2019 IIBEC WINNERS DOCUMENT COMPETITION

The following pages profile the winning entries in the 2019 IIBEC (previously RCI) Document Competition. Winners (and some stand-ins) were recognized and presented with plaques and IIBEC Dollars by President Mike Clark for Document Competition Chair Jeremy Bridwell.

LARGE PROJECTS

Large Project winners (left to right): Michael Hensen for Brian DeFrias, Troy Giebert for James Ripley, and Jeffrey Levine, with President Mike Clark.

SMALL PROJECTS

Winners in the Small Project category (left to right): Troy Giebert for James Ripley, Dennis Spina, and Pete Keener, with President Mike Clark.

REPORT WRITING

Winners in Report Writing (left to right): Troy Giebert for James Ripley, Bryce McQueen, and Kenrick Hartman, with President Mike Clark.

SPECIAL PROJECTS

Special Project document winners James Ripley (1st and 3rd places) and Jean-Guy Levaque for Guillaume Vadeboncoeur and Jeff Vermette, with President Mike Clark.

Jeffrey Levine
Levine & Company, Inc.

Roof Replacement

Bradford County Courthouse

Towanda, Pennsylvania

This project was completed by Jeffrey Levine while he was with Levine & Company, though he is now an Associate Principal in the Philadelphia office of Wiss, Janney, Elstner Associates.

The existing terra cotta tile roofing on the dome and the Spanish-style copper shingles on the main roof of the 117-year-old Bradford County Courthouse had reached the end of their service lives and needed to be replaced. Roof replacement was carried out in two phases beginning in 2016.

The first phase included installation of new flat-seam copper roofing on the dome in lieu of tile, which was not weathertight. New plywood sheathing was installed on top of existing spaced steel purlins to provide a solid, nailable substrate for the copper pans. A double layer of ½-in.-thick plywood, rather than a single layer of thicker sheathing, allowed the plywood to conform to the curve of the dome without the need for kerfing. Phase 1 also included installation of new wood framing, sheathing, and copper gutter liners at the dome's built-in gutters; new copper cladding and curved standing-seam roofing at the lantern; and restoration of the copper Lady Justice statue atop the lantern.

Phase 2 involved installation of new batten-seam copper roofing on the main roof in lieu of the Spanish-style shingles, which could not be made watertight, given the roof's relatively low slope. This work included installation of new insulation and plywood sheathing atop the existing steel roof deck, new copper built-in gutter liners, and new snow retention systems.

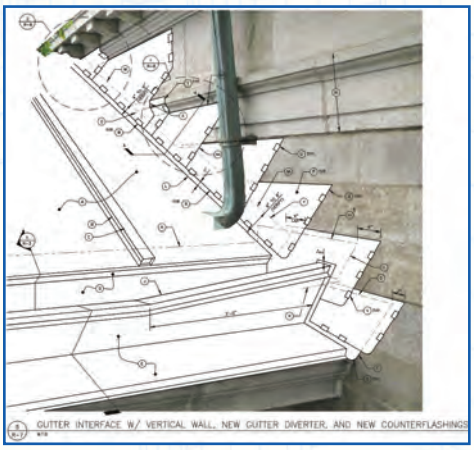
Numerous challenges posed by the project required innovative solutions and detailed construction documents to achieve a long-lived, watertight roof system. Details included drawings overlaid on photographs, axon views, and multi-step illustrations in order to convey the scope of work and complexity of the detailing in the clearest possible way. In addition, working closely with the roofing contractor throughout construction helped ensure a smooth construction phase and a final product that will provide decades of worry-free service life for the county.

Some of the improvements afforded by the design include the following:

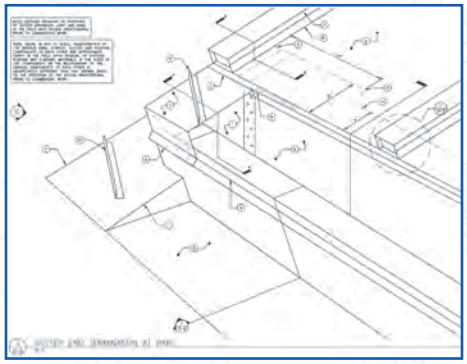
- Ventilation incorporated into the dome roof helps minimize the risk of condensation forming inside the dome's attic.
- Copper cleats fastened to new plywood sheathing impart better securement and blow-off resistance to the batten-seam roofing as compared to the short screws that previously secured the copper shingles to a layer of deteriorated fiberboard.
- Raised expansion joints installed in new built-in gutters and gutter straps that are loose-locked to the outside edge of the gutter and fastened to the roof deck above the gutter liner accommodate thermal movement in the new gutter liners.
- Multiple rows of new snow rails installed on top of the battens on the main roof allowed the brackets to be secured without puncturing the new roof pans and keeps them out of the direct path of flowing water.

Restoration of the Lady Justice statue included removing an existing green coating, patching cracked seams and holes (including a large hole in the top of her head), repairing the scales of justice, and tucking the new lightning protection cable discreetly into the folds of her robe.

The curve of the dome was carefully mapped, and two seam profiles were specified: loose-locked seams with a 2-in. lap for steeper-sloped areas, and locked and soldered seams for lower-sloped areas. Mock-ups were constructed during the design and construction phases to ensure the copper pans would lay properly on the curved surface and to verify sequencing and all aspects of detailing.



One of numerous photo details included in the drawing set to help define the scope of work.



A detail drawing showing a new expansion joint at the interface between the built-in gutter and rake flashing.

2ND PLACE

Roof Replacement

Miami International Airport Concourse H

Miami, Florida

James Ripley
A/R/C Associates, Inc.

Bird's-eye view of Concourse H before reroofing.

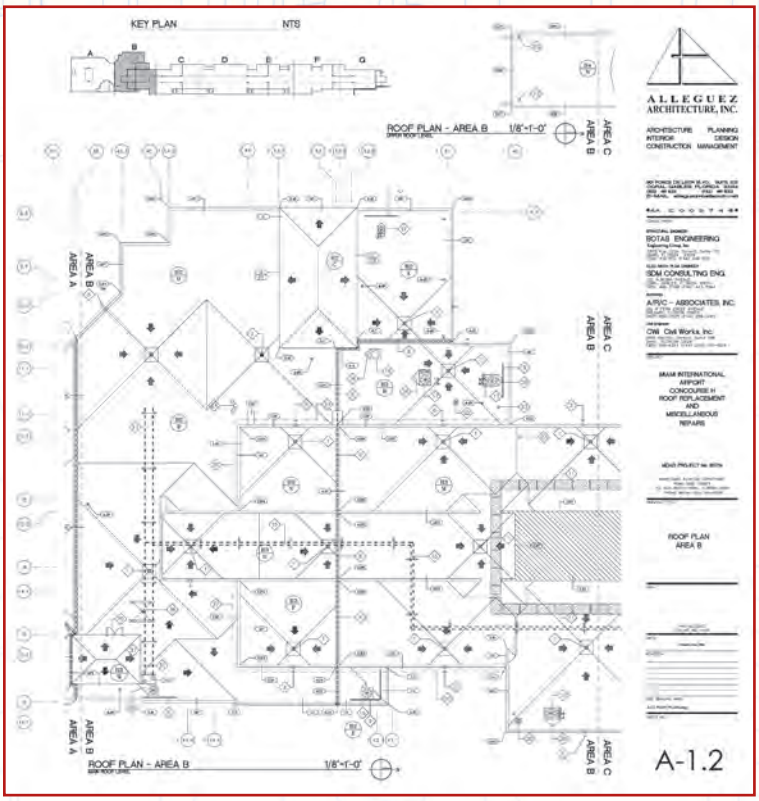
Complex curb installation.

