DENNIS V. WALTER JR. | CONSTRUCTION MANAGEMENT

PHASE 2 NEW BUILDING, JOHN TYLER COMMUNITY COLLEGE

TECH ASSIGNMENT #2

Thesis Advisor: Chris Magent
10/28/2009

Image courtesy of Burt Hill

[Special thanks to the Gilbane Project Team, Burt Hill, and John Tyler Community College]

Phase 2 New Building
John Tyler Community College, Midlothian Campus
Midlothian, VA

PROJECT TEAM:

Owner:

Virginia Community College Systems

CM:

Gilbane

Architect:

Burt Hill

Civil Engineer:

Burgess and Niple

Structural Engineers:

Stroud Pence

MEP Engineers:

H.CYU Engineers

Telecommunications/Audio-Visual/Acoustics Engineers:

Shen Milsom Wilke

Cost Estimating Consultant:

Construction Consultants, Inc.

PROJECT OVERVIEW:

Function: Mixed Use Academic Building

Size: 60,000 SF Total, 61,001 Net SF

Height: 3 Stories

Construction Dates: May 2008 – October 2009

Delivery Method: CM @ Risk w/ GMP Contract

LEED® : Pursuing LEED® Silver Certification

STRUCTURAL SYSTEM:

Foundation: Reinforced concrete shallow spread footings, Below grade perimeter cantilevered concrete foundation walls, 4" ground floor slab-on-grade

Framing: Elevated slabs (4" lightweight 4000psi concrete over 1 1/2" x 20 gauge VLR composite deck) and roof deck (4" normal weight 4000psi concrete over 1 1/2" x 22 gauge type B composite deck) supported by typical W16 floor beams and W10 columns.

Façade: Masonry veneer backed up by a cold formed stud curtainwall, CMU (stair and elevator towers), precast concrete and metal paneling w/ steel stud

Roof: Steel roof decking supported by steel bar joists, beams, and columns

MECHANICAL SYSTEM:

- (4) 12,500 CFM AHU's serving Laboratory, Library, Classroom, and others on North End
- (1) 3,750 CFM AHU serving Office/Admin area on South End
- (4) 80 Ton Modular Chillers
- (1) 675 GPM Cooling Tower
- (2) 170 GPM Multi-Zoned Gas Fired Hot Water Storage Heaters
- (2) 1,200 MBH Hydronic Boilers constructed adjacent to Chilled Water Plant

SUSTAINABLE FEATURES:

- Green roof to filter and absorb rainwater, and reduce heat island effect while insulating the building.
- "Cool" Light Color Roofing to further reduce heat island effect at unplanted areas
- Modular chillers in the mechanical room eliminates the use of oil for the primary cooling equipment in the building
- Recycled content used in building materials such as drywall, fly ash in the concrete, and carpeting
- Natural daylighting sources reduce electrical consumption
- Energy efficient glass and motorized sunshades control solar heat gain, and allow solar shading
- Thermostats in every office to maximize occupants thermal comfort and control

ELECTRICAL SYSTEM:

- 968.2 kW Total Connected Load
- 842.3 kW Total Demand Load
- (1) 150 kW Generator
- 277 V Majority of Lighting System

ARCHITECTURE:

The exterior of the building is a combination of brick, precast concrete accents, metal panels, aluminum windows and an aluminum framed curtain wall complementing existing buildings on the Midlothian Campus. The layout of the building is designed to accommodate the science department, a library, student lounge, bookstore, and multipurpose room. Science labs on the third floor are the driving force for the building shape. The second floor is the primary entrance of the building from the north, and houses the library. The first floor has an entry on the south to accommodate the newly added south parking lot and contains the bookstore, multipurpose room and the student lounge.

Dennis V. Walter Jr. | Construction Management

special thanks to Burt Hill and Gilbane for photos and data

e-Portfolio: http://www.engr.psu.edu/ae/thesis/portfolios/2010/dxw5004/index.html

Contents

Executive Summary

Technical Assignment 2 is a comprehensive report covering Phase 2 New Building at John Tyler Community College's Midlothian Campus. It is located at 800 Charter Colony Parkway, Midlothian, Virginia. The report gives a detailed look at the key features of the project that affect project execution.

This technical assignment analyzes many aspects of the Phase 2 New Building Project Execution. This includes a detailed project schedule, site layout planning, detailed structural systems estimate, a general conditions estimate, and current critical industry issues.

The project schedule and site layout planning are important aspects when building projects are being developed. The detailed project schedule consists of 240 activities which helps understand the sequence of events taking place during the construction process. The project began early in 2008 with a critical date of substantial completion so the building was functional for the first day of classes on August 24, 2009 and final turnover set for October 30, 2009. A large open project site with more-than-sufficient vehicular access allows the site layout planning to be very unrestrictive. The abundance of on-site parking, lay-down areas, and storage area gives contractors better opportunity to succeed and eases the construction process.

This report also consists of the detailed structural system and general conditions estimate. The structural systems estimate, consisting of structural steel, structural cast in place concrete, composite metal decking, and reinforcement results in an estimated cost of $1,362,577 or $22.34/SF. This estimate is somewhat low but reasonably close to the actual costs of construction, but may attribute to take-off error or additional materials and services that were provided in subcontractors' scopes and left out of the structural estimate in this assignment. Also, a general conditions estimate totaling $3,027,302 was performed in this assignment. The general conditions estimate includes a 5% construction manager fee and is approximately 16% of the total contract amount for the project. The estimated total cost/week for general conditions is $47,302.00 during construction.

Finally, after meeting and discussing important topics that are currently creating opportunities within the construction industry with fellow students, faculty and industry members at this year's PACE Roundtable, there are a few interesting topics or issues that could be applied to the Phase 2 New Building. This report will highlight a few of the interesting topics of discussion at the PACE and how they might be of interest to this project.

Detailed Project Schedule

(Actual schedule evaluation is based on a detailed schedule provided by Gilbane. The dates have been slightly altered from the actual occurrences for the convenience of this technical assignment.)

The design for the Phase 2 New Building at John Tyler Community College began late in 2007 through 2008. Gilbane was brought on board early during the design phase to assist with preconstruction services. The preconstruction activities included assisting the A/E and Owner during the design to keep the building within budget. Gilbane provided the estimating and constructability reviews and value analysis. After a design was finished, the project was put out to bid to multiple trade contractors in bid packages and Gilbane was awarded the contract for construction manager. Construction began shortly after mobilization and the Notice to Proceed issued early in 2008. The construction is currently wrapping up and the building has already been occupied for the fall semester at John Tyler Community College. The final completion and handover of the Phase 2 New Building is set for October 30, 2009.

Construction sequencing is broken up by floors and areas of the building. After site clearing and excavation, work on the foundation and superstructure began. This is including all piers, footings, grade beams, below grade foundation walls, and slab on grade. MEP work begins rough-in and placement after excavation is completed and continues through the majority of the construction phase. Once the foundation activities were wrapping up, the structural steel and CMU walls began. Steel was able to be fabricated and delivered while the substructure was still being put into place to allow for a smooth transition of work. The masonry and curtain wall façade followed steel erection until the building was fully enclosed by the envelope and roofing system. The building skin was broken into sections based on column lines and exterior wall systems. Then, interior trades could begin installations starting with the ground level and working up to floor 3. Once the project was wrapping up with furnishings, equipment and fully enclosed, the testing, balancing, and commissioning of the building systems could take place. The building had to be substantially complete to provide the owner with a month of move-in activities before the first day of classes on August 24, 2009.

Please see **Appendix A: Detailed Project Schedule**.

Site Layout Planning

The 117.2 acre site is located west of Charter Colony Parkway within the Midlothian Campus of John Tyler Community College in Chesterfield County, Virginia.

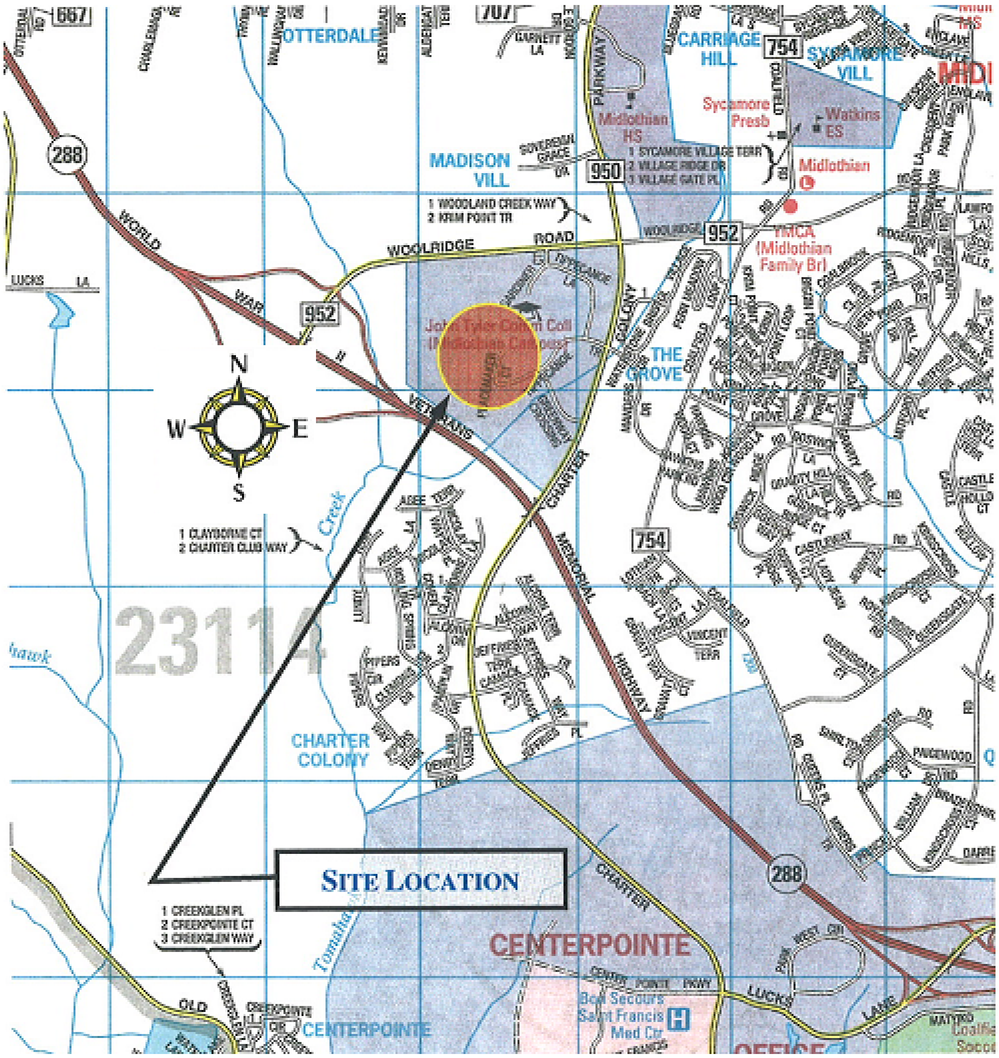


Figure 1, Image extracted from ADC Street Map Book, Chesterfield County, Virginia.

The site includes several existing campus buildings and two small tennis courts directly to the north and east of the building location. The tennis courts will be relocated before construction begins, while the surrounding existing buildings remain open. The relocation of utilities is minimal for this project, because of the presence of existing campus buildings.

