Crabtree, Rohrbaugh & Associates

York Suburban SCHOOL DISTRICT

Construction Projects Update

September 16, 2024

HISTORY

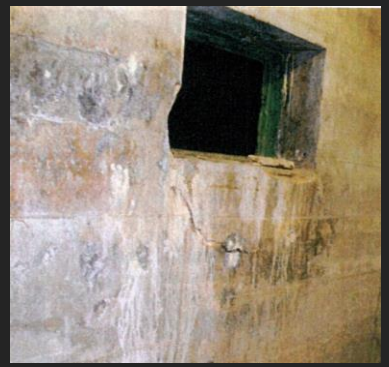
- Swimming Pool Audit January 2009
  - Counsilman Hunsaker identified the following list of deficiencies:

    - Corrosion of reinforcing steel is visible through the tile finish at the gutter lip
    - Scum line above gutter lip indicates gutter is often flooded
    - Main drain grating covers are not compliant
    - ADA access is not provided
    - Starting platforms provide little slip resistance
    - Corrosion on steel equipment in natatorium and mechanical room
    - Elevated lifeguard chair not provided
    - Floating lane ropes are in poor conditions
    - Drinking fountain not provided in natatorium
    - Pool deck space is limited for hosting swim meets, PE classes, etc.
    - Safety rail not provided at filter tank stairs and platform
    - Air gap not provided at fresh water supply or backwash pit
    - Secondary containment not provided for liquid chlorine
    - Automatic water level controller not provided
    - Dectron dehumidification unit is near life expectancy
    - Broken concrete and exposed reinforcing steel at underwater viewing windows
    - 7.25 turnover for pool complies with the administrative code of 8 hours, but does not meet the industry standard of 6 hours
    - Relative humidity in natatorium not maintained within industry standards
    - Structural evaluation is required

YSHS NATATORIUM

HISTORY

- Pool Structure Condition Assessment October 26, 2009
  - Carney Engineering Group recommended the following recommendations in order of importance to extend the life of the pool by 20 years:

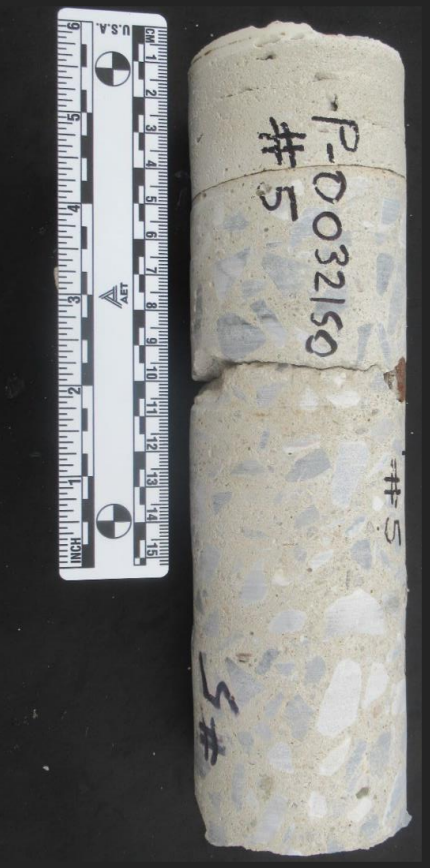


- Existing delaminated concrete areas should be removed down to sound concrete and all corrosion cleaned from the existing reinforcing steel. The patch area should be coated with corrosion inhibiting bonding agent. The concrete wall should be patched back with self consolidating repair concrete with a corrosion inhibiting additive.
- The entire pool wall in the basement should be sprayed with a penetrating corrosion inhibitor to arrest the effect of the existing chlorides on the reinforcing steel.
- A protective coating should be applied to the exterior of the pool to prevent further chlorine penetration into the walls.

YSHS NATATORIUM

CURRENT STRUCTURAL INVESTIGATION

- Pool Structure Condition Assessment September 2024
  - American Engineering Testing performed petrographic testing of 5 concrete cores extracted from the pool:



- Measures chloride concentration and carbonation depth in concrete
- Chlorides that accumulate in sufficient quantity at the level of reinforcing steel will corrode the steel.
  - Weakens the tensile strength of steel
  - Corrosion on steel will cause concrete to crack
  - Corrosion on steel will affect the bond
- Concentration measured by pulverizing sample into a powder and performing a standard test method for acid-soluble chloride in mortar and concrete