This project included reroofing of the entire active concourse of the Miami International Airport, which totals approximately 120,200 sq. ft., and refurbishment of the associated central penthouse walls. The roof replacement was performed as a design–bid–build project, and the roofing contractor was the prime with the other trades as subcontractors.

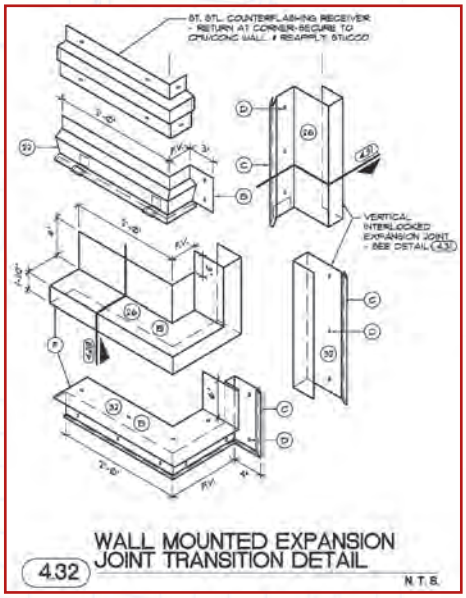
The project required adding drainage slope to the building, upgrading the stormwater overflow system, removal of some abandoned equipment and penetrations, removal and reinstallation of the remaining equipment, infill of some existing roof deck openings, and application of a new 20-year built-up roof with mineral-surfaced cap sheet. Expansion joint flashing between sections of the cast-in-place concrete structure was also required.

This building has a central penthouse system with cast-in-place concrete undulating roofs, clerestory windows (which were to be refurbished), and large mechanical louvers to be waterproofed. The penthouse walls are direct-applied stucco, which was scanned using thermographic imaging. Entrapped water and debonded stucco were removed, the stucco was repaired, and waterproofing was applied to the entire wall system.

An important addition that was lacking in the original design was the ability to replace/repair the surrounding roof system without having to disturb the stucco wall finish and large rooftop equipment. This was accomplished by installing a stucco stop trim with an integral counterflashing receiver prior to the stucco application. The counterflashing was then installed as the base flashing for the roof system was applied. Construction was completed in the summer of 2018.



Concourse H roof plan for Area B.



Wall-mounted expansion joint transition detail.

Brian DeFrias
IRC Building Sciences Group

Building Envelope Rehabilitation

South Residence, The University of Guelph

Guelph, Ontario, Canada

The University of Guelph's South Residence—the largest single residence complex in Canada—was designed by architect John Andrews in his renowned Brutalist architectural style with the original exterior wall finishes composed of predominantly exposed concrete and clay block masonry. Built in 1968, South Residence houses over 1,800 students in 12 six-story wings within its 212,000-sq.-ft. facility.

In 2016, IRC Building Sciences Group was retained by The University of Guelph to design and manage the exterior rehabilitation of the South Residence to address building components that were at the end of their service lives, while also improving the overall performance of the building enclosure. The ambitious project would span six construction phases to rehabilitate all 12 wings of the facility, completing two wings per phase during a short summer construction window when students did not occupy the building.

IRC's design for this project involved a major retrofit of several of the building's components such as the exterior metal cladding system, upgrading all punch windows and introducing curtainwall glazing assemblies, exterior door replacement, roof replacement, and upgrading in-room fan coil heating units to allow for individual unit ventilation and improve indoor air quality. Cladding of the exterior walls also presented an opportunity to update and refresh the appearance of the building to provide South Residence with an individual identity while drawing inspiration from and complementing its original design.

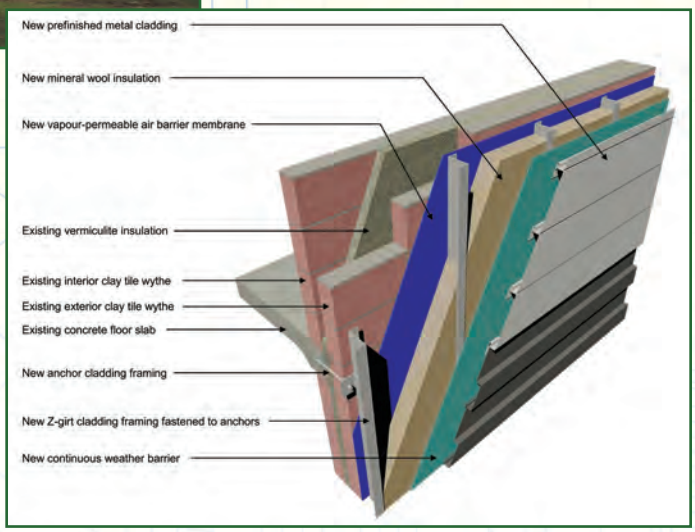
The large overall surface area of the exterior walls throughout the entire facility presented a vast potential for future savings related to heating costs by improving the energy efficiency of the building envelope. By introducing an air barrier membrane to the backup walls and converting the original screened-in balcony areas into insulated curtainwall systems, IRC's design for South Residence created a more continuous and uniform building exterior, greatly reducing the potential for air leakage and heat loss. The addition of exterior mineral wool insulation within the framing of the new cladding improved the thermal performance of the exterior walls from R-8.5 to R-28.

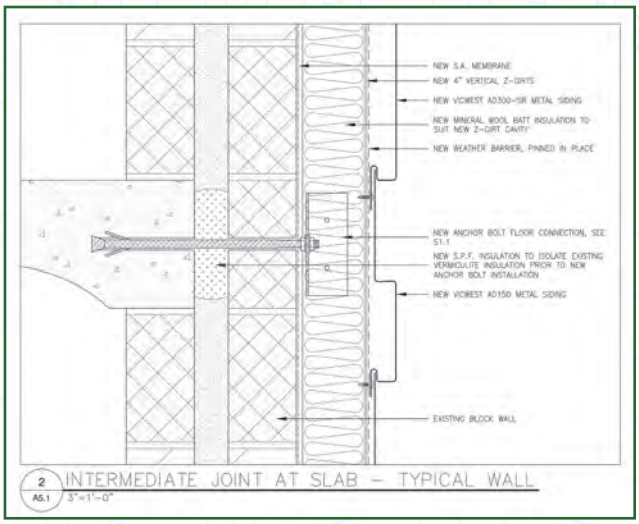
The original clay block masonry was not considered a structural element of the building; therefore, all anchoring of the new cladding could only be completed through the concrete floor slab at each level from which the sub-framing was "hung." In turn, this created virtually no direct thermal bridging between the interior and exterior of the building except at these individual anchor points.

South Residence before.

South Residence after completion.

South Residence wall composition detail.





South Residence detail.

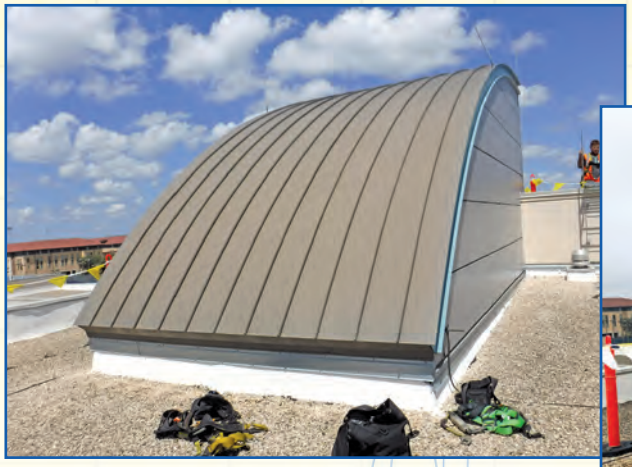
1ST PLACE

Kerry "Pete" Keener
Wiss, Janney, Elstner Associates, Inc.