Because of the topography of the site and access to existing buildings, the Phase 2 New Building has entrances to the south on the first floor and to the north on the second floor. The existing plaza connecting the two existing buildings to the east will remain, but will be extended to the west to provide access to the new building.

During the Excavation Phase of the project, there was plenty of room on site for storing disturbed earth and moving excavation equipment for relocating soils. As with all stages of construction, the office trailers, storage boxes, and parking spaces are located south of the Phase 2 New Building. The building pad was mainly excavated and stepped back at a 45-degree angle to allow for soil retention and ease of access around the perimeter of the excavation. The large structural retaining wall on the north side of the building on the ground floor level required dead-men and a kicked back excavation for formwork to be built around the wall and supported during the pouring and curing of the concrete.

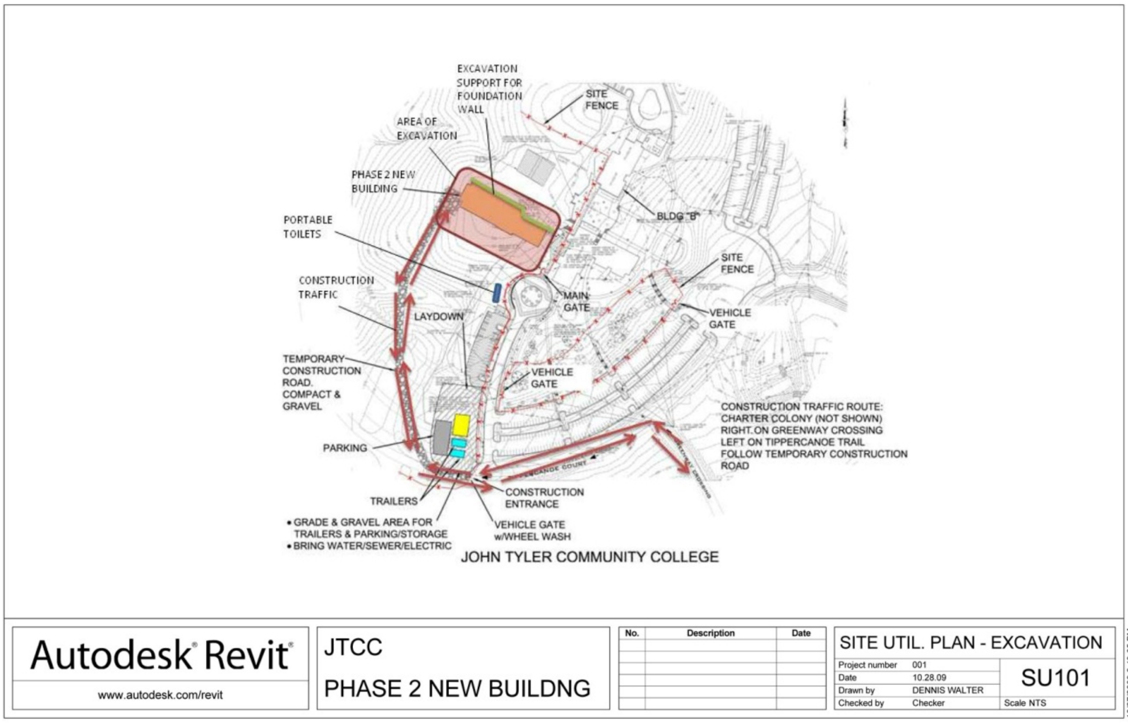


Figure 2, Site Utilization Plan for Excavation Phase

During the superstructure phase, the site layout plan was to utilize the large amount of open area for material lay-down and coordinating the sequencing of materials. The 175 ft lattice booming crane was on site during the steel erection process to pick the pieces from the lay-down sequencing area. The lay-down areas allow for better coordination of materials being installed. Areas to the south of the building were utilized for laying-out steel members, building envelope materials, and on-site material storage.

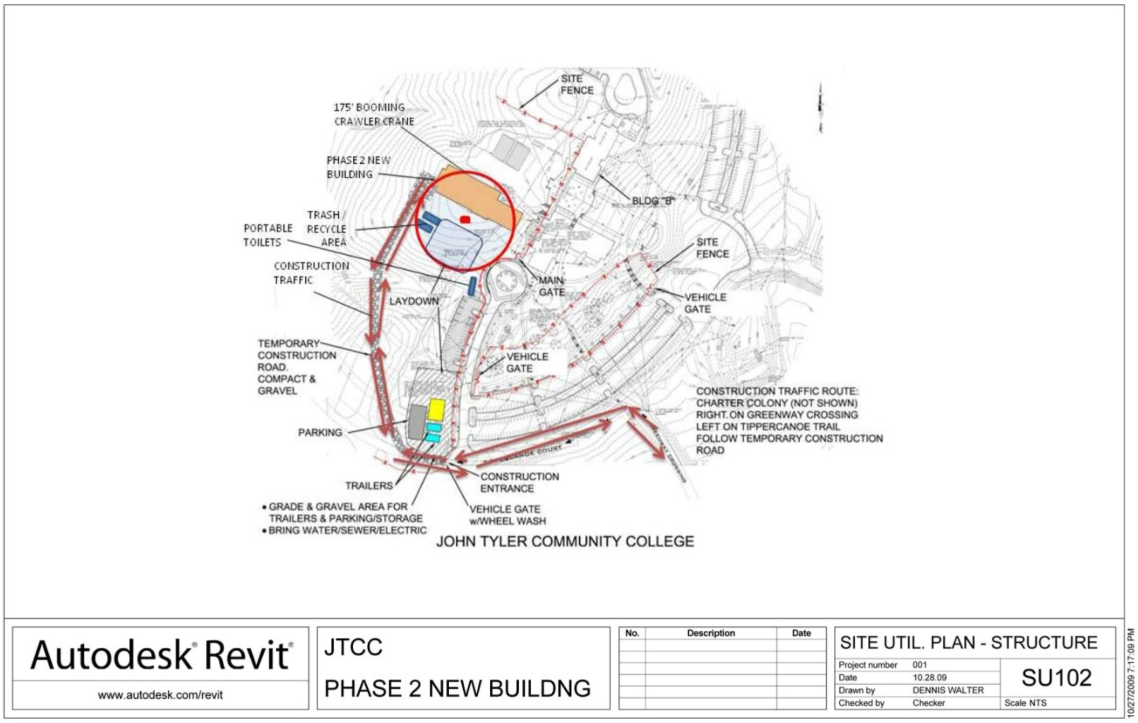


Figure 3, Site Utilization Plan for Structural Erection Phase

Once the superstructure was finished, the final phase of the project site planning was for the building interiors' phase. During this phase, the crane was no longer on site. Materials could enter the building through the loading dock side on the west or through the south opening on the ground level and the north opening on the second level. The materials and equipment that needed access to the roof or upper floor were placed using booming material hoists.

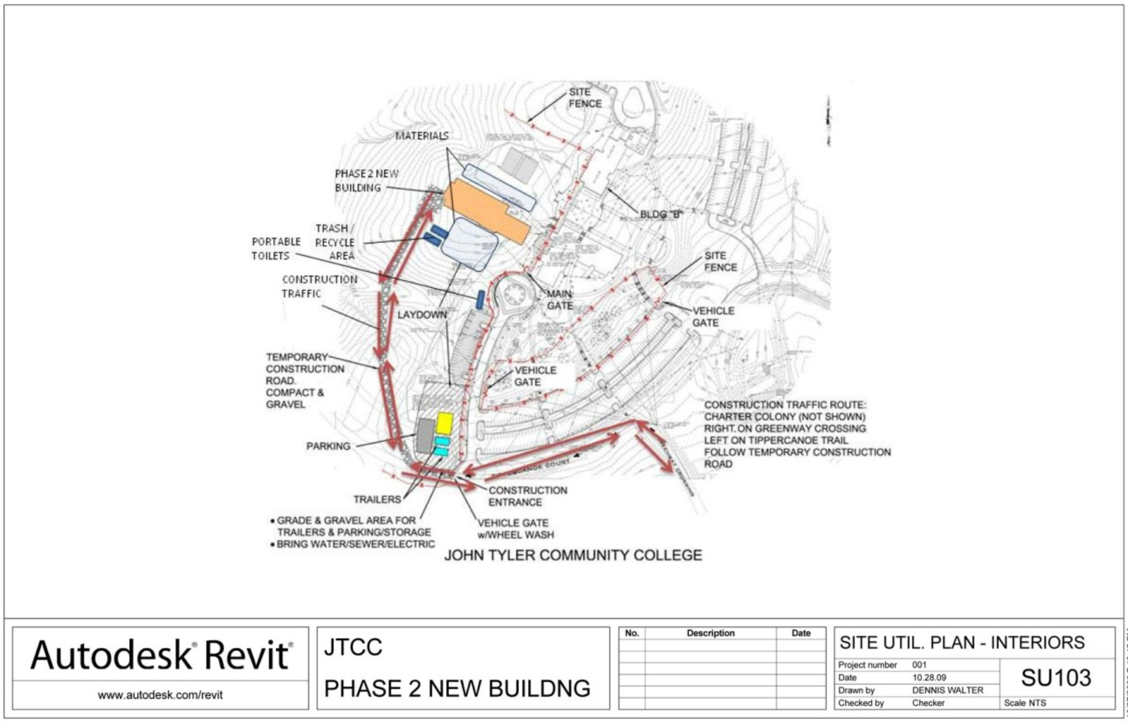


Figure 4, Site Utilization Plan for Interiors Trades' Phase

See **Appendix B: Site Layout Planning** for full size 11 x 17 Site Plans.

Detailed Structural Systems Estimate

(Actual cost evaluation is based on the R.S. Means 2008 Cost Works estimates. The location was factored for Richmond, VA. This detailed structural systems estimate is only estimation and does not represent the actual costs of construction from Gilbane.)

Structural Systems Estimate

	Total Cost	Cost/SF
Steel	$ 643,132	$ 10.54
Metal Decking	$ 298,570	$ 4.89
Concrete	$ 316,447	$ 5.19
Concrete Reinforcement (30% of Concrete Cost)	$ 104,428	$ 1.71
	$ 1,362,577	**$ 22.34**

Figure 5, Detailed Structural Systems Estimate Summary

All of the detailed structural systems estimates are based off of 2008 R.S. Means Cost Works Construction data. The location is factored for Richmond, VA which is only 14 miles away from Midlothian, VA (the project location). All cost data is based on the time of the start of construction in 2008. Also, a 10% waste factor has been incorporated into all material cost estimates.

The structural steel take-off was performed on the entire building based on the structural drawings. A table summary in Appendix C: Detailed Structural Systems Estimate shows the takeoff and R.S. Means estimate for the structural members. The structural steel estimate includes the costs of materials as well as the labor for erection. The estimated cost for the structural steel is $643,132 or $10.54/SF which is slightly lower than actual costs. This difference might be attributed to the estimate not including miscellaneous steel members such as smaller L or HSS pieces, as well as not estimating for field cutting or other unforeseen materials.

The metal decking take-off was based on the structural drawings and the SF of floor areas. The metal decking occurs where the typical elevated slabs consist of a 1 ½" x 20 gauge VLR composite deck. The roof deck is a typical 1 ½" x 22 gauge type B composite deck. The metal decking was estimated to be $298,570 or $4.89/SF which includes materials and labor for installation.

