

WASHINGTON DC AREA

MULTI-USE HIGH RISE



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MULTI-USE HIGH RISE

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SECTION A: EXECUTIVE SUMMARY

The Multi- Use High Rise, found in the greater Washington DC area is a very unique building with a plethora of distinguishing features and systems. This project is going to be zoning code classification C-3 (general commercial), with a gross floor area of 214,768 SF and a total lot area of 51,696 SF. The building will be a mixed occupancy, with the ground floor being retail and the remaining floors being residential. This project is unique because it is made up of two buildings, building A and building B seen in *Figure 1: Site Plan*. Building A is a ten story multi-use building, while Building B is a six story multi-use building. Both buildings will be used as retail space on the ground floor and residential condominiums for the remaining floors. Building's A and B are connected by a two story, underground parking garage, which will provide 189 parking spaces for residential occupants, 20 spaces for residential visitors, and 23 spaces for retail uses. Of these spaces, six will be handicap accessible and 25 will be compact spaces. There will also be a total of 92 bicycle parking spaces. This building will be classified under building code as R-2 (residential), M (Mercantile) and A3 (assembly), and is required to have automatic sprinklers, standpipes, and a Fire Department Connection. The building is also designed to achieve a LEED accreditation.

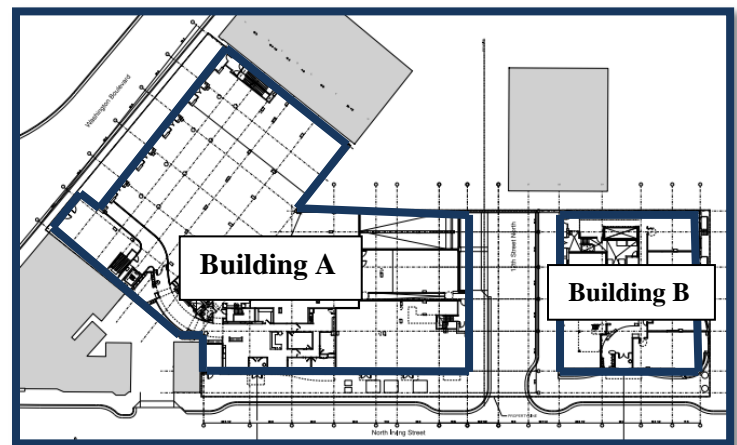


Figure A: Site Plan

The Multi-Use High Rise is owned and operated by ZOM Mid-Atlantic, who is largely known for its residential construction. Lately, ZOM has ventured to multi-family residential and commercial retail construction, which is where this project is labeled. ZOM Mid-Atlantic reached out to Esocoff & Associates Architects for design and Donohoe Construction Company for construction management. Donohoe received the rights to the project through a BID process, and was contractually granted status as the construction management team for the project. ZOM has separate contractual agreements with both the architect and construction manager in this project, making the project delivery method used a construction management at risk. Donohoe Construction Company is acting as a construction manager at risk throughout this project, so it has a contractual agreement with the owner as well as the subcontractors used to complete the project. Donohoe has overall control of the construction site, while the owner works through Donohoe and Esocoff separately throughout. ZOM also as an owner's representative, Patrinely Group, who works as a liaison for the owner to remain in contact with Donohoe Construction Company throughout the duration of the project.

This project started July 24, 2013 and has an estimated substantial completion date of July 29, 2014. Once the final construction documents were received by the construction manager,

demolition of existing structures was required. Once demolition takes place, site clearing and excavation takes place. Since the project has a two story underground parking garage, sheeting, shoring tiebacks, and bracing is required to ensure the excavated walls do not cave in. Following excavation, the foundation system is set to be placed. Following the foundations, which are found on underground parking level's one and two, the superstructure may begin. The superstructure is made up of structural steel, cast-in-place concrete, and structural concrete masonry units. Following construction of the superstructure, building enclosure is vital to be completed to ensure the building is water-tight. Once the building is water-tight, interior finishes may begin, bringing the project to a close. Foreseeing no large-scale issues with the project, it will be completed on time, with little to no delay.