Roof Replacement

University Center II – UTSA

San Antonio, Texas



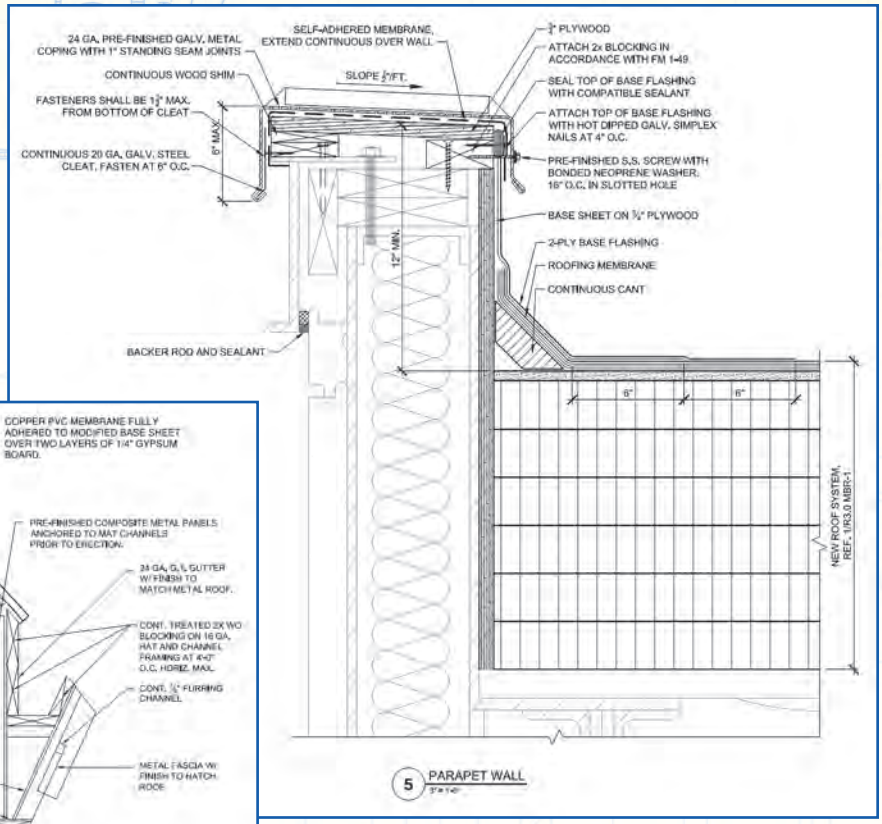
Before.

After.

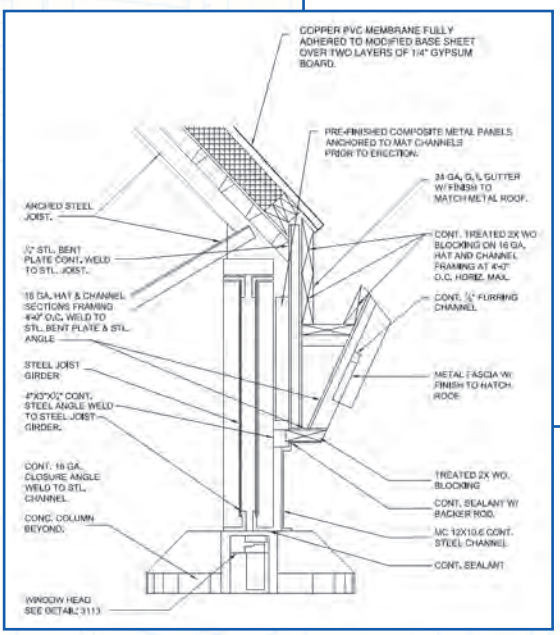
The University of Texas at San Antonio's (UTSA's) University Center II (UC II) serves the campus as the student union building, with a constant, high volume of foot traffic. The building's roofs were constructed in 1996 and composed of gravel-surfaced built-up asphalt and metal roofing. Due to signs of general deterioration and numerous reported leaks, UTSA retained Wiss, Janney, Elstner Associates, Inc. (WJE) to conduct a roof condition assessment, including document review, water testing, and a survey; develop the repair/replacement design; and perform construction observation services during implementation.

During the evaluation, WJE discovered the original metal roofing was in poor condition and a full replacement was warranted. Among the replacement options presented to UTSA, WJE recommended a copper polyvinyl chloride (PVC) batten roof system, which UTSA subsequently selected. This particular system contains copper flakes impregnated into the roofing membrane, giving the single-ply membrane the look of a copper metal roof.

Although the unique radius of the building's roofs presented design challenges, WJE was able to maintain some of the distinctive metal details of the building's original architecture. In fact, portions of the building's new, shop-fabricated metal fascia and gutters were patterned after the original fascia and gutters. The building's profile has been enhanced by the new copper PVC roof system, and UC II remains the focal point of the campus.



Parapet wall detail.



Gutter detail.

Dennis Spina
Bell & Spina Architects

Roof Replacement

Olin Library, Cornell University

Ithaca, New York

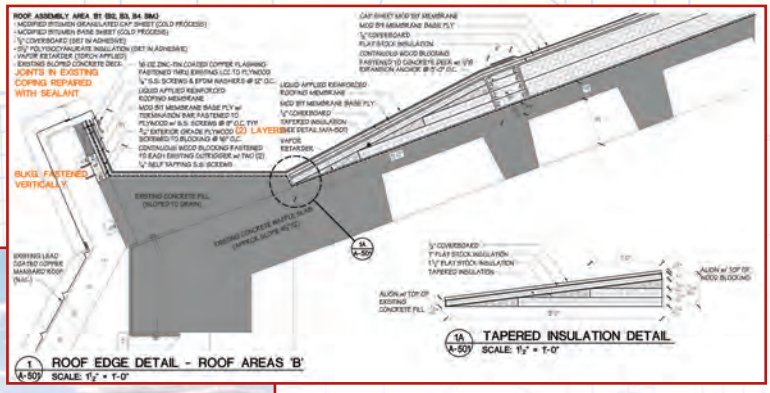
Olin Library.

This project included replacement of the main-level mansard roof and the seventh-floor Promenade Deck at Olin Library on the main campus of Cornell University. The building is located on the south side of the historic quad and, while not deemed a historic building, was subject to review by the Landmarks Review Board, which requested the original look and color for the mansard roof.

