

ENTRY FORM



DVASE 2010 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

| | | | |
|-----------------------------|---|------------------------------|--|
| New Building under \$30M | | Other Structures Under \$10M | |
| New Building over \$100M | | Other Structures Over \$10M | |
| New Building \$30M - \$100M | X | | |

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|--|--|
| Approximate construction cost of facility submitted: | \$75 Million |
| Entry Fee: | FREE |
| Name of Project: | Cornell University – West Campus Residential Initiative – Phase IV |
| Location of Project: | Ithaca, New York |
| Date construction was completed (M/Y): | August 2008 |
| Structural Design Firm: | CVM Engineers |
| Affiliation: | All entries must be submitted by DVASE member firms or members. |
| Architect: | Kieran Timberlake Associates |
| General Contractor: | Welliver McGuire, Inc. |

Company Logo (insert .jpg in box below)



Provide a concise project description in the following box (one page maximum). Include the significant aspects of the project and their relationship to the judging criteria.

The West Campus Residential Initiative - Phase IV was a 220,000 SF project consisting of two 5 story and one 6 story precast residential bars for student housing and two 2 story steel-framed dining pavilions serving the residential bars. The three residential bars are precast plank clear spanning to precast bearing walls clad in brick with steel framing for the gabled roof. The foundations utilize spread footings bearing on rock with rock anchors to stabilize the required rock cuts and to resist uplift on the transverse shear walls. The two dining pavilions are steel framed utilizing semi-rigid and full moment connections respectively. The dining pavilions are clad with a combination of curtain wall and brick.

The main issue confronting the design team was determining the type of foundations required to support the precast plank and bearing wall residential bars. The existing bedrock sloped from east to west with a differential as much as 35'-0". CVM worked closely with the Geotechnical Engineers and the rock contour plans to establish where rock would need to be cut (due to the required program) and where rock would be low. In determining these areas, CVM was able to present to the contractor and geotechnical engineer areas where spread footing bearing on bedrock could be used and areas where rock was expected to be much lower than the bearing elevation. A deep foundation solution (Cassions) and the use of lean concrete fill were both discussed for the areas with low rock. Based off of CVM's presentation during the early design phase, the Contractor determined that the use of lean concrete fill would be more economical than mobilizing for a deep foundation system. In the end, the amount of lean concrete that was required compared to what was estimated on the construction documents only varied by a few cubic yards.

The other main foundation issue was on the west end of two of the residential bars where the existing grade dropped 20 feet over a 30 foot span. Due to the large loads from the precast structure, the existing rock was benched and tied back with a series of vertical and diagonal rock anchors to stabilize the rock to support the new foundation loads. Rock anchors were also used to resist the overturning moment in the transverse shear walls in all three of the precast residential bar buildings.

The residential bar buildings utilized 12" thick hollow-core precast prestressed concrete plank with a 2" non-composite topping, spanning 40'-0" from exterior bearing wall to exterior bearing wall which gave ultimate flexibility of the program layout. To add to the complexity, the exterior bearing walls had a random window opening pattern which required the use of internal beams and columns in the 8" thick precast wall panels. Several large openings were required at the connection to the dining pavilions, in which upturned precast wall/beams were used.

Due to Zoning Restrictions, a large exterior reinforced cast in place concrete terrace was created on the west end of two of the precast residential bars. The terrace allowed for the 5 story building to be constructed while also handling the steep existing slope in the grade at the west end of the site.

The two dining pavilions which are separated from the residential bars by a 2" expansion joint are both steel framed. Both dining pavilions support a partial plaza which required the steel structure to be lowered and resulted in intricate detailing. Long span beams and cantilevers are used throughout both pavilions. Due to floor to floor height restrictions, careful coordination occurred between the design team to incorporate multiple beam penetrations in most of the girders and beams. One of the dining pavilion roof slopes and supports a 6" lightweight mix green roof.

Please attach your photos as previously described in the call for entries document and insert captions for the photos in the following boxes.

Photo 1:



Residential Bars at Stewart Avenue

Photo 2:



Dining Pavilion – Brick clad piers with curtain wall façade.

Photo 3:



Residential Bars – View of the Terrace at the west end.

Photo 4:



Residential Bar – View at stair tower

Photo 5:



Residential Bar – View showing steel framed gabled roof on top of precast plank and bearing wall building.

By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record:

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Submitted by:

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| <p>Print name: Jeff Pitchford</p> | <p>Signature: </p> | <p>Date: 4-14-10</p> |
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| Submitting Firm: | CVM Engineers | |
| Mailing address: | 400 Cresson Blvd. Suite 300 P.O. Box 398 Oaks, PA 19456 | |
| Telephone: 610-989-3800 | Fax: 610-989-3677 | Email: jcp@cvmengineers.com |