Category: 9 – Best Building Project – GC ($10 - $40M)

Contractor: Swinerton Builders

Project Name: Byers Renovation

The transformation of Byers Junior High into a 21st century learning environment transcends its historical renovation. It represents what a community can achieve together to save a treasured building and what a Swinerton Builders team can accomplish while ***overcoming considerable structural challenges and unforeseen conditions*** that threatened the Denver Public Schools facility opening on time for the 2014 academic year.

The 110,000-square-foot building sat vacant for a decade with many ideas considered for its future. An active, outspoken community desired the brick structure built in 1921 to house a school again. It was a community triumph when Denver School of Science and Technology selected the campus to educate 500 students. Swinerton won a hard bid contract in June 2013 to renovate the building into a new middle and high school.

The ***new learning and teaching environment is a dramatic contrast to the historical exterior.*** Modern finishes and technology serve students focusing on science and engineering education with classrooms, collaboration spaces and common areas, science labs, a wood shop, warming kitchen and gymnasiums.

History Reveals Itself

Swinerton began work in early July using as-built drawings from a 1972 remodel that informed the demolition plan for the three-level building. With deconstruction started, it soon became apparent that these ***plans conflicted with actual conditions***. For example, in an 8,000-square-foot area which is now the middle school commons, plans indicated two concrete columns with interconnecting concrete beams that were to remain to support new construction.

As workers removed the existing veneer, they discovered masonry columns and plaster-on-brick beams instead. Both elements supported the two-story exterior wall and roof. Understanding that ***93-year-old masonry is far less structurally sound than concrete***,

Swinerton immediately closed the area. By day's end, Swinerton and Waco Scaffolding assembled a temporary shoring solution of I-beams and scaffolding to support the area. Meanwhile, Swinerton ***refocused work in other areas during the 22-day delay*** needed to analyze alternate engineering solutions to replace the masonry columns and beams.

Cautious of existing conditions, Swinerton's proactive investigation revealed ***additional structural issues impacting over half of the building***. Plans called for construction of a new level in two former gymnasiums and an auditorium for new classrooms. As workers prepared to install structural steel to support metal decking they discovered that the existing concrete failed to hold expansion bolts. The 1920's concrete had deteriorated due to large aggregate and unregulated mixing specifications.

Swiss Hammer testing revealed that the ***compressive strength of the existing concrete ranged between 1200 to 1700 psi*** when it should have been in excess of 3000 psi. The engineered solution included installing epoxy set anchors, through-bolting specific connections and adding steel columns beneath the existing concrete decks. Due to these unforeseen conditions, the schedule sustained another 30-day delay and impacted work flow.

DPS vacated the building in 2004 after removing surface-level asbestos from the 1972 remodel. As Swinerton's demolition work progressed, we encountered ***five major cases of asbestos*** and 20 minor instances. These findings resulted in a 20-day delay for abatement, a significant rework of the schedule and resource reallocation to maintain the opening date and $19 million budget.

Overall, DPS granted Swinerton an 80-day extension for unforeseen conditions. We ***mitigated this down to 59 days*** through schedule acceleration with longer work hours. Swinerton's tenacity ensured the students' education commenced on time.

History Rewrites Itself

Swinerton's original plan started with interior demolition followed by new construction in the north wing and through to the south wing, from top to bottom. However, unforeseen conditions impacted this execution and activities became scattered to safe and available spaces. ***Through all***

obstacles, Swinerton, architect Eidos, and the DPS and DSST team kept communication lines open to ensure all key partners remained updated on schedule and cost impacts.

DPS built the school in 1921 on 2.5 acres donated by former Rocky Mountain News publisher William Byers. As a designated Denver landmark, no exterior alterations are permitted. However, more than ***220 windows were replaced*** which replicated the original design but surpassed energy efficiency performance. Every window required custom fabrication due to window opening inconsistencies. Congested site staging limited glazers to removing and replacing four to five windows per day while ensuring the building remained waterproof.