The estimated total cost is roughly \$44 million dollars. This project is under tight confidentiality by ZOM Mid-Atlantic, and they refuse to disclose certain items of information. Cost data is one vital piece of information that is unable to be disclosed due to owner constraints. At \$44 million and a total square footage of 214,768 square feet, an approximate cost per square foot comes to \$205 per square foot. Using R.S Means, an estimate was done coming close to this value. RS means has a square foot cost, for an apartment between eight and 24 stories, of \$213.83 per square foot. With the square footage of 214,768, RS Means estimates the total building cost to \$45.9 million.

A few different structural systems are used for this building; cast-in-place concrete, structural steel framing and structural masonry. The general make-up of this building is cast-in-place concrete. Most of the columns and beams throughout this project are made of cast-in-place concrete and reinforced with steel reinforcing bars. Cast-in-place concrete is also used in foundations, footers, slabs on grade, support slabs, equipment pads, and shear walls, as well. While constructing this cast-in-place concrete, both metal and wood formwork is used. Structural steel framing is also used in construction the Multi-Use High Rise. W-shaped, grade 50 and high strength, low alloy members are used in the buildings superstructure. Along with structural steel and cast-in-place concrete, masonry is used as a structural system. This building uses normal weight concrete masonry units to support some of the structure. 3/16" diameter welded wire joint reinforcing is also used. While there is masonry for the structural system, there is also masonry used in the building's façade

The majority of this building's façade is made up of face brick masonry units. Brick masonry units were used in this building because historical brick was preserved along the Washington Avenue side of the Multi-Use High Rise. The brick and lintel system is found throughout, complimenting this preserved historical façade. While the brick is preserved, new windows, frames, doors and glazing are installed. Other façade include an architectural a glass block curtain wall, structural slate stone, tile, metal panel, and split face CMU.

The mechanical system being used in the Multi-Use High Rise is a split system heat pump unit. The exhaust system is mounted, with ceiling and wall mounted ventilators, as well as centrifugal

roof ventilators. By code, automatic fire sprinklers, fire department connections, and standpipes are required. All exhaust systems for the mechanical system are found on the roof of the structure. Several electrical systems are used throughout the building. A 3 phase 120/208 V, 3 phase 277/480 V switchboard is used using unshielded twisted pair cable. Circuit breakers are used as overcurrent protection. The panel boards used are as follows, a 3 phase 120/208 V, 3 phase 277/480 V, and a 1 phase 120/208 V. The electrical system is very widespread in voltage and amperes due to the multi-use occupancy, requiring different appliances to be powered throughout the entire building.

The Multi-Use High Rise is a project that will take great precision and coordination in order to complete to satisfy the owner, ZOM Mid-Atlantic. Donohoe Construction Company, as the construction manager at risk, is excelling in this project, leading all teams to a successful experience. The overall goal is a LEED accredited Multi-Use High Rise, and it is on track to be achieved with great owner satisfaction.

SECTION B: ATTACHMENTS

- Presentation Slide Notes



Washington DC Area

MULTI-USE HIGH RISE

Ryan MacNichol
PSU AE Senior Thesis 2013
Advisor: Sowers



USAA REAL ESTATE

- Developer: ZOM Mid-Atlantic's Mission
 - NAHB Award 1999
- Expectations
 - Safety is number 1
 - Obtain certified LEED rating
 - Under budget
 - On Time

