The Winsor School

Centers for Performing Arts and Wellness Academic Wing

103 Pilgrim Road, Boston, Massachusetts

Maggie Golden
Lighting / Electrical
Advisor – Richard Mistrick

Building Statistics

Part 1 Completed - September 5th, 2014
Part 2 Completed – October 20th, 2014

BUILDING STATISICS

Maggie Golden | L / E | R.Mistrick | The Winsor School | Boston, Massachusetts | October 20th, 2014

General Building Data

BUILDING NAME

The Winsor School | Centers for Performing Arts and Wellness Academic Wing

LOCATION AND SITE

103 Pilgrim Road | Boston Massachusetts

BUILDING OCCUPANT NAME

The Winsor School

OCCUPANCY OR FUNCTION TYPE

Theater (A-1), Exercise Spaces (A-3), Offices (B), Parking Garage (S-2)

The new wing is the performing arts and athletic wing connected to the academic portion of an all-girl preparatory school for young women in grades 5-12.

SIZE [TOTAL SQUARE FEET]

79,000 sf

NUMBER OF STORIES ABOVE GRADE | TOTAL LEVELS

Three Stories above grade | Five Total Levels

PRIMARY PROJECT TEAM

Owner: The Winsor School | http://www.winsor.edu/

Architect: William Rawn Associates, Architects, Inc. | http://www.rawnarch.com

Construction Manager: Lee Kennedy Co Inc. | http://www.leekennedy.com/

Structural Engineer: LeMessurier Consultants | http://www.lemessurier.com

M / E / P / FP Engineer: Rist-Frost-Shumway Engineering, P.C. | http://www.rfsengineering.com

Civil Engineer: Nitsch Engineer | http://www.nitscheng.com

Geotechnical Engineer: McPhail Associates, Inc. | http://www.mcphailgeo.com

Landscape Architect: Landworks Studio Inc. | http://www.landworks-studio.com

Theatre Consultant: Theatre Projects Consultants | http://www.theatreprojects.com

Acoustic / AV Consultant: Threshold Acoustics | http://www.thresholdacoustics.com

Sports Consultant: Brailsford & Dunlavey | http://www.programmanagers.com

Code Consultant: Sullivan Code Group | http://www.rwsullivan.com/services/code-consulting

Lighting Consultant: Horton Lees Brogden Lighting Design | http://www.hlblighting.com

Sustainability Consultant: The Green Engineer | http://www.greenengineer.com/

BUILDING STATISICS

DATES OF CONSTRUCTION

May 2013 – September 2015

ACTUAL COST INFORMATION

Total Construction - $71,000,000

Electrical - $7,200,000

HVAC - $6,000,000

Plumbing - $2,000,000

PROJECT DELIVERY METHOD

Design - Bid - Build

RENDERINGS [COURTESY OF WILLIAM RAWN ASSOCIATES]

Figure 1 - Street View of Winsor School New Wing Addition

Figure 2 - View from the Dining Hall of the Winsor School New Wing Addition

BUILDING STATISICS

Architecture

ARCHITECTURE

The new wing of The Winsor School is a juxtaposition to the 100-year-old classical building that inhabits most of the schools classrooms. This new wing, housing mostly sporting, rehearsal and performance facilities, will add a modern feel to the classic campus. The building's exterior, with no brick except the repairs to the existing structure, will mostly incorporate aluminum cladding and an extensive amount of glazing. On other locations on the façade, limestone and calcium silicate units will be used for a warm and light atmosphere. The warmth will be exemplified with every overhang, which will incorporate wood ceilings. The linear expansion of the building shapes creates a geometrical aspect that allows the architecture to seemingly float on air next to the heavier appearance of the neighboring academic wing.