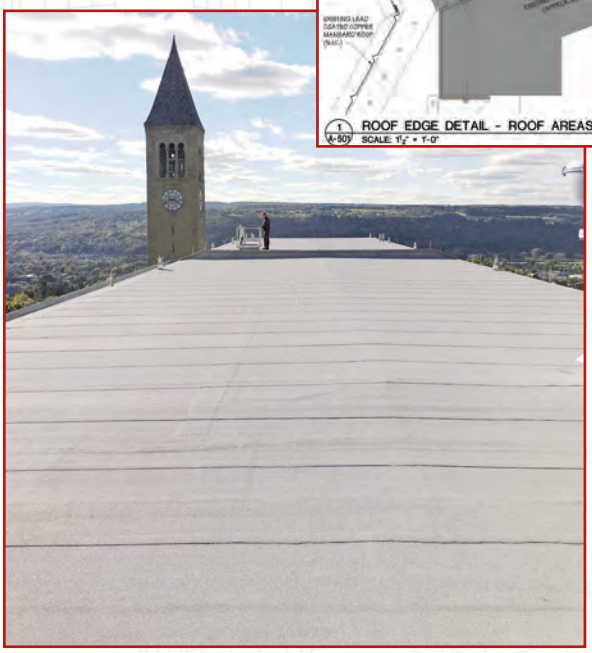
The building's mansard upper roof is flat, requiring tapered insulation to slope to the edge, where water then flows to a gutter around the perimeter with roof drains. Under the mansard are two mechanical spaces and an enclosed center space which, at one time, was open and screened the building's chiller unit. The roof structure is cast concrete with the original open center chiller section infilled with steel and metal decking, which is fireproofed. There is evidence that there is differential movement on one side of the chiller infill area roof structure, while the other side rests on the concrete structure.

The building's seventh floor has a narrow promenade on each elevation, with restricted access. Windows along the entire length have low sills, which restricted roof flashing. The existing low railing did not meet fall protection requirements.

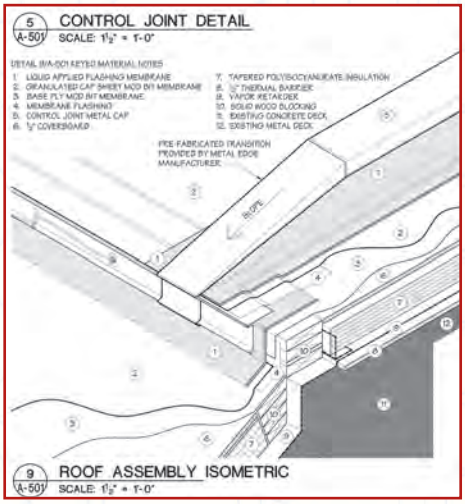
The staff that had to conduct maintenance was concerned with slip resistance for the new membrane. Bell & Spina's recommendation for the membrane, therefore, was a modified bitumen. The membrane in the gutters on the upper mansard was over-coated with a liquid flashing system to provide some redundant protection. Fall protection was provided so workers could be tied off to access the gutter for maintenance. Lightning protection was added to the upper roof, with the air terminal bases being set in liquid flashing to assure they stayed in place with snow-pack movement. The grounding cables were placed in grey polyvinyl chloride (PVC) conduit to hide them in the corners of the building and were run under the ballasted terrace roof to the grounding rods. A liquid membrane was recommended due to the lower promenade roof's low flashing height and numerous rectangular railing posts. A cable fall protection system was installed along the promenade for use in maintaining drains and cleaning the windows.



Roof edge detail.



View of the clock tower from the roof after completion of the project.



Olin Library roof control joint detail.

3RD PLACE

James Ripley
A/R/C Associates, Inc.

Reroofing Project

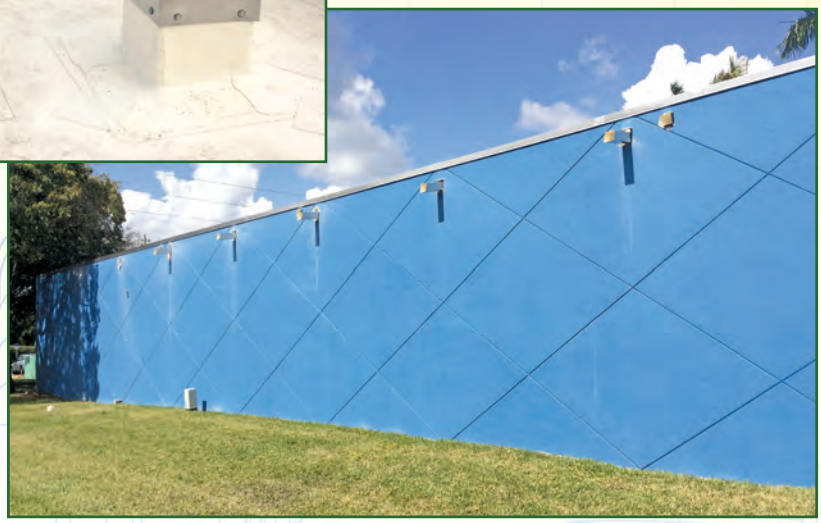
Assurant Satellite Learning Center

South Miami Heights, Florida

Completed Assurant Satellite Learning Center roof.

This Miami-Dade elementary school is located on Assurant's Miami office campus, and is maintained by Assurant for the benefit of its employees. The complex includes five buildings interconnected by exterior walkways.

The existing modified-bitumen roof system had received a reflective coating to extend its service life. Reroofing of this entire active campus includes approximately 22,400 sq. ft. of conditioned space and 13,700 sq. ft. of exterior canopy.

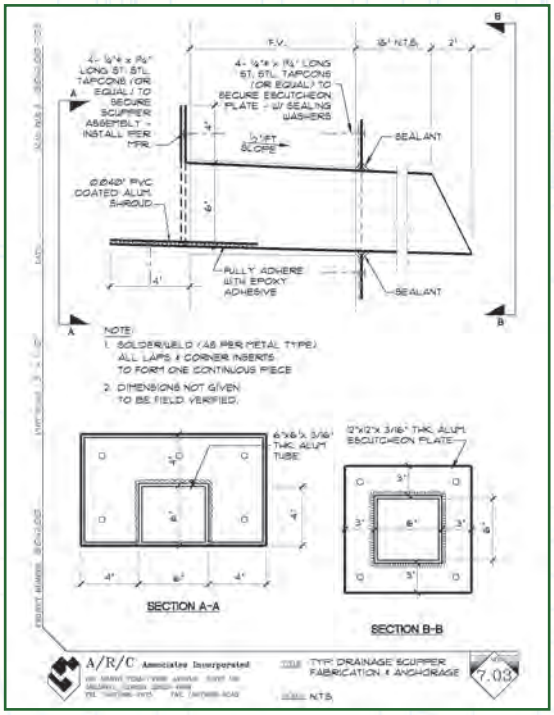


Exterior with scuppers.

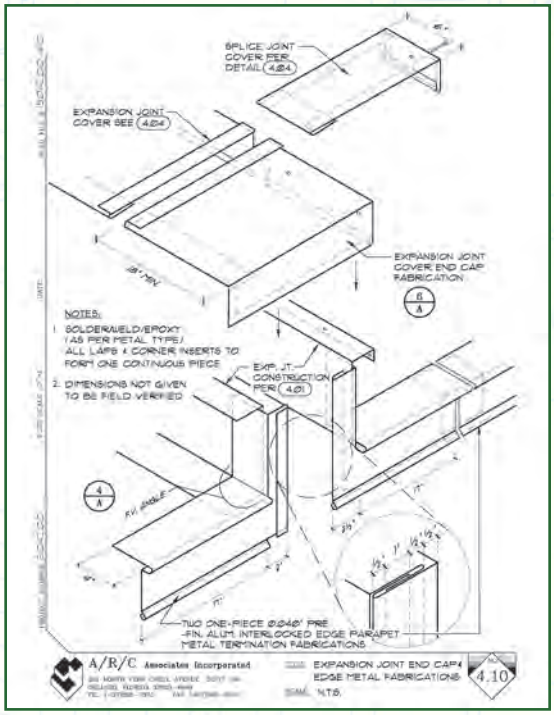
The project required adding insulation and drainage slope to the building. Tapered rigid insulation with a gypsum coverboard was installed for this reason. Work also included removal of some abandoned equipment and penetrations, removal and reinstallation of the remaining equipment, infill of some existing roof deck openings, and application of a new reflective-surfaced, PVC/Elvaloy®-based single-ply roof membrane.