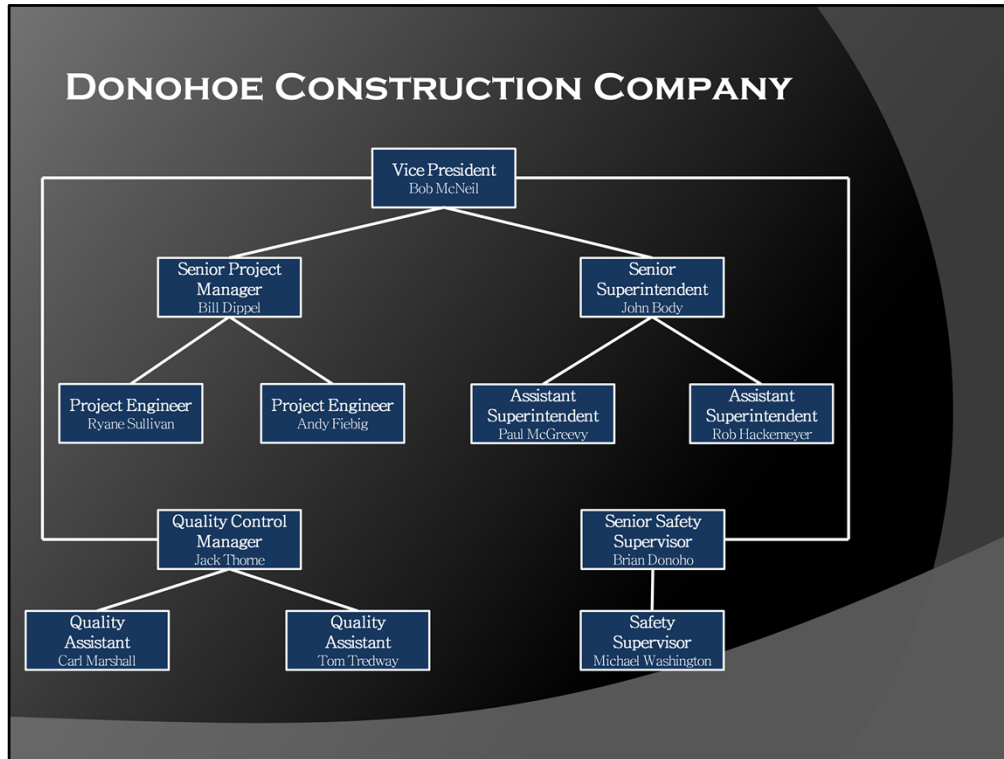
PILLARS of the INDUSTRY Awards

USAA®

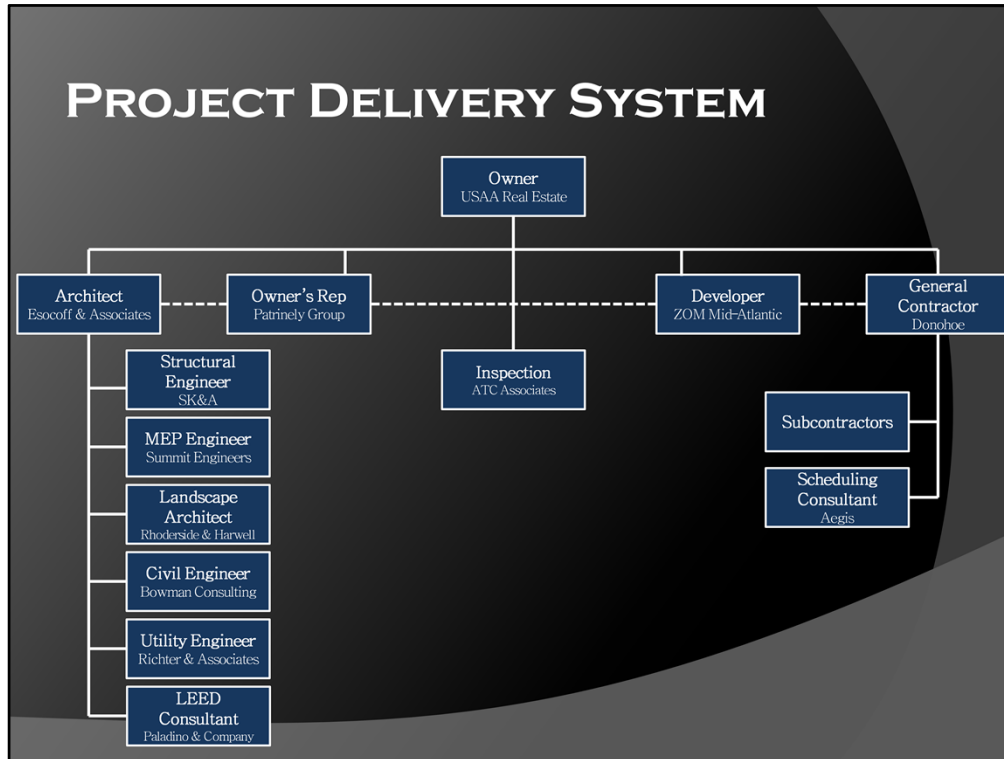
ZOM LIVING®

- USAA Real Estate Company
 - Thoroughly understands the development process, from national real estate dynamics to local site selection, entitlements, construction and lease-up
 - Developer-friendly capital program
 - Flexibility and Simplicity
 - Well versed in customizing the terms of each investment partnership in ways that meet each transaction's particular requirements
 - Expertise in lease terms, capital pricing, project phasing, partnership mechanics, asset management, accounting, investment horizon, exit strategy, and tax treatment
 - Significant financial capacity for development and able to commit in quick timing
- Developer: ZOM Mid Atlantic
 - Founded in 1977 by a dutch oil company executive, targetting florida real estate investment opportunities.
 - Based in Orlando, had a broad initial activities scope
 - Invested land and developed single-family residential, commercial, office, and retail projects
 - Expanding geographical focuses, now has regional development offices in Texas and Washington D.C.