The structural concrete was estimated using the structural drawings and concrete schedules. The estimate includes the cost of forming, concrete, and placement. The building sits on a 4", 3500 psi reinforced concrete slab on grade. The cast in place concrete is also used for the spread footings, column footings, and foundation walls and is 4000 psi in these applications. For the elevated floor slabs, a 4" lightweight composite 4000 psi concrete is poured over the metal decking. The roof slab is a 4" normal weight 4000 psi concrete poured over the metal decking. The concrete was assumed to be placed via pump truck for all of the foundations, slab on grade, and elevated slabs. The concrete cost estimate was $316,447 or $5.19/SF. This cost seems to be lower than actual costs, but may attribute to takeoff error in estimation. To estimate the reinforcement for the concrete, it was assumed that roughly 30% of the cost for concrete would be a good rough idea of reinforcement costs. This method was used to get a rough estimate of the necessary cost for reinforcement and labor for placing it. The cost is estimated to be $104,428 or $1.71/SF.

See **Appendix C: Detailed Structural Systems Estimate** for take-offs and detailed R.S. Means Estimates.

General Conditions Estimate

(Actual cost evaluation is based on historical data, local fees and data, as well as R.S. Means 2008. This general conditions estimate is only estimation and does not represent the actual costs from Gilbane.)

The General Conditions Estimate was broken into "Project Management," "Site Services," and "Other General Conditions Costs" as shown below. All testing, inspections and surveying contracts are held within the pre-construction contracts, and are not considered in this general conditions estimate. Items such as scaffolding, commissioning, and temporary protection are included in separate bid packages and are not accounted for in general conditions. Construction management staff estimates were produced assuming the project manager, superintendent, project engineer, and assistant project engineer remain on the job for 64 total weeks. The project executive is only billing for an assumed 10 weeks of the project, because only part of his time is committed to this project, while he has many other projects to oversee. The estimated amount of $3,027,302.00 includes a 5% construction manager fee and is approximately 16% of the total contract amount for the project. The estimated total cost/week for general conditions is $47,302.00 during construction.

General Conditions Estimate

Project Management:

Description	Unit	Unit Price	Quantity	Total
Project Executive	week	$ 5,000.00	10	$ 50,000.00
Project Manager	week	$ 3,000.00	64	$ 192,000.00
Superintendent	week	$ 2,750.00	64	$ 176,000.00
Project Engineer	week	$ 2,600.00	64	$ 166,400.00
Assistant Project Engineer	week	$ 2,200.00	64	$ 140,800.00
				$ 725,200.00

Site Services:

Description	Unit	Unit Price	Quantity	Duration	Total
Toilets	month	$ 170.00	8	21	$ 28,560.00
Trailer	month	$ 450.00	3	18	$ 24,300.00
Storage Box	month	$ 120.00	1	21	$ 2,520.00
Field Office Equipment	month	$ 150.00	2	21	$ 6,300.00
Office Supplies	month	$ 100.00	2	21	$ 4,200.00
Telephone/Internet	month	$ 250.00	2	21	$ 10,500.00
Fencing	LF	$ 4.50	2500	-	$ 11,250.00
Material Hoists	month	$ 850.00	1	2	$ 1,700.00
Dumpsters	week	$ 600.00	4	64	$ 153,600.00
					$ 242,930.00

Other General Conditions Costs:

Description	Unit	Unit Price	Quantity	Total
Permits	LS	$ 125,000.00	1	$ 125,000.00
Inurance	LS	$ 173,012.00	1	$ 173,012.00
General Liability	LS	$ 531,020.00	1	$ 531,020.00
Fee	%	-	5%	$ 928,700.00
Electrical Consumption Allowance	LS	$ 301,440.00	1	$ 301,440.00
				$ 2,059,172.00
			General Conditions Total	**$ 3,027,302.00**

Figure 6, General Conditions Estimate

Critical Industry Issues

This year's 18th Annual PACE Roundtable was held at The Pennsylvania State University on October 14-15th, 2009. The Roundtable discussions consisted of a wide variety of critical construction industry issues between industry professionals, Architectural Engineering Faculty members, and Architectural Engineering students. The theme of the roundtable event was "Creating Opportunities." This theme has discussions incorporated into the day's activities which included topics such as "Energy and the Building Industry," "BIM Execution Planning," and "Business and Networking."

Since the Phase 2 New Building is trying to achieve a LEED Silver Certification, the Energy and Construction Industry breakout session is an important topic for this project. This topic is important at the current time because of the growing demand for energy efficient buildings and the importance to owners' to have confidence in building performance and energy performance. The industry members were excited to discuss the growing standards for energy performance and the technologies that have been emerging because of this growth. There is also the idea that design-build delivery methods are the most suitable and preferred for getting the best building systems design for optimum energy performance.

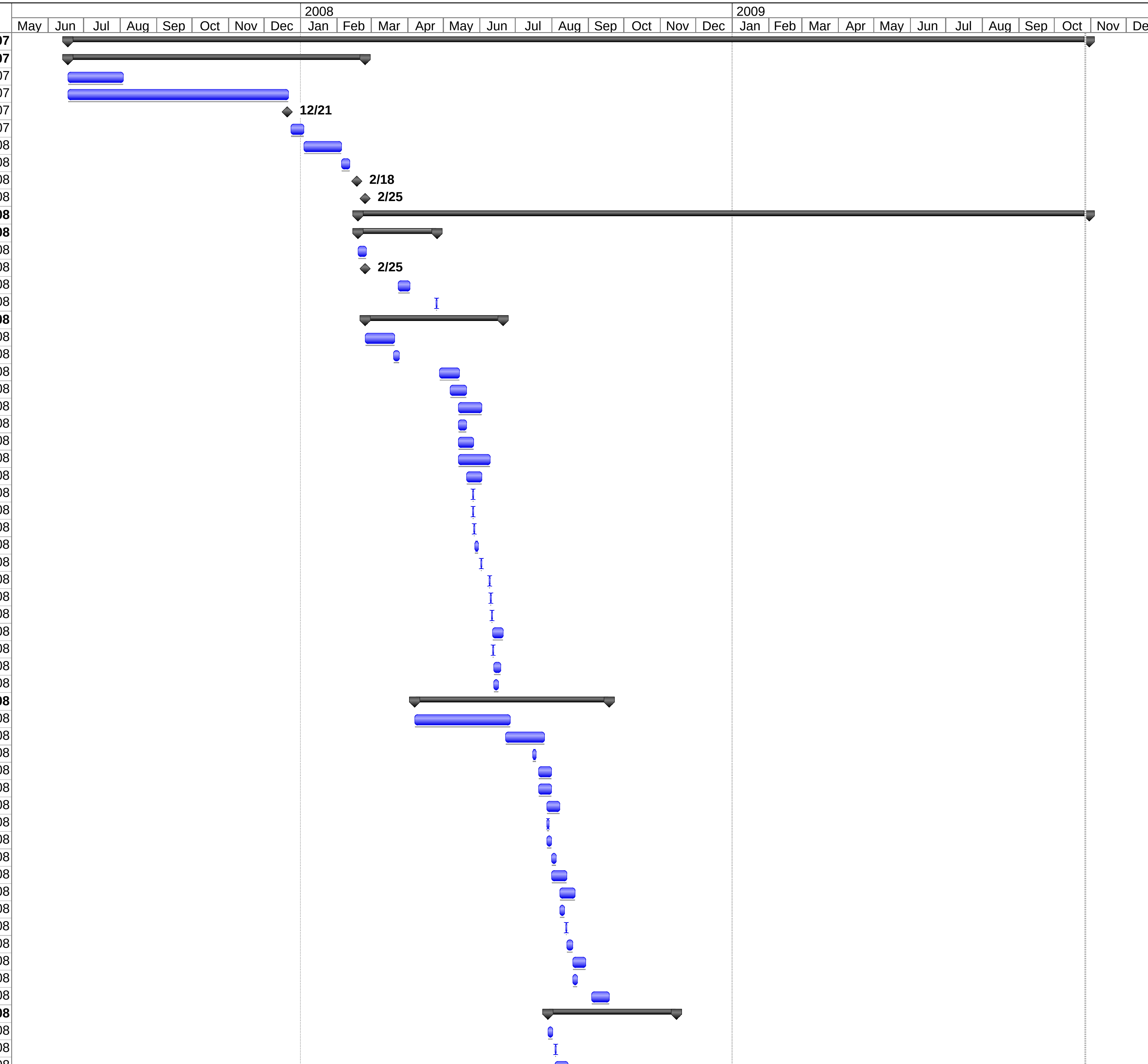
Additionally, during the BIM Execution Planning breakout session, the industry members were keen on discussing how BIM adds a value to projects, but more importantly how to decide the best way to use BIM on a project by project basis. Industry members shared their experience with using BIM on projects to a certain degree, and agreed with the students and faculty that a BIM implementation plan must be presented to the owner. To a certain extent, there was an argument that BIM is really just a good tool being developed extensively for building project teams' use. It was discussed that if the owner did not understand what BIM will provide, then it is a useless tool for the building owners once the project team turns over the building and BIM model.

After leaving the PACE Roundtable with insight on BIM Execution Planning and Energy and the Building Industry, there are a few applications these topics could be used for on the Phase 2 New Building. First, looking at using BIM and how to plan and execute the usage of it for the Phase 2 New Building could be beneficial and add value to the project. Second, looking at the building's energy performance and the LEED points the project is striving for within energy efficiency may be interesting. The building's mechanical system design could have been designed differently if a design-build delivery method and the mechanical contractor was on board during the design phase of the project.

After meeting Mr. Chuck Tomasco, Jr., P.E. from Truland Systems, I believe that he could be a great contact for advising and discussing how looking at the use of BIM on the Phase 2 New Building might impact the project and add value. He may be able to offer insight on how BIM can be applied the correct way to the project, and to what extent it would be used for. He also may have insight on energy efficiency and the mechanical system within the Phase 2 New Building. Insight on the advantages for using a design-build delivery method with a mechanical contractor on board during that time could also be discussed with him.