There were also expansion joints between sections of the cast-in-place concrete structure that needed to be addressed. This was done by constructing double-curbed expansion where appropriate. These buildings had a typical South Florida design with stucco-capped parapet walls which had performed poorly, so a stainless-steel coping cap system was provided.

Construction was performed during the school year with students present, and was completed in the early summer of 2017. A 20-year manufacturer's no-dollar-limit (NDL) weathertightness warranty with a high-wind rider (186-mph design wind speed) was provided for the project.



Scupper detail.



Detail of expansion joint at edge.

1ST PLACE REPORT WRITING

Kenrick Hartman
Wiss, Janney, Elstner Associates, Inc.

Building Envelope Assessment

Northern Westchester Hospital (Northwell Health)

Mount Kisco, New York

Northwell Health's Northern Westchester Hospital Center facility is composed of several adjoining buildings constructed at various times. Established in 1916, the facility has gone through several additions and renovations, one of which was The Wallace Pavilion in the early 1970s. As part of their facility maintenance and improvement plan, Northwell Health contracted WJE to perform a building envelope assessment of the Wallace Pavilion, other select façades and roofs throughout the campus, and the whole campus lightning protection system. The purpose of the assessment was to determine the general condition of the façades, roofs, and lightning protection system and to identify deficiencies recommended for repair.

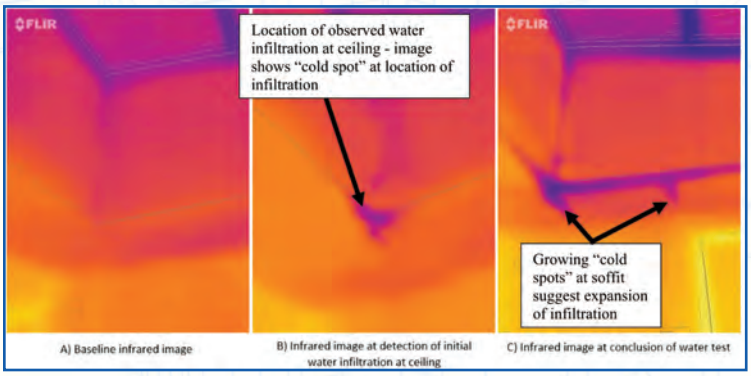
Hartman Wallace Pavilion.

Mortar erosion pattern studied in laboratory.

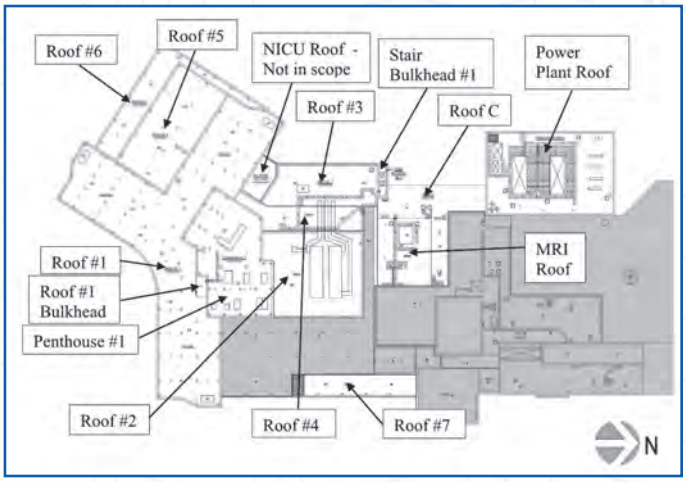
In total, 13 roofs were reviewed and were generally categorized as EPDM membrane roofs, fabric-reinforced polyurethane membrane roofs, or modified-bitumen roofs. The roof assessment included visual review of the readily observable conditions and investigative probes to better understand the condition and composition of the roof assemblies. The modified bitumen and all but two of the EPDM membrane roofs were found to be in poor condition and were recommended for replacement. The fabric-reinforced polyurethane membrane roofs were found to be in good condition. A maintenance program was recommended for roofs that were to remain.

The façades generally consist of brick masonry cavity wall and precast concrete (barrier) wall systems. Small areas of EIFS were also reviewed. The façade assessment included a visual condition survey from grade and accessible rooftop vantage points, water testing at active water leak locations, investigative probe openings, and laboratory petrographic analysis. Deficiencies identified for repair include failed sealant joints, failed mortar joints (including an uncommon erosion pattern studied in the laboratory), cracked and spalled brick, and cracked precast concrete. Atmospheric, biological, ferrous, and copper stains were also documented for cleaning and façade restoration (cleaning mock-ups performed subsequent to this report).

Finally, the lightning protection system was assessed to determine the extent and type of the existing system and to evaluate the need for repair/replacement of the system (or for installation of an entirely new system). NFPA 780, *Standard for the Installation of Lightning Protection Systems*, was also used to perform a risk assessment by comparing the annual threat occurrence to the structure and the tolerable lightning frequency. The assessment concluded that the existing lightning protection system requires repair and that additional lightning protection is recommended to supplement the existing one.



Infrared thermography used during water testing.



Partial roof plan.

2ND PLACE

Bryce McQueen
Merik, Inc.

Moisture Intrusion Assessment

Georgia Bureau of Investigation Annex

Decatur, Georgia

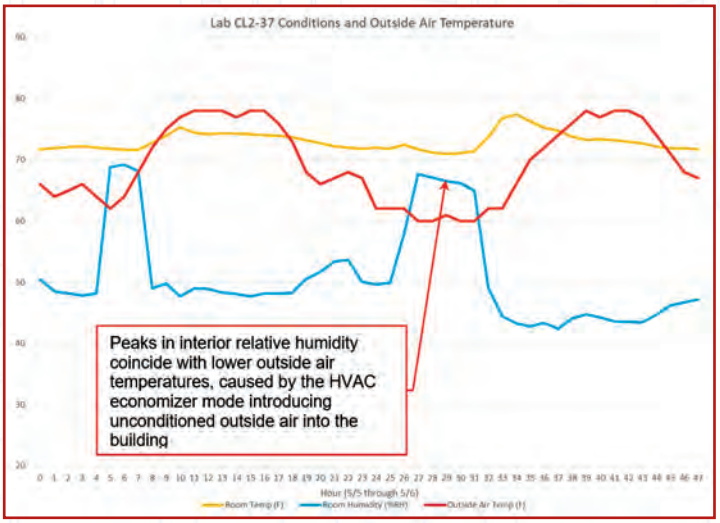
GBI Annex.

View of smoke pen test illustrating air infiltration into the open weep joints of the masonry veneer wall.