 - Grown into one of the most highly regarded multifamily development companies in the United States

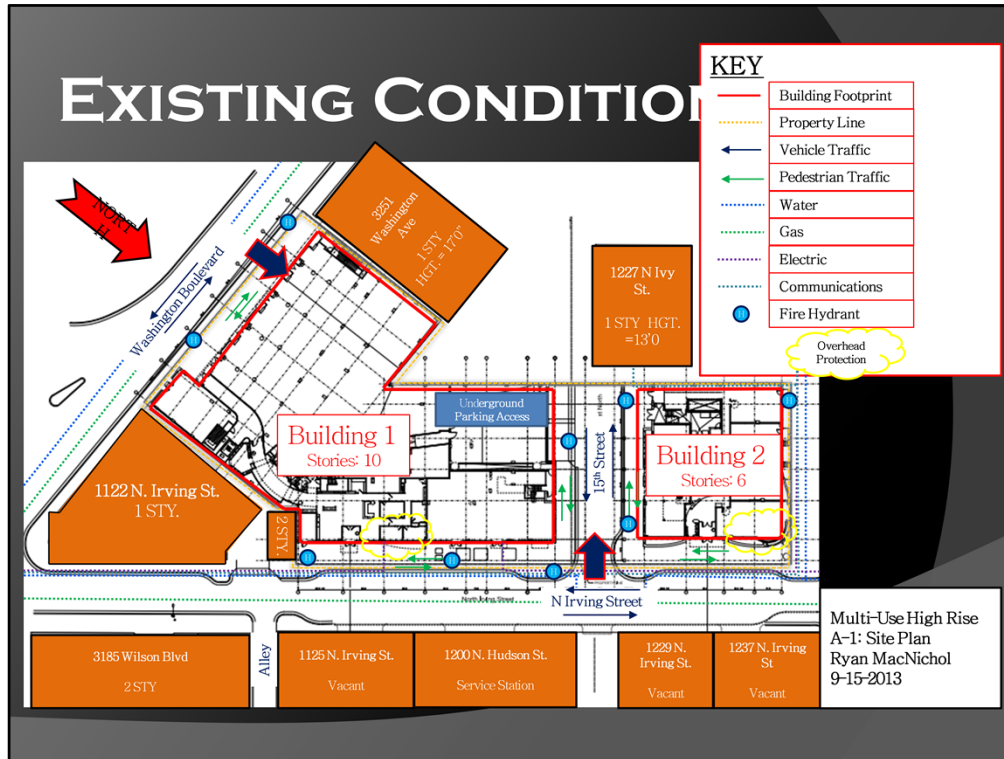
- Has earned the National Multifamily Development Firm of the Year (NAHB) in 1999



- Vice President
 - Only bills part of his time to this project because he has several projects.
- Senior project manager reports to the vice president. Even playing field as the senior superintendent
 - Two project engineers to assist the senior project manager
- Senior superintendent reports to the vice president. Even playing field as senior project manager
 - Assistants vary as per where in the project they are
 - Skin superintendent, interiors/finish superintendents
 - There was a PM on site, but as the project proceeded, he switched to superintendent
- Quality control manager reports to vice president
 - One person for preconstruction meetings and a person to visit the site everyday/every couple of days
 - Work on all projects
- Senior safety manager reports to vice president
 - Safety supervisor insures safety on the jobsite