A special wire-cut light buff brick facade highlighted by terra cotta and glazed tiles mark the exterior. Over the years the ***terra cotta*** topping stoops at the entrance and running up the façade had ***sustained damage***. To ensure the historical character of the terra cotta, Swinerton sent sample pieces of the existing material to terra cotta restoration specialists to replicate the damaged material. ***Laser scanning*** of the sample pieces supplied accurate information and quality control during fabrication for seamless field installation.

Making Way for Opportunity

After asbestos abatement and structural improvements, Swinerton demolished more than 900 tons of unrecyclable materials. Swinerton and the demolition subcontractor engineered a temporary ramp system to remove materials from the top floor. This ramp was safe and effective with tie-off points for individuals responsible for unloading materials into the dumpster 30 feet below. Swinerton placed guardrails and signage on the ramp when not in use to maintain a safe work environment.

Byers stands among Victorian homes, 100-year-old trees and ***one-way streets making semi-truck deliveries challenging***. Swinerton remedied this situation by scheduling deliveries during low traffic times and dedicating personnel to ensure deliveries were coordinated among all subcontractors. Some construction activities overflowed into the streets and right-of-ways as the 10,000-square-foot gym sits within 10 feet of the public sidewalk.

Dedication to Teamwork

Swinerton remained steadfast in our commitment to deliver the project on time and overcome schedule threats. In addition to unforeseen conditions, Swinerton faced challenges with overall subcontractor manpower availability due to the workforce shortage impacting Denver.

This renovation is a part of a $119 million bond program with at least 10 projects completing in August or under construction. With many projects finishing concurrently, compounded by a general workforce shortage due to increased construction activity, ***subcontractors were stretched thin to meet commitments***. To ensure our project maintained adequate attention, senior Swinerton leadership proactively called subcontractors to thank them and encourage everyone to finish strong. When things came down to the wire, 10 Swinerton interns and project engineers worked alongside tradesmen to install ceiling tiles so teachers could begin preparing their rooms.

Building the Modern Learning Environment

While the exterior remained unchanged, ***modern geothermal heat pumps*** condition the interiors. The first 10 weeks of construction included drilling 48 wells up to 525 feet deep under what is now a parking lot to provide the school an energy efficient system. This equipment ***reduces energy cost and saves valuable space for learning*** by eliminating the need for a large central utility plant. These heat pumps, along with spray foam insulation, energy efficient windows, daylighting through angled cloud acoustical ceilings and other sustainable design and construction methods combined to result in a ***30% off-peak energy savings*** compared to a new school of a similar size.

Since the Byers school has transformed into a science and technology campus, Swinerton left several ***building systems exposed to educate the students*** about these systems. In classrooms the ceilings do not extend completely to the walls but are left short to expose the HVAC and electrical systems. Data center and geothermal pumps rooms feature large windows so students can learn more about the school's operating systems.

