Technical Assignment One
Construction Management
October 5, 2009

Upper Dublin High School

Upper Dublin School District
Fort Washington, PA

Stephen Kelchaw
The Pennsylvania State University
Architectural Engineering
Construction Management Option

Faculty Adviosr:
Dr. David Riley

Table of Contents

List of Figures

List of Tables

Executive Summary

In need of major improvements to a much outdated high school, the Upper Dublin School District decided to invest in a five-year project from design to completion of a new high school. During the summer of 2007, an architect and a construction manager was hired to start conceptual designs for this project. Throughout the design process goals and standards were set. This facility would be built on the existing high school site and would encompass 368,000 square feet of area. The budget allotted from taxpayer money and grants turned out to be approximately $119.2 million for the entire project. As was stated earlier, goals and standards were set, with one of them being an ambitious goal of obtaining a LEED Silver rating for the new building. This would be an attractive finish to this project to update and replace the current facilities.

In order to obtain a LEED Silver rating for this building, many efficient technologies and concepts were used. For one, all the heating and cooling of the building is run through 320 geothermal wells. To save some of the energy from the conditioned air in the building, eleven Energy Recovery Units (ERU's) were installed. This helps to reduce the amount of energy needed to heat and cool the outside air by reusing some of it. All areas of the building are equipped with occupancy sensors and photosensors. These are only a few of the many ideas used on this project.

Due to the large scale and time span of this project, the schedule had to be divided into multiple phases. There are two major phases, with each being broken down into different subsections. Each phase begins with asbestos abatement and demolition of the old building, followed by placement of the foundation and the structural steel system. This must be done to ensure that the student of the Upper Dublin High School have full access to the needed facilities, whether in the new building or the old one, throughout the entire project. As more of the old building is demolished, more of the new building will be constructed and operational to replace it.

Square foot estimates were made for this project. The RS Means estimate was deemed inadequate due to the size of this project being well out of the recommended range for the model used. This led to an estimate equal to less than half of the actual project cost. The D4Cost estimate was much more successful, because it allows you to compare the project being estimated to actual projects of the same size and type. This estimate was still slightly low. Possible reasons for this occurrence can be partially due to the higher end sustainable equipment being used for this project. Since they are trying to meet LEED requirements, more upfront costs are associated.

This project is being delivered as a design-bid-build with multiple prime contracts. This is the preferred method of construction for a high school project in this area. Construction parking is available throughout the entire project on the north-eastern side of the project. Construction entrances will vary based on the phase of the project. Overall, this project has been extremely successful up to this point. Credit for this can be given to the thoroughness of the construction manager in his responsibilities as well as organization and strategic planning. The project is on time and on budget, which are the expectations of the owner.