- Owner: USAA Real Estate
- Architect: Esocoff & Associates (direct contract with owner, communication with owners rep, developer, and GC)
 - Structural Engineer: SK&A Structural Engineers
 - MEP Engineer: Summit Engineers
 - Landscape Architect: Rhoderside & Harwell
 - Civil Engineer: Bowman Consulting
 - Utility Engineer: Richter & Association
 - LEED Consultant: Paladino & Company
- Owner's Representative: Patrinely Group (direct contract with owner, communication with others)
- Developer: ZOM Mid Atlantic (direct contract with owner, communication with others)
- Inspection: ATC Association (direct contract with owner)
- General Contractor: Donohoe Construction Company (direct contract with owner, communication with others)
 - Scheduling Consultant: Aegis
 - Subcontractors
- Contract Types
 - ...



- Many surrounding buildings
- Not much space between property line, building footprint and fencing
- Recycling plays a big part in this project for LEED credibility
- Two separate building footprints
- 15th Street separating two buildings could cause traffic issues
- Live wires causing overhead obstruction
- Water, gas, electric, and communication lines still similar to existing utilities
- Site access off Washington Blvd. and N. Irving street at 15th street

BUILDING SYSTEMS SUMMARY

- Demolition
- Excavation
- Structural Steel Framing
- Concrete
- Masonry

- Demolition
 - Existing buildings
 - No interference with other buildings, walkways, or traffic
- Excavation Support
 - 2-stories underground parking
 - Sheeting and shoring tiebacks
 - Bracing
- Structural Steel Framing
 - W-shaped, grade 50 steel
 - High Strength, low alloy steel
 - Cold-formed, light metal framing
- Concrete
 - Slab on Grade, Min 5" thick, 4000 PSI
 - Footings: 4000 PSI
 - Framed Slabs/Beams: 5000 PSI
 - W6X6-W2.0XW2.0 Welded Wire Fabric
- Masonry
 - Historical Façade Preservation
 - Facing Brick: Grade SW
 - CMU: Normal weight
 - 3/16" dia. welded wire joint reinforcing
 - 12 gauge veneer anchors

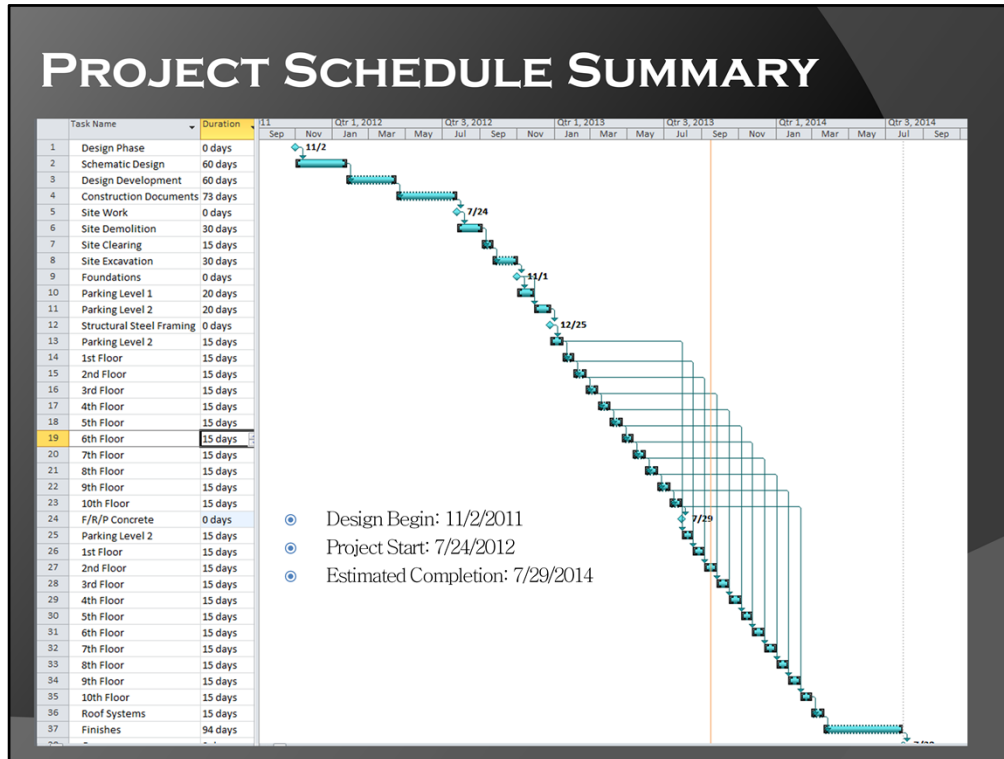
- Other Structural Features
 - Post tensioning rebar decks
 - Piles around site with tiebacks during excavation
 - Caissons, rakers, and waler at existing 1-story building

