of the pool roof section is not necessary at this time. The default assumption is that the original built-up roof is probably still in place below the membrane that is visible now, and that a roof-over approach had been used when the current roof was applied. For estimating purposes, it is further assumed that the underlying built-up roof flashings may contain asbestos fibers, even though the original roof was applied after 1973 when sale of asbestos containing materials (ACM) was stopped. Until it is sampled to verify that there is no ACM presence, it remains classed as a suspect material.
4. Since building code prohibits placement of more than two roof layers, the estimate will be based upon a full tear-off approach, down to the existing plywood roof deck. That choice to do a full tear off is also prudent since the wood roof deck must be inspected for possible moisture damage to confirm that it is still viable, and the status of any vapor barrier at the roof deck is not known, if one was even installed. In the case of a roof located over a natatorium space, the provision of a high-quality vapor barrier on the deck is essential because of the significantly elevated vapor pressure that is present with this particular occupancy type. Remember that roof cores will still need to be taken at the point that a roof replacement project is initiated, because we have to test for asbestos presence, and for the need to confirm whether there is one layer or two layers of existing roofing to be demolished.
5. The pool roof structure itself uses solid wood joists spanning to ledgers bolted to steel main girders, all covered by plywood decking. Based on visual observation from below, it is felt that the basic structure is can be expected to be still serviceable. (See Photo #1 in section 6.2)
6. With the type of low-slope (nearly flat) roof system that exists, the perimeter metal fascia system around the outer edges will need replacement with new metal fascia material. The new fascia will be higher to correspond to thicker insulation than the minimal thickness that the building has today. This comment applies only to the main roof over the pool space. The roof sections over the adjacent support spaces were already replaced with new roof membrane over a thick tapered insulation system which was installed around 2009 when the new white reflective roof was done over the Elliott Place wing of the school.
7. Generally in a roof replacement project, the existing roof drains from a built-up roof system cannot be cleaned sufficiently to be re-usable, so they get scheduled to be replaced. The existing insulated roof leaders below the drains can almost always be reused in their present locations. We have assumed reuse of the insulated interior leaders.

8. There is a noteworthy point to be made in regard to the insulation function of the roof system. Energy code has become much stricter since the pool addition was originally built. At the time that the pool roof section is to be replaced, the opportunity to upgrade the insulating value will yield a noticeable reduction in energy use by the HVAC system. This also will improve the maintained interior temperature, which had been a reported past complaint. Present insulation thermal resistance is poor. The new insulation would be Polyisocyanurate boards, in a tapered configuration to prevent ponding. The new design would be compliant with the energy code.
9. The already replaced roof membrane system over the Filter Room, Pool Office, HV Mechanical Room, and Boiler Room support spaces was referenced in item 6 above. That already renewed roof area is fastened to the steel decking that was only used over the support spaces. Only the pool roof section is on plywood roof deck. Since the new roof system over support spaces is presently in the early part of its 30 year warranty period, there is no remedial action required on that part of the pool area roof at this time, unless the corroded metal deck to which it is fastened is found to need replacement. With the cold applied single ply hybrid membrane type that was used, localized temporary removal can be done, if needed, with greater ease than older hot asphalt built-up roof types.
10. There are no reported active leaks at the pool roof, although chronic ponding along one edge over the main pool space does exist. Ongoing general monitoring of the roof condition can still be the planned procedure for the next three years or so.

B. Walls:

1. The 1980 Pool Facility has two exterior wall types. The main pool space has three high (about 22 feet high, and 5,800 sf in area) exposed exterior walls of the pool enclosure that are single wythe concrete masonry unit (CMU) walls, painted on the interior face, and covered on the exterior side with a minimum thickness Exterior Insulation and Finish System (EIFS) application. The outer surface of the EIFS is a mesh reinforced synthetic stucco material applied over an expanded polystyrene foam board layer that provides the only real thermal insulation that the pool enclosure walls have. Unfortunately, the EIFS material installed at the pool addition appears to be the older sealed type that is no longer used. The newer design approach for EIFS provides a wall configuration that can weep out excess moisture, protecting the whole system from trapped moisture damage.