Appendix A: Detailed Project Schedule

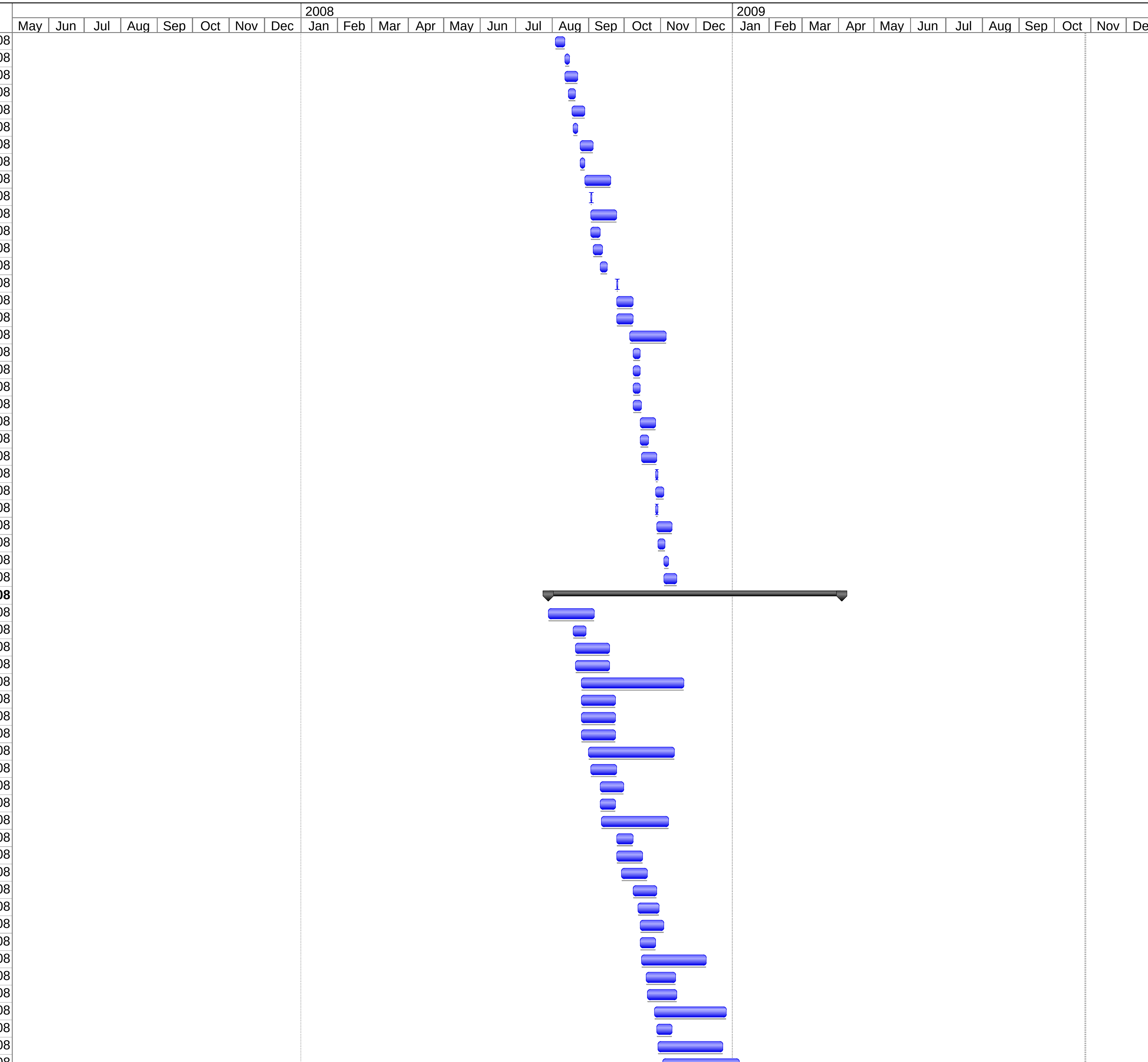
ID	Task Name	Duration	Start
1	**PHASE 2 NEW BUILDING**	**620 days**	**Mon 6/18/07**
2	**PRE-CONSTRUCTION PHASE**	**180 days**	**Mon 6/18/07**
3	CM at Risk Selection	35 days	Mon 6/18/07
4	Design Phase	135 days	Mon 6/18/07
5	100% Construction Documents	0 days	Fri 12/21/07
6	Prepare Bid Documents	9 days	Mon 12/24/07
7	Bid & Award Construction	22 days	Fri 1/4/08
8	Prepare / Submit / Approve GMP	5 days	Tue 2/5/08
9	GMP Approval	0 days	Mon 2/18/08
10	Permit	0 days	Mon 2/25/08
11	**CONSTRUCTION PHASE**	**444 days**	**Tue 2/19/08**
12	**MOBILIZATION / SITE CLEARING**	**49 days**	**Tue 2/19/08**
13	Mobilize / Site Fencing	5 days	Tue 2/19/08
14	Notice to Proceed	0 days	Mon 2/25/08
15	Strip Topsoil / Excavate To Building Pad	8 days	Mon 3/24/08
16	Re-grade Building Pad	1 day	Fri 4/25/08
17	**SUBSTRUCTURE**	**85 days**	**Mon 2/25/08**
18	Site Clearing / E&S Controls	19 days	Mon 2/25/08
19	Relocate Dominion Power Line	3 days	Thu 3/20/08
20	Concrete Foundations	13 days	Mon 4/28/08
21	Concrete Retaining Wall - 1st Half	10 days	Wed 5/7/08
22	Masonry Foundations	14 days	Wed 5/14/08
23	Concrete Elevator Pits	5 days	Wed 5/14/08
24	SOG Underground Electrical	9 days	Wed 5/14/08
25	SOG Underground Plumbing	19 days	Wed 5/14/08
26	Concrete Retaining Wall - 2nd Half	9 days	Wed 5/21/08
27	Foundation Drain @ Elevator Pits	1 day	Mon 5/26/08
28	Retaining Wall WP - 1st Lift / 1st Half	1 day	Mon 5/26/08
29	Retaining Wall Backfill - 1st Lift / 1st Half	1 day	Tue 5/27/08
30	Backfill Elevator Pits	3 days	Wed 5/28/08
31	Retaining Wall WP - 2nd Lift / 1st Half	1 day	Mon 6/2/08
32	Retaining Wall Backfill - 2nd Lift / 1st Half	1 day	Mon 6/9/08
33	Retaining Wall WP - 1st Lift / 2nd Half	1 day	Tue 6/10/08
34	Retaining Wall Backfill - 1st Lift / 2nd Half	1 day	Wed 6/11/08
35	Form/Rebar Concrete Slab on Grade	7 days	Thu 6/12/08
36	Retaining Wall WP - 2nd Lift / 2nd Half	1 day	Thu 6/12/08
37	SOG Electrical Floor Box R/I	4 days	Fri 6/13/08
38	Retaining Wall Backfill - 2nd Lift / 2nd Half	2 days	Fri 6/13/08
39	**SUPERSTRUCTURE**	**119 days**	**Mon 4/7/08**
40	Fab & Deliver Steel	59 days	Mon 4/7/08
43	Erect Structural Steel & Metal Deck	25 days	Mon 6/23/08
50	Pour Concrete Slab on Grade	3 days	Wed 7/16/08
53	Masonry Stair #3 & Elevator Shaft	9 days	Mon 7/21/08
54	2nd Floor Slab R/I - Electrical	9 days	Mon 7/21/08
42	Install Stair #1 - Steel Framing	9 days	Mon 7/28/08
55	Pour 2nd Floor Slab - 1st Half	2 days	Mon 7/28/08
56	Detail Roof Steel	4 days	Mon 7/28/08
49	Pour 2nd Floor Slab - 2nd Half	2 days	Fri 8/1/08
52	3rd Floor Slab R/I - Electrical	9 days	Fri 8/1/08
48	Install Stair #2 - Steel Framing	9 days	Fri 8/8/08
51	Pour 3rd Floor Slab - 1st Half	2 days	Fri 8/8/08
44	Pour 3rd Floor Slab - 2nd Half	1 day	Wed 8/13/08
46	Pour Roof Floor Slab	3 days	Thu 8/14/08
41	Install Stair #3 - Steel Framing	9 days	Tue 8/19/08
47	Spray Applied Fire Proofing	4 days	Tue 8/19/08
45	Set Rooftop Mechanical Curbs	11 days	Thu 9/4/08
57	**BUILDING SKIN**	**79 days**	**Tue 7/29/08**
58	North Elev (5-1) Ext Studs / Shthg / VB	4 days	Tue 7/29/08
59	Roof: Metal Flashing & Trim - West	1 day	Mon 8/4/08
81	North Elev. (5-1) Brick	9 days	Mon 8/4/08



Project: Detailed Project Schedule1
Date: Tue 10/27/09

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

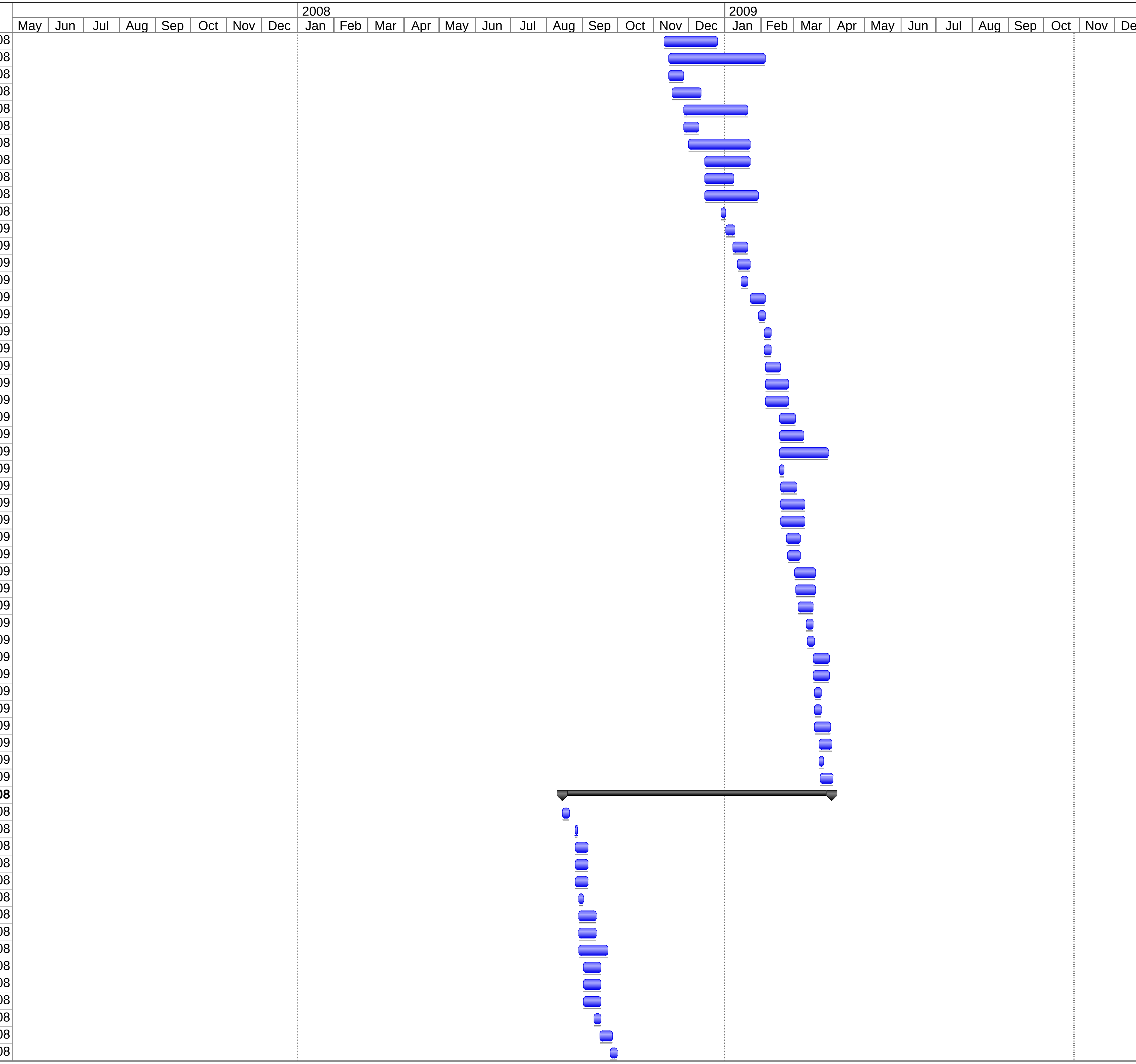
ID	Task Name	Duration	Start
84	West Elev. Ext Studs/Shthg/VB	6 days	Mon 8/4/08
87	West Elev Brick	4 days	Tue 8/12/08
88	South Elev (1-5) Studs/Shthg/VB	9 days	Tue 8/12/08
89	North Elev. (5-1) Curtainwall	4 days	Fri 8/15/08
92	West Elev Curtainwall	9 days	Mon 8/18/08
63	North Elev. (5-1) Metal Parapet	4 days	Tue 8/19/08
80	South Elev (5-8) Studs/Sthtg/VB	9 days	Mon 8/25/08
85	South Elev. (1-5) Brick	4 days	Mon 8/25/08
86	South Elev. (1-5) Curtainwall	16 days	Fri 8/29/08
60	Roof: Metal Flashing & Trim - North	1 day	Wed 9/3/08
77	South Elev. (8-11) - Studs/Shthg/VB	16 days	Wed 9/3/08
78	South Elev. (5-8) Block/Precast Coping	6 days	Wed 9/3/08
82	West Elev Metal Parapet	6 days	Fri 9/5/08
83	South Elev. (5-8) Curtainwall	4 days	Thu 9/11/08
61	Roof: Metal Flashing & Trim - East	1 day	Thu 9/25/08
90	South Elev. (8-11) Brick	10 days	Thu 9/25/08
91	East Elev. Studs/Shthg/VB	10 days	Thu 9/25/08
64	Install Roof Membrane	23 days	Mon 10/6/08
73	North Elev (11-8) Ext Studs/Shthg/VB	4 days	Thu 10/9/08
74	South Elev. (8-11) Curtainwall	4 days	Thu 10/9/08
75	South Elev. (8-11) Metal Parapet	4 days	Thu 10/9/08
76	East Elev. Brick	5 days	Thu 10/9/08
65	North Elev (8-5) Ext Studs/Shthg/VB	9 days	Wed 10/15/08
66	North Elev. (11-8) Brick	5 days	Wed 10/15/08
67	East Elev. Curtainwall	9 days	Thu 10/16/08
62	Roof: Metal Flashing & Trim - South	2 days	Tue 10/28/08
68	North Elev. (8-5) Block / Precast Coping	5 days	Tue 10/28/08
79	Temp Plastic - Weather Protection - South	2 days	Tue 10/28/08
69	North Elev. (11-8) Metal Parapet	9 days	Wed 10/29/08
70	East Elev. Metal Parapet	4 days	Thu 10/30/08
71	South Elev (1-5) Metal Parapet	4 days	Tue 11/4/08
72	North Elev. (8-5) Curtainwall	9 days	Tue 11/4/08
173	**MEP**	**179 days**	**Tue 7/29/08**
175	Install Sprinkler Risers @ Stair Shaft	29 days	Tue 7/29/08
200	Install Storm Risers and Roof Drains	9 days	Tue 8/19/08
176	Set Electrical Equipment/Hang	21 days	Thu 8/21/08
180	Terminations @ Gear/Panels	21 days	Thu 8/21/08
186	Duct Ceiling R/I 1st Floor	63 days	Tue 8/26/08
187	Install Duct Risers	21 days	Tue 8/26/08
188	Install Plumbing Risers	21 days	Tue 8/26/08
189	Install Electrical Risers	21 days	Tue 8/26/08
174	Electrical Ceiling R/I 1st Floor	53 days	Mon 9/1/08
182	Electrical Wall R/I 1st Floor	16 days	Wed 9/3/08
183	Plumbing Wall R/I 1st Floor	14 days	Thu 9/11/08
184	R/I Control Conduit 1st Floor	9 days	Thu 9/11/08
185	Plumbing Ceiling R/I 3rd Floor	41 days	Fri 9/12/08
177	R/I Control Conduit 2nd Floor	10 days	Thu 9/25/08
178	Electrical Wall R/I 2nd Floor	16 days	Thu 9/25/08
179	Plumbing Wall R/I 2nd Floor	16 days	Mon 9/29/08
233	Electrical Wall R/I 3rd Floor	14 days	Thu 10/9/08
234	Set Rooftop Mechanical Equipment	14 days	Mon 10/13/08
191	Plumbing Wall R/I 3rd Floor	14 days	Wed 10/15/08
235	R/I Control Conduit 3rd Floor	9 days	Wed 10/15/08
192	Duct Ceiling R/I 2nd Floor	39 days	Thu 10/16/08
193	Set Mechanical Room Equipment	19 days	Mon 10/20/08
194	Install Service Elevator (Elev. #2)	19 days	Tue 10/21/08
195	Electrical Ceiling R/I 2nd Floor	45 days	Mon 10/27/08
196	Install Sprinkler Mains/Branches 1st Floor	9 days	Wed 10/29/08
197	Pipe/Duct Rooftop Equipment	39 days	Thu 10/30/08
198	Plumbing Ceiling R/I 1st Floor	47 days	Mon 11/3/08



