WINTER 2017 NEWSLETTER

CHAMBERLIN
Roofing & Waterproofing

A Hallmark Restoration

The Hallmark, senior living community in Houston, TX, after exterior restoration.

The Hallmark, owned and operated by Brazos Presbyterian Homes, Inc., is a senior living community nestled in the Galleria area of Houston, Texas. The facility has been serving individuals for four decades, offering independent living, continuing care, assisted living and Alzheimer's care. Acclaimed as a signature retirement community in Houston, the facility boasts a fine dining room, swimming pool, fitness center, hair salon, library, chapel, community center for events and a putting green.

Over 40 years of weather and time can take its toll, and recently water intrusion at various locations on this 10-story building became apparent. The exterior brick façade also needed to be revitalized. Due to Chamberlin's experience in remedial construction, professionalism and dedication to safety, JPS Consulting enlisted Chamberlin Roofing & Waterproofing to repair the leaks around the windows and restore the facade.

Since the building was to remain occupied during the repairs and restoration, the protection and respect of the residents and visitors was vital. Chamberlin conducted in-house safety meetings to discuss daily tasks. The crew defined all exclusion zones and

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CONSULTANT'S CORNER:

By Danielle Czyzewski and Carole Cummings, Pie Consulting & Engineering

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Project Manager

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Project Manager

The Use of Electronic Leak Detection (ELD) on Waterproofing Membranes over Concrete Surfaces

Waterproofing membranes are a key element in building enclosure systems — a key element that ultimately gets covered up by a variety of finish materials including landscaping, green roofs, topping slabs, pavers and so on. As most of us know, excavation to expose a failed waterproofing membrane for repairs can be prohibitively

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utilized the appropriate signage to ensure the safety of all residents, visitors and on-site contractors. Bi-weekly site meetings with The Hallmark representatives, JPS Consulting, Chamberlin's Project Manager Luis Antezano and Superintendent Thomas Borrosco were also part of the project's success. The potential noise factor and time constraints were concerns as well, and Chamberlin developed and maintained a job schedule that catered to The Hallmark's time frame with minimal disruption for their residents.

Clean as a Whistle

Chamberlin's scope of work began with high pressure power washing of the building to remove dirt from the existing brick and expose any imperfections in the grout, as well as cracks in the exterior skin of the building. Then the crews repaired the reverted joint sealants and the cracked mortar and brick. A second power washing was performed after the repairs were complete to remove any dust or debris so the substrate was in prime condition to receive the optic coating, which was the final step of the renovation.

Searching High and Low

The brick that was originally used to construct The Hallmark was discontinued prior to renovation. Chamberlin was challenged to find a new brick that matched the existing masonry closely enough to use as a replacement in some areas that were too damaged to be salvaged. Chamberlin went through many brick samples to no avail until finally a brick was discovered in Austin, Texas, that was thought to be a good match. However, when the sample arrived on site, the color appeared too light next to the existing brick. Chamberlin applied a clear optic coating to the sample. Even though the sealant is clear, the porous brick absorbed part of the liquid, darkening it slightly, resulting in a very close match to the original.

The crew then replaced the broken bricks and reverted joints and performed crack repairs. The reverted joints were originally sealed with mortar. The joints in this building are very active and that movement was causing the mortar to crack due to its rigidness. Instead of replacing the joints with more mortar that would continue to crack, a silicone sealant was the best option.

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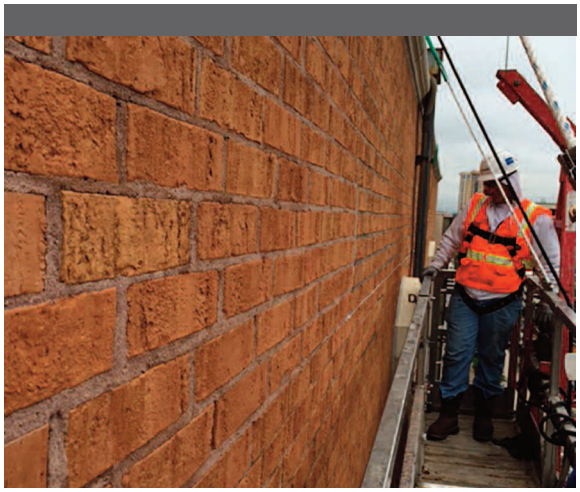
The front entrance of The Hallmark with overhead protection and safety barricades in place.



