

# **Building Statistics Part 2**

## **Structural**

The Health and Human Development Building consists of 4 stories and a mechanical penthouse. The foundation is made up of a shallow strip and spread footings foundation system. Foundations walls are placed on top of the strip footings around the building. These footings range from 18" to 36" in thickness. There is also a mat foundation present for the stair tower areas, which is 24" thick. Normal weight concrete will be used for all footings and must have a minimum compressive 28-day strength of 4 ksi. A soil nail wall is used in the area connecting to the existing to remain section in order to contain the pressure for the excavation. It is recommended that the foundations sit on solid dolomite bedrock in order to reduce settlement.

The main super structure of the building consists of structural steel columns, beams, and flanges. Floors are composed of composite concrete floor slabs on metal decking, which are supported by wide flange beams. A 5" thick slab-on-grade is located on the ground floor. A wide variety of beams and girder sizes are used to support the office, lab, and classroom spaces. Column sizes range from 8x31s to 12x170s. The lateral force resisting system is a combination of braced frames and moment resisting connections.

## **Construction**

The project is funded through the Department of General Services (DGS). With this type of project, it is required that multiple prime contractors be used. A design-bid-build type of contract with multiple primes is utilized. With this many primes, collaboration is very important. Dual trailers have been added to the site in order to increase collaboration and allow for small issues to be resolved quickly. A challenge with this project is the location and size of the site. The building is being constructed alongside one of the busiest streets on the Penn State University campus. Also, the site is very small due to its proximity to the HUB lawn (a major student gathering area). The site was compressed in order to minimize the amount of space taken up on the HUB lawn. With the small site, it is important to establish lay down areas for material storage and also designate spaces for site traffic.

Safety is a major concern on the site. Adjacent buildings will be fully functional throughout the construction process. Also, the constant traffic of students throughout the campus will need to be managed for activities such as steel lifts and demolition. A temporary sidewalk was constructed in order to increase site area and allow for a safe swing radius for a crane. Also, traffic control personnel will be utilized at all times to have eyes on pedestrian traffic around the site entrance. The building is expected to be finished in June of 2015.

## **Mechanical**

With the Health and Human Development building being located on the Penn State campus, it is able to be hooked into the steam and chilled water loops that run through the campus. The building will consist of 6 new air handling units in order to pump air throughout the building. There is also an existing AHU that will be salvaged and reused in the existing to remain section. The air handling units will be located on the roofs of both the ETR (existing to remain) and the new building. The air will then be cooled and heated using VAV boxes. Exhaust fans are located throughout the building in bathrooms and lab spaces as well.

## **Lighting**

The HHD building consists of both fluorescent and LED lighting fixtures. With the push to have lights that do not require maintenance, LED lights are utilized a lot more, especially in the atrium space where changing of light bulbs would be difficult. Fluorescent lights are utilized mostly in more private spaces. Occupancy sensors are used throughout the building in order to control the lighting and reduce energy usage.

## **Electrical**

Similar to the mechanical system, the electrical system is also tied into the campus power. The main distribution switchgear is a 1600 A, 480/277, 3-phase, 4-wire switchgear. This is then distributed to two switchboards, which stem out to sub-distribution panels.

## **Fire Protection**

The building contains a sprinkler system that runs throughout the building. Beams and columns are designed to be fire resistant through spray on fireproofing. This foam allows for a 2-hour fire rating. Stair towers and elevator towers will consist of fully grouted CMU to allow for them to have a 2-hour rating as well.

## **Transportation**

The HHD building contains two passenger elevators located in the center of the existing to remain building and the southwest side of the new construction. There are two main stair towers that service the new building and one main stairwell to service the existing to remain building. These are the main means of egress in case of a fire emergency. The atrium area is also made up of a detailed, open stair tower.