Project: Detailed Project Schedule1
Date: Tue 10/27/09

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

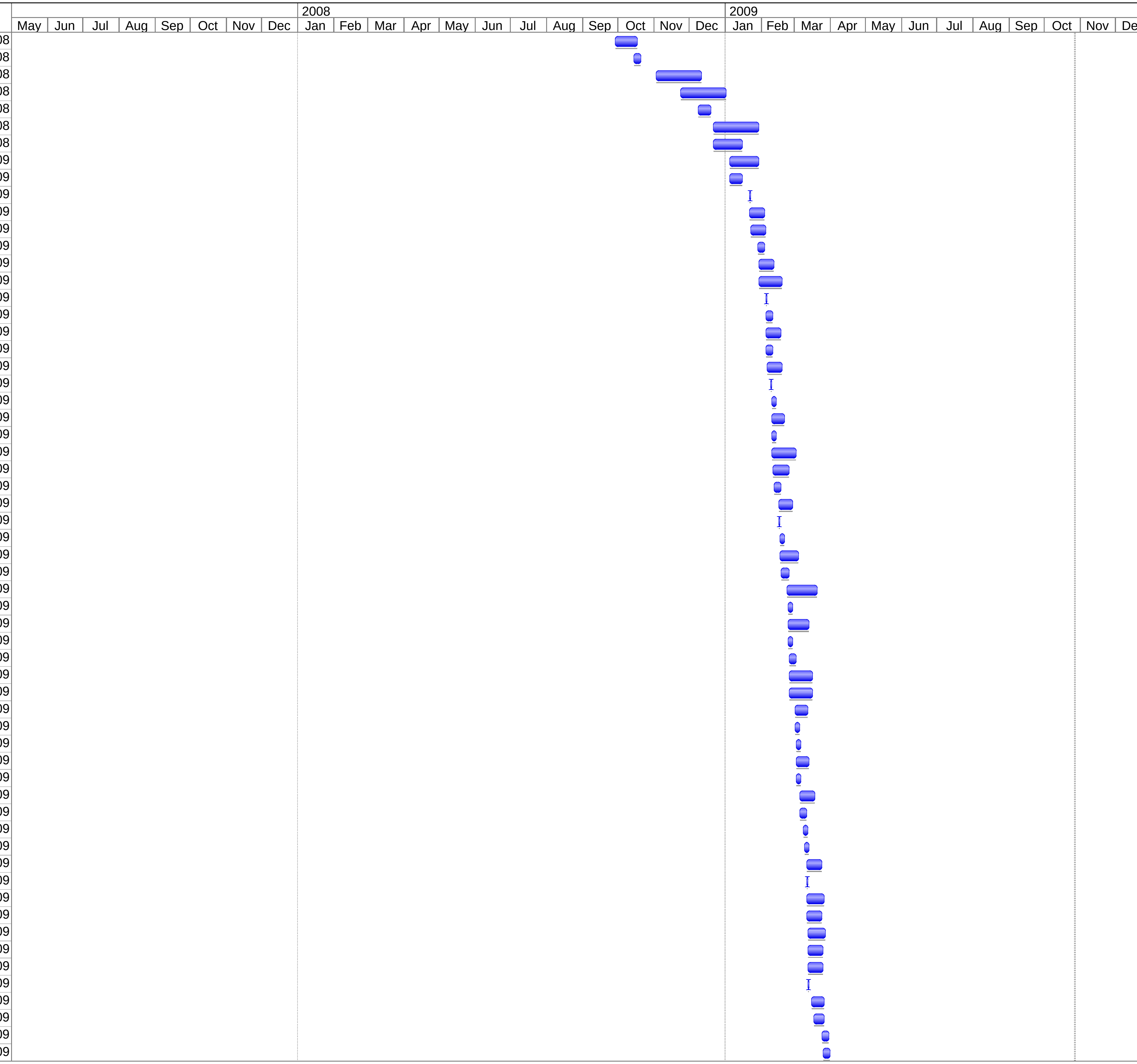
ID	Task Name	Duration	Start
199	HVAC Piping 1st Floor	34 days	Mon 11/10/08
201	Mechanical Room Piping	59 days	Fri 11/14/08
202	Electrical Connections of Mechanical	9 days	Fri 11/14/08
203	Install Passenger Elevator (Elev. #1)	19 days	Mon 11/17/08
226	Duct Ceiling R/I 3rd Floor	39 days	Thu 11/27/08
227	Install Sprinkler Mains/Branches 2nd Floor	9 days	Thu 11/27/08
228	Electrical Ceiling R/I 3rd Floor	39 days	Mon 12/1/08
229	Plumbing Ceiling R/I 2nd Floor	29 days	Mon 12/15/08
230	HVAC Piping 2nd Floor	19 days	Mon 12/15/08
231	HVAC Piping 3rd Floor	34 days	Mon 12/15/08
232	Electrical Connections for Rooftop Equip	4 days	Mon 12/29/08
181	Install Garden Roof and Paver System	6 days	Fri 1/2/09
204	R/I Lighting @ Soffits 1st Floor	9 days	Thu 1/8/09
205	Install Sprinkler Mains/Branches 3rd Floor	9 days	Mon 1/12/09
206	R/I Sprinkler @ Soffits 1st Floor	4 days	Thu 1/15/09
207	R/I Lighting @ Soffits 2nd Floor	9 days	Fri 1/23/09
208	R/I Sprinkler @ Soffits 2nd Floor	4 days	Fri 1/30/09
209	R/I Sprinkler @ Soffits 3rd Floor	4 days	Wed 2/4/09
210	R/I Lighting @ Soffits 3rd Floor	4 days	Wed 2/4/09
211	Sprinkler Trim Out 1st Floor	9 days	Thu 2/5/09
212	Install GRD's & Flex 1st Floor	14 days	Thu 2/5/09
213	Install Lighting 1st Floor	14 days	Thu 2/5/09
214	Sprinkler Trim Out 2nd Floor	10 days	Tue 2/17/09
215	Install GRD's & Flex 2nd Floor	15 days	Tue 2/17/09
216	Install Plumbing Fixtures 1st Floor	30 days	Tue 2/17/09
217	Trim-Out HVAC Controls 1st Floor	4 days	Tue 2/17/09
218	Sprinkler Trim Out 3rd Floor	10 days	Wed 2/18/09
219	Install GRD's & Flex 3rd Floor	15 days	Wed 2/18/09
220	Install Lighting 2nd Floor	15 days	Wed 2/18/09
221	Trim-Out Electrical/FA/IT 1st Floor	10 days	Mon 2/23/09
222	Install Lighting 3rd Floor	9 days	Tue 2/24/09
223	Install Plumbing Fixtures 2nd Floor	14 days	Mon 3/2/09
224	Install Plumbing Fixtures 3rd Floor	13 days	Tue 3/3/09
225	Connect Fumehoods Ductwork & Plumbing	9 days	Thu 3/5/09
190	Trim-out HVAC Controls 2nd Floor	4 days	Thu 3/12/09
236	Trim-Out HVAC Controls 3rd Floor	4 days	Fri 3/13/09
237	Trim-Out Electrical/FA/IT 2nd Floor	10 days	Wed 3/18/09
238	Trim-Out Electrical @ Lab Casework	10 days	Wed 3/18/09
239	Trim-Out Bathroom Fixtures 1st Floor	4 days	Thu 3/19/09
240	Trim-Out Bathroom Fixtures 2nd Floor	4 days	Thu 3/19/09
241	Trim-Out Electrical/FA/IT 3rd Floor	10 days	Thu 3/19/09
242	Connect Plumbing & Gas @ Student Tables	9 days	Mon 3/23/09
243	Trim-Out Bathroom Fixtures 3rd Floor	4 days	Mon 3/23/09
244	Trim Out Electrical @ Student Tables	9 days	Tue 3/24/09
93	**INTERIORS**	**165 days**	**Fri 8/15/08**
133	Frame/Hang/Finish Electrical Room	4 days	Fri 8/15/08
127	Priority Wall Frame & Hang GWB 1st Floor	2 days	Tue 8/26/08
131	In Wall Blocking 1st Floor	9 days	Tue 8/26/08
169	Wood Blocking at Roof	9 days	Tue 8/26/08
171	Priority Wall - Door Frames 1st Floor	9 days	Tue 8/26/08
95	Priority Wall Frame & Hang GWB 2nd Floor	2 days	Fri 8/29/08
96	Priority Wall - Door Frames 2nd Floor	11 days	Fri 8/29/08
109	In Wall Blocking 2nd Floor	11 days	Fri 8/29/08
110	Frame Remaining Stud Walls 1st Floor	17 days	Fri 8/29/08
112	Priority Wall Frame & Hang GWB 2nd Floor	11 days	Tue 9/2/08
113	Priority Wall - Door Frames 2nd Floor	11 days	Tue 9/2/08
114	In Wall Blocking 3rd Floor	11 days	Tue 9/2/08
172	Door Frames 1st Floor	4 days	Thu 9/11/08
129	Frame Remaining Stud Walls 2nd Floor	9 days	Tue 9/16/08
128	Door Frames 2nd Floor	4 days	Thu 9/25/08