   So, the existing exterior material (adhered insulation boards, with adhered stucco finish system) have delaminated in substantial areas. The western wall (toward Elliott Place) is being held in place by a line of fasteners screwed through washers at the top edge to mechanically retain the loosened surface skin. That foam and synthetic stucco skin can actually be moved like a drum head by just tapping it anywhere in the middle. Numerous locations of corner damage were also found, with the underlying EPS foam base exposed. We would categorize the wall condition as failed, and in need of replacement with new vented type EIFS. Ideally, replacement with thicker board insulation would be necessary to meet energy code thermal resistance requirements, so that adjustment would be easiest if done at the same time that the roof system new fascia metal is being done along the top edge. That way, the increased insulation dimensions for both wall and roof systems can be easily coordinated with each other, and the new perimeter fascia can be detailed to allow both adjusted surface locations. (See Photo #2 in section 6.2)

   Regarding project timing, my professional opinion is that the EIFS replacement can be planned for a budget period several years in the future, so that it could still be planned in advance as a coordinated project of both wall and roof coincident replacements. Through the execution of other past projects at the High School, I have been observing the status of the existing EIFS at the pool addition for over 10 years. It has remained in place despite the delaminated sections, so it is not judged in this current observation timeframe to be any more than a condition to be monitored, until such time as more significant failure must be addressed. It would be prudent to plan on system replacement in a three to five-year period. The roof will need to be done in that same timeframe, and it would be beneficial to do both renewals in one coordinated project.

2. The remaining exterior walls around the mechanical support spaces are single wythe CMU walls of 1,400 sf area, but with just a painted exterior finish. These do not have any real energy retarding capacity to speak of, so the building heat loss is high around the service spaces. These do not meet current energy code requirements, but may remain as existing since they are not being altered. Alternatively, these bare walls could be provided with EIFS covering to improve their thermal performance at the time of any project to replace the failed existing EIFS around the Pool Room itself. (See Photo #3 in section 6.2)

3. Both wall types (insulated and bare) suffer at their outer finish from the push of vapor pressure trying to escape from the building interior. Coating interior wall surfaces with a high-performance vapor retarding coating would improve that situation.

C. Doors, Windows, and Vents:

1. The pool enclosure is windowless in all spaces except that the pool office does have interior vision lights into the pool area and the corridor. The pool space has two direct exterior exit doors, (single door with vision light toward the field, and unglazed double doors toward Elliott Place). A pair of wood doors leads to the exit corridor, and a single wood door separates the pool office from the main pool space. All other doors relating to the mechanical support spaces are metal doors. (See Photo #4 in section 6.2)
2. All doors, frames, and hardware in this section of the High School are showing deterioration from the corrosive atmosphere around the pool and its water systems, and from the pervasive presence of condensed moisture on the cool metal surfaces.
3. With winter temperature conditions, liquid water will bead up on the cool doors, frames and hardware surfaces, leading to corrosion of steel fasteners and components.
4. Some replacement of doors and door hardware are recommended where the corrosion has progressed to surface deterioration or impaired hardware functionality.
5. The pool consultant has recommended that translucent wall panels might be used to brighten the interior space. In view of the projected costs needed for functional systems, a change to the building's fenestration was judged to be of a lower priority. It could be considered as a logical option when the district reaches the point of planning EIFS wall replacement.

D. Interior Finishes:

1. Ceiling. Ceiling condition in the main pool space is exposed solid wood rafters supporting plywood roof deck. Rafters span to painted steel girders. No finish is applied to exposed structure. Lighting fixtures and ductwork are attached to or suspended from bare structure. Ceiling in Pool Office and Corridor to locker rooms is suspended 2 by 4 acoustic ceiling tile (ACT). The ACT system components in both locations are candidates for replacement with corrosion and sag resistant systems. Ceilings in filter room, boiler room, and HV mechanical room are exposed underside of structure (metal deck on open web steel joists). Both the metal deck and the structural metal joists are marked with corrosion. Remedial work to protect the systems from advancing corrosion is needed. Access difficulty will raise the cost of addressing the existing deterioration, and applying protective coatings. An estimated net cost for this remedial work is $21,000.00. We are not recommending any change to the wood rafter system over the pool. The appearance

of that underside of roof surface can be improved by suspending an array of acoustic banner panels below the roof framing, reducing the direct visibility of the exposed wood members. As a by-product of that aesthetic improvement, the panels would aid in cutting reverberation times. A reverberation cycle time of under one half second will increase speech intelligibility.

