TECHNICAL ASSIGNMENT 1
CONSTRUCTION PROJECT MANAGEMENT

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THE APARTMENT BUILDING
ROCKVILLE, MD
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EXECUTIVE SUMMARY

The Apartment Building is a mixed-use building located in Rockville, Maryland. The building features a concrete podium system on the first floor with 4 floors of wood-framed apartments above, all next to a 6-level precast parking garage. The 310,800 GSF project consists of three buildings: Building 100 and 200, which will have future retail tenant build-out spaces on the first floor and 4 floors of 206 high-end apartment units, and Building 300, which is an 107,800 SF precast parking garage. The owner for this project has many developments in the area, including GSA offices nearby, and is aiming to draw tenants for the Apartment Building from the employees at these offices. James G. Davis Construction was selected as the contractor for the job, in a cost of work plus fee with a guaranteed maximum price contract. The delivery method was design-bid-build, as the owner selected a team of architect and engineers/consultants to design the project and then hard bid the job to Davis. The project staff is made up of an owner construction manager with Davis project engineers and superintendents responsible for scheduling, quality assurance, BIM management, safety, and much more. With a 22-month schedule, the Apartment Building began construction in September 2013 and will conclude in May 2015. The cost of the project is approximately $34M, or $120/SF. Systems of the building include a split HVAC system for use in individual units and 3000A 120/208V electrical system serving panels to every unit. The building facades consist of 3 main types: brick veneer, cast stone, and a fiber-cement siding, called Hardi panels. While the city of Rockville requires a LEED minimum of 25 points, the Apartment Building will be targeting a score of 65, which will achieve a rating of Gold in LEED for Homes. Some of these LEED features include: radon venting, use of regional materials, proximity to transit (metro), 82-bicycle storage capability, reduction of roof heat island effect by installation of high albedo materials, construction waste management, and much more.
CLIENT INFORMATION

The owner is an active developer in the Washington D.C. area and throughout the US. With other properties nearby they expect to lease these apartment units to employees of their owned GSA offices. They also are looking to expand their residential properties, as they have another apartment complex in the area. The owner expects Building 100 to be turned over before the project is completed as well as having the retail spaces complete 3 months prior to completion of the rest of the building. As safety is important, the owner will require Davis and its subcontractors to follow OSHA and MOSH standards. The owner expects to be in attendance for meetings that Davis holds with the subcontractors before they perform work to address Safety, Quality, Schedule, Change Orders, RFIs, Submittals, etc.

PROJECT DELIVERY

The project delivery method for this project is design-bid-build, in which the owner contracted the architect, The Preston Partnership, to design the complete set of documents along with engineers and consultants and then the job was hard bid to the public, with Davis Construction winning the contract. The contract between Davis and the owner is a cost of work plus fee with a guaranteed maximum price. The reason for this is so that the owner can be sure what Davis is including, changing, or excluding in based upon the drawings, as it leaves more risk on the contractor to complete the project to the right standards and specifications. Davis has hired 19 subcontractors on the job and they are all lump sum contracts. While normally the lowest bidder gets the job in lump sum contracts, Davis decided to take the 3 lowest bids and meet individually with the subcontractors to ensure their numbers matched the scope of work and that they were the best qualified for the job. Figure 1 shows an organizational chart of the project team and the contractual relationships.

![Figure 1 Contractual Relationships](image-url)
The owner has selected an OCIP, Owner Controlled Insurance Policy, for this job allowing the owner to purchase the general liability and excess insurance for onsite operations. Because of this, the general liability rate that Davis charges the owner on a monthly basis is lower than the normal rate a contractor charges (0.1% vs. 0.4%). There is a 0.6% performance and payment bond and 1.2% subcontractor default insurance that Davis bills upfront at the beginning of the project.

**PROJECT STAFFING**

Davis’ construction management team is set up typically with executive operations managers from both Davis and the owner overseeing the Davis PM and superintendent. Under the PM are 3 Project Engineers who all have different responsibilities but in summary include QA/QC, submittal reviews, RFI management, and LEED coordination. Also on the project management side is the scheduling manager that oversees all project scheduling. On the field side, the superintendent oversees 3 assistant superintendents that are in charge of finishes, wood framing, MEP coordination, and facades. The superintendent also works alongside the safety manager who oversees all safety and performs site inspections. See the appendix for the organizational chart.

**EXISTING & LOCAL CONDITIONS**

The current site does not have any more than a small parking lot and a few temporary sheds. Surrounding the site are buildings to the north, south, and east. Main Street is a 4 lane street, so it will be not accessible for a construction entrance. An existing site conditions plan with utility lines and existing building can be seen in the appendix.

Per the geotechnical report, the current subsurface conditions consist of firm, sandy silt to silty sand fill with gravel and organics. Because of this an excavation support system of H-beams and wood lagging is recommended. Groundwater was found to be at depths of 13 to 25 feet below the existing surface and approximately 10 feet below the ground floor of buildings 100 and 200. The city of Rockville requires the site to have...
proper waste management procedures as well as a site cleanup system. 465 parking spaces will be available as well as 82 bicycle spots via the parking garage.