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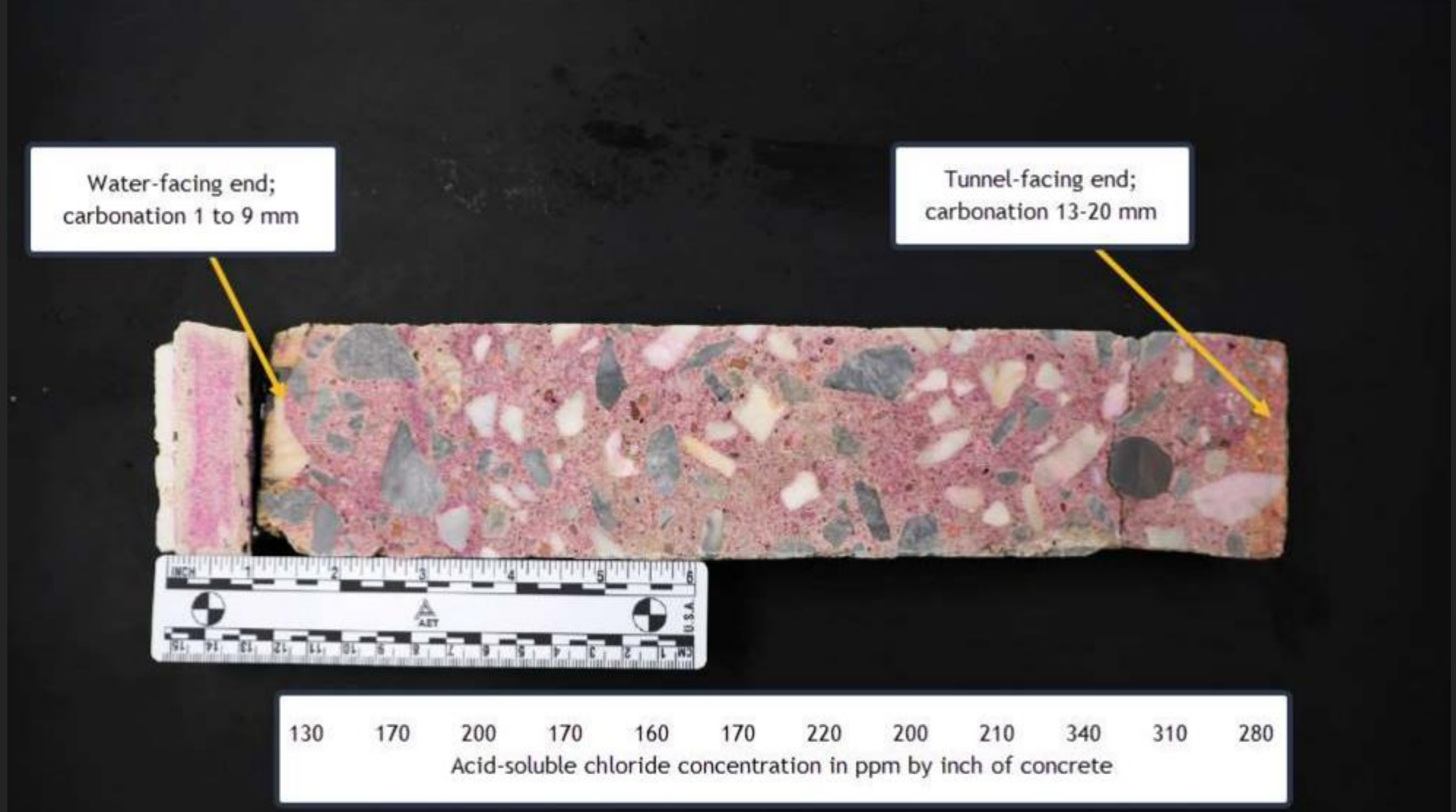

Photograph of cut and lapped sample with the pool-facing side to the left and the tunnel facing side to the right. The pink stain is a phenolphthalein solution. Where the concrete is not pink, it is carbonated.

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CURRENT STRUCTURAL INVESTIGATION

- Pool Structure Condition Assessment September 2024

  - Chloride Concentration
    - Testing indicated 60-300 ppm
    - 200 – 300 ppm is an elevated chloride concentration from baseline, it is not high enough to cause corrosion of the reinforcing steel.
    - It is likely that 200-300 ppm is an equilibrium chloride concentration meaning that It will not significantly increase over time and represents the chloride concentration in the air.
    - None of the reinforcing steel was corroded beyond the sacrificial corrosion layer.

