State College Area High School

Building Statistics Part 2

Senior Thesis

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Construction Management

Project Location: State College, PA

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Building Statistics- Part Two

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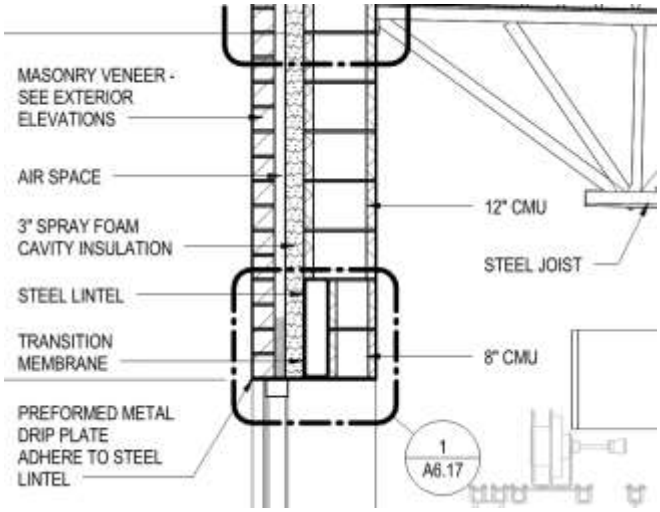
Construction

Figure 1: Construction and Structural System



The construction process is based off how the existing school will be used and the schedule will be based off of the school calendar schedule. The façade process is a key milestone activity. The structure is mainly composed of aluminum storefront system and manufactured brick material. As part of the sustainable design sunshades will be incorporated into the design. There will be an upgraded 3 inch cavity spray foam insulation that will increase the R-Value on the CMU wall. The perimeter walls are composed of 3" insulated metal panel system, 3 5/8" metal studs, 8" CMU, and 5/8" GWB on 1 5/8" metal studs. The CMU will be painted for the interior finish which will save money for interior finishes.

Lighting/Electrical

The South Building will consist of two new separate electrical services installed at 400A, 480V, 3-phase, 4-wire. New transformers will be installed to feed the new switchboards. The existing electrical services will remain live until construction is completed and the two new services are ready to be operable. The lighting throughout the building will meet LEED Gold Criteria such as: LED type fixtures, foot candle levels, vacancy sensors, etc. The interior and exterior lighting control system will be monitor by manual and automatic controls with the automatic controls consisting of: mounted occupancy sensors, day light harvesting, and time on/off control.

Mechanical

Since there is renovation and new construction all the existing HVAC equipment, piping and associated controls will be removed and replaced with new systems. HVAC system will be water source heat pumps. Classrooms will be served by 3.5 ton units with ductwork distribution to ceiling diffusers. Auditorium and Cafeteria will be served by water source heat pump rooftop units. Energy efficient methods of ventilation will be required for LEED Certification and therefore energy recovery wheels with 70% minimum effectiveness will be used.

All the plumbing fixtures shall be installed to meet ADA standards where required. Hot water will be distributed throughout the building at 140 Degrees Fahrenheit and controlled at each individual fixture. Also, a return hot water loop will be installed and controlled according to the occupancy schedule.

Structural

The foundation is a typical spread footing with an allowable bearing pressure of 3,000 psf. Footings that experience poor soils will be removed and replaced with structural fill. Any limestone present that shows high risk of sink holes will result in pressure grouting to secure the existing soils.

The main structure will consist of masonry bearing walls with steel joists spanning the horizontal runs. The load bearing walls will be 8", 12", or 16" concrete masonry units. The first floor will consist of a concrete slab on grade with a minimum thickness of 4". Elevated slabs will be constructed of concrete over a composite metal deck with a minimum total thickness of 4" with fiber reinforcement. Elevated floors will be supported by steel joists bearing on masonry walls. The steel joists are K and LH Series fabricated.

Fire Protection

The fire protection system for State College Area High School is a wet and dry system that employs automatic sprinklers attached to a piping system containing water and/or compressed air. Sprinkler protection is based on light hazard (225 SF per head) and ordinary hazard (130 SF per head) criteria.

Transportation

Located in the main corridor and Pod B are two 3500 pound, single-car, hydraulic elevators. The elevators operate at 150 fpm and are equipped with a battery-powered lowering system in case of emergency or power outage.

Telecommunications

There is an existing district wide data center located in the North Building. As part of the summer project, Massaro rerouted conduits through the North parking lot and across Westerly Parkway so it will hit the new MDF room in the South Building. During construction, temporary connections will need to be made in the South Building to existing IDFs and the new

MDF to allow service to remain in the occupied parts of the school. Additionally, the Data center in North will be moved to its new location over a span of months to limit disruptions.

Storm Water Management System

Storm water detention basins will be used during construction to hold water run off on site. This will ensure streams and inlets are not contaminated due to the site run off. Trench drains, water quality structures, and energy dissipaters will be used where necessary.