2. Walls, Pool Space. Paint finish is in mediocre condition, being quite damaged at bottom of walls where splash zone effect and chemical content in the room air has caused deterioration of the finish in approximately a 2-foot high area. Repainting at least the wainscot color zone of the wall could permit patching and finish renewal to be achieved in an acceptable manner. The recommendation is to fix the crack issues noted in the structural evaluation, execute other localized repairs such as at removed items, and then apply commercial high-performance coating to all of the wall surfaces, cutting vapor permeability of the exterior wall system.
3. Walls, Support Spaces. Wall finishes in the Pool Office, and Filter room are not clean looking. Any repainting program should include these spaces. The interior faces of all exterior enclosing walls, including Boiler Room and HV Air Handler Room, should be painted with a low-perm sealer to retard vapor transmission into the CMU wall, which deteriorates the exterior finish.
4. Floors. Floors in the pool space (appx. 2,700 sf) are exposed and painted concrete deck, currently a medium tan color. Several repair locations are in poor condition, and need remedial work. Other locations with staining would be addressed with a complete deck painting. The floors in the corridor to the pool showers are a rubber tile material in moderate to poor condition. Renovation of this surface could be considered as desirable.

E. Other Considerations:

1. Room Acoustics. The nature of the pool enclosure is that all surfaces are hard and reflective, so the space is subject to excessive reverberation times that reduce speech intelligibility, and produce ambient noise levels that can be uncomfortable. The main activity space is in need of acoustic damping, with materials that will tolerate the elevated humidity levels of this space type. By example, normal suspended acoustic ceilings cannot be used in such a saturated, corrosive atmosphere. However, properly sized and deployed acoustic banner panels could bring the Noise Reduction coefficient values back into a healthy range.
2. Room Air Quality and Energy Conservation. Existing mechanical system configuration affects pool space air quality by not being effective in removal of chemical compounds which are heavier than the room air. The roof mounted exhaust fan does not remove them, but it does remove the warm room air without any energy recovery. The airborne chemicals do affect the room painted wall finish along the bottom of the wall surface, as well as being concentrated at the space occupied by swimmers. As part of the consideration of indoor air quality, and of correct energy management, review of the ventilation system needs to be done as part of considering the possible corrective actions regarding the architectural thermal envelope. The insulation factors in the roof and walls around the pool space should be increased as part of any repair / replacement effort.

6.2 EXTERIOR ENCLOSURE AND INTERIOR PHOTOS

Photo 1: Pool roof structure is wood framed with plywood decking, exposed to view over the pool space.

Lighting is located around the pool perimeter so that the fixtures can be serviced from the deck around the pool edge. Any alternative lighting approach would need to be located around the pool perimeter for the same reason.

Photo 2: Pool facility exterior wall is constructed of concrete masonry units (CMU) in a bearing wall configuration, surfaced on the outside face with an Exterior Insulation and Finish System (EIFS).

The walls have no fenestration except for the double exit doors facing Elliott Place (seen at left edge of this photo), and the single door on the opposite end wall that faces the play field. The exposed stucco-like surface is in only fair condition, exhibiting some delamination.

The EIFS should be replaced within 3 to 5 years.

Photo 3: Pool facility exterior EIFS & CMU block wall transition. The pool enclosing walls have some insulating value from the EIFS. The exposed CMU walls around the support spaces seen in the right side of this view have little thermal resistance, and are not compliant with current Energy Conservation Code requirements.

At the time selected for replacement of EIFS on the pool enclosing walls, It would be prudent to apply new EIFS on the support space walls also, at that same time.