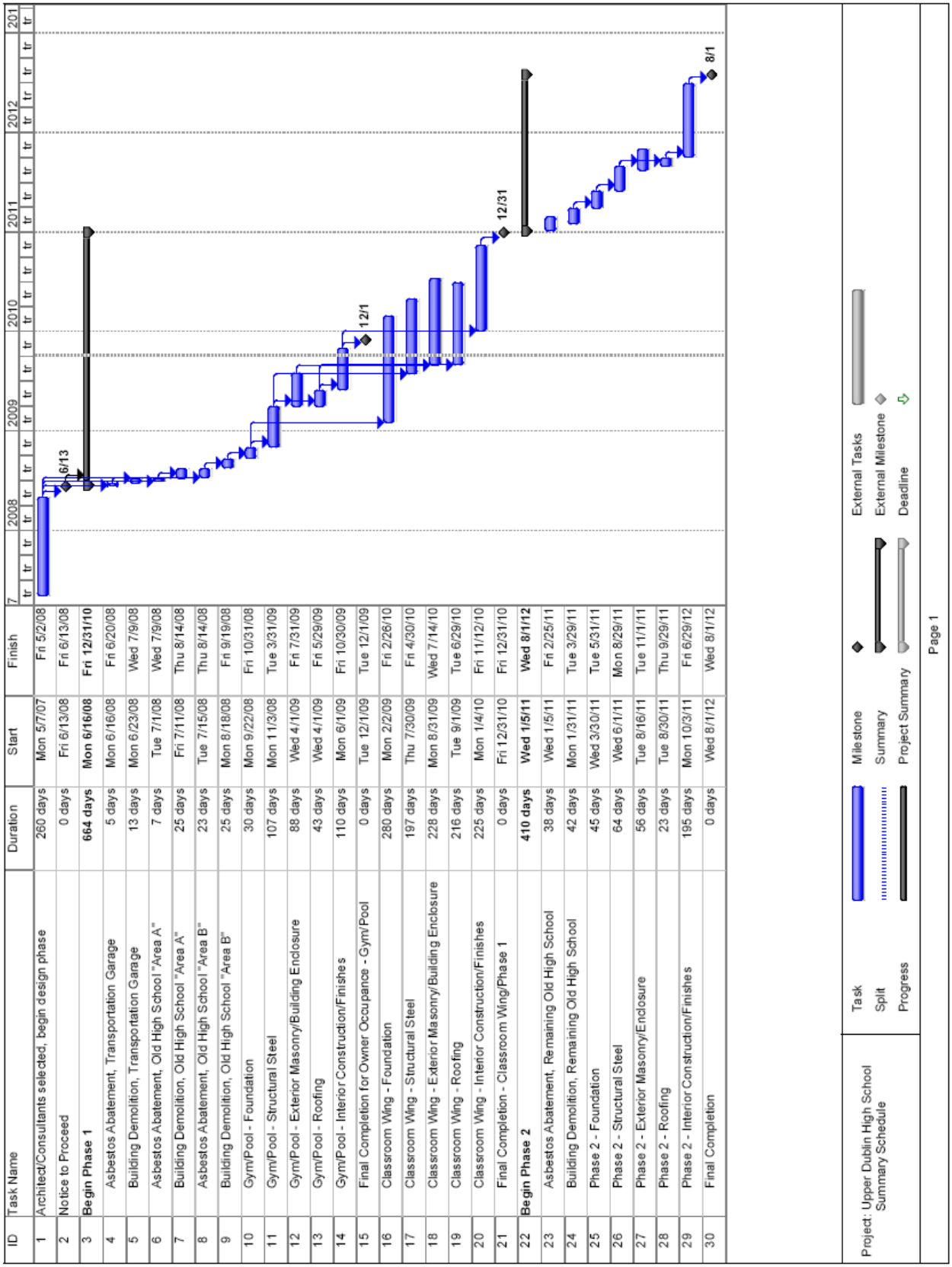


Figure 1: Project Summary Schedule

Project Schedule Summary

Due to the complexity and long time frame of this project, it has been split into two major phases. These two phases are then split up into many smaller sub-phases. For this reason, creating a summary schedule with such a limited number of tasks is difficult to really encompass the thoughtfulness and careful planning that went into this project. The project summary schedule shown in **Figure 1** highlights the major activities and milestones throughout the project. In the following paragraphs, the key elements of three major construction activities of construction will be analyzed. To see a complete breakdown of all milestones and phasing activities throughout construction, see the phasing drawings in **Appendix A**.

Foundation:

Prior to the placement of the foundation during any of the phases of construction, asbestos abatement and demolition of part of the old high school must be done first. This is an important part of the schedule, especially when dealing with the existing high school as to not disrupt the portion of the building that will stay intact until a future phase. Once the old building has been demolished and moved, excavation for the spread footings can be started. As a result of soil testing, the water table in this area has been found to be sufficiently deep enough to extend below and of the footing depths. This reduces the concern of having to remove groundwater from any of the excavated trenches before and during placement of the concrete. The foundation sequence begins with the foundation for the gymnasium and natatorium on the northern side of the project site. In progressive stages, the foundation will be placed in a flow from the north to south end of the project site. This does not take place continuously, because portions of the old high school need to stay intact throughout construction until portions of the new high school can be utilized.

Structural:

Once a section of the footing has been completed for a particular phase, the structural steel frame installation can proceed. The height of this building is not as much a problem as the width when it comes down to crane selection. Since a main road borders the westerns side of the project site, the only spot for a crane location is along the eastern side of the project. This location will be the future site of parking lots and bus drop off points, so there is sufficient space for a standard crawler crane to move about. Placement of the steel will start with all the columns, followed by the beams and joists for each phase. This will also follow a flow from the western side of the high school to the eastern side. This will eliminate the need to place steel over existing pieces. Once most of the structural steel has been set, the exterior CMU installation must begin. This is necessary, due to the fact that some of the CMU is load bearing and will support some of the steel structure. Once the load bearing CMU has been put in place, the rest of the steel can be as well. The sequence between the structural steel and CMU installation should be timed accordingly to allow for the CMU supported steel to be put in place as the steel structure allows it. The CMU cannot be installed before the steel because the block is fastened to the steel system through masonry ties. A detail of how the structural steel is supported by the CMU wall can be seen in the Building Systems Summary section, **Figure 3**. A detail of a typical corner assembly that shows how the CMU is secured to the steel can be found in the same section, **Figure 4**.

Finishes:

Due to the size of this building and the fact that some of the new high school will be used before the entire building is complete, the interior mechanical and electrical systems must be split into zones. This will allow the finished section of the building to be maintained before the full completion. The finish sequence for each phase will go as follows:

- The Energy and Heat Recovery Units (ERU and HRU) with be set in place.
- All interior wall frames will be constructed.
- All rough-in MEP work will be completed. This will begin with the installation of the ductwork, followed by the fire suppression and plumbing. Finally, all electrical and telecommunication lines can be run.
- All exterior walls will be insulated.
- Drywall will be applied to all applicable surfaces, and the ceiling grid will be put into place.
- The painting sequence can now begin.
- All MEP terminations can be completed.
- The final floor material will be put into place.