After the initial power washing, the Chamberlin crew inspected the facade to identify the cracked brick and mortar that needed to be replaced.

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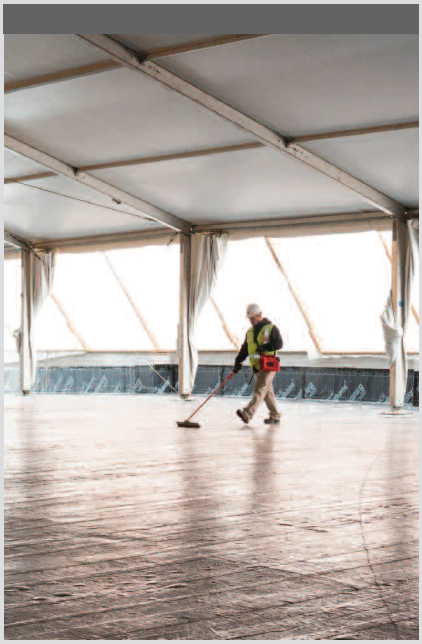

Figure 1: *HVELD testing in progress*

expensive and in some cases impossible. For this reason, many designers are choosing to specify integrity testing to verify that the waterproofing membrane is free of discontinuities and penetrations through the membrane prior to the installation being permanently covered. When integrity testing is not specified, many contractors are often performing this type of testing voluntarily to avoid future problems or "call-backs."

The most common integrity testing method is the flood test. Flood testing is typically performed by flooding waterproofed horizontal surfaces with at least two inches (50 mm) of water for a period of up to 48 hours. Temporary dams are often constructed to partition the test areas, provide an up-turned plaza edge and control the depth of the flood testing. During the flood test, access to the underside of the flooded areas is necessary for a visual inspection of water leakage. However, in the case of a membrane failure (leak), flood testing indicates only where water is penetrating through the entire assembly within the test area, not the location above where water is breaching the membrane. In addition, flood testing cannot be performed on vertical surfaces or at locations where the underside of the slab is not accessible.

The aforementioned restrictions and lack of conclusive data associated with flood testing has enabled Electronic Leak Detection (ELD) to gain momentum as a viable alternative to traditional flood testing. This article will focus on the different types of ELD and the applications where ELD is or is not well-suited.

High Voltage Electronic Leak Detection (HVELD)

High Voltage Electronic Leak Detection (HVELD) can be performed on vertical or

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Chamberlin began tuckpointing the joints by applying primer and inserting a backer rod. The backer rod was then tooled into place with the silicone. While this material was a good choice because it allows for flexibility and elongation, aesthetically it would not match the mortar joints so Chamberlin rub brushed a color-matched sand into the silicone. When finished, one could not tell the new joints apart from the existing joints.

After the brick and cracks were repaired, Chamberlin applied two coats of clear elastomeric optic coating. This material is a very effective waterproof coating that maintains the look of the original construction. Chamberlin left The Hallmark with a watertight building renewed to its original beauty.

Safety Pays Off

The rigging logistics for this building were not ideal. Most modern high-rise buildings are equipped with roof anchors, davits or other type of rail systems to which swing stages can be anchored. However, the only potential tie-off points on the The Hallmark's roof are CMU scuppers, and they are not sturdy enough as an anchor to sustain the minimum load requirement of 5,000 pounds. Chamberlin created a system to safely suspend their swing stages by running the tie back cables and the crew members' safety lines across the roof and down the back side of the building where they were tied off to eye bolts that were anchored into the foundation of the building. With this system, the rope lifelines were exposed to potential abrasion damage as they ran up and over the roof's parapet wall and scuppers. To counteract this, heavy duty nylon was secured around them with Velcro.

Chamberlin had two stages per elevation running consecutively, sequencing their drops for maximum productivity. Two independent safety inspectors and the owner of the equipment rental company inspected the swing stage system before it was put into use. During the project, the equipment was inspected prior to use each shift by Chamberlin's trained competent person.

