



Construction Management

IPD | BIM Thesis Tech I



Summary

- Schedule Narrative
- Building & Construction Systems
- Constructability Issues
- Project Cost Evaluation
- Project Site Logistics
- Project Staffing
- BIM Process Guidelines
- Project Delivery Method
- Client Information



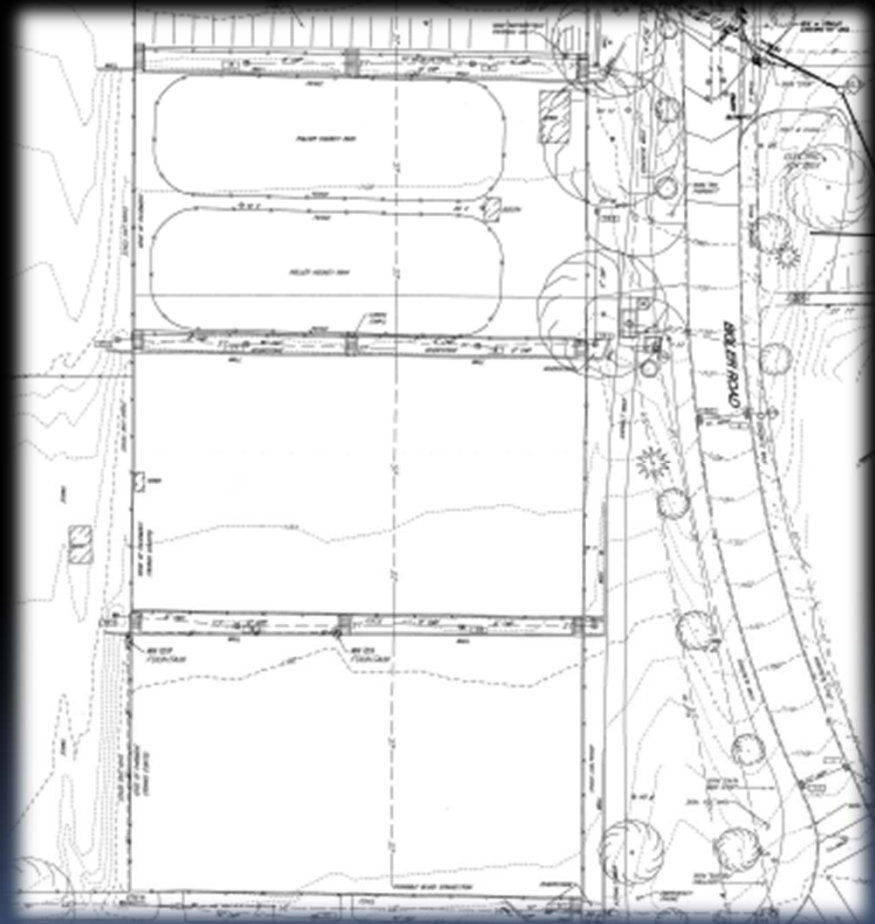
Schedule Narrative

Construction Phase	Duration (Days)	Start	Finish
Foundation/Substructure	270	2-16-09	2-26-10
Superstructure	274	7-7-09	7-23-10
Enclosure	303	11-9-09	1-5-11
Building Systems/Finishes	345	12-14-09	4-8-11
Construction Duration	758	8-12-08	7-7-11

- Preconstruction began March 2008
 - Includes design, bid and award
- Drawing Coordination began May 2009
- Structural Steel Erection began July 2009
 - Top out April 2010
- Commissioning is planned to start in November 2010
- Building turnover is projected for July 2011
 - However, Whiting-Turner still holds that the building will be turned over by June 2011

Building & Construction Systems Demolition

- Existing asphalt reused for parking.
- Water fountains and storage sheds demolished.
- Walkways remain.



Building & Construction Systems

Excavation Support

- H-piles with lagging
- Shotcrete
- Trench boxes



Building & Construction Systems

Mini Pile Foundation

- 785 piles totaling 51,213 LF
- Rotational forces of cantilever
- Piles in tension and compression
- Depths reaching 145'



Building & Construction Systems

Enclosure

- 334 precast panels with brick veneer
- 22' x 12' panels with bearing and lateral connections cast in concrete
- Curtain wall glazing



Constructability Concerns

Logistics

- Existing utilities provided on drawing C1.3
- Steel delivery via Hastings Rd.
- Pedestrian walkway provided

Construction

- Steel and Precast panels standardized where possible
- Cantilever welds require three 8-hour shifts a day
- Deflections monitored at column lines on 5-10 day intervals.

Project Cost Evaluation

Total Cost	Total Cost Per Square Foot
\$215,000,000	\$788/SF

Construction Cost*	Construction Cost Per Square Foot
\$139,176,843	\$510/SF

Building System	Percentage of Project Cost	Cost	Cost Per Square Foot
Structure	17.6%	\$24,559,974	\$90.06/SF
Plumbing	4.8%	\$6,731,107	\$24.68/SF
Fire Protection	1.0%	\$1,362,000	\$4.99/SF
HVAC	18.1%	\$25,159,105	\$92.26/SF
Electrical	8.9%	\$12,313,658	\$45.15/SF

*Construction Cost does not include contingency, general conditions, insurance and fees.