Photo 4: Pool Enclosure Interior Windows & Doors

SECTION 7:

Rehabilitation Cost Summary

by Parette Somjen Architects

for the

Rutherford High School Pool Investigation Report

56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

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9 April, 2019 (Record Edition)

7.1 COST SUMMARY

A. One principal objective of the study is to consider the **observable deficiencies**, and then to estimate **repair or renovation costs** that would be necessary to address discovered issues. This section takes each observed condition, classifies it in terms of priority, and assigns a gross budget allowance that would be anticipated if the recommended action were to be taken.

B. This cost report Section 7 is arranged according to the related report section numbers, as follows:

1. **Section 3** - Pool Systems
2. **Section 4** - Structure
3. **Section 5** - Mechanical and Electrical Systems
4. **Section 6** - Building Enclosure

C. Conditions and their corresponding recommendations are listed in the same order as they appear within each primary section of the report. The summary table for each section includes a column that denotes the priority level assigned to the recommendation, between 1 and 5, with the designation of 1 representing the highest priority. For the purpose of this review, the levels are delineated in the Priority Scale below.

Priority Level	**Importance**	**Observations**
1	**Highest** Urgency	These would be safety issues, or items that would cost much more if deferred.
2	**Important** Item	Recommendable actions, in keeping with sound facility management.
3	**Moderate** Need	Prudent to undertake in the normal course of building maintenance.
4	**Low** Importance	Optional action that could be taken if desired.
5	**Deferrable** Task	Optional Action that could be put off in time, or eliminated completely.

D. **Observations on Project Cost Values**

1. The various tasks or options have been assigned an "order of magnitude" gross budget allowance based on experience. The purpose of these preliminary estimates is for relative valuation between items, providing a basis for discussion in general comparison and planning, but knowing that detailed designs and system engineering have not been done at this time.
2. Net costs for each item or option have been factored up to a total project cost basis by taking each net estimate for hard cost, and adding a soft cost allowance of 25% to cover fees, mandated testing services, procurement process costs, state fees, and including a project construction contingency amount that is compliant with DOE Regulations (5% minimum).
3. Task values are also affected by the way in which they are bid. Collecting several individual scopes into one larger rehabilitation project will affect the actual individual item prices. Economy of scale can reduce the administrative costs to the contractor for the individual parts. Therefore, the menu of costs should not be approached like the lunch menu at the local diner. Bidder's calculations made during assembly of their proposal are not under our control, and they do vary from one company to another, or under seasonal influences.

E. **Section 3.** Pool Systems

(Net hard costs have been adjusted to include 25% more to cover project soft cost allowance.)

No.	Corrective Action or Option Description	Priority Level	Project Budget for Hard and Soft Costs
3.1	Provide new CO2 Feeder	2	$2,750.00
3.2	Replace rusted pipe supports and ferrous metal components	3	$7,500.00
3.3	Filter Room Upgrade	4	$2,500.00
3.4	Refurbish or replace starting platforms	2	$18,750.00
3.5	Provide new water chemistry & UV systems	2	$72,500.00
3.6	Provide new Chloramine (source capture) exhaust system (not including other HVAC upgrades)	2	$100,000.00
3.7	Provide enzyme treatment system	3	$4,380.00
3.8	Provide automated make-up water system	2	$3,130.00
3.9	Clean deck equipment	2	$3,130.00
3.10	Remove Scoreboard	4	$1,880.00
3.11	Clean Gutter	3	$3,750.00
3.12	Add backsplash depth markers	2	$940.00
3.13	Add gutter grating inserts	3	$24,000.00
3.14	New interior pool paint & lane markings	3	$32,500.00
3.15	New 6-line scoreboard and timing system including touch-pads	2	$70,000.00
	Aggregate total of all items, including soft cost factor		$347,710.00

F. **Section 4.** Structure

(Net hard costs have been adjusted to include 25% more to cover project soft cost allowance.)