Joel Smith with JPS Consulting commented on Chamberlin's safety culture saying, "I have observed a distinct, concerted effort by your field team, led by Thomas Borrosco, to ensure the safety of The Hallmark's residents and Chamberlin's team of dedicated workers. They respect the dignity of the residents, protect them with excellent, timely planning and execution of their daily plans. No unnecessary risks are taken. When I make site observations, I find your field crew to be fully PPE'ed (Personal Protective Equipment). They keep the Hallmark administration fully advised of where they will be working with two week look-a-heads so as to keep the residents, staff and guests fully apprised of the exclusions zones.

Horizontal eyebrow on the building prepped for concrete patchwork to repair extensive deterioration.

Your men have been observed to be fully tied-off, 100% of the time, in their swing stages. I have observed daily inspections of the swing stage equipment along with the necessary safety measures including fire extinguishers, equipment lanyards, anchorage checks, support confirmation and access strategy options. Your site is a safe, clean site, and I learn something from your team each time I listen and observe them."

The Hallmark representatives were extremely pleased with Chamberlin's project management and quality work delivered professionally in a timely manner. Chamberlin has subsequently been awarded an additional contract for The Hallmark's parking garage structural restoration and also enlisted to perform a water leak investigation on another building on the property. Chamberlin is proud to have provided the level of service that develops a customer into a client who entrusts Chamberlin time and again with their roofing and waterproofing needs. ■

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horizontal surfaces under dry conditions (Fig. 1). The principle of the HVELD process involves a generator that delivers an adjustable stabilized direct current (DC) output voltage for the detection of breaches to the electrically insulated roof or waterproofing membrane.

The generator emits a calibrated voltage discharge which conducts through membrane penetrations to a grounded earth lead, such as a metal drain body or steel reinforcing embedded in the concrete slab. Should the current make contact with the ground, this will complete the circuit emitted by the generator. An audible beep from the test equipment alerts the technician of the breach. Small sparks can sometimes be seen or heard when a breach location is contacted by the probe.

The initial test voltage is based on the thickness of the waterproofing membrane and is verified (calibrated) by creating a sample breach in a typical section of membrane being tested to ensure detection levels are appropriate. In the case of liquid applied membranes,

Figure 2: *LVELD testing in progress.*

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properly calibrated HVELD equipment can also detect locations where the membrane does not meet the minimum thickness requirements, even if no breach is present.

HVELD Limitations

Multiple false positives are possible with this type of testing if the equipment is not properly calibrated for project specific materials. Due to the high voltage, testing should not be performed in inclement weather or in wet or moist conditions for the safety of the testing operator. HVELD is also not successful if the membrane is conductive, such as black ethylene propylene diene monomer (EPDM).

HVELD can only be performed over conductive substrates, such as metal decking and concrete. If a conductive substrate is not present, it is possible to create a conductive substrate by installing a metal mesh or screen prior to the installation of the waterproofing membrane. However, the waterproofing membrane manufacturer must be consulted to confirm that the presence of an embedded screen or mesh material will not adversely affect the membrane material or void the warranty.

Low Voltage Electronic Leak Detection (LVELD)

Low Voltage Electronic Leak Detection (LVELD) is performed on horizontal surfaces using water as a conductive medium on the surface of the waterproofing membrane (Fig. 2). Multiple types of LVELD testing equipment and setups are available. The principle of the LVELD process involves a perimeter conductor loop placed on the surface of the membrane. The conductor loop is then connected to an electrical pulse generator. The generator is also connected to the grounded portion (e.g., reinforcing steel or a metal drain body) of the substrate below the membrane.

During LVELD testing, the top surface of the membrane is lightly wetted. The thin layer of moisture creates a continuous surface plane of electrical current within the established perimeter conductor loop and allows the electrical pulse from the generator to pulse across the membrane. Once the generator is set up and activated, it sends a low voltage electrical pulse through the water on the surface of the membrane. Should any water make contact with the ground, this will complete the circuit emitted by the generator. Because the electrical current is directional, the testing technician can use hand-held probes to determine the direction of the current flow and follow the flow until the breach is located.