MAJOR NATIONAL MODEL CODES

2009 International Building Code / Massachusetts State Building Code, 8th Edition

2011 National Electrical Code

2009 International Mechanical Code

2009 International Energy Conservation Code & Stretch Energy Code

Massachusetts Architectural Access Board Regulations

Massachusetts Fire Prevention Regulations

Massachusetts Plumbing Code

Massachusetts Elevator Code

ZONING

The Campus is located within the H-1 District of the "Brookline" neighborhood or "Boston Proper" section of Boston. This is mostly a residential apartment district stated by Section 3-1 of Boston Zoning Code. It is also located within the Groundwater Conservation Overlay District, per Article 32 of the Zoning Code.

Furthermore, according to Article 13, the restrictions for the H-1 district are as follows: a maximum floor area ratio of 1.0, lot size of 5,000 sf, a minimum lot frontage of 25 feet, a minimum side yard between 12.5 ft and 20 ft. Building height is not restricted in the H-1 District.

Building Enclosure

BUILDING FACADES

The building façade features many different materials, none of which relate back to the classical academic building of which it is attached. The Southwest façade of the building largely consists of heavily glazed curtain walls and metal panels. The metal panels, which are featured on all sides of the building, are preformed aluminum but vary between a smooth or corrugated kynar finish. Furthermore, the spacing of the corrugation also varies by location. The glazing mentioned above is primarily used on the southwest and northwest facades on multiple expansive curtain walls consisting of steel frames for fire-rated assembly or aluminum framing. The types of glazing incorporates mostly high visible light transmission glass of around 40-65% but on the southwest façade of the building there are portions of highly fritted glass allowing a visible light transmission of around 5-10%. The sparse amount of glazing on the Southeast and Northeast sides of the building follow the same type of glazing as above.

Where there is not glazing or metal panels, a variety of stone is used. The majority of the stone façade is Calcium Silicate Masonry Units of varying sizes. These units are finished with a "sandrift" or tan coloring. Similar to that of the other stone masonry heavily used on the building, limestone of type Jura Buff Dolomite, with varying degrees of light to dark coloring.

Finally, the least used materials on the façade include granite and wood. The granite stone of type Quarra Black is used along the base of the building where the exterior walls meet the ground plane. The wood, used on the underside of all canopies and overhangs is specified to be FSC-Certified local Douglas Fir planks with a smooth face.

ROOFING

The roofing, mostly unseen, will hold a large amount of the mechanical equipment which will be mostly disguised as a person may approach the building, though if far enough away not completely, by a half wall. The roof is planned to be in most cases, a low slope roof comprised of a typical insulating system.

The surface roofing material will be mostly a white EPDM (ethylene propylene diene terpolymer or rubber) membrane. The white color of the membrane allows the roof to be US DOE EnergyStar Complaint. In some locations a black EPDM membrane is also used though mostly when it will be covered by another material. The other material is precast concrete pavers located on rubber supports. These will be situated in areas along walking paths or around mechanical equipment.

Sustainability Features

The goal of the building process was to create and obtain a LEED certification through the United States Green Building Council of LEED Silver. This was hoping to be obtained through use of regionally obtain and manufactured materials, low emitting materials, recycled content, high performance building systems and construction waste management.

Primary Engineering Systems

CONSTRUCTION

The construction of The Winsor School is to be completed by Lee Kennedy Co Inc, a preconstruction and a construction management company based in Quincy, Massachusetts. The construction is ongoing, beginning in May 2013 and set for completion in September 2015. The cost of construction is estimated at $71,000,000. The project delivery method is design-bid-build.

Sustainability efforts have been highly focused on the construction of the building in terms of limiting construction waste. To be specific, the end goal will be to salvage or recycle 75% of the non-hazardous construction and demolition debris. This is planned to be a highly coordinated event with plans required to be reviewed by multiple facets at regular meetings along the way. This work may be subcontracted out to sub-contractors specializing in this aspect of construction, it is not known at this time if this was done.

There are also plenty of challenges of this site. Layout wise, the site is extremely tight, surrounded by three main roads and an active campus, leaving minimal room for laydown of materials and limits the site to only one entrance/exit for vehicles and trucks. Furthermore, apart from the site restrictions there are also special focus needed on the squash courts and the acoustical features in many of the performance spaces. The squash courts require complete building enclosure to ensure the materials are not corrupted by incorrect humidity or weather. Also, the specialty glass has to be construction in such a way that allows a maximum deflection if a player were to fall against it. The acoustical requirements are very involved, detailed and strict requiring experts for installation and numerous tests to be investigated concurrent with the construction.