This sequence will continue in the same manner from phase to phase. Since there are certain deadlines for building occupancy, sections of the building must be finished with a higher priority than others. The gymnasium and natatorium are the first areas of the new building that will be used, so a higher concentration will need to be placed in this area before moving into the adjoining classroom wings.

Table 1: Building Systems Summary

Yes	No	Work Scope
X		Demolition Required?
X		Structural Steel Frame
X		Cast in Place Concrete
X		Precast Concrete
X		Mechanical System
X		Electrical System
X		Masonry
	X	Curtain Wall
	X	Support of Excavation

The purpose of this section is to provide a description of the key aspects of the design and construction for this project. The following paragraphs will summarize each of the items used on this project contained in the above table.

Demolition Required:

The construction of the new Upper Dublin High School is located on the site of the existing high school. Therefore, the demolition of the old structure is needed to make way for the new one. Since this job will take approximately four years to complete, the construction of the new school will be done in multiple phases. The first phase (Phase IA) will begin with the demolition and asbestos abatement of the bus garage and a partial section of the old high school located in approximately the north corner of the site. This will make way for the construction of the new gymnasium and natatorium. In a similar manner, all new phases of demolition and construction will work continuously from the northern to the southern corner of the site.

Although this may seem odd to do the demolition and construction in multiple phases, this is completely necessary as to not disrupt classes for the high school students present during the length of the project. The goal with this method is to keep students in the old building as long as possible until a section of the new high school is completed. Once this is done, students will be able to utilize parts of the new building, while more demolition and construction take place. The phasing plan will better be described in the section "Site Plan of Existing Conditions" and in the site layout drawings found in **Appendix E**.

As a part of the LEED requirement, all stone and masonry from the demolition of the old building will be crushed and used as a fill material for the new high school. Materials such as metals, glass, wood, etc. will be recycled as well.

Structural Steel Frame:

The structural system of this building consists of a steel frame with load-bearing CMU block walls. Most of the structural steel contained in this building is dedicated to the floor and roof frame construction, but there are also many W-series structural steel

columns located throughout the building. The structural steel members that support most of the second floor (40 pounds per square foot classroom live load) are W18x35 I beams spanning approximately 30 feet with 6 foot spacing. Typical floor assemblies are made up of one of two different assemblies. Floor construction type F-1 is 1.5 inch, 20 gage composite decking and 4.5 inches NW concrete topping with 6x6 W2.1xW2.1 WWF. This provides a total floor thickness of 6 inches. Floor construction type F-2 is 2 inch, 18 gage composite decking and 3.25 inches LW concrete topping with 6x6 W1.4xW1.4 WWF. This provides a total floor thickness of 5.25 inches. These floor types are based on the loading in that particular area of the building.

The roof construction takes on many different shapes due to its varying architectural design. There are multiple flat and curved roofs situated around the building. All roof construction consists of a structural steel frame with one of the several assemblies listed below:

- Roof Type R-1: 1.5 inch, 20 gage, Type B roof deck
- Roof Type R-2: 2 inch, 16 gage, ER2RA
- Roof Type R-3: 2 inch, 20 gage, ER2RA
- Roof Type R-4: 3.5 inch, 18 gage, EPIC ER3.5A
- Roof Type R-5: 2 inch, 18 gage, ER2R
- Roof Type R-6: 2 inch, 18 gage, ER2RA
- Roof Type R-7: 3 inch, 20 gage, Type N roof deck

As was just mentioned, the structural steel frame for the roof varies throughout the building due to its loading and architectural design. Some of the typical variations seen throughout the building are 68DLH19 bar joists above the gymnasium and natatorium spaces, and 22K5 bar joists. Depending on the structural needs, there are also a variety of W-series I beams in certain locations. Finally, curved steel trusses were used to support and create the arched roofs found on the building.

Since this is such a large building and there are many heavy structural steel members, such as the roof trusses above the gymnasium and natatorium, a crawler crane will be used throughout construction. The western side of the building is adjacent to a main street, so the only position for the crane is on the rear side (eastern) of the building. This area will be the future site of a parking lot and a bus drop-off point, so there is more than sufficient space for the crane to move around. Also, by placing the crane here, there is no worry about the swing radius being over any area other than the construction site.

Cast in Place Concrete:

Most of the cast in place concrete on this project can be found in the foundation and first floor. The foundation is made up of spread footings that range in size from 4'x4' all the way up to 20'x20' to support either a structural steel column or a load-bearing CMU wall. These footings also range from 1' to 5' in depth. Most of the first floor is made up of a 4 in slab on grade with 6x6 - W2.9xW2.9 WWF on 4 inches drainage fill and vapor retarder. As was mentioned earlier in the Structural Steel Frame section, the second floor also has cast in place concrete on metal deck. This varies between two different floor assemblies. Type F-1 has 1.5 inch, 20 gage composite decking and 4.5 inches NW concrete topping with 6x6 W2.1xW2.1 WWF, for a total floor thickness of 6 inches. Floor

construction type F-2 has 2 inch, 18 gage composite decking and 3.25 inches LW concrete topping with 6x6 W1.4xW1.4 WWF, for a total floor thickness of 5.25 inches. Depending on the location of the pour, the concrete is placed either directly from the truck or with the use of a pump.

