CALVIN G. DOUGLASS, LEED® AP

BUILDING STATISTICS – PART I

General Building Data:

Building Name: Cougar Upper Elementary School
Location and Site: Manassas Park, Virginia
Building Occupant Name: Manassas Park City Schools; Manassas Park Students Grades K-5
Occupancy Type: Institutional
Size: 132,500 square feet
Number of stories above grade: 3
Primary Project team:

Owner: Manassas Park City Schools	<http://www.mpark.net>
Architect: VMDO Architects	<http://www.vmdo.com>
Contractor: Hess Construction + Engineering Services	<http://www.hessconstruction.com>
Commissioning Authority: Sebesta Blomberg and Associates	<http://www.sebesta.com>
Civil Engineering: Bowman Consulting	<http://www.bowmanconsulting.com>
Structural Engineer: Fox & Associates	<http://www.foxengineers.com>
MEP Engineer: 2rw Consulting Engineers	<http://www.2rw.com>
Foodservice Consultant: EIS Incorporated	<http://www.eisinc.crbp.net>

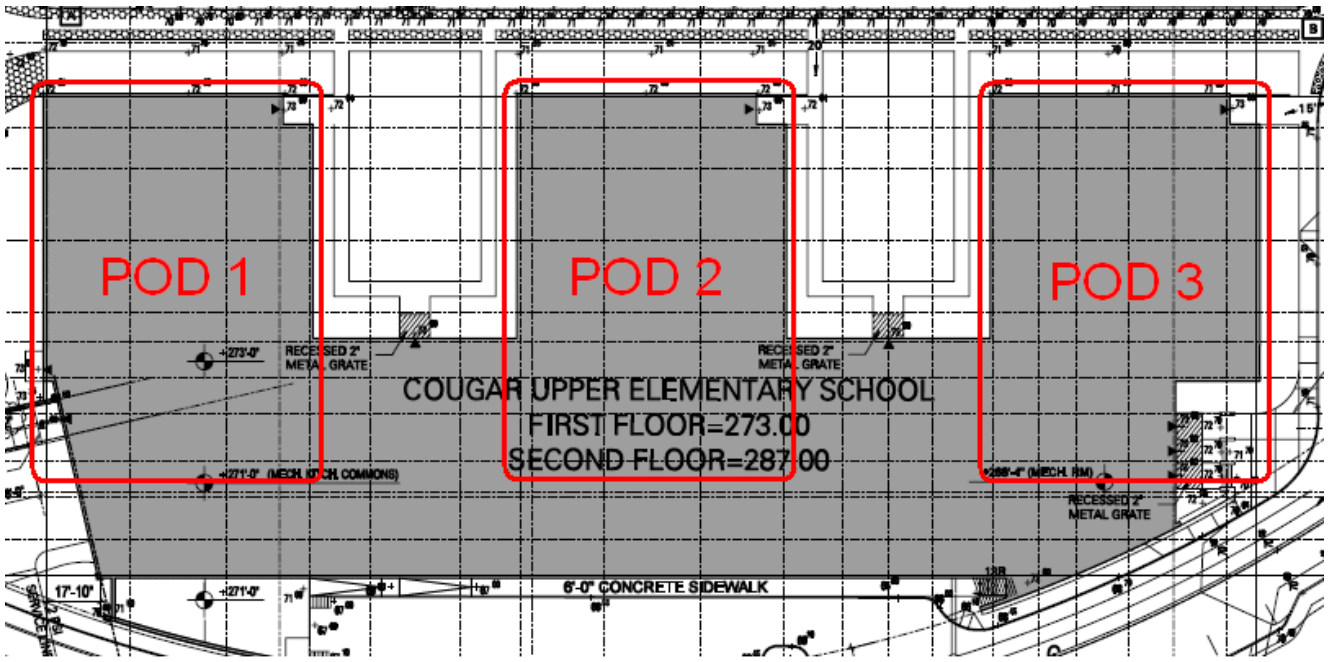
Project Timeline:
- Proposal: October 2006
- Substantial Completion: March 2009

Overall Project Cost: $33 Million
Project Delivery Method: Design-Bid-Build

ARCHITECTURE:

Cougar Upper Elementary School was designed to achieve an educationally productive and environmentally friendly space to enrich the lives of school children in grades three through five. The architecture of this building is focused on sustainability and constructability; it takes simple cubes and through extrusions and indentations creates visually pleasing forms that interact with humans and nature to achieve an aesthetically satisfying design.