No.	Corrective Action or Option Description	Priority Level	Project Budget for Hard and Soft Costs
4.1	Recommend only general monitoring of wood roof deck condition where staining can be observed.	5	$0.00
4.2	Epoxy crack repair at pilasters to seal that moisture path	2	$16,000.00
4.3	Deteriorated Masonry replacement, localized in one area	2	$15,000.00
4.4	Pool Deck Repair, at former diving board removal location	3	$7,500.00
4.5	NW Corner vertical crack repair similar to item 4.2	2	$3,500.00
4.6	Further inspection of localized metal deck corrosion, & possible section replacement, if warranted	2	Range $1,200.00 to $24,000.00
4.7	Clean and repaint open web steel joists over support space	3	$15,000.00
	Aggregate total of all items, including soft cost factor		$81,000.00

G. **Section 5.** Mechanical and Electrical Systems

(Net hard costs have been adjusted to include 25% more to cover project soft cost allowance.)

No.	Corrective Action or Option Description	Priority Level	Project Budget for Hard and Soft Costs
5.1	Replace electrical disconnect switches and control panels with corrosion resistant NEMA 4X enclosures	3	$ 43,750.00
5.2	Replace light fixtures w/ Corrosion resistant LED directional high bay fixtures	3	$ 62,500.00
5.3	Provide new HVAC system to meet requirements	2	$ 687,500.00
	Aggregate total of all items, including soft cost factor		$ 793,750.00

H. **Section 6.** Building Enclosure

(Net hard costs have been adjusted to include 25% more to cover project soft cost allowance.)

No.	Corrective Action or Option Description	Priority Level	Project Budget for Hard and Soft Costs
6.1	Replace 6,500 sf Pool Room Roof, including fascia and roof drains	3	$243,750.00
6.2	Replace 5,800 sf of EIFS wall surfacing around Pool Room with new drainable EIFS surface having increased insulation thickness	3	$112,500.00
6.3	Provide 1,400 sf of new drainable EIFS surface treatment to the existing bare CMU walls of the mechanical spaces	3	$26,250.00
6.4	Exterior CMU wall surface repairs beyond structural epoxy crack repair, & concrete pool deck repairs, made prior to application of high-performance coatings	2	$10,000.00
6.5	Painting of interior surfaces of CMU walls, using high performance chemical resistant coating	3	$32,820.00
6.6	Painting of pool deck surface using high performance traffic bearing non-slip coating	2	$25,000.00
6.7	Replacement of doors and door hardware due to corrosion	3	$10,000.00
6.8	Remedial surface preparation and application of protective coating needed on all metal surfaces in roof construction	2	$26,250.00
6.9	Replacement of suspended ACT ceilings at office & corridor	3	$2,750.00
6.10	Replacement of rubber flooring in corridor	3	$3,750.00
6.11	Provide suspended Acoustic Banner Array at ceiling	5	$21,250.00
	Aggregate total of all items, including soft cost factor		$514,320.00

I. **Rehabilitation Cost Summary.** The last chart illustrates a summary of the aggregate costs derived in the various report sections. It is not necessary that all scopes represented need to be done in one contract arrangement, or even at all. The list offers options regarding various noted problems, but execution of the whole list is not the recommendation. The summary simply tallies the costs here for the purpose of understanding the gross amount of deficiency correction that may become necessary within the next three to five-year period if the pool is going to remain a viable facility. The more likely condition is that a limited selection of the available high priority recommendations for rehabilitation work might be considered for execution, or be put into a multi-year upgrade program.

Section	**Description**		**Project Budget for Hard and Soft Costs**
3.0	Pool Systems		$347,710.00
4.0	Structure		$81,000.00
5.0	Mechanical and Electrical		$793,750.00
6.0	Pool Enclosure, Architectural		$514,320.00
	Aggregate Total		**$1,736,780.00**

End of Section 7

SECTION 8:

Pool Facility Existing Floor Plans
by Parette Somjen Architects

for the

Rutherford High School Pool Investigation Report
56 Elliott Place
Rutherford, NJ 07070