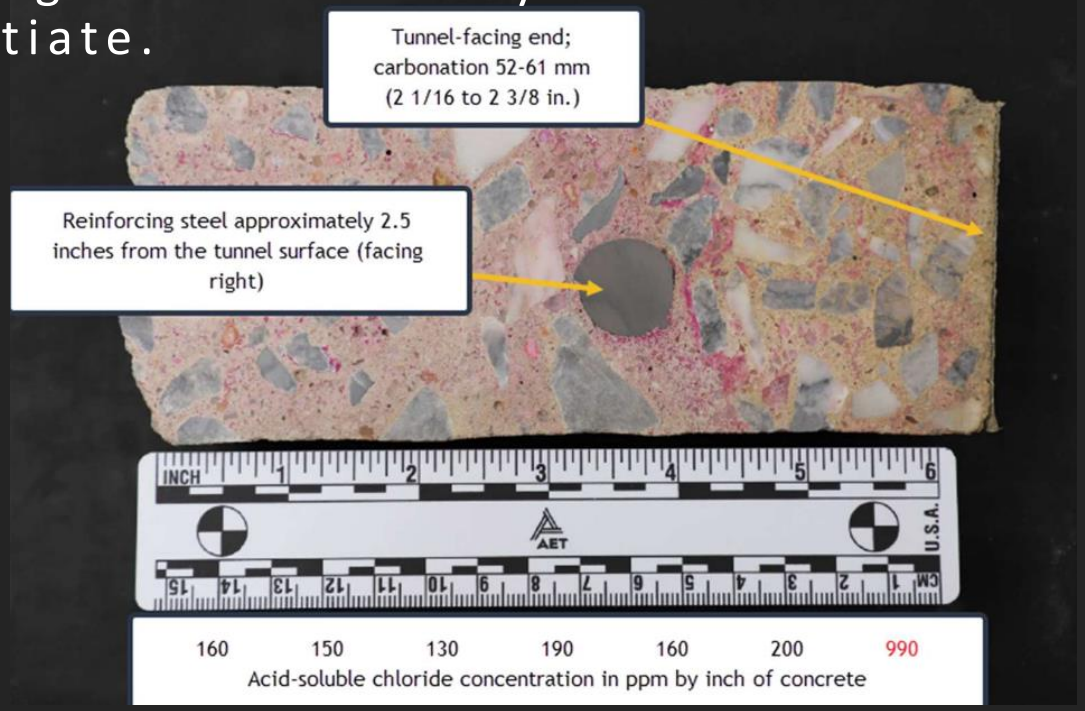
  - Carbonation Depth
    - Carbonation depth was deeper on the exterior-facing side
    - Depth ranged from 13 – 61 mm (1/2” to 2-3/8”)
    - Reinforcing was present in samples with approximately 2.5” of cover on the exterior-facing side.
    - Assuming ingress of 0.5-1 mm/year, chlorides could reach the steel in 15-25 years

CURRENT STRUCTURAL INVESTIGATION

- Pool Structure Condition Assessment September 2024

  - The debonding of tile/mortar to the concrete substrate is the most detrimental failure to the service life of the natatorium form a material perspective.

  - AET expects that the concrete carbonation could reach the level of reinforcing steel in 15-25 years when reinforcing steel corrosion could initiate.



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CURRENT STRUCTURAL INVESTIGATION

- AET recommends that the concrete basin has over 25 years of service life left with the following repairs:

  - Remove the tile and mortar finish on the water facing side of the basin. Remove 1/8” – 1/4” of concrete substrate surface. Install a new tile and grout system that achieves long-lasting, continuous bond between the mortar and concrete substrate.

  - Remove about 1/2” to 1” of concrete from the exterior face of the basin. Leave the surface rough and clean. Surface apply a repair mortar that has a low water-to-cement ratio and includes pozzolans or slag or is a non-Portland cement-based repair product. Repair mortar shall equal the depth of the material removed to maintain concrete cover depth to steel reinforcing.

  - Additionally, CRA recommends a protective coating be applied to the exterior of the pool to prevent future chlorine penetration into the walls.

EXISTING POOL CHALLENGES

- The following items are considerations that must be accepted or addressed if renovating the existing pool:

- 4 lane pool.
  - Industry standard recommends a minimum of six (6) 7’ wide lanes
  - USA Swimming recommends a minimum of eight (8) 7’ wide lanes
- 3’-6” shallow end does not meet the National Federation of State high School Associations recommended minimum depth of 4’-0”
- Perimeter gutter system is antiquated
  - 12” between gutter lip and pool deck makes it difficult to exit pool without ladder
  - Little capacity to capture waves, resulting in a slower competition pool
- Deck space around pool is limited causing difficulties when hosting swim meets, PE classes, swim lessons, or other large groups