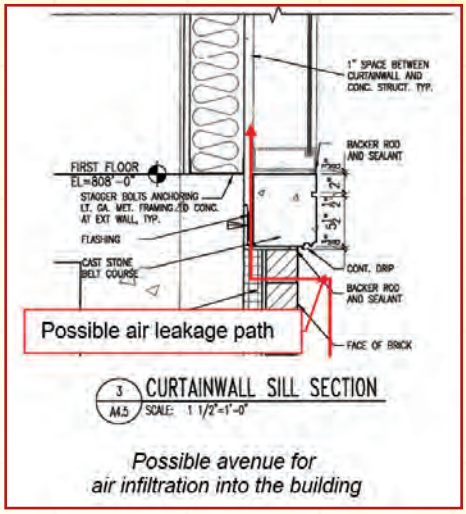
The Georgia Bureau of Investigation (GBI) Annex consists of an approximately 69,000-sq.-ft., three-story building with a mechanical penthouse completed between 2000 and 2002. The building contains numerous laboratory spaces typically situated around the perimeter on the second and third floors. The building's mechanical systems are located primarily in the rooftop penthouse and on the ground floor mechanical room on the south end.

According to building operations and maintenance personnel, elevated air moisture and relative humidity (RH) levels and fluctuations identified within the interior perimeter laboratory spaces have been resulting in problems with the advanced testing equipment. The elevated and widely fluctuating moisture levels also reportedly affect the ability to store physical samples in the laboratory storage cabinets, as the samples are moisture sensitive.

In order to evaluate the reported moisture issues, representatives of Merik, Inc. and Abbeville Commissioning performed a joint investigation of the building envelope and mechanical systems. The investigation included a review of original construction documents, interviews with building personnel, installation of data loggers in the affected areas, and analysis of temperature and RH log data, a visual building envelope assessment and infrared survey, evaluation of building mechanical systems, collection and analysis of mechanical systems trend data, and air pressure differential testing between the building interior, exterior, and affected laboratory spaces.



Outside air temperature and room conditions for laboratory space.



Curtainwall sill section detail.

Log data revealed that the affected laboratory spaces were consistently operating at humidity levels above those needed to properly operate the lab equipment and store samples. This is occurring due to the building operating under a significant negative differential pressure that may be driving the introduction of unconditioned air into the structure through leaks at doors, windows, and gaps in the building envelope. Suspect conditions were also observed on the exterior of the building cladding that may indicate an underlying issue with the wall assemblies. In addition, specific mechanical system set points and modes are allowing the forced introduction of unconditioned outside air into the laboratory spaces.

In order to address the issues, recommendations were provided that included further exploratory investigation and testing of the building enclosure to identify breaches in the concealed air barrier systems, modifications to the mechanical system set points to reduce outside air influx, a test and balance of the building intake and exhaust systems, sensor recalibration, and installation of supplemental conditioned air into the building as necessary to create a positive air pressure differential.

James Ripley
A/R/C Associates, Inc.

Roof Report

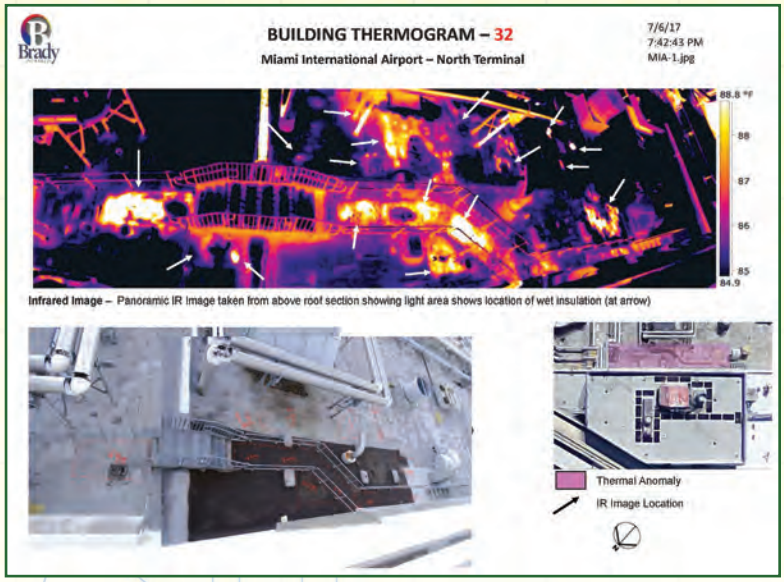
Terminal D at Miami International Airport

Miami, Florida

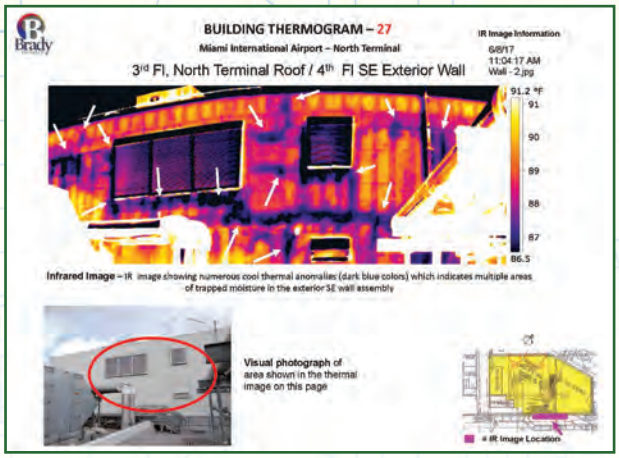
A/R/C Associates was retained by the Miami-Dade Aviation Department (MDAD) of the Miami International Airport (MIA) to investigate a designated area of the existing Terminal D that had experienced ongoing water intrusion for several years. Several attempts had been made previously by other consultants and construction managers to resolve the water intrusion, which improved the conditions, but were not considered successful.

Using infrared survey methods, and comparing dry- and wet-season results, followed by our destructive investigation, we were able to identify specific water intrusion sites. Our report defined the procedures, observations, conclusions, and recommendations for repairs. Documents for bidding and construction were prepared, and the project was being priced by the airport's construction manager at the time of submission of the project to IIBEC.

The repair work will be performed by a construction manager with a continuing contract with MIA, and will need to be phased to allow the facility to remain in full operation. An interesting observation is that the previous repair efforts were focused on roof and wall penetrations, while our report indicated the inherent problem was a stucco wall system itself, due to a significant number of cracks and control joints, but no dedicated waterproofing plane within the wall system, combined with the use of a surface-mounted counterflashing for the adjacent roof area. These conditions allowed any water within the stucco finish system to bypass the roof flashings. The lack of through-wall flashings allowed infiltration of water into and through the wall system. The repairs will include the removal of the existing stucco finish system, application of a waterproofing membrane, then reinstallation of a stucco exterior finish system.



Building thermogram of North Terminal of MIA showing thermal anomalies.



Building thermogram of exterior wall.


Miami International Airport – North Terminal
Water Intrusion Investigation & Report
Investigative Analysis and Report
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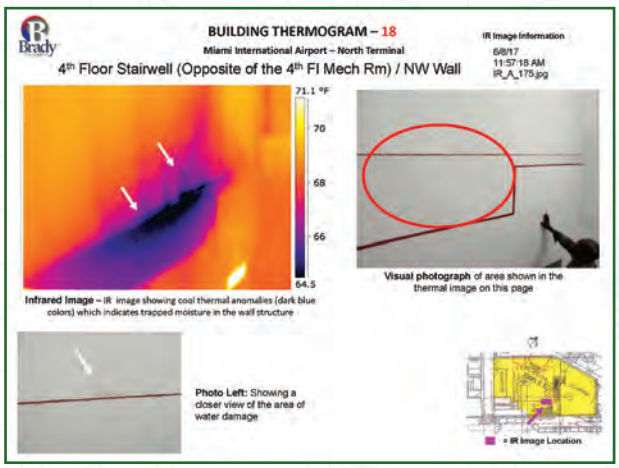
We believe the key observation at the test cut was significant water discharging from the top of the test cut, which indicated water intrusion from the wall system above. The fact that the base flashing was capped with a surface-mounted counterflashing applied to the surface of the stucco wall finish, has allowed any moisture within the stucco wall finish to simply bypass the counterflashing and enter the roofing and base flashing system.