PSA Project Number 7984

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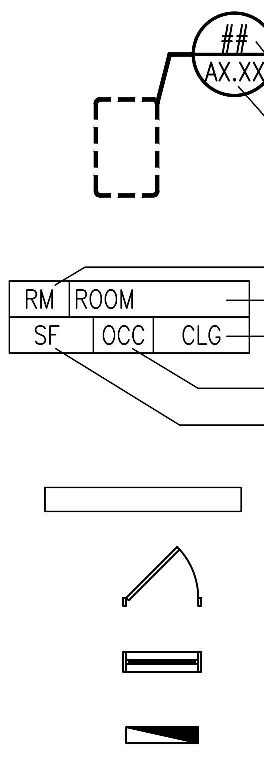
9 April, 2019 (Record Edition)

SYMBOL LEGEND



CALL OUT BUBBLE
Section Number
Sheet Number

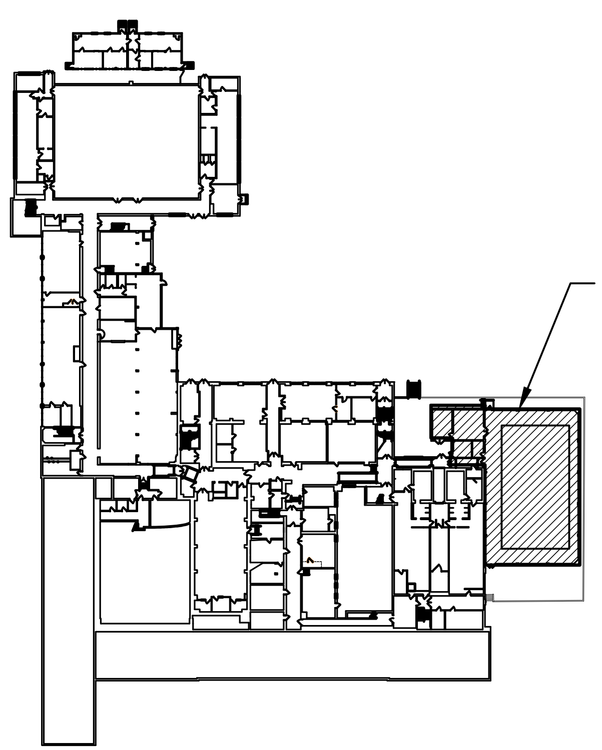
DOE ROOM TAG
Room Number
Room Name
Ceiling Height
Room Occupancy
Room Area