**BUILDING SYSTEMS**

**DEMOLITION**

The site will need to remove 5 sheds, 1 trailer, and the existing parking lot within the property lines. Post-demolition and site grubbing, excavation can begin, which will be supported by wood lagging and soldier piles.

**STRUCTURAL**

A 22’ concrete podium system is utilized on the first floor which supports 4 floors of wood framed apartment units above. The podium has a slab on grade as well as an elevated slab, while the apartment floor/ceiling assembly is a plywood subfloor glued and screwed on an 18” parallel wood truss and the ceiling to be 0.020” thick galvanized steel furring channels perpendicular to the truss.

**CIP CONCRETE**

Cast in place concrete shall use plywood horizontal and vertical forms per ACI 301. The concrete will be placed by using a crawler crane by Accu-Crete.

**PRECAST CONCRETE**

Precast concrete will be cast in Winchester, VA by the subcontractor. The crawler crane to be utilized is a 440-ton capacity with a 177’ boom and 276’ luffing jib. The crane’s location will be in the footprint of Building 200, north of the precast garage. Using welded plates and grouting spandrel panels, the precast garage will be assembled.

**MECHANICAL**

The HVAC for the each of the apartment units and corridors is a split system, consisting of 5 different AHU types ranging from 17,800 MBH to 42,000 MBH cooling capacities. There will be
an exhaust for each unit, as well, for the washing and drying systems. Fire suppression includes sprinkler standpipes on every floor with the entire building sprinkled with ½" spray pattern fusible link type in accordance with NFPA 13, and fire extinguishers in every unit.

ELECTRICAL

Incoming 120/280V, 3 phase, 3000A from the power company serving buildings 100, 200, and 300, with individual panels in each of the units. There are many electrical rooms in the building but the main room is in building 100 where a duct bank is used to enter the building. All conductors are to be copper: conductors #10 AWG and smaller are to be solid copper type THHN/THWN heat-resistant thermoplastic insulation and clear nylon jacket rated at 90°C and #8 and larger are to be stranded type THHN/THWN heat-resistant thermoplastic insulation rated at 75°C.

MASONRY

The exterior facades feature brick veneer on levels 2 through 5 and cast stone on the retail level. The brick is secured with galvanized metal anchors spaced at max 16” o.c. horizontally and vertically. Tube and clamp type scaffolding will be used to place the masonry.

STOREFRONT AND WINDOWS

The Apartment Building features a vinyl window system with clear tempered and non-tempered monolithic glass of 1/4” thick glazing. These windows vary from each unit and either single hung or fixed with most being bottom sash operable. They are attached to the facade via a window nailing flange to the wood framing. The current storefront system is not designed as tenants have yet to lease the retail spaces. Davis will provide temporary plywood over the metal studs in the meantime.

SCHEDULE SUMMARY

The construction schedule begins with procurement of materials on August 1, 2013 and will be ongoing for 170 days. Ground will be broken on October 1, 2013 as a new entrance to the site will be completed. Demolition will follow on December 31, 2013 to remove the existing parking lot and sheds. After this 24 day period, excavation can begin, which will go on for 45 days and be completed on March 12, 2014. The precast garage can begin digging foundations on March 13, 2014 and pouring and forming of footings and walls will take place. The precast portion will be set on May 2, 2014 and last for 60 days. This item is on the critical path because the precast staging area is in the footprint of building 200, so 200 cannot begin until all of the precast is set. Building 100 and 200 foundations will then begin with building 200 lagging by two months. For framing and foundations each building is split into 4 phases and will begin work south to north. After foundations, framing will begin with all buildings watertight by February 2, 2015. Building 100 finishes will begin on August 26, 2015 with the retail spaces being ready on January 14, 2015. Final inspections will begin for Building 100 on February 24, 2015 and Building 100 will be turned over on March 30, 2015. The rest of Building 200 will be inspected and turned over and the project will complete on May 18, 2015. The total duration for this project is 443 days, or 22 months.
PROJECT COST EVALUATION

A square foot estimate was done to estimate the project and construction costs of the Apartment Building. RS Means 2014 was used in the three categories: Garage, Parking; Store, Retail; and Apartment, 1-3 Story. The estimate cost of construction was estimated at $85.14/SF and with fees and bond was calculated at $96.49/SF. The actual cost of construction and the project are $96.53/SF and $109.40/SF, respectively. The reason why these numbers may not match up perfectly is because the RS Means data had to be interpolated because they do not include wood framed structure for apartments greater than 3 stories.

**Square Foot Estimate**

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<th>Occupancy</th>
<th>Cost</th>
<th>Cost/SF</th>
<th>SF</th>
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<tbody>
<tr>
<td>Apartment, 4-7 Story</td>
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<td>Garage, Parking</td>
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<td>Store, Retail</td>
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<td>Total Construction Cost</td>
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<td>Total Project Cost</td>
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**Actual Costs**

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