

Project Delivery Evaluation

Executive Summary

Timely information became an issue with this submittal due to the stage in which the project is currently in and how it is being delivered. I hope to have clearly noted where pieces of information were not explicitly obtained. Working without specifications and a completed GMP contract made first-hand contacts my primary source for this submittal. That being said, I think it has given me the opportunity to see how a fast-tracked project can be delivered through being flexible with contracts. It has also shown me how important it is to choose a reliable and trustworthy construction manager for a project delivered in such a method.

I have also been able to identify a couple of areas that I want to look at in more detail. I feel MEP design and construction coordination as well as an alternative to the mechanical system will be interesting for this thesis project.

Contracts

Since Eastview's project delivery is fast-tracked, there is not a formal signed Guaranteed Maximum Price contract between Penn State and Turner Construction Company at the moment. This will be negotiated upon 100% completion of contract documents, which is scheduled for the end of October 2002. Turner will deliver the GMP as a Construction Manager at Risk, meaning they will hold all contracts with subcontractors under the GMP. The bid packages will be released in three separate phases. The first phase being the site work and underground utilities, which has already begun but *is not* included in the GMP. The second includes everything within the scope of the actual buildings and *is* part of the GMP. However, both foundations and structural steel have been removed from the GMP in order to stay within schedule by releasing these two bid sets early. This was a decision made between Penn State and Turner after construction delays earlier in the project. The last phase will also be part of the GMP and will include final grading, landscaping, sidewalks, and parking lots. The GMP will not include an incentive clause but will include liquidated damages. Owner controlled insurance policies or OCIP will be provided through Penn State and will include workers compensation and general liability insurance. Turner will require the building envelop subcontractor and any sub with a contract over \$100,000 to provide a performance bond under dual oblige to Turner and Penn State. Since a final written contract has not been completed at this point I do not know whether or not Penn State will require a payment bond from Turner Construction.

Contractor Selection

With Eastview Terrace Housing being a fast-tracked project under a GMP contract, contractor selection becomes very important. Project quality and scope can be sacrificed due to the GMP and a shortened schedule. As it is, Penn State and its Office of the Physical Plant are very experienced owners when it comes to building construction. However, managing a \$70 million contract involving seven buildings and extensive site utilities is something the OPP does not have the expertise or resources to handle. Yet the capacity to be involved in every phase of the project from design to completion and the ability to have a close watch over the construction are within reason.

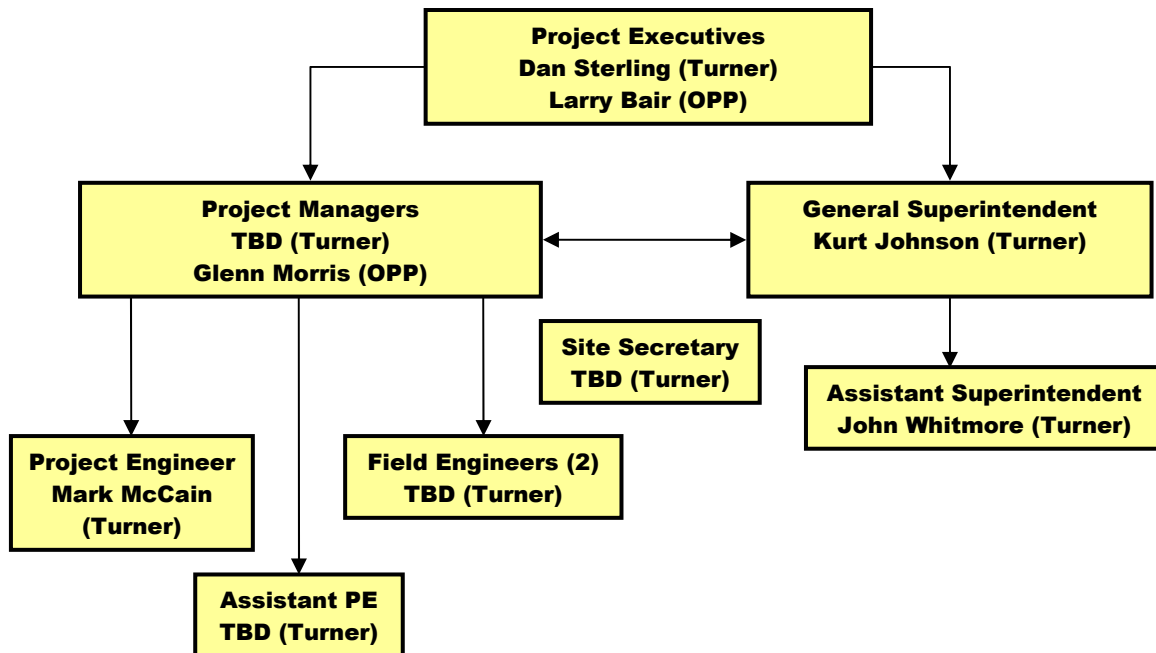
Therefore, Penn State chose a construction manager delivery for Eastview as it does for most of its projects. OPP produced a shortlist of three construction managers who have had previous experience with work on campus and invited them to interview. Turner Construction was picked on the merits of project team selection and prior work experience. Turner completed the Hetzel Union Building, a large student union building, in 1999 and is currently working on the new Information Systems Technology (IST) building on west campus.