Precast Concrete:

Precast concrete can be found on the exterior surface as a profile piece that separates the lower split face CMU façade from the upper brick veneer façade. Other than precast concrete, there is also a large amount of cast stone masonry façade populated around the many main exterior entrances to the building. It is also the material that makes up the lintels and sills above and below the windows, respectively. All of the precast concrete and cast stone masonry will be incorporated with the brick and stone façade. All surrounding joints are filled with mortar and secured to the CMU back-up wall with masonry ties. The cast stone lintels are supported with steel angles, also tied into the CMU back-up wall.

Mechanical System:

One of the more interesting features of the new high school is the geothermal heat pump system. Since the Earth holds a fairly constant temperature of around 55 degree Fahrenheit all year round, this geothermal system will provide very high energy efficient heating and cooling throughout the year. This system contains a total of 320 wells at a depth of 400 feet. The wells are separated into 20 different circuits for a total of 16 wells per circuit. Each well is made from 1.5 inch SDR 11 Polyethylene pipe and connected to a 4 inch supply and return main branch of the same material. The fluid mixture is made up of a Glycol/Water mixture of 20 percent Propylene Glycol mixture with a flow rate of 3800 GPM. **Figure 2**, below, shows a typical well assembly.

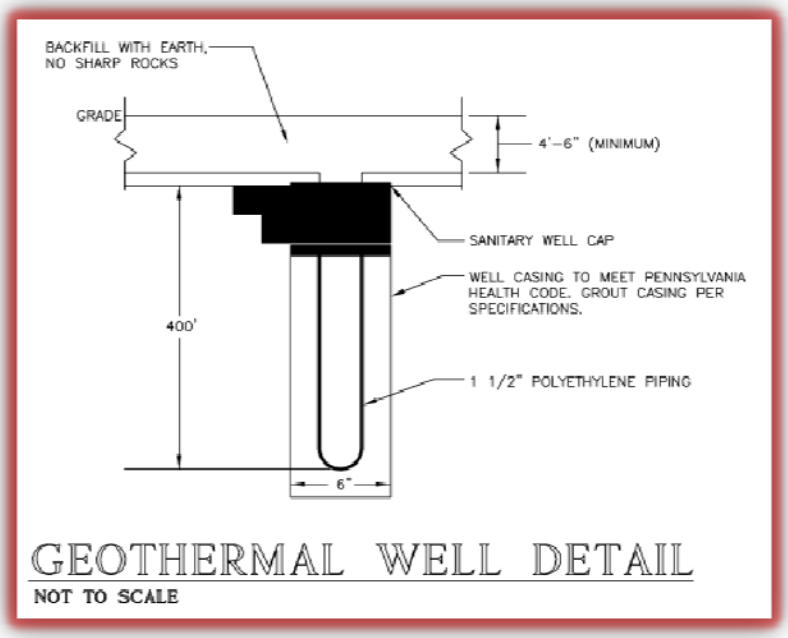


Figure 2: Geothermal Well Detail

The mechanical system also contains 11 Innovent brand Energy Recovery Units (ERU). These units help add to the efficiency of the building with the use of the enthalpy wheel. As the conditioned air leaves the building, it passes through the enthalpy wheel and, in turn, heats or cools the wheel membrane depending on the season. This wheel is constantly spinning. As it reaches the top of the unit, where the supply air flows through, the temperature of the membrane is then passed on to the incoming air. This natural process reduces the load on the building, by allowing the outside air to enter the system at a temperature closer to the indoor conditions than it would have been otherwise. There are a total of 12 Innovent brand Heating Recovery Units (HRU) throughout the building as well. These range in size from 2500-20000 CFM supply air and 2800-17000 CFM return air capacity. Most of these systems are strategically placed on the building rooftop near the location it will be serving. The remainder of the ERU's and HRU's are located in a penthouse near the gymnasium. There are several mechanical rooms located throughout the building containing heat pumps, boilers, etc. The indoor air is closely controlled through a full building Automatic Temperature Control (ATC) system along with VAV and fan powered VAV boxes.

The Upper Dublin High School has a fully automated, fire suppression system. Smoke detectors and audio/visual fire alarms are located throughout the entire building. A majority of the building, especially in all the classrooms and corridors, are equipped with quick-response concealed sprinkler heads colored to match the ceiling. This will provide a more appealing aesthetic feature instead of the sprinkler heads hanging in the open space. Due to the large size of the two floor levels, each floor is divided into multiple zones for fire protection. Each zone is fitted with a hydraulically calculated zone control valve and riser. Black steel schedule 40 piping is typical for all fire suppression lines.

