Executive Summary

Memorial Vista is a core and shell structure being built to house an aviation tenant in the north Virginia area. The purpose of this building is to consolidate 2 primary office buildings that are currently occupied by a single tenant to one single building. This single structure will create a main regional presence for the company near the nation's capital. According to the Washington Business Journal, the move that this company is undertaking is entirely keeping with their commitment to accelerate change in order to manage costs, reduce overhead, improve productivity, and increase competitiveness for growth. The consolidation will allow for the company to save in costs (Plumb, 2010).

Although saving money was a main aspect to the company, the owner's main crucial points are quality and time. The building will be occupied by important tenants for furthering the research of aviation design and to ensure safety and security, the building is equipped with maximum security. This increased security boosts the price of the project but keeps the future tenant happy. The other aspect that the owner requested was that the building finishes on time or before the project deadline. To accomplish this, many stake holders had to work together to ensure the project was sequenced correctly and remained on track. These stakeholders include the civil roadwork crews to complete the road around the perimeter of the building upon the time of completion, government buildings surrounding the space, air and transportation officials to approve the height restriction on the building, and the owner to complete the project with the intent of making the future client happy. To see the key dates of this project, reference the square foot cost breakdown slide within the report.

An interesting fact about the original plot of land was that it was in the design phase for quite some time, but not for the pure use of an office building. The northern Virginia region originally had the plan to keep this land as a mixed use development containing residential, office, and retail space. Then, according to a local government official, the future company pleaded for the space to be a single use office building. By having a large office building in this location, the area would solidify the presence of a corporate entity. The local government officials accepted the request in return that the company to occupy the building achieves LEED silver with 60 points, install a Capital Bike Share Station, improve the design of the landscaping around the sites edges, contribute $15,000 to a special transportation mitigation fund, and allow public access to the lawn area. The company accepted the requests and the building process began.

After the building began to go through the design phase, James G. Davis Construction (Davis) was brought in at when the construction documents were about 90% completed. Upon entering the Design phase, Davis was asked to look over the drawings and specs and assist the process by finding alternatives to the project's means and methods by undergoing value engineering. This makes Davis the consultant to the owner in the design and preconstruction phase and can result in numerous problems being solved prior to finding them in the field. This process saves both time and money, but it must be remembered that the team was brought in at 90% so only a limited amount of value engineering could be done.

The actual project delivery method for this project was CM at risk with guaranteed maximum price. This should technically be called a GC at risk with a GMP, since Davis self performs work. In a CM at risk with a GMP, the CM (Davis) holds the subcontracts and assumes risk for cost overruns. Davis also works in a partnership with the owner and the architect in this delivery system, and allows for the owner to have an early maximum price for the project.

The Davis team that was assigned to Memorial Vista put the owner and their satisfaction first in the hopes of continuing the work with the future client. Safety was always the first thought on the job site, where numerous tool box talks and safety meetings were held weekly. The team seen in the side show performs the task of being the general contractor for this site and ensures the schedule and the cost is on track for completion.

The original site had an extremely complex existing utilities web below ground. This is due to the location in northern Virginia. The project schedule was designed to work around the conflicts in the existing utilities and their relocation to allow for Memorial Vista to be put in place.

When the project began in the demolition phase, the first step was to check the old industrial warehouses for asbestos. Upon finding it in some locations, the Davis team then called in an asbestos abatement team to remove the toxin before the demolition could commence. Since Davis accounted for the asbestos abatement in both the schedule and in the estimate, no real large problems were encountered in the demolition phase.

During the excavation phase, Davis used permanent soldier piles were used with wood lagging. Wood walers were used in two locations of the building, those being the level one and two of the underground parking garage in the south wing. These walers are structural elements which are attached to the top of the soldier piles for stability and support. The owner also requested that the entire site be excavated to the lowest excavation to ensure there were no contaminated soils. After finding none, the soil would then have to be replaced anywhere where the foundation was not going. To prevent ponding in the bottom of the excavation pits, pumps were used to remove any water.