In addition, all known breaches and items that are in contact with the grounded substrate should be isolated from the test area during testing with a separate perimeter conductor loop (Fig. 3). This includes drains, metal pipe penetrations, fasteners and so on.

Compact LVELD testing units are also available. The compact units feature a portable perimeter conductor loop and series of probes that are moved across the top surface of the membrane. Similar to the scenario described earlier, the portable perimeter loop is energized and the probes are used to detect discontinuities in the membrane. With this test equipment, it is necessary to lightly wet the surface of the membrane during testing, but it is not necessary to set-up a perimeter conductor loop or to isolate grounded items.

LVELD Limitations

LVELD testing is good for testing the unobstructed field of a waterproofing membrane, and large quantities of membrane may be tested in a short period of time. However, this method is less effective at testing vertical flashings, material transitions and around drains, as these conditions are typically isolated from the test area as a result of being grounded or due to the difficulty of keeping these surfaces continuously wet. Therefore, it is important to visually inspect these types of locations and/or perform isolated alternative testing. LVELD testing relies on the continuity of the water on the surface of the membrane to connect to the grounded substrate to identify breach locations. Breach locations where water has not yet reached the substrate can be missed. An example of this is often seen in the roofing industry when a vapor retarder is installed prior to the installation of the roof membrane. Water may breach the membrane but is prevented from coming into contact with the substrate if the vapor retarder is not also breached in the same area.

Similar to HVELD, LVELD cannot be performed on conductive membranes or on membranes over non-conductive substrates; however, conductive substrates can be created (during construction) as previously discussed. Special precautions should be taken when testing some types of membranes, such as sheet membranes with high density polyethylene (HDPE) backing, to prevent water from beading up and providing a continuous layer of water across the surface of the membrane.

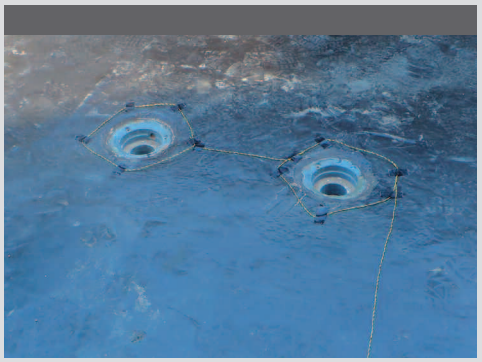

Figure 3: Drains isolated with perimeter conductor loop.

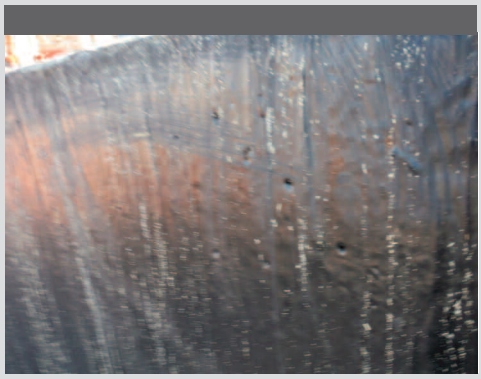

Figure 4: Pinholes observed on vertical surface.

Case Study

An engineering consulting firm was contacted by a general contractor who was charged with constructing a university sports stadium on a tight schedule. The contractor was concerned about maintaining the integrity of the waterproofing membrane as the project schedule required a specially formulated waterproofing membrane to be installed shortly after each concrete pour (24 hours). As a result of the restrictive schedule, testing was required to occur on specific dates and times in both wet and dry site conditions. To accommodate the stringent timeline set forth and varying site conditions, both HVELD and LVELD were performed. HVELD testing was completed in the dry locations, and LVELD testing was performed in wet locations. The consulting firm was contracted to identify any breaches or material deficiencies and retest repair areas completed by the waterproofing contractor the same day.