Your Family Needs You

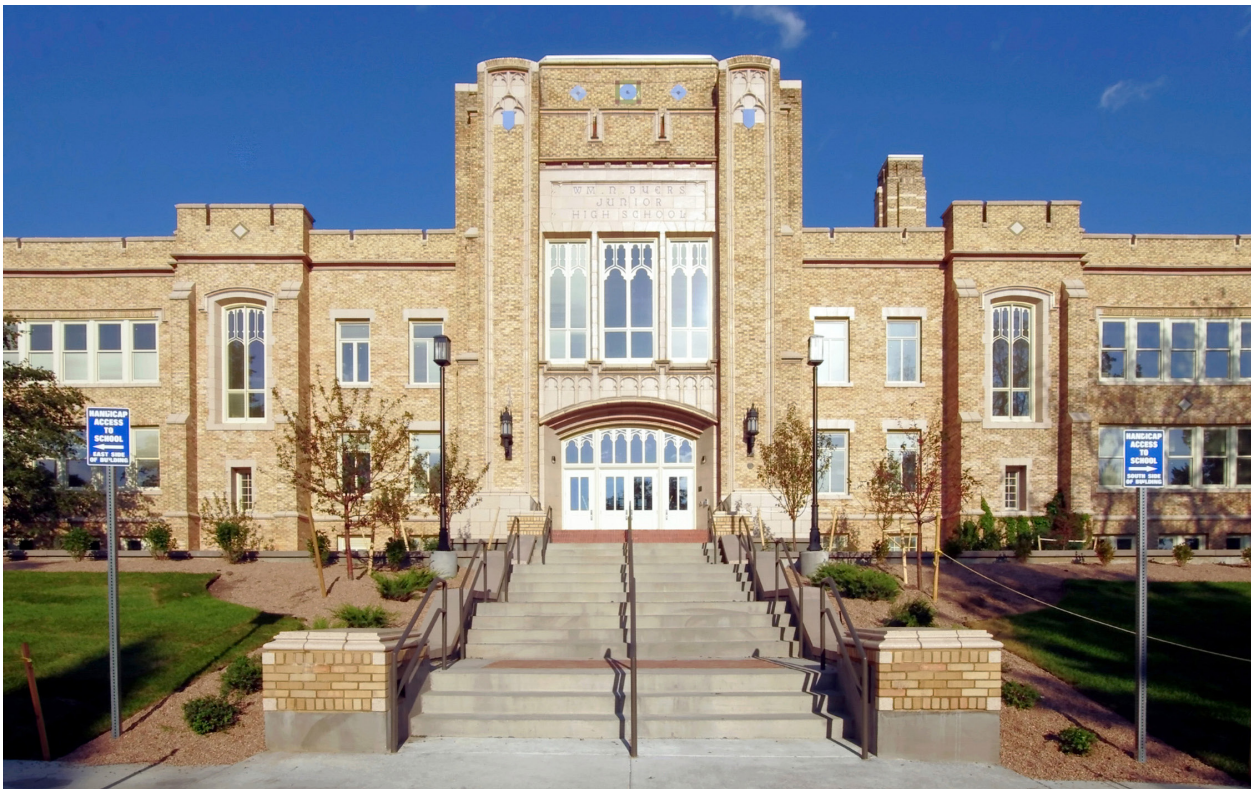
Swinerton ***maintains zero tolerance for safety incidents*** and holds every worker accountable to high expectation levels. When the initial demolition subcontractor didn't share in Swinerton's vision, we replaced the firm after noting too many corrections and finding unacceptable work practices. The replacement subcontractor took Swinerton's safety culture to heart while completing some of the ***riskiest demolition tasks*** – including surgical demolition of full floor sections to create new stairwells.

As ***demolition of floor sections presented fall hazards***, Swinerton first identified the floor areas needing removal, and prior to allowing access, installed ***safety rails, with mid-rails and toe-kicks creating physical barricades***. Workers were allowed beyond these barriers once they were properly tied off to pre-determined points.