Once under construction, the focus was on the concrete core of the building in both the superstructure and substructure. The slabs were primarily flat plate slabs with drop panels as the columns and were laced with rebar. Upon the pouring of the concrete for the actual slabs, one of the two tower cranes on site hoisted a bucket of concrete to the proper location. The forms for the decks were made through the use of Peri SKYDECK panels that easily allowed for quick and safe installation of formwork. After the concrete cured as per the request of the specs and structural engineer, the drophead is released with a hammer blow which causes the formwork (panels and beams) to drop 60 millimeters. In both the Lobby and Multipurpose Room, the structural engineer called for post tensioning to take place to allow the slabs to span large distances with minimal support from below. This post tensioning added to the concretes strength in tension and allowed the slab to be able to handle its load that it will receive in the future.

As the structure was being crated, anchors and bolts were formed into the slabs as they were being poured to allow the façade of curtain walls, precast panels, and metal panels to be directly fastened to the structure. Within the façade, there are seven different types of curtain wall, those including both point supported glass and curtain wall with aluminum trim. Precast panels border parts of the curtain wall on the structure and are connected to the structural of the building through the use of shims to get the panel in place and then welded or bolted to the predetermined anchors. Metal panels also accompany the structure and are also welded and or bolted directly to the structure. Once this façade was completed, the building was considered water tight.

Within the building is the mechanical system that is comprised of two air handling units on every floor of the building (one being in each wing) and VAV’s that are supplied by the air handling units. On the roof of the structure are two chillers, two cooling towers, a heat exchanger, three chilled water pumps, and three condenser water pumps. This means that the

buildings system is a water to air system with two closed loops. One of the loops in the mechanical system is condenser water with the cooling tower, and the other loop being the chilled water circulation to the air handling units on every floor. The pumps are used to circulate the liquid in the loops, and the heat exchanger transfers heat energy from the condenser water to the chilled water in a recycling fashion. The chiller is also used in the transmission on heat to get the water to the desired temperature that the air handling units are calling for.

Along with the mechanical system is the fire suppression system. This is primarily wet standpipes with CPCV piping running to each sprinkler head on every floor. These wet standpipes are on every level of the building including the penthouse level, equipment rooms, elevator equipment rooms, and electrical rooms. Once the glass filament in the sprinkler head shatters due to heat, and the smoke alarms have detected the presence of smoke, the water rushes out of the pipes to attempt to put out the fire. In places where the space is not heated, such as the garage, a dry standpipe is used, where it is filled with compressed air until a sprinkler goes off and water is rushed through the system. These unheated spaces have dry stand pipes filled with compressed air to prevent the freezing of water within them in extreme temperatures.

The electrical system in this building is fed from three transformers at 3750 kVA that run to 3 switchboards at 4000 A on the first floor of the Parking Garage. Bus-ways then runs the feeders up to each floor where they meet the panel boards. There are then two panel boards per floor (one in each wing of the building). In the case of an emergency, there is a 2500 A emergency distribution panel that is accessed through the use of automatic transfer switches. For the short amount of time the systems are down, batteries are used until the diesel generator kicks in. Here, the generator powers the 2500 A emergency distribution panel that supplies the fire pump, life safety loads, and 2500 amps for standby loads.

Davis performed an original estimate that came up with the construction cost of the building to be $63 million with an average cost of $110 / S.F. After my calculations using R.S. Means, I found the building cost to be $46.1 million and $81 / S.F. This cost breakdown can be seen on the project cost evaluation slide within the report. My estimate was significantly lower due to the fact of the complexity of this building. Memorial Vista is simply being constructed as a core and shell building, but the security and telecommunications within are one of a kind. The owner has strict requirements regarding blast-proof wall and security for the building, along with the request of 14 total elevators in just over a 300,000 square foot building. These demands are unlike the average needs for an office building in northern Virginia.

Although the space is irregular in the demands that the owner requested, Davis was able to make a fairly accurate schedule. The schedule itself was designed to begin the construction process in mid-April of 2011 and have a set completion date in mid-October 2013. The schedule is broken up into the north and south wing to allow for linear scheduling to take place for the subcontractors. This will allow for continuous work and increased productivity. As of now, Davis on track of its completion date and remain under budget, proving to complete the project in a successful fashion. The next step with Memorial Vista is to perform the interior fit out and bid out the work to be completed for the 500+ employees of the aviation firm to occupy and call the space home.