ELECTRICAL

The electrical component of the building will enter the site from the eastern most corner of the grounds, and fed into a 2000 kVA pad mounted transformer provided by NSTAR utility company. It will convert the electricity to 480/277 3PH, 4W voltage to fuel the buildings electrical systems. The electricity will then enter a 3000A switchboard located on the

plan south basement floor plan in the main electrical room. At certain locations the building voltage is transformed to 208/120V by use of step-down transformers for power receptacles and certain mechanical equipment. The electrical system is backed up by a 500 kW/600 VA diesel generator. The system is designed to respond within 10 seconds of power failure. The generator supplies all life-safety loads like lighting, power and security systems. It also supports one of the two elevators for fire-fighter access.

LIGHTING

The lighting system incorporates fairly high end finishes with colors that allow them to blend into the locations where the lighting will be seen (i.e. public spaces). In “back of house” spaces, the fixtures are much more industrial. The sources in the fixtures range from light emitting diodes and linear fluorescents to, in a few locations, compact fluorescents or halogen fixtures are used. Most fixtures in the classrooms, offices and fitness centers use linear fixtures while the corridors and transitional spaces use round fixtures. The theatre uses high powered pendant or surface mounted LED sources in an enclosed cylinder and the gymnasium uses high bay linear fluorescent fixtures. The corridors are mostly on the southwest side of the building, up along a fritted glass curtain wall, allowing for direct sunlight exposure. Some of this light could creep into main classroom spaces which typically have glass curtain walls exposing them to the hallway and, thus, the direct light.

The Corridors will be controlled mainly by occupancy sensors and this corridor in particular will be controlled by daylight sensors as well. The high bay occupancy sensor in this hallway uses infrared technology. These sensors will reduce the light output or turn the fixtures off after a certain owner-determined time delay. Also designated by the owner, a time clock shall switch off all luminaires at a designated time and have a manual override. The Daylight sensors in the space are a wireless open-loop system with an integral IR receiver and provides a linear response from 0 to 10,000 footcandles. All other interior spaces will have occupancy sensor control and emergency lighting where indicated. Site Lighting will be controlled by an astronomic time clock with a manual override for daytime re-lamping.

MECHANICAL

The building is serviced by 8 interior air handling units located in various mechanical rooms on different floors and in the spaces they service. The air handling units in the mechanical rooms service various corridors and classroom spaces on level 1, each supplying 19500, 15250 or 26000 CFM. Individual air handling units service the locker rooms (4800 CFM), squash courts (6500 CFM) and the stage. Two air handling units are servicing the gym as well, supplying 12000 CFM each. Building heating and cooling is provided through hot water and chilled water coils within the air handling units. The hot water is created in 2 different boilers in the basement of the building. They are powered through natural gas lines and pumped through boiler pumps to supply the hot water to the hot water coil. Exhaust fans are located in various designated exhaust spaces like the central plant, IT and electrical rooms. The majority of the general exhaust fans that service the rest of the building are on the roof.

STRUCTURAL

Except for the slab on grade in the basement, the buildings structure is composed of a composite beam systems, meaning wide flange structural steel beams with composite decking. Lightweight concrete of 3000 psi is implemented with metal decking that doesn’t exceed 3 inches or thickness less than 20 gage. The steel is high strength, low alloy steel ASTM A992 or ASTM A588. The column sizes range from around W8x31 to W12x152. There is also Carbon Rectangular and Square HSS Tubes Grade B and Round HSS Pipe Grade C. The design criteria suggests a design that requires no shoring during construction.

BUILDING STATISICS

The foundation system of The Winsor School consists of concrete with rebar reinforcement. The footings range in size from 4'x4'x1.5' to 14'x14'x3.33' with the footings centered under the columns unless shown otherwise. Four 12" CMU shear walls as well as shear and moment connections of the steel are used to combat loading and resist lateral forces.