We believe this to be a crucial discovery in the mystery of the ongoing water intrusion in and around this area of the building. Based on this insight, we discussed the conditions with the Tyrone Brown (MDAD) and agreed that additional roof test cuts would not provide any significant additional information, and should not be performed.

(The top right photograph is looking at the right rear corner of the roof cut, remnants of an epoxy / gravel surfaced spray urethane foam roof system is visible at the top left of the photograph. The below right photograph is taken in the roof cut looking up, which reveals the layers of the wall construction above.)

There is an identified leak in the corridor below this roof cut, which we believe to be caused by a hidden defect in the preliminary roof and/or base flashing in this area. The source of the water seems to be the stucco wall finish above, and is weather dependent. A building expansion joint is also believed to run along this wall, a detailed wall section was developed by Andrew Silva based on record documents for that area, (See above right). It appears that a double curb attached to the roof deck was provided at this expansion joint.

Page of water intrusion investigation report.



Overall photos and detail of affected area.

1ST PLACE

James Ripley
A/R/C Associates, Inc.

Skylight Replacement

Thomas C. Kelly Administration Center

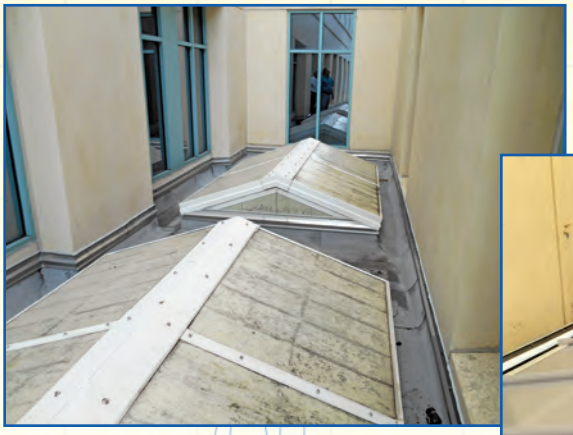
DeLand, Florida

At this county administration building, which was originally constructed in 1987, the central four-story atrium was crowned with a 48-foot-diameter, 16-segment conical skylight system glazed with a translucent, fiberglass-faced sandwich panel. The two smaller entrance corridors into the atrium have three smaller skylights with the same glazing system.

Over the years, the sealants failed and water intrusion became an issue. The system was refurbished twice as directed by the manufacturer, which was effective for a limited time. The glazing panels discolored and darkened and the skylight needed refurbishment again. It was decided to deconstruct the skylight, reinforce the framing system, and install a new glazing system using a double-layer, interlock, internally drained polycarbonate glazing panel system.

Reroofing the small surrounding roof associated with the skylight with a three-ply modified-bitumen roof system was deemed to be appropriate as part of this project. The replacement was performed as a design–bid–build project, with the roofing contractor being the prime and the skylight installer as a subcontractor. The central dome was reglazed in 2010, and the client had been so pleased with the results and performance that this project was undertaken to perform a similar replacement at the six smaller skylights at the two entry corridors.

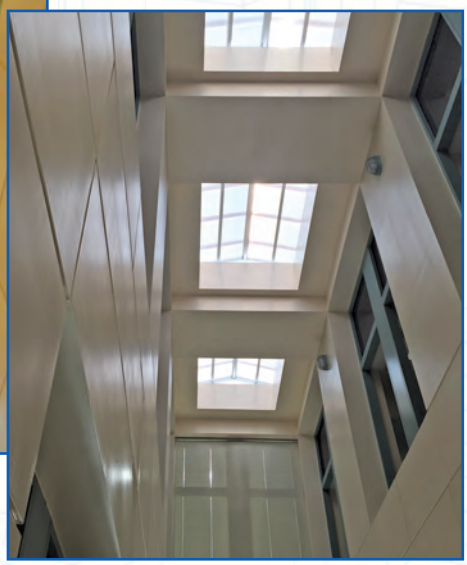
The scope of work included the glazing replacement, as well as replacement of the surrounding roof and insulation system, and correction of some flashing issues at the surrounding transitional walls. The work has been completed, and a 10-year weathertightness warranty was provided for the skylight glazing system. Light quality and levels within the atrium and corridors were increased significantly.



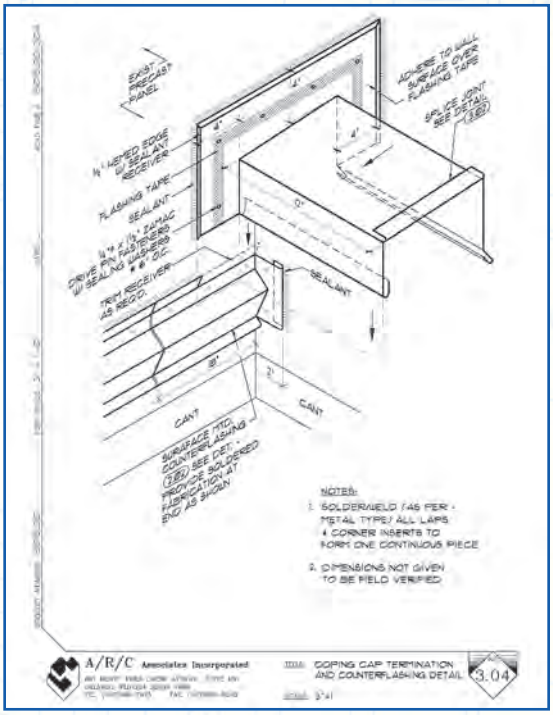
Skylight exterior before.

Skylight exterior after.

Skylight interior before.



Skylight interior after.



Detail of parapet at wall flashing.

2ND PLACE SPECIAL PROJECTS

Guillaume Vadeboncoeur and Jeff Vermette

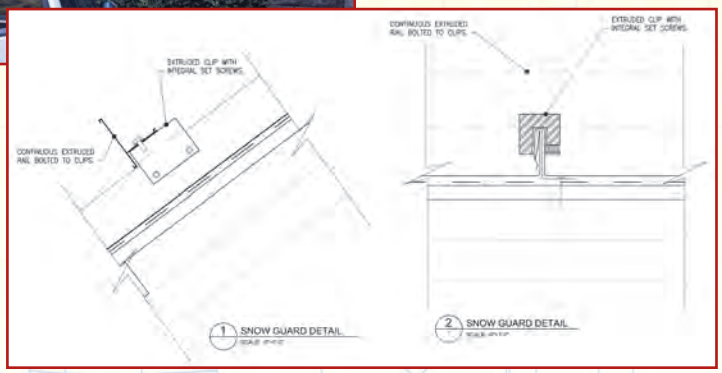
WSP Canada Inc.

Roof Replacement

Tapadera Estates Clubhouse

Harrison Mills, British Columbia, Canada

Tapadera Estates Clubhouse front elevation.



Snow guard details.