Project Cost Evaluation

Building Type	Cost	Cost Per Square Foot
Office Building	\$47,772,500	\$183.74/SF
Hospital	\$77,436,500	\$224.46/SF
College Laboratory	\$15,325,000	\$144.85/SF
The New York Times Building*	\$1 billion	\$667.00/SF
The New Dickinson School of Law – Katz Building*	\$60,000,000	\$530.97/SF
Life Sciences Building*	\$37,790,085	\$245.39/SF
Student Health Center*	\$26,000,000	\$406.25/SF

**These costs are based on student work and evaluations. References can be found in Appendix B.*

Project Site Logistics



- Surrounding Buildings.
- Site originally occupied by two roller hockey rinks, tennis courts, and intramural fields.
- Pedestrian and vehicular safety concerns.

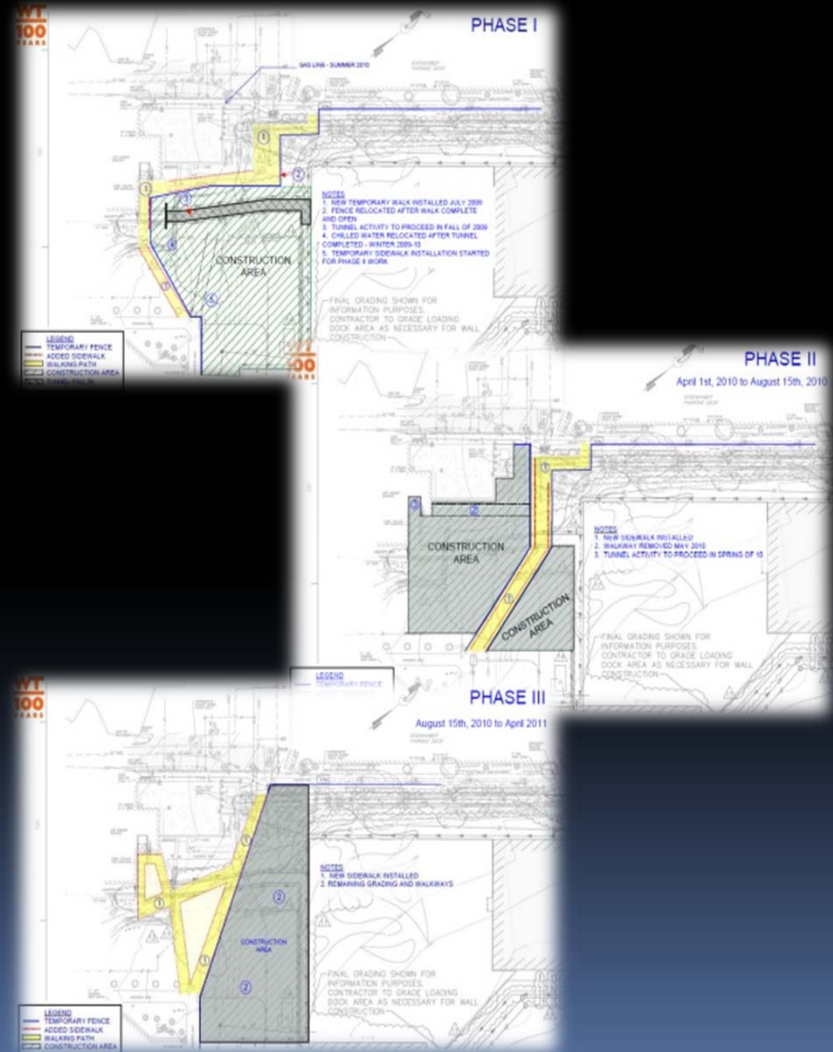
Project Site Logistics

- **Site Utilities**
- What is available:
 - Sanitary Sewer
 - Compressed Air
 - Steam
 - Electrical
- Located along the North side of the project along the Eisenhower Parking Deck.