The regularity of the window systems is pleasing to the eye from both the interior and exterior of the building. This regularity really defines this building as a working and learning environment rather than a play place. The experience of walking up on the building is very satisfying, especially to the environmentally savvy architectural or engineering professional. Sustainable features become immediately evident as one approaches the building, and the rather quaint looking school opens up greatly upon entrance.



The building is broken up into three "pods" (see picture above), used to help organize the students and to allow for views from each classroom. Classrooms are numbered using the following convention: Pod, Floor, Class. This unified naming convention will help keep students oriented and on track when navigating within the building.

CODES:

Authority Having Jurisdiction: City of Manassas Park
Applicable Building Codes:
The 2003 Edition of the Virginia Uniform Statewide Building Code (VUSBC)
2003 International Building Code
2003 International Mechanical Code
2003 International Electrical Code
2003 International Plumbing Code
2003 Energy Conservation Code
Accessibility Standards: 2004 Americans with Disabilities Accessibility Guidelines (ADAAG)
(Excluding the architectural barriers ACT (ABA) scoping requirements)
Fire Suppression Fully Sprinklered per NFPA 13

ZONING:

Construction Classification: II B (with Modifications)
Building Occupancy Use Group: E - Education; B – Business (Mixed Occupancy with Non-Separated Uses)
Allowable Height (adjusted): 3 stories / 75'-0" (excluding penthouse)
Adjusted Allowable Area per Floor:

First Floor:	52,691 gsf
Second Floor:	52,691 gsf
Third Floor:	52,691 gsf
Total Building:	158,073 gsf

HISTORICAL REQUIREMENTS:

Not Applicable

BUILDING ENCLOSURE:

Building Façades: The building has varying façades according to the functionality of the enclosed space. The gym and cafeteria regions of the building are enclosed primarily with concrete masonry units. The pods are enclosed primarily with brick, but have regularly laid out fenestrations where insulated windows are installed. A portion of these windows are operable, with a maximum opening area not to exceed a safe and acceptable width. More on these operable windows can be seen in the sustainability features section of this report. A relatively small portion of the buildings façade is made up of storefront/curtain wall systems.

Roofing: The center of the pods has penthouse space that is covered in angled metal roofing panels. These metal panels direct rainwater onto the thermoplastic membrane roofing material, which covers most of the roof area of the building. This roofing directs water into regularly spaced roof drains, which collect rainwater and send it towards a storage tank/filtration medium. More on rainwater collection in the sustainability features section of this report.

SUSTAINABILITY FEATURES:

Cougar Upper Elementary School showcases several design features that truly classify the building as a green school. These features include a heavy focus on daylighting, with tubular daylighting devices and clearstories evident throughout the building. To help the daylight penetrate deep into the classrooms, the ceilings are taller near the windows then they are at the opposite side of the rooms, and they are painted white to reflect the natural light around in the space. In the event that natural daylight levels are insufficient for a productive learning environment, the high-efficiency fluorescent fixtures automatically supplement the lighting levels of the room via occupancy sensors and photocells.

Another defining sustainable trait of this building is the geothermal heating and cooling system. This system consists of 200 wells each approximately 350’ deep. Another well field consisting of 21 wells was also built to serve the adjacent pre-K school. Cougar Upper Elementary School also takes advantage of vegetated roofing, and a very large rainwater harvesting system. This system included a concrete cistern and pumping station designed to capture all of the rainwater runoff for all rainfall events up to and including the ten-year rainfall. This water goes through a treatment process, and then is used for dish washing, site irrigation, water closet flushing, mechanical system use, etc.

Cougar Upper Elementary School also employs what is being called a “green-light system”. Local weather data is automatically analyzed, and when it is economically and environmentally sensible to shut down the mechanical system in favor of opening the windows, a green light in the center of each pod turns on. There are nine of these green lights total, one on each floor in the center of each pod. If operated correctly, this could greatly benefit the students and teachers of the school; increasing the percentage of outdoor air supplied to a space has been known to increase productivity and academic performance.