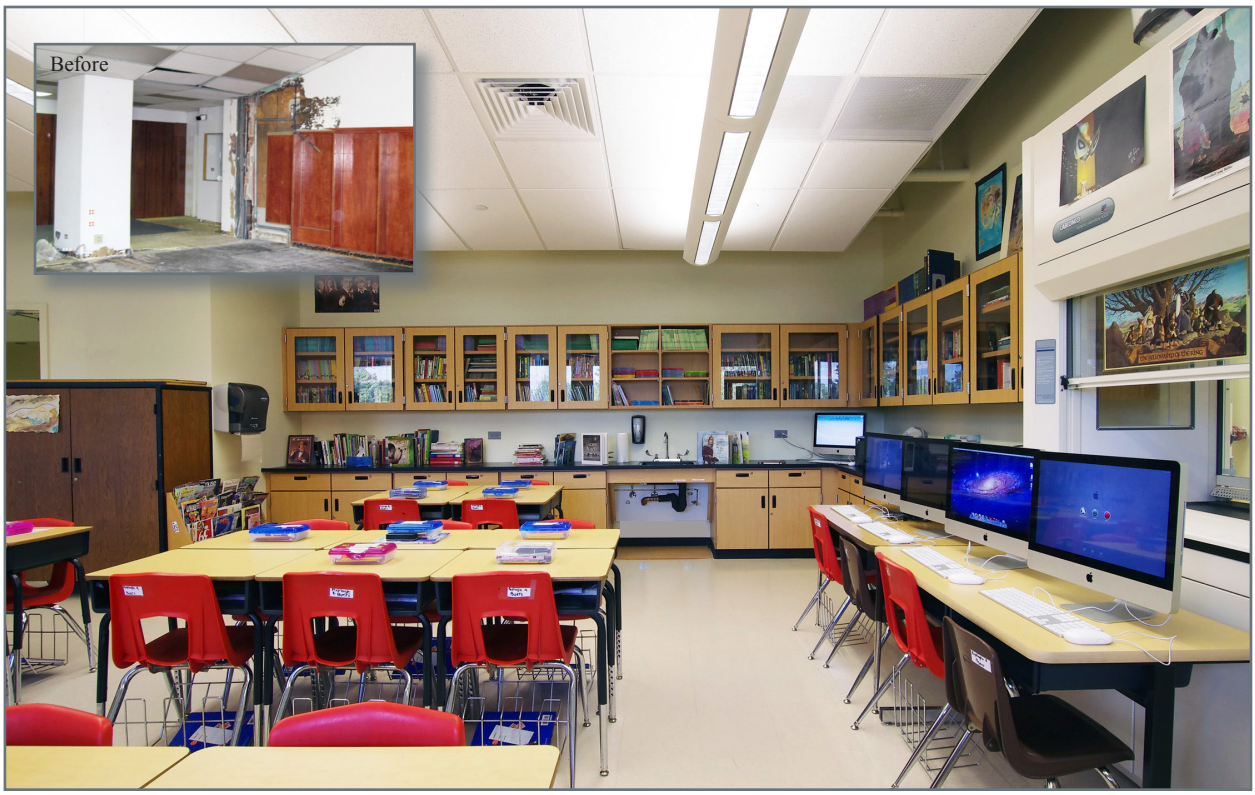
Swinerton implemented morning ***stretch and flex*** gatherings to discuss the day's activities. Since the project flow became scattered with stacked trades working where they could due to abatement and unsafe structural conditions, ***Swinerton elevated communication*** in safety meetings to ensure all 200 workers went home safely every evening.