Electrical:

Electrical lines are run into the building through underground power lines. Incoming power first enters a 2500 KVA 13.2KV-480/277V, 3Φ, 4W pad mounted transformer to be stepped down for distribution throughout the building. Once inside, power is run through multiple distribution centers around the building and distributed as 480/277V. This is then stepped down to 120/208V through multiple transformers. There are more than 90 panel boards to power lighting, receptacles, equipment, etc. around the building. Most of the building's lighting consists of surface mounted T8 fluorescent and CFL bulbs.

In case of emergency, there are two emergency back-up generators to power emergency lighting and equipment. There is one 250KW emergency generator in a mechanical room on the first floor, and one 450KW portable emergency generator located outside the building.

In order to create more efficient usage of lighting, occupancy sensors and photosensors are equipped throughout the entire building. This reduces the cost of wasted energy due to lights being left on in empty classrooms and bathrooms. This strategy is one of many used at the new Upper Dublin High School to meet the desired goal of LEED Silver Certification.

Masonry:

The new Upper Dublin High School contains a large amount of load bearing and non-load bearing CMU block as well as brick and cast stone veneer. Although many of the interior walls are made of drywall over steel studs, there are also many interior wall assemblies made up of concrete block. This can be found inside many of the large rooms such as the gymnasium and natatorium among others. Many of these walls act as bearing support for the steel structure. A typical load bearing CMU wall detail can be seen in **Figure 3**, below. The concrete block is properly secured to the steel structure with masonry ties. The masonry ties are fastened to the steel frame and inserted in the mortar joint between rows of CMU block. Masonry ties are also needed to connect the brick and cast stone veneer to the CMU backup wall. A typical corner detail can be found in **Figure 4**, below. Since the building is at a reasonable height, single-pole or swing stage scaffolding will likely be used.

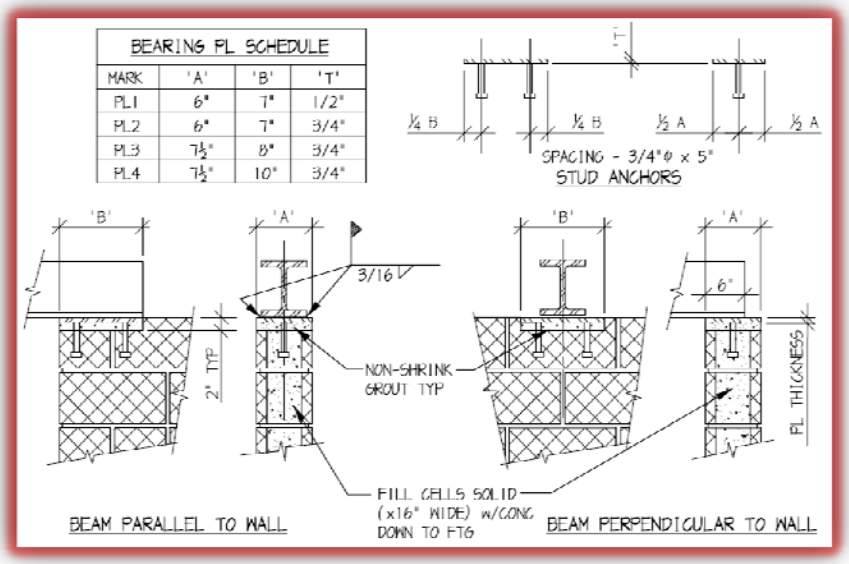


Figure 3: Steel Beam CMU Wall Bearing Details

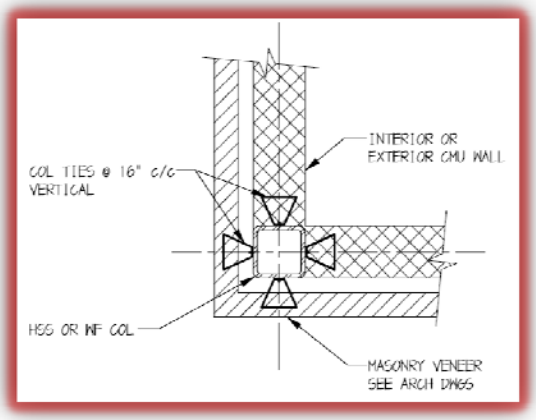


Figure 4: Col/CMU Wall Tie Detail

Due to a lack of participation from the owner, actual breakdown of the building cost could not be obtained. Instead, only a total building cost amount was provided, limiting the cost evaluation to total building costs per square foot. The construction cost and buildings system costs could not be added to this section, and therefore will not be included in this cost analysis. Since this project is being built on the site of the old high school, there was no land costs associated with this project.

Total Building Square Footage: 368,000
Total Building Cost: $119.2 Million
TC/SF: $323.91

D4Cost Estimate:

Utilizing D4Cost Estimating software, a square foot estimate for the Upper Dublin High School was created. This was accomplished by going through three different high school projects that have already been constructed and that were similar to this high school project. Based on the size, location, and year of construction of this high school, the costs associated with each of the analyzed buildings were updated to reflect these changes. Finally, the three cost amounts were averaged to provide one estimate number. The table below summarizes the three buildings that were used for my analysis.