Project: Detailed Project Schedule1
Date: Tue 10/27/09

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

ID	Task Name	Duration	Start
130	Frame Remaining Stud Walls 3rd Floor	15 days	Mon 9/29/08
136	Door Frames 3rd Floor	4 days	Wed 10/15/08
134	Hang & Finish GWB 1st Floor	29 days	Mon 11/3/08
135	Hang & Finish GWB 2nd Floor	29 days	Mon 11/24/08
157	Prime & First Coat Paint 1st Floor	9 days	Tue 12/9/08
97	Hang & Finish GWB 3rd Floor	29 days	Mon 12/22/08
108	Frame GWB Soffits 1st Floor	19 days	Mon 12/22/08
98	Frame GWB Soffits 2nd Floor	19 days	Mon 1/5/09
160	Prime & First Coat Paint 2nd Floor	9 days	Mon 1/5/09
99	Ceiling Close-In Inspection - Soffits 1st Floor	1 day	Thu 1/22/09
159	Prime & First Coat Paint 3rd Floor	9 days	Thu 1/22/09
100	Hang & Finish GWB Soffits 1st Floor	9 days	Fri 1/23/09
101	Frame GWB Soffits 3rd Floor	4 days	Thu 1/29/09
102	Hang Ceiling Grid 1st Floor	9 days	Fri 1/30/09
103	Finish Paint Walls/ Prime & Finish Paint 1st Floor	14 days	Fri 1/30/09
104	Ceiling Close-In Inspection - Soffits 2nd Floor	1 day	Thu 2/5/09
105	Install Millwork/Casework 1st Floor	4 days	Thu 2/5/09
106	Install Fabric Panels 1st Floor	9 days	Thu 2/5/09
107	Install Visual Display Surfaces & Signage 1st Floor	4 days	Thu 2/5/09
119	Hang & Finish GWB Soffits 2nd Floor	9 days	Fri 2/6/09
170	Ceiling Close-In Inspection - Soffits 3rd Floor	1 day	Mon 2/9/09
115	Install Ceramic Tile @ Bathrooms 1st Floor	4 days	Tue 2/10/09
118	Hang Ceiling Grid 2nd Floor	9 days	Tue 2/10/09
120	Hang & Finish GWB Soffits 3rd Floor	4 days	Tue 2/10/09
156	Install Doors & Hardware 1st Floor	15 days	Tue 2/10/09
117	Hang Ceiling Grid 3rd Floor	10 days	Wed 2/11/09
111	Ceiling Tile 1st Floor	4 days	Thu 2/12/09
121	Flooring 1st Floor	10 days	Mon 2/16/09
122	Install Fire Extinguisher Cabinets 1st Floor	1 day	Mon 2/16/09
116	Install Bathroom Vanities 1st Floor	4 days	Tue 2/17/09
123	Install Horizontal Louvers / Roller Shades 1st Floor	12 days	Tue 2/17/09
124	Install Millwork/Casework 2nd Floor	5 days	Wed 2/18/09
148	Install Laboratory Casework	20 days	Mon 2/23/09
145	Install Ceramic Tile @ Bathrooms 2nd Floor	4 days	Tue 2/24/09
146	Install Doors & Hardware 2nd Floor	14 days	Tue 2/24/09
147	Install Millwork/Casework 3rd Floor	4 days	Tue 2/24/09
142	Install Ceramic Tile @ Bathrooms 3rd Floor	4 days	Wed 2/25/09
143	Finish Paint Walls/ Prime & Finish Paint 2nd Floor	14 days	Wed 2/25/09
144	Install Doors & Hardware 3rd Floor	14 days	Wed 2/25/09
137	Finish Paint Walls/Prime & Finish Paint 3rd Floor	9 days	Mon 3/2/09
141	Install Bathroom Vanities 2nd Floor	4 days	Mon 3/2/09
138	Install Bathroom Vanities 3rd Floor	4 days	Tue 3/3/09
139	Install Fabric Panels 2nd Floor	9 days	Tue 3/3/09
140	Install Visual Display Surfaces & Signage 2nd Floor	4 days	Tue 3/3/09
150	Install Fabric Panels 3rd Floor	9 days	Fri 3/6/09
151	Install Visual Display Surfaces & Signage 3rd Floor	4 days	Fri 3/6/09
149	Ceiling Tile 2nd Floor	4 days	Mon 3/9/09
152	Ceiling Tile 3rd Floor	4 days	Tue 3/10/09
94	Install Toilet Partitions/Accessories 1st Floor	9 days	Thu 3/12/09
125	Install Fire Extinguisher Cabinets 2nd Floor	1 day	Thu 3/12/09
126	Install Horizontal Louvers / Roller Shades 2nd Floor	11 days	Thu 3/12/09
153	Flooring 2nd Floor	9 days	Thu 3/12/09
154	Install Horizontal Louvers / Roller Shades 3rd Floor	11 days	Fri 3/13/09
166	Flooring 3rd Floor	9 days	Fri 3/13/09
167	Install Toilet Partitions/Accessories 2nd Floor	9 days	Fri 3/13/09
168	Install Fire Extinguisher Cabinets 3rd Floor	1 day	Fri 3/13/09
155	Install Toilet Partitions/Accessories 3rd Floor	9 days	Mon 3/16/09
161	Install Laboratory Student Tables	7 days	Wed 3/18/09
132	Final Paint Bathrooms 1st Floor	4 days	Wed 3/25/09
158	Final Paint Bathrooms 2nd Floor	4 days	Thu 3/26/09

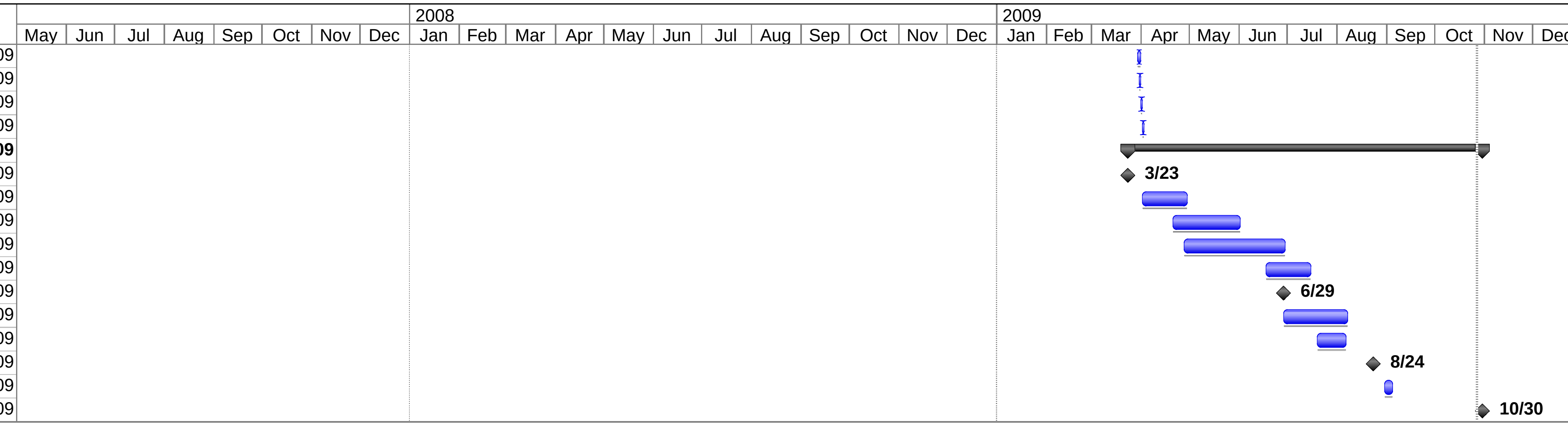


Project: Detailed Project Schedule1
Date: Tue 10/27/09

Task		Progress		Summary		External Tasks	
Split		Milestone	◆	Project Summary		External Milestone	◆