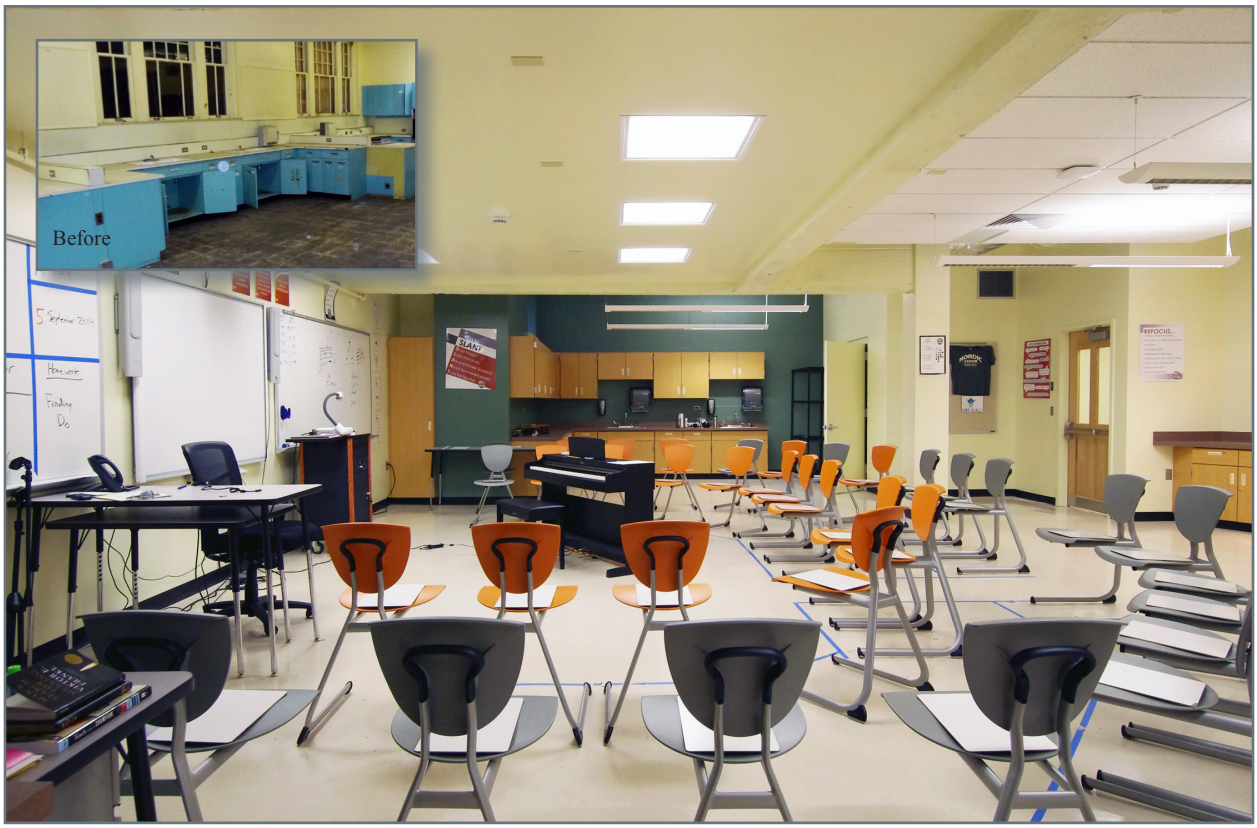
Welcoming the Future

Even through the plans didn't call for one, every school deserves a shiny flagpole, and Swinerton's summer intern took it upon himself to work through this ***positive unforeseen condition***. Over 200 community members who fought for a school to dwell in this building again walked by the new flagpole at the ribbon cutting ceremony. During this dedication, 150 students sat patiently through school officials' and politicians' speeches. As respectful students, they politely snapped their fingers rapidly in appreciation. However, when their principal took to the podium to thank Swinerton for its hard work, the students, teachers and crowd erupted in thunderous clapping and whoops of joy! ***Here's to students learning in the Byers building for the next 100 years!***