Table 2: D4Cost Estimate Buildings

Project Name	Size (SF)	Floors	Project Cost	Base Date	Location
Charles H. Flowers High School	333,000	3	$ 31,287,450	May-98	MD-Other
Central York High School	341,000	2	$ 48,533,800	Feb-03	PA-Other
Stanley High School	325,376	2	$ 73,306,767	Apr-06	MO-Kansas City

These three projects resembled the new Upper Dublin High school, both in floors and in square footage. The type of construction of these buildings also resembled that of the new high school (steel frame with CMU walls). The adjusted and averaged results can be seen in the table below. The original D4Cost Estimate sheet can be found in **Appendix B**.

Table 3: D4Cost Estimate

Code	Division Name	%	Sq. Cost	Projected Cost
00	Bidding Requirements	2.04	5.54	1,898,843
01	General Requirements	3.95	10.75	3,682,523
02	Site Work	6.24	16.97	5,816,429
03	Concrete	4.80	13.08	4,480,695
04	Masonry	8.06	21.94	7,519,786
05	Metals	5.36	14.60	5,003,633
06	Woods & Plastics	1.37	3.74	1,280,104
07	Thermal & Moisture Protection	2.93	7.98	2,734,454

08	Doors & Windows	3.21	8.72	2,989,544
09	Finishes	5.42	14.75	5,055,844
10	Specialties	0.93	2.53	868,196
11	Equipment	2.13	5.80	1,987,176
12	Furnishings	2.28	6.21	2,127,328
13	Special Construction	0.96	2.62	898,030
14	Conveying Systems	0.23	0.63	217,204
15	Mechanical	8.66	23.56	8,073,985
16	Electrical	5.95	16.21	5,553,961
21	Fire Suppression	0.82	2.24	767,683
22	Plumbing	2.82	7.67	2,627,012
23	HVAC	8.26	22.48	7,701,649
26	Electrical	7.26	19.77	6,775,852
27	Communications	1.42	3.85	1,319,837
28	Electronic Safety and Security	0.50	1.36	465,833
31	Earthwork	4.36	11.86	4,062,387
32	Exterior Improvements	6.07	16.53	5,665,297
33	Utilities	3.97	10.79	3,698,278
Total Building Cost		100.00	$272.19	$93,271,565

RS Means Square Foot Estimate:

In order to create a square foot building estimate using RS Means, an online cost estimating calculator was used (MeansCostWorks.com). Using the online calculator simplified the process and reduced the possibility of errors that may occur by performing the estimate by hand. One thing to note is that with the size of this project it was well out of the recommended range for RS Means square foot estimate Model M.570 (this source can be found in **Appendix C**. Therefore, the estimate provided for RS Means came out to be much lower than expected for this estimate. **Table 4**, on the following page, summarizes the results of the RS Means square foot estimate. The full table can be found in **Appendix D**.

Table 4: RS Means Cost Estimate

Estimate Name:	Upper Dublin High School
Building Type:	School, High, 2-3 Story with Face Brick with Concrete Block Back-up / Steel Frame
Location:	NORRISTOWN, PA
Story Count:	2
Story Height (L.F.):	15
Floor Area (S.F.):	368000
Labor Type:	Union
Basement Included:	No
Data Release:	Year 2008
Cost Per Square Foot:	$150.81
Building Cost:	$55,496,000

Costs are derived from a building model with basic components.

Scope differences and market conditions can cause costs to vary significantly.

Parameters are not within the ranges recommended by RSMeans.

		% of Total	Cost Per S.F.	Cost
A Substructure		3.70%	$4.17	$1,535,000
B Shell		29.10%	$32.79	$12,067,000
C Interiors		23.00%	$25.96	$9,553,000
D Services		40.80%	$45.95	$16,909,000
E Equipment & Furnishings		3.40%	$3.82	$1,406,500
F Special Construction		0.00%	$0.00	$0
G Building Sitework		0.10%	$0.06	$22,000
G2040	Site Development		$0.06	$22,000
	Specialties, flagpole, on grade, aluminum, tapered, 59' high			
SubTotal		100%	$112.75	$41,492,500
Contractor Fees (General Conditions,Overhead,Profit)		25.00%	$28.19	$10,373,000
Architectural Fees		7.00%	$9.87	$3,630,500
User Fees		0.00%	$0.00	$0
Total Building Cost			$150.81	$55,496,000

Evaluation:

The following paragraphs will be used to describe the findings of this cost evaluation:

The RS Means total came out to be less than half of the actual building cost and building cost per square foot. This is due to the fact that the building square footage is well out of the range for the prescribed RS Means model source. Due to this discrepancy, the RS Means estimate has been deemed useless for a project of this type and size.

