Franklin Regional High School
Pool Assessment Summary

Franklin Regional School District
Existing Facilities Assessments

VEBH Architects
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PURPOSE

This presentation identifies the scope of work required to renovate the existing pool into like new condition versus constructing a new swimming pool.

We have also identified immediate repairs that should be addressed on the existing pool.
EXISTING CONDITIONS

- Existing pool width of 40’-0” does not meet NFHS regulations
- Existing lane widths of 6’-8” does not meet NFHS regulations of 7’-0”
- Existing lane lines end 5’-6” from end wall, code compliance = 5’-0”

Dotted red lines represent code-compliant swimming pool dimensions
EXISTING CONDITIONS

- Existing 3’-6” depth does not meet NFHS regulations of 4’-0” water depth
- Existing 9’-0” distance from plummet to pool break does not meet NFHS regulations of 21’-4” minimum.
- Existing depth of 11’-4” at plummet does not meet NFHS regulations of 12’-0”

Dotted red lines represent code-compliant swimming pool profile
• Existing pool decks are inadequately sized for swimming and diving competitions.
• Deck at diving platform should be 20’-0” to 22’-0”
• Decks around balance of pool should be 12’-0” minimum, however 15’-0” decks are preferable
EXISTING CONDITIONS

ANSI/NSPI-1 2003 requires minimum 4’-0” clearance behind diving stands. Existing conditions do not allow for this to be possible.

Extremely cramped pool decks in front of spectator seating area
EXISTING CONDITIONS

Pool decks do not have required deck drains to take water to sanitary. Decks are incorrectly sloped towards the pool, allowing water from the pool deck to flow into the pool gutter. This is a current code violation. This area of the building is constructed slab on grade. Installing deck drains and piping to connect to sanitary would require a complete demolition of the floor slab in the natatorium.

Another option would be to replace the existing perimeter gutter with a combination gutter/deck drain. Extensive demolition to the pool shell and pool deck would still be required with this option.
EXISTING CONDITIONS

The pool utilizes an open top fiberglass diatomaceous earth (DE) filter. System also utilizes a diaphragm valve that is designed to stop the flow of water from the pool into the filter tank in the event of a system failure.

If the diaphragm valve does not operate properly, the filter tank could overflow and flood the filter room and first floor of the building.
EXISTING CONDITIONS

ADDITIONAL ITEMS:

• Natatorium is under positive pressure rather than negative pressure, resulting in chloramine laden air escaping into other areas of the building.

• Natatorium air handling system does not appear to be operating properly. The District is aware of this, and are currently addressing this issue.

• Natatorium is located in the center of the building surrounded by program space, making site access for any potential renovations extremely difficult and costly.
The site survey revealed that while the pool does not meet code compliance for competitive swimming and diving, the existing vessel and filtration system is in fair condition for a pool of its age, and does not appear to be at risk for a major failure in the near future.

A renovation of the existing pool to bring the swimming pool and natatorium into code compliance is highly complex and would not result in a satisfactory final product due to the spatial limitations of being surrounded by building on all sides.

Other concerns include having to remove the entire pool floor and one entire pool wall along the long axis in order to create a code-compliant depth profile and square foot area. This would increase the pool volume and in turn require the entire filtration system to be redone in order to meet the code of a 6 hour turnover rate. **There is potentially more work involved in a renovation than the work associated with a new pool.**
CONCLUSIONS

Aging HVAC equipment coupled with plumbing code violations on the main pool deck will require complete removal and replacement of these components along with the major restructuring of the pool.

It is our professional opinion that a renovation of the existing pool would be more costly than the construction of a new swimming pool at a different location, and this option should only be considered as a last resort.

The existing swimming pool still has useful life left, and can be kept in service for the foreseeable future with minor repairs and upgrades until a new pool can be constructed.

The existing natatorium space can be reprogrammed for other middle school uses once the pool is taken out of service and demolished. This is a common practice in school renovation projects.
WAi identified several items that should be addressed in order to extend the life of the existing swimming pool and filtration system, and create safer conditions until a new pool can be constructed. These ‘Immediate Repair’ items are outlined on the following slides.
IMMEDIATE REPAIRS

The ceramic tile pool finish is in fair condition, however the grout is showing signs of decay in the majority of the pool. In order to prevent water from migrating behind the pool tiles and separating tiles from the concrete shell, the entire pool should be acid washed, cleaned, and re-grouted.
The stainless steel gutter is in fair condition, but is showing signs of aesthetic aging. The gutter should be properly cleaned using readily available stainless steel cleaners. This will give the gutter a like-new appearance.

Existing pool does not have any vertical depth markers. Vinyl depth markers should be applied to the face of the gutter, similar to picture above.
IMMEDIATE REPAIRS

All starting block anchors need to be replaced. New anchors should be reset into the concrete deck slab, and slab should be repaired as required prior to patching the areas with new ceramic tile.