EXISTING CONSTRUCTION

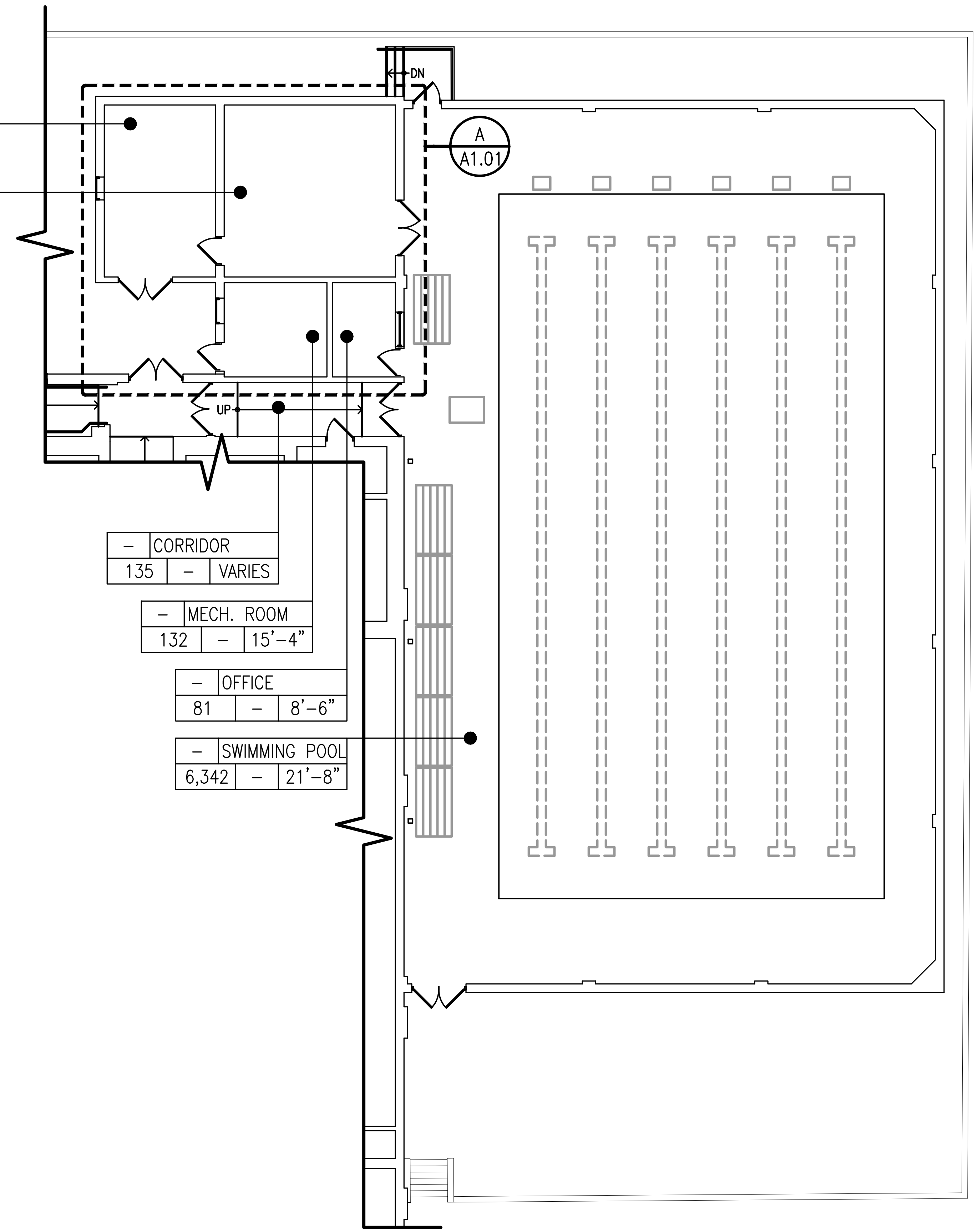
EXISTING DOOR

EXISTING WINDOW

EXISTING ELECTRICAL PANELBOARD



KEY PLAN TRUE NORTH N.T.S.



–	BOILER ROOM	
261	–	11'–3"

–	FILTER ROOM	
402	–	15'–4"

–	CORRIDOR	
135	–	VARIES

–	MECH. ROOM	
132	–	15'–4"

–	OFFICE	
81	–	8'–6"

–	SWIMMING POOL	
6,342	–	21'–8"

A FIRST FLOOR PART. PLAN TRUE NORTH SC: 1/16" = 1'-0"

PARETTE SOMJEN
ARCHITECTS
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POOL INVESTIGATION FOR RUTHERFORD BOARD OF EDUCATION AT:

RUTHERFORD HIGH SCHOOL

56 ELLIOT PLACE
RUTHERFORD, NJ 07070
BLOCK: 62 LOT: 1

REV	DATE	REMARK

Marc R. Parette A.I.A.

NCARB Registration	44264
New Jersey Architect	10436
New York Architect	024312
Pennsylvania Architect	014798B
Maryland Architect	10445
New Jersey Planner	4981
Alabama Architect	5996
Louisiana Architect	6261
Florida Architect	AR 93131
Michigan Architect	1301053053
Nevada Architect	6311

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NCARB Registration	47178
New Jersey Architect	13349
Massachusetts Architect	9629
Delaware Architect	6616
Virginia Architect	0401 011210
Connecticut Architect	8622
New York Architect	032435-1
Nevada Architect	6280
District Of Columbia Architect	101294

SIGNATURE

FIRST FLOOR PARTIAL PLAN

THE SCALE REPRESENTED ON THESE DRAWINGS IS ONLY VALID IF THE DRAWING IS 17" x 11". DRAWINGS WHICH ARE NOT PLOTTED AT THE SPECIFIED SHEET SIZE ARE NOT TO SCALE.