The D4Cost estimate was much closer, although it was still short by nearly $25 million. This estimate seems to be much more effective because you are able to look at already completed projects with actual costs, as well as projects that are similar to the actual project being constructed. A possibly reason why the cost produced by this method is low could be due to the sustainability goals of the new Upper Dublin High School. Since they are striving for LEED Siler rating, they are using systems such as geothermal and ERU's, which can have a higher up-front cost associated.

Site Plan of Existing Conditions

The Upper Dublin High School is located on approximately 50 acres of land, north of Loch Alsh Avenue and west of Fort Washington Avenue. Bordering the site is Loch Alsh Avenue to the south, residential properties to the north, Fort Washington Expressway (SR 309) to the west, and Fort Washington Avenue to the east. The construction of the new high school requires the demolition of the existing bus garage and the old high school. This will be done in phases in order to keep the high school open during the entire length of the construction project. The site plan of the existing structures before construction can be seen in **Figure 5**, below. The overall demolition and phasing sequence can be seen in **Figure 6**. Due to the large size of this project, the multiple phasing activities, and the small size of these drawings, it would be extremely ineffective to fit all the required elements in the Technical Assignment One description in a site layout drawing. Refer to **Appendix E** for a complete, full-scale site layout drawing for each phase of construction. All existing lines for electric, sewage, etc. will be utilized for the construction of the new high school. This will limit the cost of adding new utility lines, where instead the old ones will just have to be reconnected. These utilities can easily be seen in the Utility Plans for Phase 1 and 2, located in **Appendix F**.

Figure 5: Existing Site Plan View

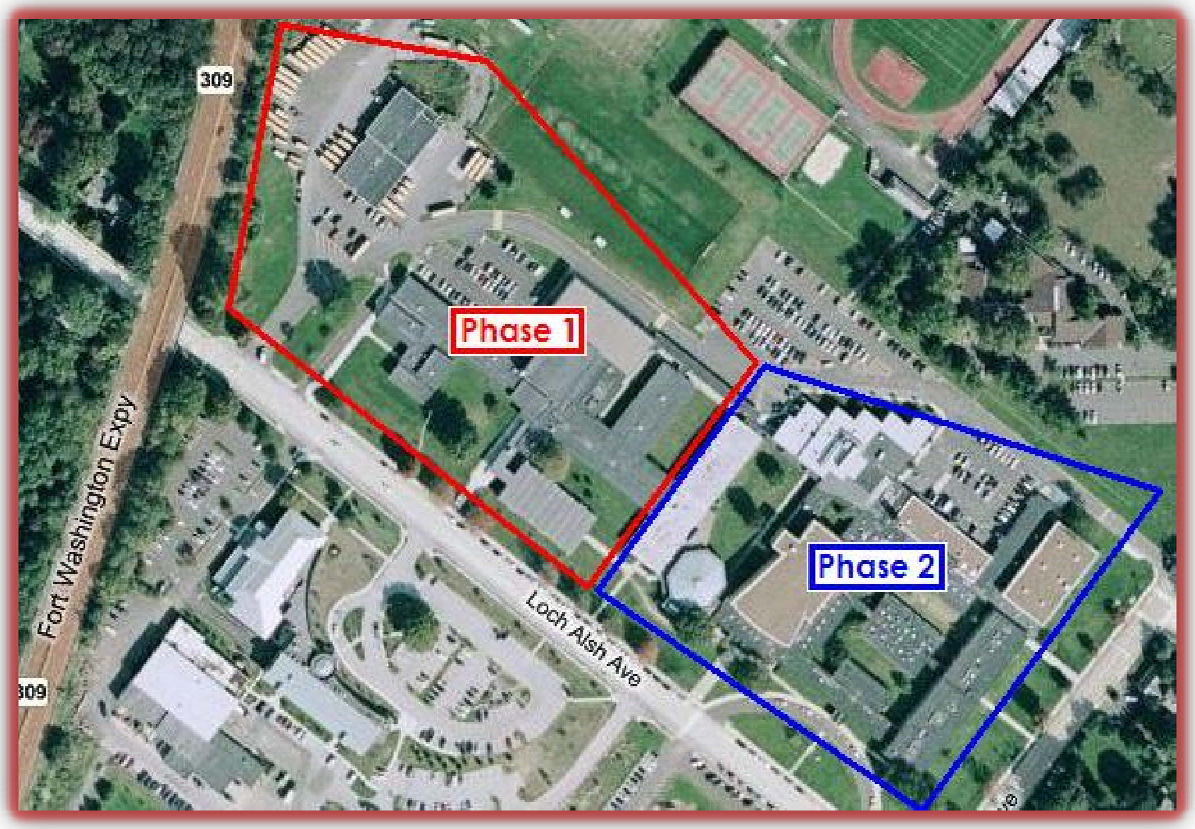


Figure 6: Existing Site Phasing Activities

Construction fences will border the entire site up to the old high school. Entrances for construction vehicles will change based on the phase. During Phase 1, the entrance for construction vehicles will be on the north side of the site off of Loch Alsh Avenue. Once Phase 1 is complete, this entrance will be closed and all future entrance to the site will be to the rear of the building off of Fort Washington Avenue. Since this is being built on the site of and existing high school, fire hydrants and lights are already in place. These will be moved accordingly during different phases of construction, but will stay in place as long as possible. Most of the parking for the existing high school is located in the Phase 2 area or directly across the street. This will not disrupt traffic flow during construction of Phase 1. During the second phase, more parking will have been created behind the building in the Phase 1 location. This is also where classes and sporting activities will commence, so pedestrian and traffic flow will once again not be disrupted.