BUILDING STATISTICS – PART II

ELECTRICAL:

The building electrical service enters a 3000A switchgear, and is then run through 2 separate 225kVA transformers. From these transformers, the electricity goes to lighting and receptacle loads, as well as specialty loads including harmonic computer loads and copy machines. Manassas Park Elementary School also takes advantage of a 35 kW standby generator with 125A 3 pole 120/208V 3 phase power.

LIGHTING:

The lighting systems in Manassas Park Elementary School consist mostly of pendant type dual lamp dimmable 32 Watt T-8 fixtures connected to both photocells and occupancy sensors. The occupancy sensors turn the lights off after no motion is detected for 10 minutes; however, occupants have the ability to manually shut the lights off at their discretion. The photocells allow the pendant fixtures to provide no more than the required amount of light to each space. When a large amount of natural light pours into the building from its many windows, artificial lights are automatically dimmed to provide the appropriate amount of light to each space.

In both the gym and the library, the school utilizes light tunnels with motorized dimming controls available to the occupants. These light tunnels provide bright, natural light to students and teachers alike, and can be easily dimmed via zone switches located by the main entrances of both the library and the gym. When the light from these tunnels is insufficient, the gym and library are brightened by halogen and fluorescent lamps, respectively.

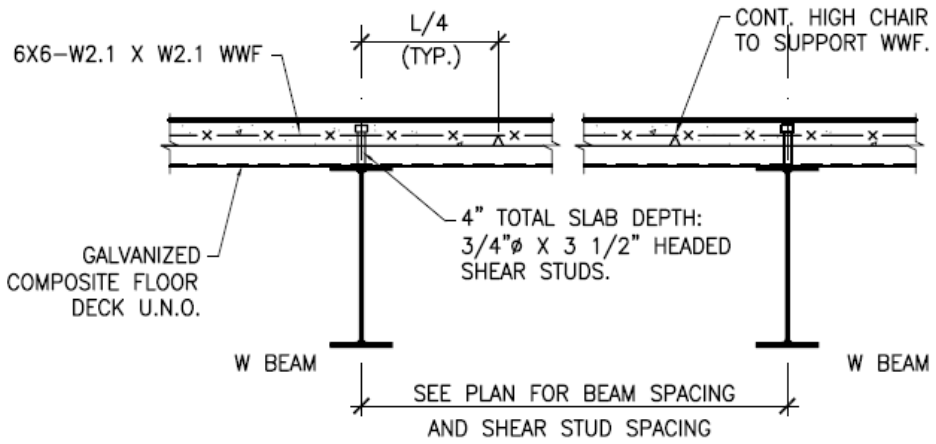
MECHANICAL:

The school's main air distribution is controlled via 5 outside air units, a makeup unit, and 2 energy recovery ventilators. Heating and cooling is provided by many distributed ground source heat pumps, connected to a series of 200 geothermal wells. The closed loop system is powered by two pumps in lead/lag configuration, rotated weekly. These pumps are modulated by a variable frequency drive which is controlled down to its minimum speed (as dictated by the systems differential pressure) to minimize energy consumption. The school does not use any boilers or chillers (as a conventional building does), but does have connections to natural gas to fire furnaces for use with domestic hot water.

STRUCTURE:

Manassas Park Elementary School takes advantage of time tested technologies to provide an economical and safe means of total building structure. The footings, foundation walls, and slab on grade are all cast-in-place concrete with self-expanding trapezoidal strip sodium bentonite waterstops. This cast-in-place concrete is made up of ASTM C150 type 1 Portland Cement supplemented by ASTM C 615 Class C fly ash and Grade 120 ASTM C 989 ground granulated blast-furnace slag. The concrete is reinforced by ASTM A615 grade 60 deformed reinforcement bars over ASTM A185 welded steel wire fabric.

The elevated portion of the structure consists of 4" slabs of normal weight concrete on 28 gage galvanized composite deck supported by a system of beams and joists. These slabs are held up by steel columns of varying dimensions, normally spaced on a 33' by 22' grid. The concrete used for the slab on deck is formulated of lightweight aggregates, ASTM C 260 air-entraining admixture and ASTM C 494/C 494M Type A water-reducing admixture. Other additions to the ASTM C 150 type 3 Portland Cement include fly ash, metakaolin, silica fume and ground granulated blast-furnace slag.



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TYPICAL COMPOSITE SLAB SECTION