Multiple starting platforms are beginning to loosen at the anchors. Previous attempts have been made to fix the starting blocks.
IMMEDIATE REPAIRS

The existing ADA access lift on the pool deck is an SR Smith PAL. This was designed as a portable lift, but a PAL ‘Secure-It Kit’ is available to allow the lift to be secured to the pool deck. This kit should be purchased and installed so that the ADA lift can be secured at the pool edge. During times of competition, the lift can easily be unsecured and wheeled away.

SR Smith PAL Lift

SR Smith PAL Secure-It Kit
IMMEDIATE REPAIRS

An Acid Fume Separator (AFS), as manufactured by Prominent, should be installed on the carboy containing muriatic acid for pH chemical control. This device will result in a fume-free work environment for the maintenance crew, and will also stop the fumes from degrading the building components in the filtration equipment room.
## IMMEDIATE REPAIRS COST ESTIMATE

**Franklin Regional School District: Immediate Repair Items**  
**Line Item Budget Estimate**  
31-Mar-17

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<th>Item</th>
<th>Description</th>
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<th>Unit Cost</th>
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<td>Acid wash, clean, regrout ceramic tile pool finish</td>
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<td>Purchase and install ADA Lift PAL Secure-It kit</td>
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<td>6</td>
<td>Purchase and install Prominent Acid Fume Separator (AFS)</td>
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**SUBTOTAL:**  
$55,000.00

**CONTINGENCY (APPROX. 10%)**  
$5,500.00

**TOTAL BUDGET ESTIMATE:**  
$60,500.00
NEW POOL CONSTRUCTION

The following slides illustrate various pool schemes with appropriately sized pool decks and support spaces. The options include:

- 6 Lane 25 Yard Pool
- 6 Lane 25 Yard Pool With Ramp
- 6 Lane Stretch Pool
- 6 Lane Stretch Pool With Ramp
- 8 Lane 25 Yard Pool
- 8 Lane 25 Yard Pool With Ramp
- 8 Lane Stretch Pool
- 8 Lane Stretch Pool With Ramp

Estimated square foot areas of each program space are indicated, along with an estimated Order of Magnitude Cost. The costs are based on average square foot construction costs for natatoriums in the Western Pennsylvania region and should serve as a general guideline only. The estimated costs approximate total building costs including pool and all related natatorium construction.
NEW POOL CONSTRUCTION

6 LANE 25 YARD POOL

Total Square Footage: 13,335
Order of Magnitude Estimate: $4,690,000
NEW POOL CONSTRUCTION

6 LANE 25 YARD POOL WITH RAMP

Total Square Footage: 16,170
Order of Magnitude Estimate: $4,945,000
NEW POOL CONSTRUCTION

6 LANE STRETCH POOL

Total Square Footage: 20,845
Order of Magnitude Estimate: $6,375,000
NEW POOL CONSTRUCTION

6 LANE STRETCH POOL WITH RAMP

Total Square Footage: 22,025
Order of Magnitude Estimate: $6,735,000
NEW POOL CONSTRUCTION

8 LANE 25 YARD POOL

Total Square Footage: 16,860
Order of Magnitude Estimate: $5,155,000
NEW POOL CONSTRUCTION

8 LANE 25 YARD POOL WITH RAMP

Total Square Footage: 17,695
Order of Magnitude Estimate: $5,411,000
NEW POOL CONSTRUCTION

8 LANE STRETCH POOL

Total Square Footage: 23,000
Order of Magnitude Estimate: $7,034,000
NEW POOL CONSTRUCTION

8 LANE STRETCH POOL WITH RAMP

Total Square Footage: 24,180
Order of Magnitude Estimate: $7,394,000
POOL COMPONENTS

The following list outlines the major components required to construct an industry accepted swimming pool and filtration system capable of handling the high use demands of a high school natatorium. See appendix for additional details.

• Gunite Pool Shell with Enhanced Plaster or Ceramic Tile Finish OR Pre-engineered Myrtha Pool System

• Stainless Steel Perimeter Overflow Gutter

• Chloramine Evacuation System (Paddock Evacuator)

• Griswold or Marlow Pool Pump with external VFD

• Neptune Benson or Paddock High Rate Sand Horizontal Fiberglass Filter with AFM glass media OR Neptune Benson or Paddock Pressure Regenerative Filter

• Medium Pressure UV Sanitation System

• Sodium Hypochlorite (liquid chlorine) with chemical feed pump

• CO2 bulk storage tank and feeder for pH control (eliminates the need for muriatic acid)
Purpose of Study:

The purpose of this study was to evaluate the operation of the existing pool dehumidification unit. The owner has stated that the natatorium is under a positive pressure which allows chlorine laden air to escape into surrounding spaces. They also experience an issue of high chloramine levels in the space, which not only affect the swimmers but the spectators as well. We reviewed the functionality of the unit as well as the design of the unit and the duct system. We were assisted with this study by Mark Mularski, of Elite Heating and Air Conditioning. Mark and I met with the owner at the site on March 1, 2017 to get Elite familiar with the project and to receive documentation including balance reports and original unit selections. We then met again on March 8, 2017 when Elite conducted tests and provided suggestions on routine maintenance. A more detailed description of the site visit, findings, and recommendations are provided below.

