

General Description:

- **Location:**
Royal Oak, Michigan
- **Profile:**
Water Intrusion
- **Project:**
Below-Grade Evaluation

Services Provided:

- Evaluation
- Water Testing
- Exploratory Excavation
- Budget Estimation

Challenge:

- Interior walls exhibiting intermittent leakage conditions
- Below-grade waterproofing had previously been performed by another contractor, but did not solve the issue.

Solution:

- Used exploratory excavation, visual observations, and review of site drawings
- Scientific approach combined with experience to solve problems for the entire building envelope

Beaumont Health Systems Royal Oak Campus

In August 2015, StructureTec was contacted by Beaumont Health Systems to complete an evaluation of below-grade waterproofing over an uninterruptible power supply (UPS) Room in the basement of the North Tower at Beaumont Hospital in Royal Oak, MI. The UPS Room was constructed in 1991 as part of the Nuclear Medicine Addition at the Southeast corner of the basement level of the North Tower. It is made of reinforced concrete and houses electrical power supply equipment.

The UPS room had been experiencing intermittent interior water leakage from the roof/ceiling area at the north and east walls for numerous years. Below-grade waterproofing had previously been performed by another contractor, but did not solve the issue.

StructureTec performed an interior observation and found that no leakage was present at the time of the observation. We then performed an exploratory excavation along the exterior building wall of the Southeast corner. The excavated material consisted primarily of sand, and moisture was found in the residual sand layer over the basement corridor roof.

StructureTec found that along the east wall of the room there were several changes in elevation of below-grade con-



Overview of exploratory excavation at Southeast side of North Tower

crete construction and tie-ins of later additions. Terminations and corner details were not installed properly, compromising the integrity of the waterproofing system. The waterproofing membrane detail at the inside corner, where the basement corridor roof slab and the main building basement wall intersect, had been installed without a cant or transition radius. This condition increased the possibility of membrane failure over time.

Transitions from the existing waterproofing systems on original construction to waterproofing systems on new additions also needed special attention to ensure membrane continuity and water-tightness over the underlying concrete joints. In addition, lack of sub-grade drainage piping above the basement corridor roof just east of the UPS room was allowing moisture to accumulate in this depressed





Drainage composite was not properly lapped at building wall-to-corridor roof transition. Membrane was not supported by a cant or curved fillet at the transition.

area bounded on the north and east by the 1991 addition.

Based on observations, review of site drawings, and exploratory excavation, StructureTec found that the interior water leakage in the UPS room was due to a combination of unreliable waterproofing details at terminations and transitions in existing construction and lack of sub-grade drainage capacity east of the UPS room.

After the source of the moisture intrusion was identified, StructureTec provided recommendations for repairs, as well as a corresponding budget estimate to complete the work. The scope of work included:

- Excavating and exposing the existing below-grade waterproofing system around the addition where it ties to the North Tower
- Reviewing and repairing deficient membrane transition details at corners and construction joints
- Providing reglet-set counter flashing along the top edge of the North Tower building wall waterproofing

- Installing a perforated sub-grade perimeter drain in the depressed area over the basement corridor roof slab
- After repairs are completed, provide a layer of coarse aggregate over the exposed existing construction prior to backfilling the site.



Cool interior air was flowing out of the building along storefront glazing sill at the 1st floor slab surface.



Detail view of building wall waterproofing system. Waterproofing material applied to wall (arrow) followed by rigid insulation and drainage composite layer.

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