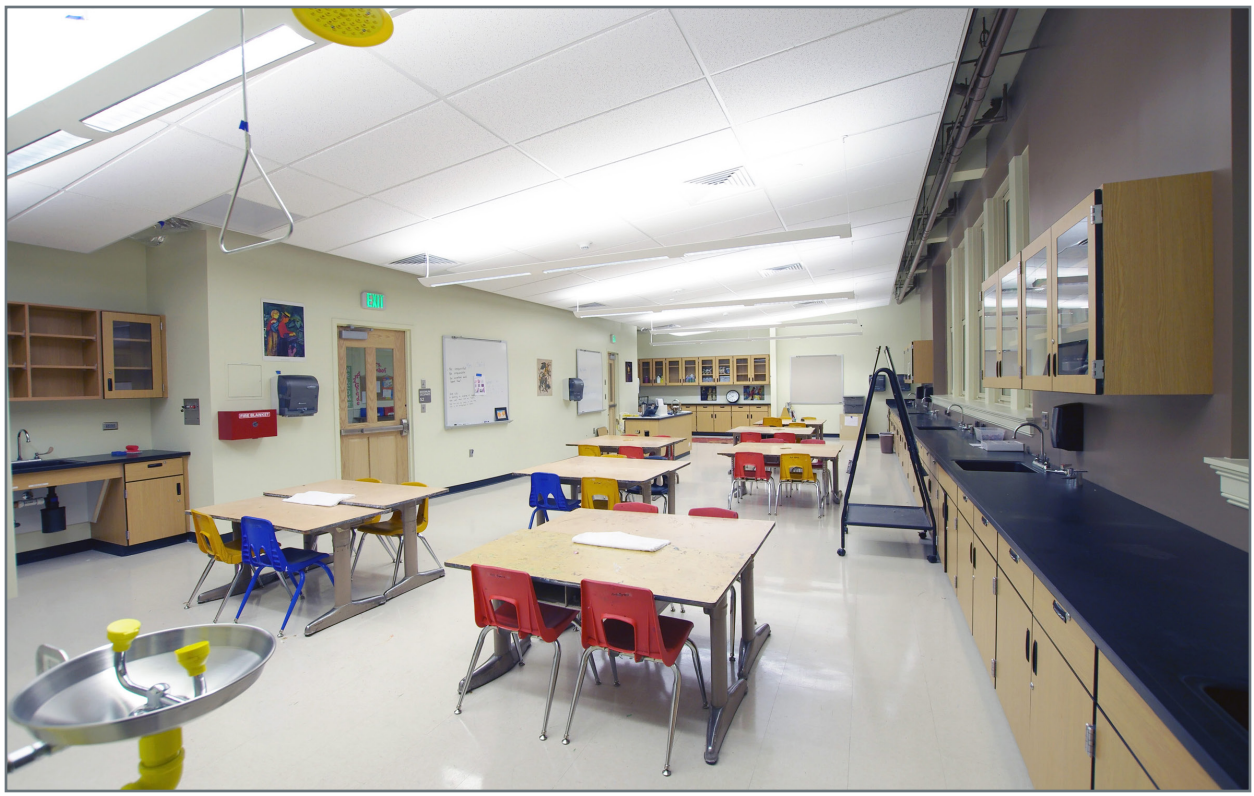


Top: More than 220 windows of varying shapes and sizes were replaced to replicate the originals and improve energy efficiency.
Bottom: Added mezzanine space looks down to cafeteria, while the skylight overhead fills the space with natural light..