Deadline ⇩

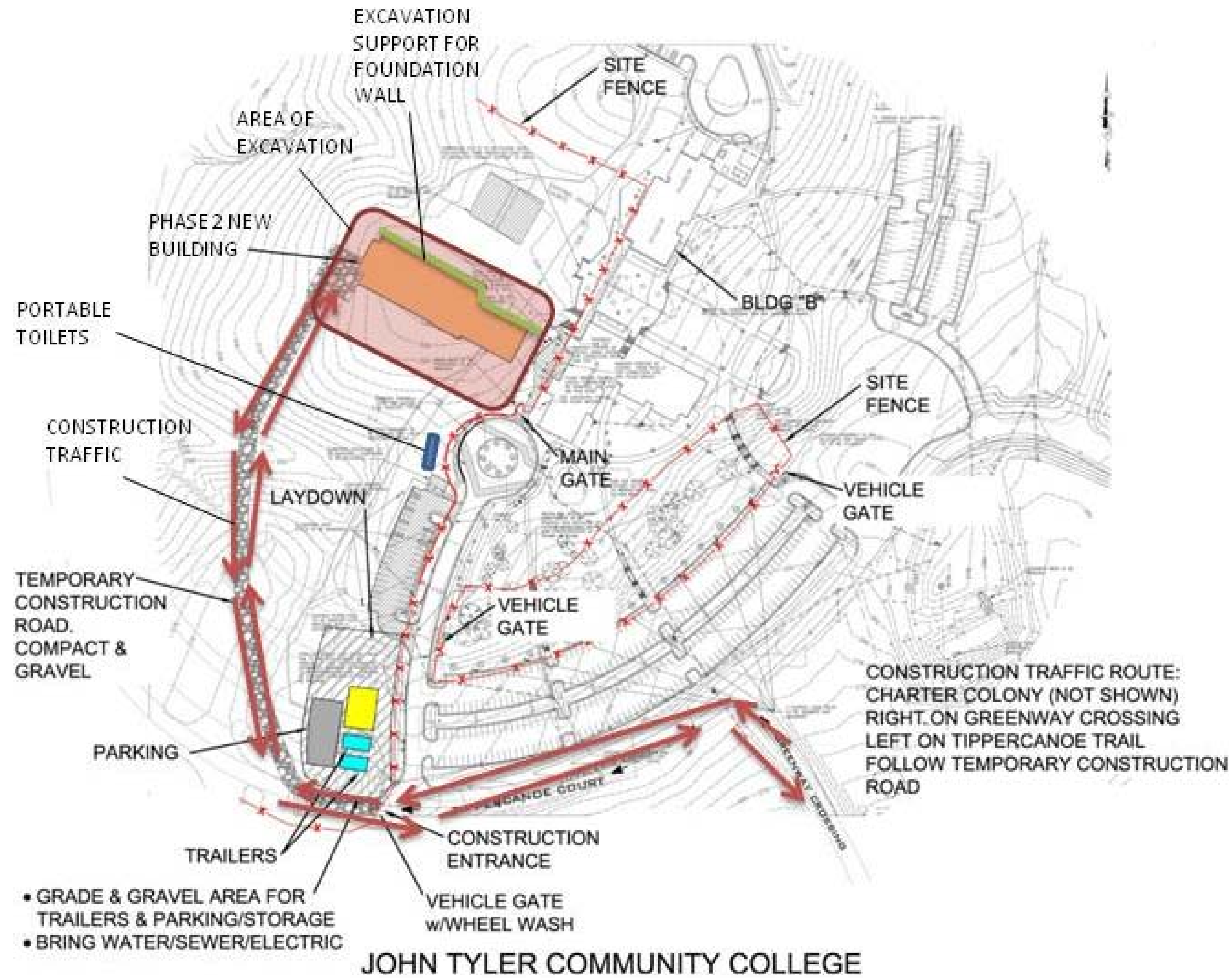
ID		Task Name	Duration	Start
162		Final Paint Bathrooms 3rd Floor	2 days	Mon 3/30/09
163		Install Bathroom Mirrors 1st Floor	1 day	Tue 3/31/09
164		Install Bathroom Mirrors 2nd Floor	1 day	Wed 4/1/09
165		Install Bathroom Mirrors 3rd Floor	1 day	Thu 4/2/09
245		**CLOSEOUT**	**159 days**	**Mon 3/23/09**
247		HVAC Operational	0 days	Mon 3/23/09
252		Architect's Punchlist	20 days	Thu 4/2/09
248		Testing / Balancing / Commissioning	30 days	Tue 4/21/09
251		Landscaping	45 days	Tue 4/28/09
246		Punchlist	20 days	Thu 6/18/09
253		Substantial Completion	0 days	Mon 6/29/09
254		Owner Move-In	30 days	Mon 6/29/09
256		LEED Building HVAC Flush Out	14 days	Mon 7/20/09
255		First Day of Classes	0 days	Mon 8/24/09
249		Demobilize Jobsite Trailer	5 days	Mon 8/31/09
250		Final Completion / Turnover	0 days	Fri 10/30/09



Project: Detailed Project Schedule1
Date: Tue 10/27/09

Task		Progress		Summary		External Tasks		Deadline	
Split		Milestone		Project Summary		External Milestone			

Appendix B: Site Layout Planning



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PHASE 2 NEW BUILDNG

No.	Description	Date

SITE UTIL. PLAN - EXCAVATION

Project number	001	SU101
Date	10.28.09	
Drawn by	DENNIS WALTER	
Checked by	Checker	Scale NTS

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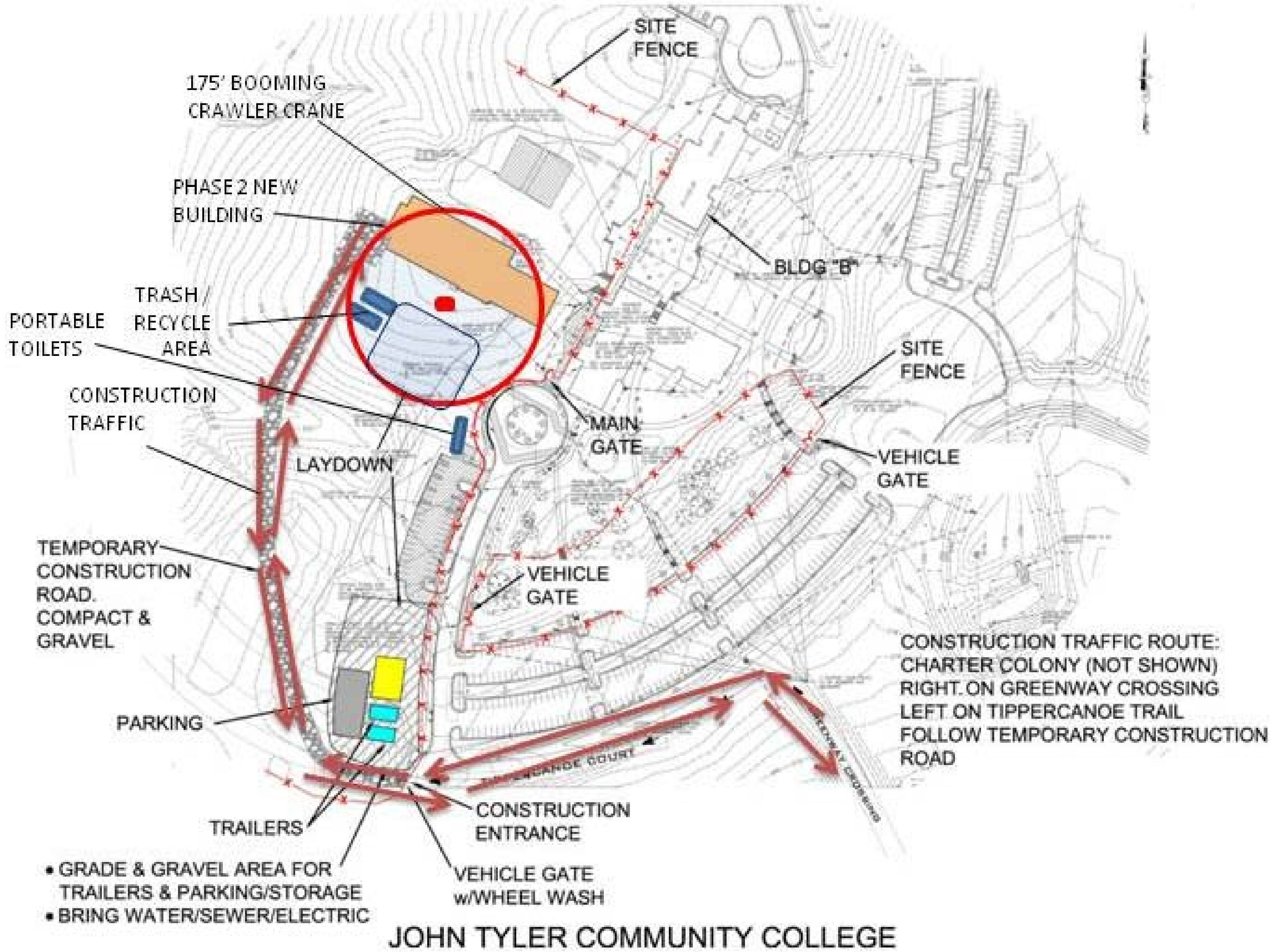

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PHASE 2 NEW BUILDNG

No.	Description	Date

SITE UTIL. PLAN - STRUCTURE

Project number	001	SU102
Date	10.28.09	
Drawn by	DENNIS WALTER	
Checked by	Checker	Scale NTS

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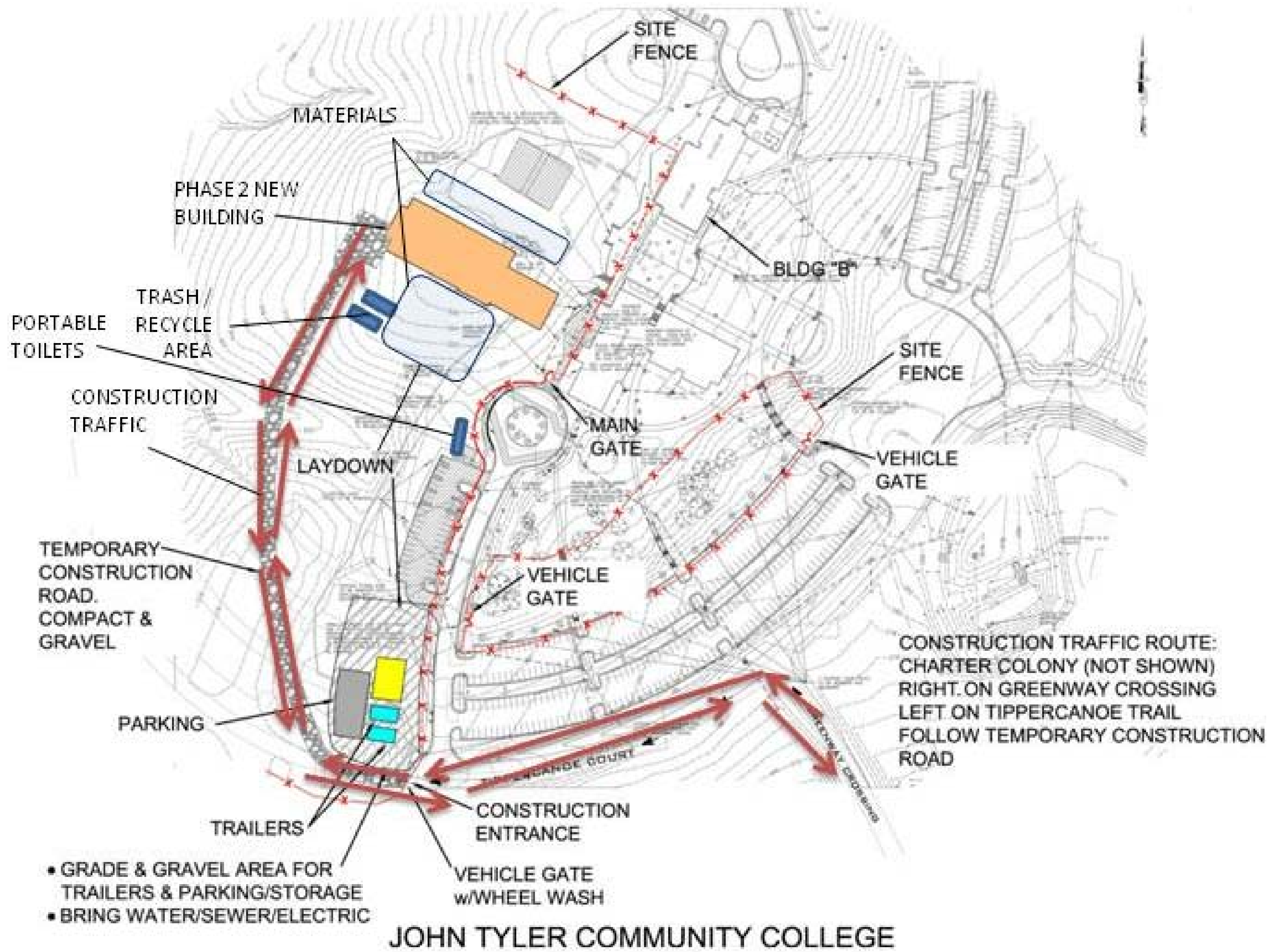