Staffing Plan

I have made a flowchart below of the anticipated staffing plan by Turner Construction on the Eastview Terrace project. The unique thing about working with an experienced owner such as Penn State is that they have the ability to have close dealings with the construction process through its own Office of the Physical Plant. This means they have a project manager/executive and an onsite project manager representative for each project. I have shown this relationship in the staffing flowchart.

The project executive for Turner will spend approximately 50% of his time on Eastview during preconstruction work and about 15-20%, depending on other project demands, once actual work commences. Turner will then bring on a construction team consisting of a project manager, a general and assistant superintendent, a project and assistant engineer, and two field engineers. The two superintendents will be the first to arrive on site followed by the project and field engineers along with the project manager. The superintendents will then be the first to move to another project followed by project and field engineers. The project manager will stay for the remainder of the construction to ensure adequate and complete delivery of the project. The site secretary will be on site for the whole duration of the project.

Eastview Terrace Housing - Construction Staffing Plan



Design Coordination

Design coordination on Eastview is a major concern considering the tremendous amount of mechanical, electrical, and plumbing work involved in building seven dormitory buildings. At Eastview Terrace Housing students will have the luxury of individual bathrooms as well as two laundry facilities on every floor. Also, each room will have locally controlled fan coil units attached to central plants for both heating and cooling. This in effect equates to building seven four-story hotels without using unitary fan coil units in each room. Even with these being part of a two-pipe system, there will be an extraordinary amount of pipe running through these buildings on top of all the fresh air ductwork, condensate return lines, electrical conduit, and plumbing piping required. The assistant superintendent, Jon Witmore, assumes to spend the majority of his time keeping track of this process. Weekly coordination meetings with Jon will be required between electrical, mechanical, and plumbing contractors to identify possible

field conflicts and establish a workflow pattern for construction. Jon did not know at the time I talked with him whether 3-dimensional drawing will be required by contract from Penn State but feels that it is a viable option with such extensive coordination needed. I will assume all applicable inspections and testing required under BOCA 1996 by local building code officials are required under contract, however, without a written contract by Penn State I was unable to determine additional commissioning procedures required by Penn State.

Project Controls

Project controls for cost and quality are joined together through the use of Prolog Manager software and Turner developed TurnerNet. All submittals, work reports, budget reports, RFIs, and punch lists are tracked using an internet-based application, integrated with Prolog software, that keeps a record of report for every project. This process saves time, creates a systematic organization tool, and reduces the use of actual “paperwork” for each project. Everything can be referenced electronically from an internet-enabled personal computer anywhere.

The schedule can also be tracked through the above method, and probably will to a limited amount at the regional office in Pittsburgh. However, the superintendent will use SureTrak Project Manger to effectively manage daily activities onsite. Schedules go through a complete review every two weeks or a needed to foresee potential problems and conflicts.

To control safety on site every subcontractor will be required to submit MSDS sheets and a complete company safety manual prior to performing work on site. There will also be mandatory weekly “toolbox” meetings by the superintendents to discuss safety and proper use of tools. Turner Construction also calls for six-foot fall protection and full-length pants on all jobsites to ensure complete worker safety.

Building Systems Analysis

Structure

The structural system consists of strip/column footings supporting a four-story structural steel frame. Each level will be composite metal decking and then topped by a sloped fiberglass shingle roofing system. The major advantage of using steel on this project is its availability in the area. Ninety percent of new building construction in the State College area consists of structural steel. Another advantage for steel is because of schedule constraints. This is a fast-tracked project and keeping the project within the tight schedule requires a method of quick construction. Lastly, the availability of steel erectors in the area out numbers other concrete and precast erectors.

A cast-in-place concrete structure will strain an already confined schedule. It would be difficult to place concrete during a cold wet central Pennsylvania winter. A precast structure is something to look into more closely. However, longer lead times and limited flexibility within the system could make it a challenge.

Façade

This is a difficult system to try and change. Penn State defined these building as a “gateway” project for the University. They are to mimic the best features of West Halls on the opposite end of campus and have a luxurious appearance. To consider any other system, besides colored face brick, would only work to diminish the character trying to be achieved.

Mechanical

The mechanical system is something I want to look closely at to determine a better alternative. The current system schematic consists of fan coil units for each room connected through a two-pipe system attached to both the central steam plant and a new chilled water facility. Heat recovery ventilation will be centrally supplied to the ceiling mounted FCUs. This option allows individual room control, however creates a great expense in mechanical work. There is a great maze of condensate return piping that must be installed for this system. Also, changeover for the two-pipe system will

make it difficult to control comfort during the fall and spring months, when the majority of students will be utilizing the dorms. This is important to consider for this area since temperatures can fluctuate so much during these months. I want to look into a switching to an all air system with possible variable air volume boxes for each room. This will alleviate the seasonal changeover problems and piping required, but will mean larger duct clearances and the addition of boilers for hot water. It will be a trade off in costs situation and will take some looking into.

Electrical

There was very little I could determine from the 80% completion review of drawings I had on the electrical system. There was actually no riser diagram. I do know there will be six service connections for the complex. The first will serve both 'A' and 'G' buildings and the rest will have individual connections. I will look more at this system once more information becomes available.