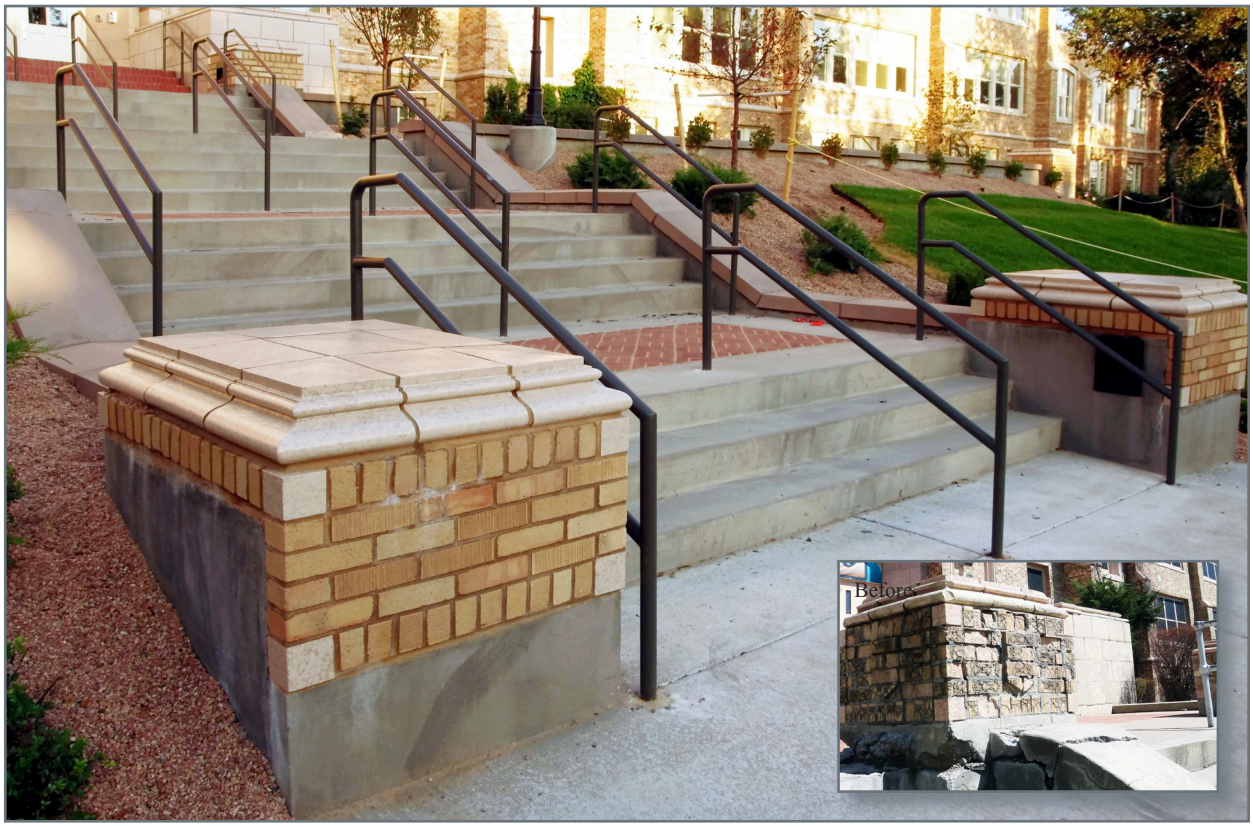




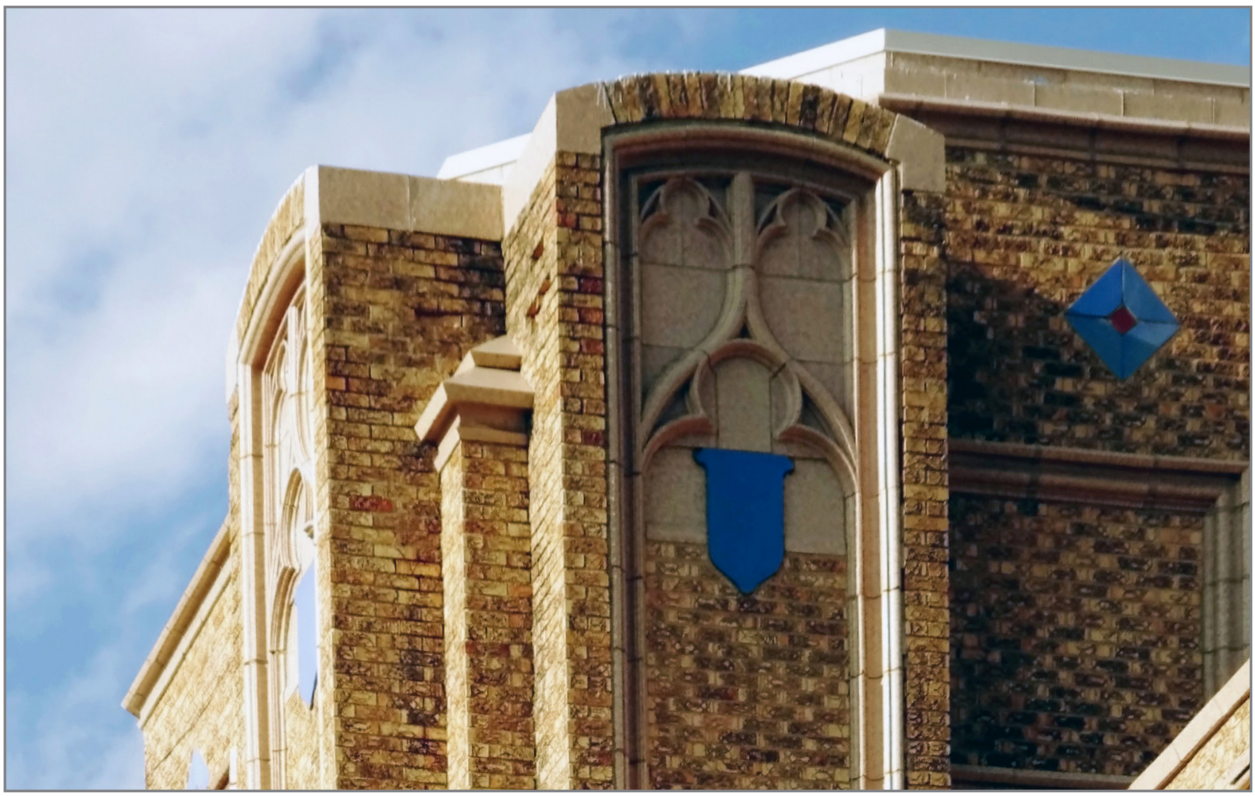
Science (top) and music (bottom) classrooms with drop ceilings, task lighting and equipment accommodations to support the 21st Century Learning environment.