Testing of a 15,000 square foot (1395 m^2) area was completed over the course of eight mobilizations. During testing, the consulting firm detected an excessive number of pinhole breaches in the installation of the membrane on vertical surfaces. Some of the breaches were large enough to be visually observed without ELD (Fig. 4), while others were much smaller (approximately the size of a pencil tip)

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Figure 5: Retroactive sealant application to repair pinholes.

and required the use of ELD for detection. It was determined that the cause of the pinholes on the vertical surfaces was due to the irregular surface of the formed concrete substrate. To correct this deficiency at locations where the waterproofing membrane had already been installed, an expensive and time consuming retroactive application of repair sealant was applied on the waterproofed vertical surfaces (Fig. 5). Once the sealant had cured, the vertical areas were retested using ELD and confirmed to be watertight.
To prevent similar pinholing at future locations, a pre-treatment of the concrete surface with extra waterproofing material or repair sealant was implemented to create a smooth surface for the waterproofing application. ■

To continue reading "The Use of Electronic Leak Detection (ELD) on Waterproofing Membranes over Concrete Surfaces," visit:
www.chamberlinltd.com/articles/the-use-of-electronic-leak-detection

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Chamberlin Recognized with Industry Honors

Chamberlin Roofing & Waterproofing received an **Engineering News-Record (ENR)** Texas & Louisiana 2016 Regional Best Project award for their roofing work on the Dallas Love Field Modernization Program. This awards program evaluates safety, innovation, teamwork, challenges overcome, craftsmanship and contribution to the industry. Out of 92 total entries this year, Chamberlin was awarded Best Project in the Specialty Contracting category.

The Dallas Love Field Modernization Program was the largest and most ambitious construction effort since the airport's establishment in 1917 and involved a complete terminal renovation and expansion, the addition of new concourses, a larger baggage claim and new ticketing wing.

Chamberlin installed a total of 450,000 square feet of a torch-applied two-ply modified bitumen roofing system, 45,000 square feet of PVC roofing and 40,000 square feet of TPO roofing. A 10-man crew worked for four years to complete this tremendous project on time and with no safety incidents. ■

Chamberlin received an ENR Texas & Louisiana 2016 Regional Best Project award for their work on the Dallas Love Field Modernization Program.

The Associated Builders and Contractors (ABC) Excellence in Construction (EIC) awards program recognizes outstanding projects in the commercial construction industry. The projects are judged on innovative programs relating to quality, productivity and scheduling, as well as special obstacles and extenuating circumstances overcome and any value engineering process. A project must be awarded first or second place at the ABC local chapter's competition to qualify for the national level. Chamberlin had three projects qualify to compete nationally in 2016. The Love Field Modernization Program was bestowed an ABC EIC award through TEXO, North Texas' ABC Chapter. Additionally, Chamberlin was honored with an ABC Oklahoma Excellence in Construction award for INTEGRIS Baptist Hospital and an ABC Greater Houston Excellence in Construction Merit award for their work on a corporate project just north of Houston.

Chamberlin received an ABC Excellence In Construction award at the local level for three of their projects in 2016.

Chamberlin installed an environmentally friendly hot rubberized asphalt waterproofing system for the renovation of INTEGRIS Baptist Medical Center's entryway in Oklahoma City, OK. The project was divided into two phases, with half of the entryway to be waterproofed in Phase I and the other half during Phase II. However, the phases were to be completed months apart, so the concern was water infiltration from the old waterproofing system ruining the new system. Chamberlin found the solution by creating a unique waterproofing detail that separated the new system from the old keeping it watertight until the installation could be completed.

Additionally, Chamberlin Roofing & Waterproofing completed their largest project to date for a corporation just north of Houston on their new 385-acre campus. Chamberlin installed over 3,000,000 square feet of below-grade waterproofing, 255,000 linear feet of joint sealants and a TPO roofing system on 16 buildings. Their scope also included installing approximately 600,000 square feet of traffic coating to three parking garages, with a unique twist - a mural on each garage roof depicting an aerial landscape view of the company's different locations around the world. Instead of paint, these murals were created with the traffic coating, which was a colored polyurethane waterproof coating combined with pool quartz. This took intricate planning and mapping, extreme attention to detail and precise application. The incredible final product is one-of-a-kind works of art on each roof. ■

PROJECTS IN PROGRESS

CHAMBERLIN
Roofing & Waterproofing

LOCATIONS:

Call the nearest local office or 1-800-749-1432

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Austin, TX 78754
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Fax (210) 822-8211