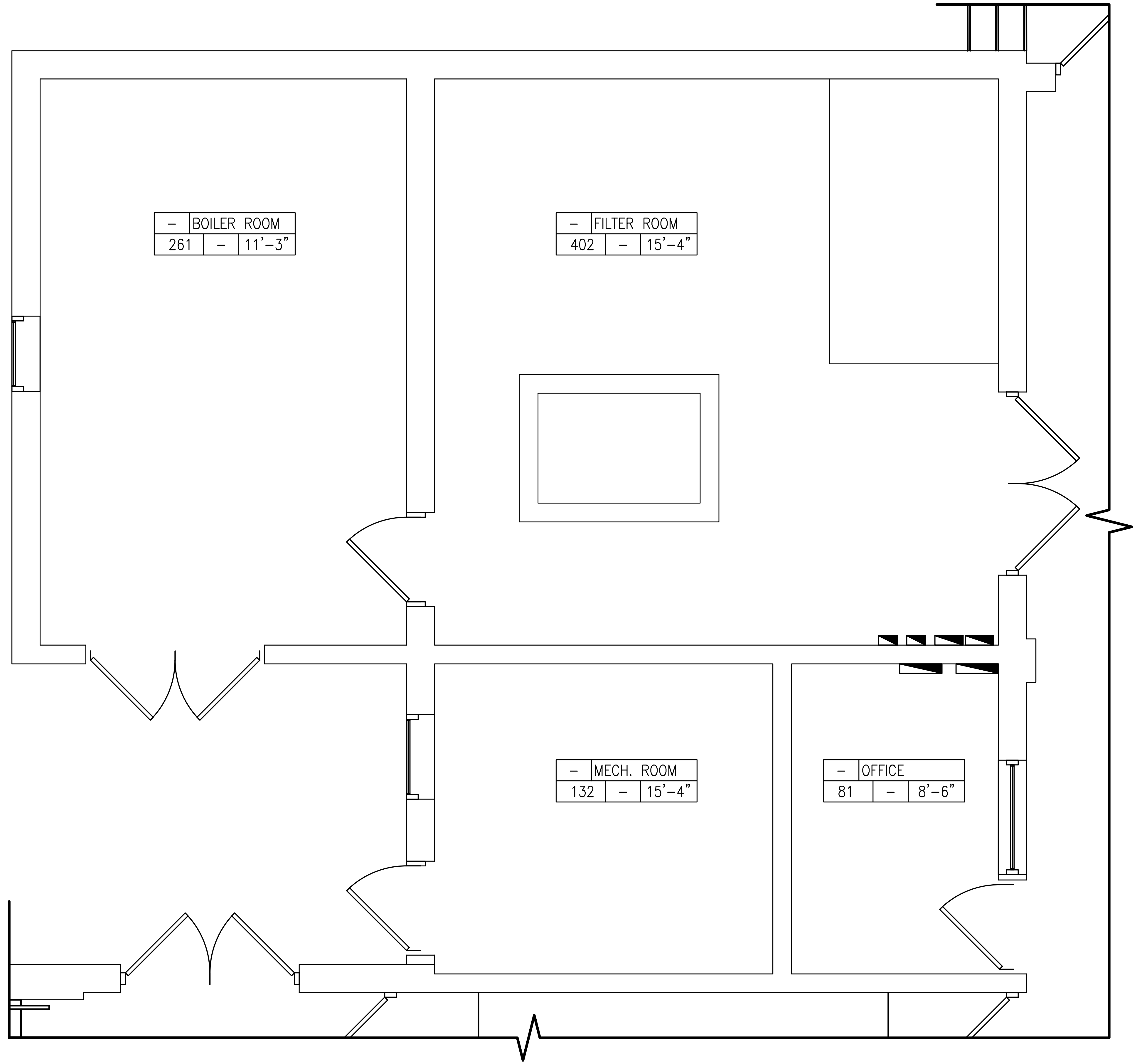
JC
PROJECT MANAGER

KP
DRAWN BY

7984
PROJECT NUMBER

SHEET NUMBER
A1.00

09 APRIL 2019
RELEASE DATE



A FILTER ROOM PLAN

TRUE NORTH

SC: 1/4" = 1'-0"

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FILTER ROOM PLAN

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