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PHASE 2 NEW BUILDNG

No.	Description	Date

SITE UTIL. PLAN - INTERIORS

Project number	001	SU103
Date	10.28.09	
Drawn by	DENNIS WALTER	
Checked by	Checker	Scale NTS

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Appendix C: Detailed Structural Systems Estimate

Concrete Takeoff

	Width	LF	Height		Total Volume (CY)
CIP Foundation Wall	1'-4"	366"-0"	14'-0"		252.4
					252.4
Column Footings	Size	Qty	Depth	Volume (CF)	Total Volume (CY)
CF4.0	4'-0" SQ	1	1'-0"	16.00	0.6
CF4.5	4'-6" SQ	3	1'-2"	23.63	2.6
CF5.0	5'-0" SQ	4	1'-3"	31.25	4.6
CF5.5	5'-6" SQ	2	1'-5"	42.85	3.2
CF6.5	6'-6" SQ	6	1'-8"	70.42	15.6
CF7.0	7'-0" SQ	5	1'-9"	85.75	15.9
CF7.5	7'-6" SQ	3	1'-11"	107.81	12.0
CF8.0	8'-0" SQ	6	2'-0"	128.00	28.4
CF9.0	9'-0" SQ	2	2'-3"	182.25	13.5
CF9.5	9'-6" SQ	2	2'-4"	210.58	15.6
					112.1
Wall Footings	Width	LF	Depth		Total Volume (CY)
WF2.0	2'-0"	10'-0"	1'-0"		0.7
WF2.0A	2'-0"	67'-0	1'-0"		5.0
WF2.5	2'-6"	116'-0"	1'-0"		10.7
WF4.0	4'-0"	28'-0"	1'-2"		4.8
WF8.0	8'-0"	21'-9"	1'-4"		8.6
WF9.0	9'-0"	26'-0"	1'-8"		14.4
WF13.0	13'-0"	22'-8"	1'-8"		18.2
WF14.0	14'-0"	216'-0"	2'-0"		224.0
					286.5
Strap Beams	Width	LF	Depth		Total Volume (CY)
SB-1	3'-0"	254'-0"	2'-6"		70.6
SB-2	2'-0"	55'-0"	2'-0"		70.6
					141.1
Floor Slabs	Area (SF)	Depth (in)			Total Volume (CY)
SOG 3500psi	20121	4.0			248.4
2nd Floor LW 4000psi	20446	4.0			252.4
3rd Floor LW 4000psi	20434	4.0			252.3
Roof 4000psi	20434	4.0			252.3
					1005.4
			Total Volume (CY)		**1797**

(R.S. Means 2008 Data for Richmond, VA)

Units	Qty	Crew	Daily Output	Labor Hours	Bare Material	Bare Labor	Bare Equipment	Bare Total	Total O & P	Total Cost
LF	117.5	E2	600	0.093	12.66	3.53	2.75	18.94	23.02	$ 2,975.34
LF	17	E2	600	0.093	23.00	3.53	2.75	28.50	35.00	$ 654.50
LF	198	E2	550	0.102	30.33	3.84	3.00	37.17	43.40	$ 9,452.52
LF	17	E2	550	0.102	44.46	3.84	3.00	51.30	58.57	$ 1,095.26
LF	7	E2	550	0.102	60.67	3.84	3.00	67.51	76.87	$ 591.90
LF	755.5	E2	1032	0.054	57.01	2.05	1.60	60.66	68.06	$ 56,561.26
LF	415	E2	550	0.102	62.24	3.84	3.00	69.08	77.92	$ 35,570.48
LF	313.5	E2	550	0.102	62.24	3.84	3.00	69.08	77.92	$ 26,870.71
LF	180	E2	984	0.057	86.30	2.15	1.68	90.13	100.21	$ 19,841.58
LF	1034	E2	880	0.064	17.73	2.40	1.88	22.01	25.73	$ 29,265.30
LF	46	E2	640	0.088	109.83	3.30	2.58	115.71	129.91	$ 6,573.45
LF	809.5	E2	990	0.057	32.95	2.14	1.67	36.76	41.61	$ 37,051.62
LF	6	E2	990	0.057	32.95	2.14	1.67	36.76	41.61	$ 274.63
LF	101	E2	900	0.062	38.18	2.35	1.83	42.36	47.92	$ 5,323.91
LF	2784	E2	1000	0.056	32.95	2.11	1.65	36.71	41.55	$ 127,242.72
LF	993.5	E2	900	0.062	39.23	2.35	1.83	43.41	49.49	$ 54,085.15
LF	23.5	E2	800	0.070	50.73	2.64	2.07	55.44	62.27	$ 1,609.68
LF	30	E2	760	0.074	84.73	2.78	2.17	89.69	100.31	$ 3,310.23
LF	312.5	E5	960	0.083	44.46	3.18	1.87	49.51	56.29	$ 19,349.69
LF	175	E5	960	0.083	50.73	3.18	1.87	55.78	63.09	$ 12,144.83
LF	199	E5	912	0.088	63.28	3.36	1.96	68.60	77.58	$ 16,982.26
LF	47	E5	912	0.088	75.84	3.38	1.98	81.19	91.50	$ 4,730.55
LF	30	E5	900	0.089	96.23	3.40	1.99	101.62	113.79	$ 3,755.07
LF	119.5	E5	1064	0.075	55.44	2.88	1.69	60.01	68.10	$ 8,951.75
LF	20	E5	1036	0.077	78.45	2.95	1.73	83.13	93.39	$ 2,054.58
LF	30	E5	1036	0.077	86.30	2.95	1.73	90.98	101.75	$ 3,357.75
LF	36	E5	1018	0.078	95.30	3.01	1.76	100.02	111.50	$ 4,415.40
LF	72	E5	1000	0.080	104.60	3.06	1.79	109.45	122.40	$ 9,694.08
LF	36	E5	1000	0.080	118.20	3.06	1.79	123.05	137.04	$ 5,426.78
LF	36	E5	1110	0.072	69.56	2.76	1.31	73.93	82.96	$ 3,285.22
LF	222	E5	1110	0.072	96.23	2.76	1.61	100.60	112.25	$ 27,411.45
LF	117	E5	1080	0.074	106.69	2.83	1.65	111.17	123.93	$ 15,949.79
LF	72	E5	1190	0.067	106.69	2.57	1.51	110.77	123.30	$ 9,765.36
LF	30	E5	1190	0.067	119.24	2.57	1.51	123.32	136.90	$ 4,517.70
LF	295	E5	1200	0.067	125.52	2.55	1.50	129.57	144.17	$ 46,783.17
LF	107.5	E5	1200	0.067	137.03	2.55	1.50	141.08	156.72	$ 18,532.14
LF	39	E5	1160	0.069	156.90	2.64	1.54	161.08	178.89	$ 7,674.38
										$ 643,132.17

Area (SF)	Unit	Crew	Daily Output	Labor Hours	Bare Material	Bare Labor	Bare Equipment	Bare Total	Total O&P	Total Cost
20446	SF	E4	2700	0.012	4.01	0.48	0.05	4.54	5.31	$ 119,425.09
20434	SF	E4	2700	0.012	4.01	0.48	0.05	4.54	5.31	$ 119,354.99
20434	SF	E4	3865	0.008	1.83	0.33	0.03	2.19	2.66	$ 59,789.88
										$ 298,569.96

QTY	Unit	Crew	Daily Output	Labor Hours	Bare Material	Bare Labor	Bare Equipment	Bare Total	Total O&P	Total Cost
20446.00	SF	C14F	3425	0.021	1.35	0.76	0.01	2.12	2.63	$ 59,150.28
504.69	CY				152.87			152.87	167.24	$ 92,845.04
504.69	CY	C20	140	0.457		8.87	5.85	14.72	20.12	$ 10,154.39
252.27	CY				108.76			108.76	120.04	$ 33,310.95
252.27	CY	C20	140	0.457		8.87	5.85	14.72	20.12	$ 5,075.70
792.10	CY				105.68			105.68	115.94	$ 101,019.41
792.10	CY	C20	1150	0.427		8.27	5.48	13.75	18.8	$ 14,891.44
										$ 316,447.22

Structural Steel Takeoff

Designation	Member	Length (ft)	Qty
W	10x45	11	2
W	10x45	11.5	1
W	10x45	13	2
W	10x45	14	2
W	10x45	28	1
W	10x45	29	1
W	10x45	30	5
W	10x45	45	4
W	10x45	46	2
W	10x45	47	3
W	10x45	48	1
W	10x49	13	2
W	10x49	14	1
W	10x49	29	2
W	10x49	45	5
W	10x49	46	2
W	10x54	13	4
W	10x54	14	2
W	10x54	46	1
W	10x54	46.5	1
W	10x54	47	3
W	10x60	45	4
W	12x16	4	1
W	12x16	6	3
W	12x16	7	1
W	12x16	7.5	6
W	12x16	8	2
W	12x16	9	4
W	12x16	11	16
W	12x16	12	2
W	12x16	13	1
W	12x16	14	15
W	12x16	15	19
W	12x16	20	10
W	12x87	46	1
W	14x22	5.5	1
W	14x22	6	1
W	14x22	8	1
W	14x22	8.5	14
W	14x22	11	1
W	14x22	14	1
W	14x22	15	1
W	14x22	20	13
W	14x22	21	12
W	14x22	23	1
W	14x22	24	4
W	14x26	6	1
W	14x26	15	1
W	14x30	16.5	2
W	14x30	29	1
W	14x30	39	1
W	16x26	20	2
W	16x26	21	1
W	16x26	24	9
W	16x26	26	2
W	16x26	29	5
W	16x26	30	76
W	16x31	13.5	1
W	16x31	14	2
W	16x31	24	1
W	16x31	29	1
W	16x31	29.5	2
W	16x31	30	28
W	16x40	23.5	1
W	16x77	30	1
W	17x84	36	1
W	18x35	7	1
W	18x35	20	1
W	18x35	21	1
W	18x35	22	1
W	18x35	24	2
W	18x35	25	3
W	18x35	29.5	1
W	18x35	30	3
W	18x40	23	1
W	18x40	24	3
W	18x40	25	2
W	18x40	30	1
W	18x50	20	2
W	18x50	24	1
W	18x50	25	3
W	18x50	30	2
W	18x60	23.5	2
W	18x76	30	1
W	21x44	29.5	1
W	21x44	30	3
W	21x62	20	1
W	21x68	30	1
W	21x73	36	1
W	21x83	36	2
W	21x93	36	1
W	24x55	36	1
W	24x76	36	4
W	24x76	39	2
W	24x84	39	3
W	27x84	36	2
W	27x94	30	1
W	30x108	35.5	1
W	30x108	36	2
W	30x124	39	1
W	30x90	35.5	4
W	30x90	36	1
W	30x90	39	3
W	8x10	3	2
W	8x10	4	4
W	8x10	6	2
W	8x10	9.5	3
W	8x10	13	1
W	8x10	14	3
W	8x18	17	1
W	8x24	6	1
W	8x24	7	6
W	8x24	8	6
W	8x24	11	1
W	8x24	12	1
W	8x24	15	3
W	8x24	17	2
W	8x35	17	1
W	8x48	7	1