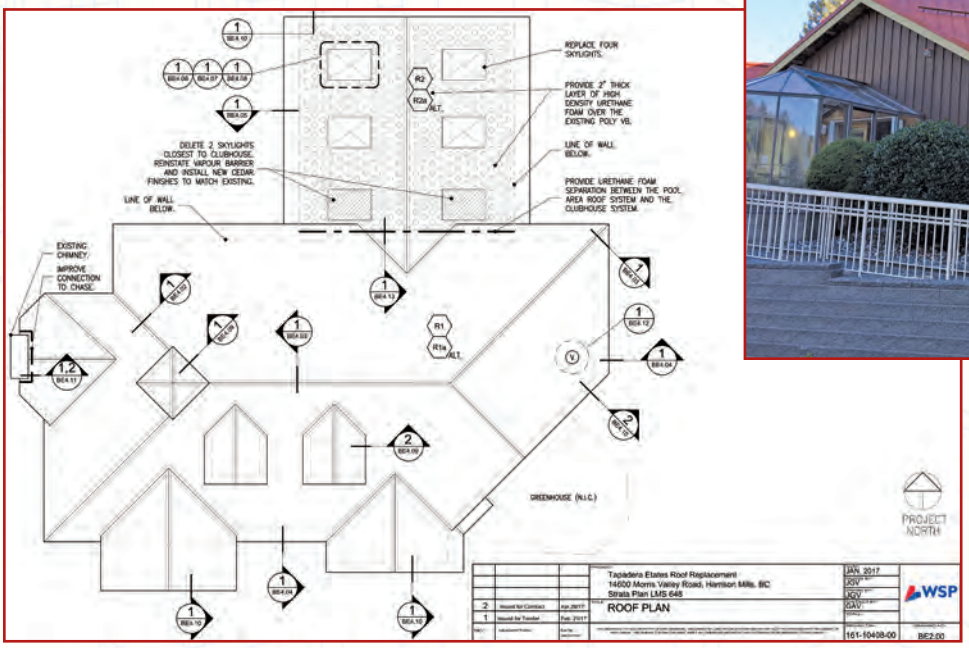
This project consisted of replacing a metal roof of a clubhouse in a residential complex in the province of British Columbia in Canada, which has a typical Northwestern climate. The area does have some snowfall during the winter, with large amounts of rain in the fall, winter, and spring. The summers are generally hot and dry.

The most challenging aspect of the project was the fact that part of the roof covered an interior swimming pool. The interior conditions varied greatly from one space to the other. The previous metal roof assembly had suffered from water ingress and condensation issues. The condensation issues were, predictably, generally in the roof area above the high-humidity environment over the indoor pool. There were also challenging details to consider during the design phase at some skylights and at a rooftop chimney. Tightening the air/vapor barrier with a combination of membranes and sprayed polyurethane foam, as well as performing decay repairs to the water-damaged wood roof-framing components, were also challenging aspects during this roof replacement project.

The new roof assembly included full plywood roof sheathing and a continuous self-adhered waterproofing membrane under the new standing-seam metal panels. The existing skylights were replaced with new pressure-glazed skylights. The new metal roof required snow guards at specific locations. The gutters and rainwater leaders were also replaced during the project.

The roofing contractor showed great workmanship during the metal panel and flashing installation. The project was generally on schedule and on budget. The project was successful, and we are very proud of the outcome.

Tapadera Estates Clubhouse rear view.



Roof plan detail.

3RD PLACE

Roof Replacement

DeLand H.S. Health Clinic

DeLand, Florida

James Ripley
A/R/C Associates, Inc.

DeLand High School, in Volusia County, Florida, has been the location of several projects for our firm. Although small (2,240 sq. ft.), this was a design–bid–build project that required full bid/construction documents.

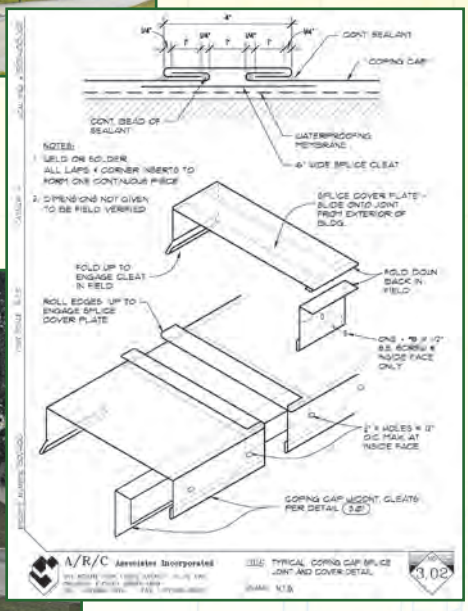
The existing roof system was a single-ply thermoplastic that had failed due to age and substandard flashing details. Water intrusion from the roof and parapet system were being experienced at numerous locations. The project required adding insulation and correcting the drainage patterns on the building. Tapered rigid insulation with a gypsum coverboard was added for this reason.

Work also included removal of some abandoned equipment and penetrations, providing overflow drainage per code, installation of through-wall scuppers, and application of a new reflective-surfaced, mechanically fastened PVC/Elvaloy®-based single-ply roof membrane.

Unique issues included the need to verify the existing steel deck anchorage, reuse of the existing rigid insulation, and the need to transition from a drip edge to parapet condition due to the roof slope. This was done by using a drip edge condition at the majority of the building perimeter. The edge metal was a two-piece interlocked system that allowed the use of a clad metal deck flange (to heat-weld the membrane) and a Kynar-finished fascia piece for the desired exterior appearance. The two metals were joined with epoxy adhesives.

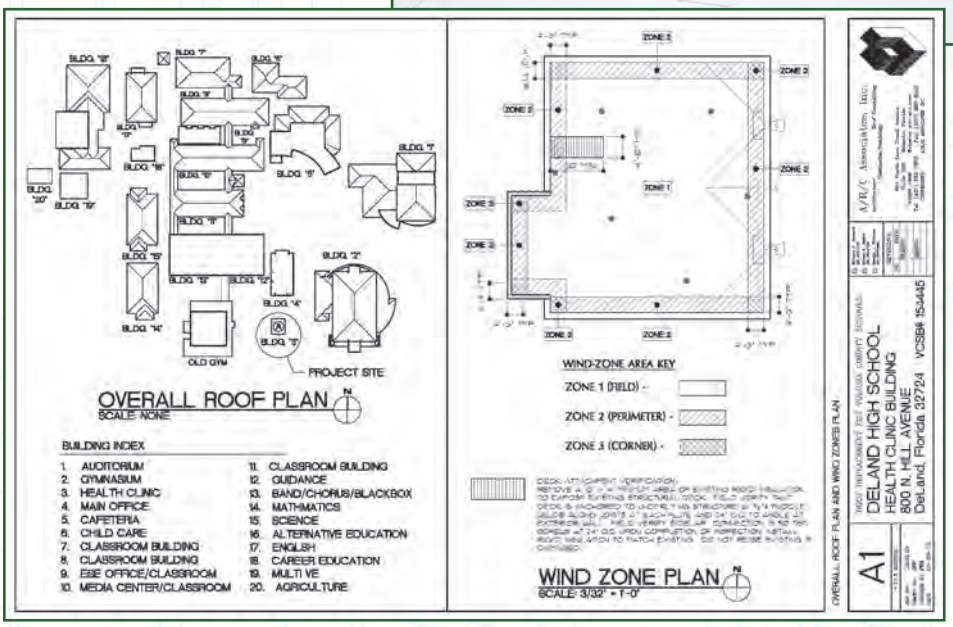
Construction was performed during the school year with students present, and it was completed in the early spring of 2016. A 20-year manufacturer's no-dollar-limit (NDL) weathertightness warranty with a high-wind rider (186-mph design wind speed) was provided.

Deland High School Health Center exterior.



Coping cap splice joint and cover detail.

DeLand High School Health Center roof after completion.



Overall roof and wind zone plan.