

JULIE DAVIS
STRUCTURAL OPTION
DECEMBER 14, 2007

CITY VISTA
WASHINGTON D.C
ADVISOR: DR. MEMARI

EXECUTIVE SUMMARY



City Vista is a three building mixed used complex in downtown Washington D.C. Building 2 is strictly residential and contains 149 condos along with a community room, library, steel frame pedestrian bridge, and outdoor patio. This 11 story 324,298 square feet building reaches a height of 114'-0". City Vista was designed by world renowned architects Torti Gallas and Partners. The design uses strong vertical and horizontal elements. Building 2 skyline is a powerful horizontal statement though the use of a roof overhangs. This horizontal element is counteracted with protruding glass and crème colored brick vertical components throughout the building's façade. During design *The District of Columbia Building Code* was used in conjunction with the IBC, ASCE 7-05 and ACI.

The building is a flat plate post tension system with (4) shear walls for lateral support. A grid of (52) cast in place piles support the 7 1/2" PT slabs. The deep foundation system consist of over 250 16" Diam. augured cast in place piles drilled to a depth of 60-65'. The ground floor is a 4" slab on grade. Post Tension tendons are unbounded in one direction and uniform in the other.

City Vista's is heavily dictated by the 130'-0" height restriction in downtown Washington D.C., Including the pent house Building 2 is 128'-6" tall a little shy of the governing 130'.

In this report I will proposal a resign of the current structural system. Instead of the current cast in place system, I suggest a precast system of hollow core planks, inverted t-beams, columns, and shear walls. This system will meet height requirements without losing any rentable space. A precast system also presents the possibility of a LEEDS certification, faster construction, and a reduction in cost.

Changing the current structural system will present architectural challenges regarding the current floor plan. Corridors may need relocation, and apartment layouts may need alterations. An architectural study will be done with the new column grid to verify all codes are met for egress and flow is sufficient. An in-depth life cycle assessment will also be conducted for each system to highlight the benefits of a precast system.

The following report outlines my plan of action and timeline to accomplish the redesign and analysis of City Vista Building 2.

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BREADTH

LEED Certification:

Changing City Vista from a cast in place system to a precast system allows the possibility of LEED certification. When approached correctly a precast system is able to acquire 23 of the 26 points required for LEED certification. Since all structural elements are cast in a factory waste, production pollution and concrete content can be closely monitored. A life cycle assessment will be performed for the proposed precast system and cast in place system. This will be accomplished through the use of MC2 and primavera software, research, and input from precast companies and concrete contractors. A comparison of cost, reuse, recyclability, reduction of materials, schedule, and LEED points will be formulated.

Architectural Alterations:

City Vista's current layout is conducive for a post tension system. The columns grid does is not a square grid, which is needed for the precast system. Column alterations will be made resulting in the creation of architectural issues. After the precast system is designed an architectural study will be done to verify that all code are met and that flow through the building is sufficient.