FIRE PROTECTION

Fire protection is performed by sprinkler and fire pump systems. With five different types of sprinkler heads based on ceiling finish, they are finished with brass, white enamel or chrome and spaced according to IBC requirements. There is both wet-pip and dry-pip sprinkler alarm valves. Some of the walls, between occupancies, are rated for a maximum of 2 hours of fire protection as well as the fireproofing on some of the exposed structural members. The fire alarm is an analogue addressable fire detection and alarm system with both manual and automation initiation. It allows special loading and editing instructions and loss of power will not erase the instructions in the memory. There will be both speakers and strobes, as noted on the plans. In the event of a fire, the system will be able to give full manual or automatic control of elevators, door hold open devices, sprinklers, fire pump and emergency power. There is also an alarm silence button, located in the main office of the building. It receives 120 V power with battery capacity to run for the duration of a power outage and the generator to kick in. Smoke control systems with pressurization located in Stair #2 and Stair #4 with fans are meant to dissipate and damper smoke. There is also a firefighter smoke control panel to indicate to firefighters whether the systems are operating or not.

TRANSPORTATION

There are two elevators in the building used for transportation. One is used in the main academic wing and not primarily used in this wing of the wellness center. The other elevator is centrally located in the Center for Performing Arts and Wellness Wing designated as Elevator 1 and located right outside Stair 2.The passenger elevator uses a machine-room-less, gearless traction traveling 88 feet in total. It will stop 7 times counting the basement and mezzanine levels. It is rated for 5000 AIA, finished with mostly stainless steel and has a total square footage of 51 ft^2. It is connected to emergency power for use during an event by emergency crews.

There are also 5 staircases throughout the wing, three of which are fold back fire stairs traveling the entire length of the building from basements to the top floor. Stair 1 is also enclosed but is tucked away in the wellness section of the building right by the locker room. It only travels to the third floor. The other stair, Stair 5, is open and transitional stairs and not meant for main egress. It is located right along the glass curtain wall in the performing arts section of the building. This stair case also only leads to the third floor.

TELECOMMUNICATIONS

The telecommunications and data portion of this building are very extensive. Not so much from a data sense but rather from a security standpoint. Telecommunication Rooms are located on the basement, first, second and fifth floors of the buildings and designated IT Rooms on the plans. The basement telecom room holds the data center where the main telephone equipment, servers, CCTV, intercom equipment and data racks are located. This is in the north part of the building. The rest of the telecom rooms are more centrally located on the floor plan and house equipment racks, CATV and telephone equipment. The CCTV equipment offers LCD displays for workstations, network video recorders running at 240/100 V, indoor color pan/tilt/zoom dome cameras and door intercom systems.

The access control telecom portion is very extensive as security measures are fairly high in this school. The access control system can be broken down into three different sections: Configuration Reports, History Reports and People Reports. For the configuration reports, the access control handles camera displays, elevators, portals (doors/windows), resources like temperature points and assigned threat level groups. The people reports log current uses, occupancy, photo ID gallery and information, roll call, time specifications and even sound files in emergency situations. The history

report logs both of these overtime to develop a report where patterns can be found, if necessary. The groupings allow for a password protected viewing system to allow security officials to assess where people are located throughout the school and what is going on in those locations. Many settings can be activated to trigger possible alarms from video motion detection, camera failure, high or low temperature events, forced or held portals or occupancy limit violations.

Security speakerphones are located in every classroom space. The unit is vandal resistant and ADA compliant. There is a button labeled “PUSH FOR HELP” that will activate a strobe and place a call. Otherwise, the call button can be used to allow calls to be made from the keypad and be projected through the room. It is housed in stainless steel. The Access Control system is listed above alone with its security measures. Cameras are located in every corridor and focused on every entrance and stairwell. They are configured for very little blind spots. There are also wall mounted and ceiling mounted motion detectors.