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EXISTING POOL CHALLENGES

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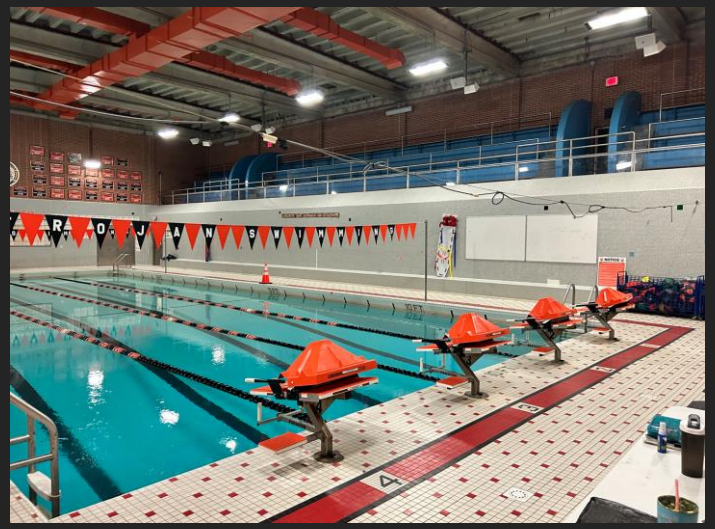

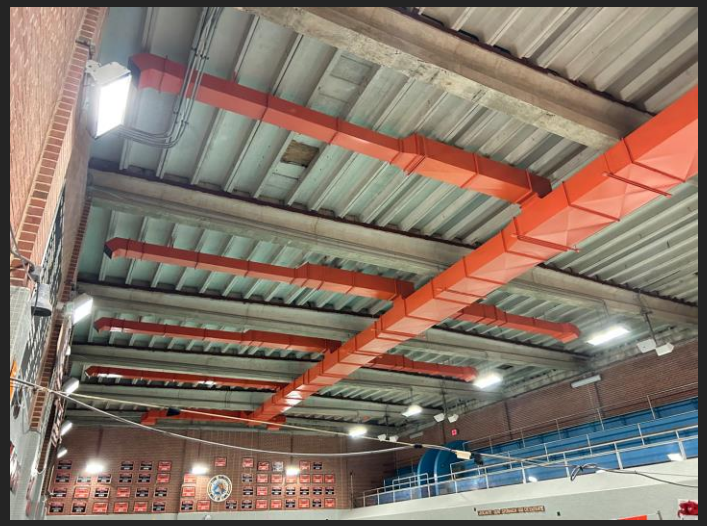

- Space is limited for storage of pool equipment either on deck or adjacent storage rooms.
- Pool does not have the appropriate amount of surge capacity, causing gutters to flood and not function as intended
- ADA access is not provided
- Additional structural repairs are required
  - Active cracking at previously repaired corner following refilling the pool in 2024
  - Window infills show signs of movement and stress following refilling the pool in 2024
- HVAC system is in need of replacement and is in the process of progressive failure
- Pool water boiler requires upgrading to eliminate the last steam boiler

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EXISTING POOL CHALLENGES

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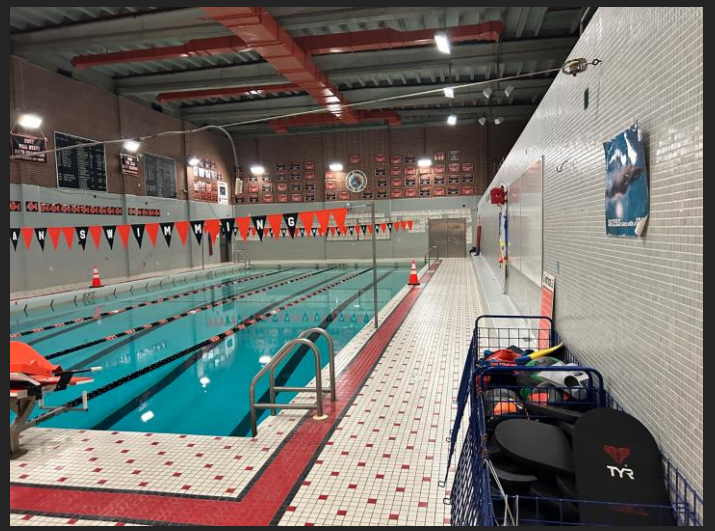

- Pool equipment would be replaced during comprehensive pool renovation to ensure full compliance with current code requirements and industry standards
- Ventilation at the water level should be considered as part of a gutter modernization
- The pool's current location creates security, access, and control issues
- Limited spectator seating & ADA access issues for spectators

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NEXT STEPS

- Continue to develop an option for the proposed High School that includes renovations to the existing pool

- Concurrently develop an option for the proposed High School that includes a new construction pool with supporting facilities

- Develop estimates associated with each option for Board consideration