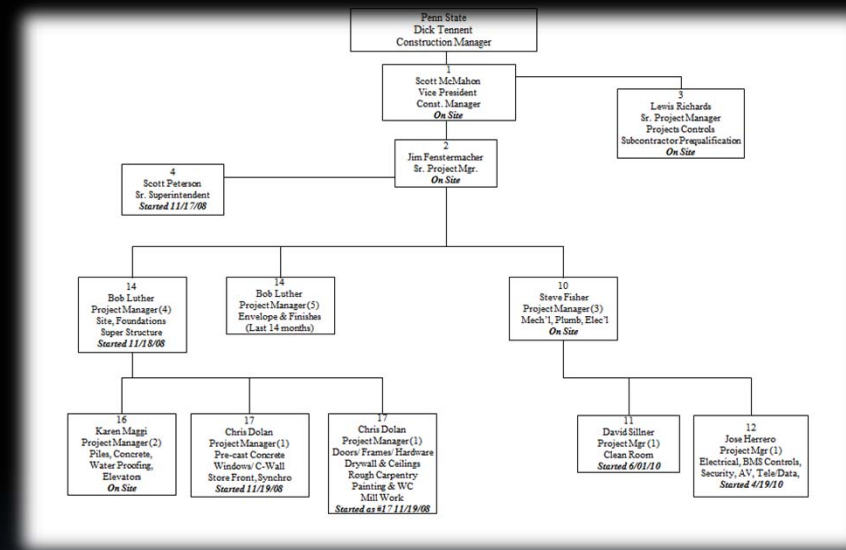
Project Site Logistics

- Tunnel Phasing
- Life Sciences I to Life Sciences wing of MSC.
- Major paths of travel for students had to be blocked in order to proceed with this work.
- Limit the impact on the direct paths of travel for students.



Project Staffing

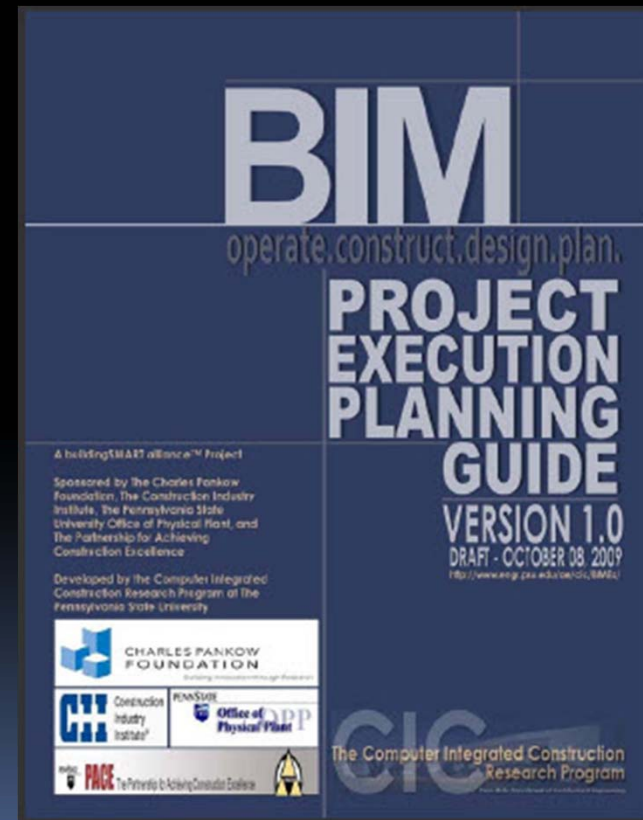
- Owner Representative
 - Dick Tennant
- Whiting-Turner
 - Two Sr. Project Managers
 - Four Project Managers
 - Sr. Superintendent
 - Two Superintendents
 - Five Project Engineers
 - PSU AE Faithful Interns



BIM Process Guidelines

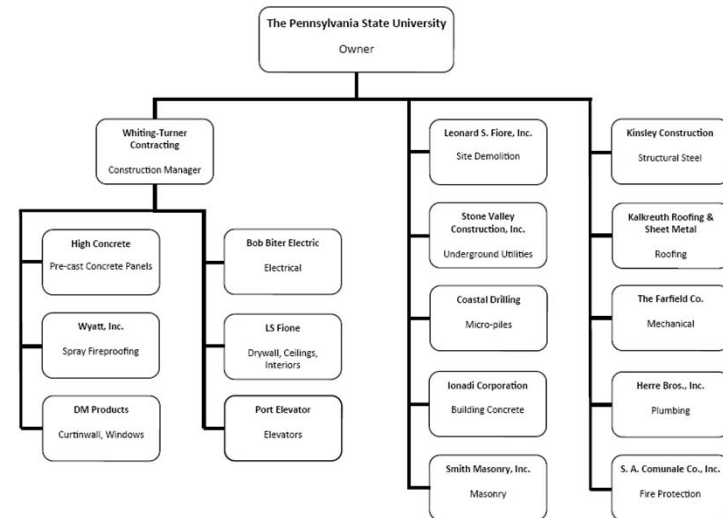
Whiting-Turner

- Coordination is the key!
- WT is combining all of the subcontractor generated models into the master file.
- WT demanded that models be built with compatibility for Revit and Navisworks.
- Other demands.



Project Delivery Method

- Design-Bid-Build
 - DGS Funded Construction
 - CM "Agency"
- Design-Build
 - Clean Rooms
 - Evaluation process based on quality and needs before cost



Client Information



- The Pennsylvania State University
 - Office of Physical Plant
- The Vision
 - Bring Chemistry, Engineering, Biology, Physics, & Medicine to one facility.
 - High expectations for now and the future.
 - Major benefit to research and education.



Questions?