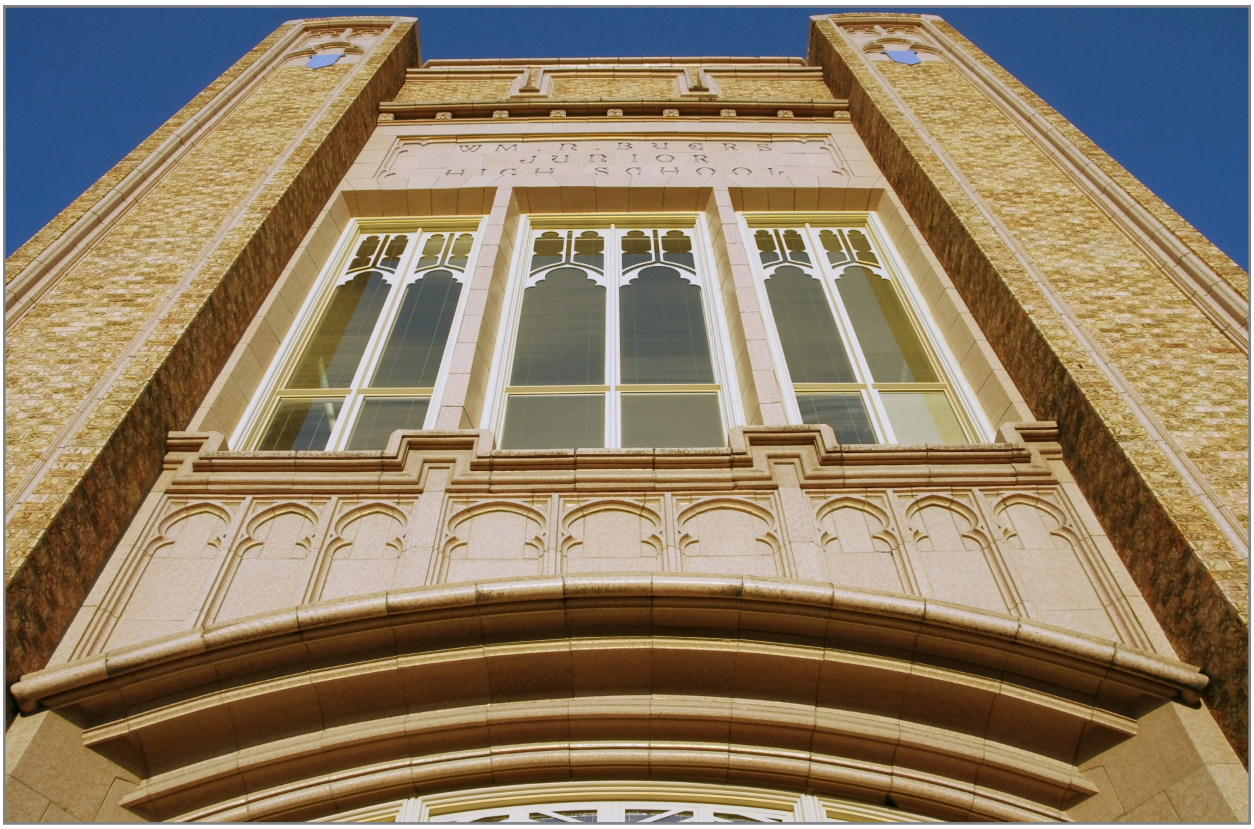


Top: Classrooms are conditioned by a geothermal heat pump system. The exposed mechanical equipment revealed by the cloud ceiling allows students to discover engineering in application. Bottom: Wide, well-lit hallways for student collaboration and break-out learning groups.



Top: Students proudly participate in the ribbon cutting held on the south end of the building next to the brick restored by Swinerton.
Bottom: Brick, terra cotta and stairs repaired to provide safe and attractive building access.





Top: Swinerton collaborated with subcontractors to solve project challenges like the restoration of the brick, terra cotta and clay roof tiles.
Bottom: The beautiful Denver Landmark renovated by Swinerton welcomed students back into its halls on-time and with pride.