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Fax (405) 680-0508

TULSA
10828 E. Newton Street, Ste. 117
Tulsa, OK 74116
Ph. (918) 439-0055
Fax (918) 439-0067

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UT East Campus Parking Garage – Austin, TX
New Construction Waterproofing
Contract Amount: $1,000,000 (approx.)
Owner: University of Texas Systems
Architect: PGAL
General Contractor: SpawGlass
Scope of Work: Below-grade waterproofing, expansion joints, traffic coating, fluid-applied air barrier, metal flashing, joint sealants, water repellents
Project Description: New parking garage for The University of Texas

Awty International School of Early Learning Center – Houston, TX
New Construction and Remedial Waterproofing
Contract Amount: $150,000 (approx.)
Owner: The Awty International School
Architect: Shepley Bulfinch
General Contractor: JE Dunn Construction
Scope of Work: Pressure washing, below-grade waterproofing, fluid-applied vapor barrier, joint sealants and site sealants
Project Description: College preparatory PK3 - 12th grade international school

Samsung – Austin, TX
Remedial Roofing
Contract Amount: $700,000 (approx.)
Owner: Samsung
General Contractor: SECAI
Scope of Work: Overlay of PVC membrane roofing system, sheet metal flashings and coping cap
Project Description: Roof re-cover for office building

CyrusOne SAT Building II – San Antonio, TX
New Construction Waterproofing
Contract Amount: $350,000 (approx.)
Owner: CyrusOne
Architect: Corgan
General Contractor: Rogers-O'Brien Construction
Scope of Work: Below-grade waterproofing, cold-applied waterproofing, sheet waterproofing, crystalline waterproofing, joint sealants and expansion joints
Project Description: Data center

CityLine Block C – Richardson, TX
New Construction Roofing and Waterproofing
Contract Amount: $900,000 (approx.)
Owner: City of Richardson
Architect: Wallace Garcia Wilson Architects
General Contractor: JLB Builders, LLC
Scope of Work: Fluid-applied waterproofing, joint sealants, firestopping, site and paving sealants, TPO roofing, flashing and sheet metal
Project Description: Upscale offices and mixed-use campus

Alamodome – San Antonio, TX
New Construction Waterproofing
Contract Amount: $600,000 (approx.)
Owner: San Antonio City Council
Architect: MarmonMok Architecture
General Contractor: Turner Construction Company
Scope of Work: Below-grade waterproofing, hot-applied waterproofing and air barrier
Project Description: Multi-purpose arena renovation and expansion

HarborChase of the Park Cities – Dallas, TX
New Construction Waterproofing
Contract Amount: $250,000 (approx.)
Owner: HarborChase of the Park Cities
Architect: BOKA Powell
General Contractor: HC Beck, LTD
Scope of Work: Blindside waterproofing, elevator pit waterproofing, joint sealants, hot-applied waterproofing and traffic coating
Project Description: Eight-story assisted living facility

The Buckingham – Houston, TX
Remedial Waterproofing
Contract Amount: $3,000,000 (approx.)
Owner: Senior Quality Lifestyles Corporation
Consultant: French Engineering
General Contractor: Chamberlin Roofing & Waterproofing
Scope of Work: Power washing, crack repair and traffic coating
Project Description: Balcony repair of resort-style retirement community

UTMB 17E BP 2 – Galveston, TX
New Construction Roofing and Waterproofing
Contract Amount: $950,000 (approx.)
Owner: University of Texas Medical Branch
Architect: Perkins and Will
General Contractor: Hensel Phelps
Scope of Work: Modified Bitumen roofing system, weather barrier, joint sealants, expansion joints, traffic coating, sheet metal fabrication and installation
Project Description: Research facility

University of Texas Southwestern Moncrief Medical Center – Fort Worth, TX
New Construction Roofing
Contract Amount: $500,000 (approx.)
Owner: University of Texas Southwestern Moncrief Medical Center
Architect: HKS
General Contractor: Turner Construction Company
Scope of Work: TPO roofing system, sheathing, walk pads, cap wall and curb flashing, sheet metal and trim
Project Description: Medical center expansion

For a complete list of specialty contracting services, visit www.chamberlinltd.com.

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- Traffic coatings
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