HVAC Pool Dehumidification System:

The existing pool dehumidification unit was installed in 2007. It consists of one roof mounted dehumidification unit with a remote mounted air cooled condenser. The unit contains a supply fan, two exhaust fans, a DX cooling coil and hot water heating coil. Supply and return air ductwork is routed on the roof to locations where it drops into the natatorium below. The supply and return duct on the roof is adequately sized for the design airflow rates and appears to be properly insulated and weatherproofed. The weatherproofing on the hot water piping has been damaged over the years but this should not cause any performance issues. The refrigerant piping between the pool dehumidification unit and the remote air cooled condenser is only partially insulated. Some of the insulation has fallen off and some has been damaged by the sun. The refrigerant piping did not appear to have a weatherproof jacket. The coils within the unit were dirty, which could affect performance of the unit. The equipment is controlled using a web based system to allow the owner to make set point adjustments and monitor natatorium conditions. There are wall mounted temperature and humidity sensors located in the natatorium.

The supply air is distributed in fabric duct around three perimeter sides of the pool including the spectator area. There are four return air locations, two high and two low, located opposite of the spectator area. The configuration or location of the supply and return air outlets is good from a design standpoint because it helps capture and pull air across the pool which should help reduce indoor air quality issues. However, some of the indoor return air ductwork is undersized. The indoor return air ductwork was not replaced in 2007 and is undersized for the amount of return air that was designed at the two low return air locations. The result of this, more than likely, is less return at the low return grille and more return at the high grilles. This will reduce the effectiveness of removing the chloramines from the water surface.

The pool dehumidification unit, as designed, is exceeding the code required amount of outdoor air and it provides between 6-8 total air changes per hour, which is the recommended amount per ASHRAE. The unit was designed to maintain the space at 85°F and 56% relative humidity with a pool water temperature of 80°F. The owner stated they like to keep the pool water at
80°F and the space temperature at 82°F. This fluctuates based on the season, who is using the pool, etc. On the day of the site visit the space temperature was measured at 79.6°F and 44.2% RH.

The positive pressure of the natatorium was measured with a magnehelic gauge at one of the doors that exited toward the corridor but the actual value was undetermined. The positive pressure was apparent with a flame test. The exhaust airflow from the unit was designed at 6,600 cfm and the original TAB (testing, adjusting and balancing) report from 2007 indicated an actual exhaust airflow rate of 6,000 cfm. The exhaust motor amperage was tested and found to be well below the results from the TAB report. Our HVAC technician attempted to adjust the motor sheaves to increase the exhaust airflow but found that the sheaves required replacement. New sheaves and belts were obtained and adjusted to provide an exhaust airflow rate that met or exceeded the original TAB report. After increasing the exhaust airflow, the flame test was conducted again at the same door. Although the natatorium space did not become negative, it was obvious that increasing the exhaust airflow helped in bringing the space to be almost neutral with the surrounding corridor.

We had considered decreasing the speed of the supply air fan to reduce the amount of outdoor air entering the space but this would have required additional labor to realign the sheaves on the supply fan. This also would have reduced total airflow and in return would have reduced the overall air change rate in the space. We also thought about adjusting the outdoor air dampers to create more negative pressure in the space. In later discussions with the owner, he informed me that he would prefer that the supply fan not be adjusted and the outdoor air rate not be decreased because they want to retain as much fresh air entering the pool space as possible.

**Recommendations:**

The following are a list of routine maintenance recommendations that would ensure the best available performance from the pool unit:

- Clean evaporator coils.
- Clean hot gas reheat coils.
- Clean hot water coil.
- Clean condensing coil.
- Re-insulate refrigerant piping from air cooled condenser.

The following is a list of recommendations that would help create better indoor air quality in the natatorium:

- Install a roof mounted exhaust fan with exposed exhaust air ductwork routed down to the deck area. These low points of exhaust will help pull the chloramines to the exhaust grilles and away from the spectator area. The low exhaust will serve two purposes. First, it will compensate for the undersized return air ductwork. Second, it will enable the owner to create a negative pressure in the natatorium which will limit the migration of chlorine laden air into the surrounding rooms. The exhaust fan will be provided with controls to measure the space differential pressure. The fan can provide minimum exhaust air to keep the space slightly negative when unoccupied and then will automatically adjust itself through modulation of a variable speed drive to increase exhaust airflow prior to swim meets or practices. The location of exhaust grilles to be coordinated with the owner to not interfere with daily functions.
- Have an NEBB certified balancing contractor balance the new exhaust system and verify the exhaust, outdoor air and total airflow from the pool dehumidification unit. Adjustments to be made to the pool unit as required.