BUILDING SYSTEMS SUMMARY

- Mechanical System
- Electrical System
- Fire Protection System
- Architectural Features

- Mechanical System
 - Split System Heat Pump Units
 - Located on various roofs
 - Rooftop heat pump
 - RTU-2: located on the 10th floor overtop of the 9th floor common room
 - Mounted Exhaust Systems
 - 3 100% Outside Air Make Up Air Units
 - MUA-1: Located upper roof building A to condition and circulate 100% outside air to building A
 - MUA-2: Located roof deck of building B to condition and circulate 100% outside air to building B
 - MUA-3 provides air for the retail space and is located on the 2nd floor
 - Ceiling diffusers
 - Fan wall / unit heaters
 - Stair pressurization / garage fans
- Electrical
 - Demminion Virginia Power transformers in the transformer vault located in the garage, supplyin 3 switchboards located in the electrical room
 - UTP cable (unshielded twisted pair cable) used

- NEMA PB 1 power and feeder distribution
- Switchboards
 - #1: 2500A, 277/480 V
 - #2: 3000A
 - #3: 1600A
- Panel Types
 - 3 Phase: 120/208 V
 - 3 Phase: 277/480 V
 - 1 Phase: 120/208 V
- Diesel generator: 277/480 V
 - 300kW/375kVA
- Fire Protection System
 - Fire pump/sprinkler room is located on the P1 level in building A
 - Fire control room is located on the ground floor of building A
 - Fire pump controllers in both buildings that are connected to the fire alarm control panel located in building A
 - Pressure reducing valve at fire protection water service entrance
 - Pressure shall not exceed 165 PSI
 - Sprinkler zone or sprinkler head in elevator pit and trash chutes
 - Sprinkler zone and dry pipe valve for garage
 - Valve, controls, compressor piping and a complete and operational dry pipe system
 - CPVC Piping only in branches and arm over in units
 - All other piping, branches, mains and risers to be black steel
 - Fire pump, jockey pump, controls switches
 - Fire Pump: 1250 GPM, 110 PSI boost, 35 PSI Inlet 100 HP, 3 phase, 488 V
- Architectural Features
 - Serpentine walls, terraces, and railings
 - Glass block "beacon wall" on Building A
 - Metal Panel penthouse
 - Fluted concrete terraces
 - Roof Terrace
 - Canopy on upper roof
 - Historical facade preserved
 - LEED Certification
 - Building A
 - 145 Apartment Units
 - 3 Retail Areas
 - Building B
 - 42 Apartment Units



The owners representative to this project would refuse to disclose some information, which is vital to this project. I was unable to receive a cost breakdown or a schedule breakdown. Without that vital information, I still tried to deliver a complete summary in this presentation. The project start date was 7/24/2012. I estimated it taking approximately 3 months to demolish, clear and excavate the site, and another month and a half on foundations. I also approximated it to take about 6 months each to frame the site with structural framing and to form/reinforce/pour concrete. After that I estimated the finishes to take about 3.5 months, bringing the estimated completion date to the date given by my representative to be 7/29/2104.

PROJECT COST EVALUATION

- Construction Cost: Approx. \$44 Million
 - 214,768 SF
 - Cost/SF: Approx. \$205
- RS Means Cost/SF
 - Apartment (8-24 story)
 - \$213.83 /SF
 - Total: \$45.9 Million

When gathering cost data, I ran into quite a predicament. The owners representative of this project would not disclose any kind of cost data to me, other than the estimated project cost, which is roughly \$44 mil. With this information, and the total square footage given to me I can estimate the cost/SF to be roughly \$205. Then, taking this square footage, I went to RS means to find the cost/SF of an apartment, between 8-24 stories is \$213.83, giving me a RS Means total of \$45.9 Mil for this project.