Construction Methods:

The new Upper Dublin High school is being built in a typical fashion for the Fort Washington area. As what is standard for many schools, the structure is made from a steel frame with CMU walls. This is set atop a spread footing foundation with the first floor being slab on grade. A spread footing is sufficient in this area due to the soil type, which will be discussed in an upcoming sub-section. The exterior masonry façade is also very typical for many schools in this region. As part of the sustainability movement, this building also adds an extra level by working towards a LEED Silver rating. This is sought after in the community, because of its lowered demand on energy and natural resources, as well as its positive public appearance. This, among other things, may help to attract new students to the area causing growth in this community. The delivery style is also very typical for this area, as well as for Pennsylvania. Many schools in this state are built with multiple prime contracts. Another common delivery method in this area is through a general contractor.

Construction Parking:

Throughout the entire construction process, parking will be available on site and in the neighboring parking lots on the school property. This parking is in the rear of the building on the north-eastern corner. Parking for school faculty and students will also be available throughout construction. This parking is located in the front of the building on the other side of Loch Alsh Avenue.

Recycling and Tipping Fees:

Recycling is a requirement of this project to meet LEED qualifications, so there are multiple dumpsters on the site at all times for recyclable materials. These dumpsters are split into plastics, glass, aluminum, etc. Once the dumpsters are full, the materials will be taken to a local recycling plant for processing. Many of the materials, such as concrete and brick, from the demolition of the old high school were recycled on-site as a fill material for the foundation.

Soil/Subsurface Water Condition:

The soil on the site of the new Upper Dublin High School is located in an area of the Triassic Period Stockton Formation. This is composed of beds of red to purple sandstone, shale, and siltstone, along with light gray to buff-colored arkosic sandstone. Soil samples taken as a preliminary to construction help to confirm these conditions. Ease of excavation in this type of soil can range from easy in the highly to completely weathered rock to difficult in the moderately weathered to fresh bedrock. During core testing in the soil, no groundwater was found, even at the maximum depths explored. This reduces the costs and concerns associated with groundwater removal during construction.

Client Information

The owner of the new Upper Dublin High School is the Upper Dublin School District. The school is located in Fort Washington, PA on the site of the old, and still in use, high school. Upper Dublin is the home of the Cardinals and enrolls approximately 1,500 students with a 99% graduation rate. The mission state can be seen written below:

"The mission of the School District of Upper Dublin is to provide a safe, supportive environment for all students to become lifelong learners and contributing members of a changing society. Additionally, UDHS works very hard to ensure that its points of pride are maintained and/or exceeded during the course of the year, including:

- *Blue Ribbon School of Excellence*
- *Graduation rate of 99.9%*
- *College Placement of 96% enrolled in post-high school education*
- *Graduates admitted to high-level and elite universities, service academics and university honors programs*
- *18 AP and 29 Honors courses*
- *10% of class achieves National Merit recognition*
- *Ranked 8th in Philadelphia Magazine's 100 Best Public and Private Schools*
- *Named best High School in Montgomery County by Philadelphia Inquirer*
- *2012 completion of state-of-the-art high school with cutting-edge instructional space"*

The purpose for the construction of a new high school is ultimately to update the old and outdated high school that was built in 1948. This new high school will add much needed space and better facilities to help reach the goals mentioned in the mission statement.

During construction, UDSD would, above all, like an on-time, on-budget project that takes special care not to disrupt students in adjacent spaces throughout the entire process. Work on a construction site can be very loud. This is something that must be taken into account as school will be in session during a large part of construction. Another goal for the owner would be to have certain spaces in the new high school available before the entire process is complete. By the end of this year, construction of the gymnasium and natatorium will be complete and ready for use by the owner. This is very important to meet the deadlines set forth by many of the athletic teams in the high school. Since LEED is sought after in this project, quality is expected to be extremely high.

The schedule for this project is extremely important due to the phased occupancy requirements. As part of the new building is completed and ready for use, another section of the old building will be torn down. Coordination of these activities is extremely important to ensure that the students and faculty have all the resources they need throughout the entire process.

This project is being delivered through a design-bid-build method with multiple prime contracts. A construction manager is overlooking the whole process and working close with the owner to ensure a quality construction project is delivered. The organizational chart for this project is shown below, in **Figure 7**. This is further explained in the upcoming paragraphs.

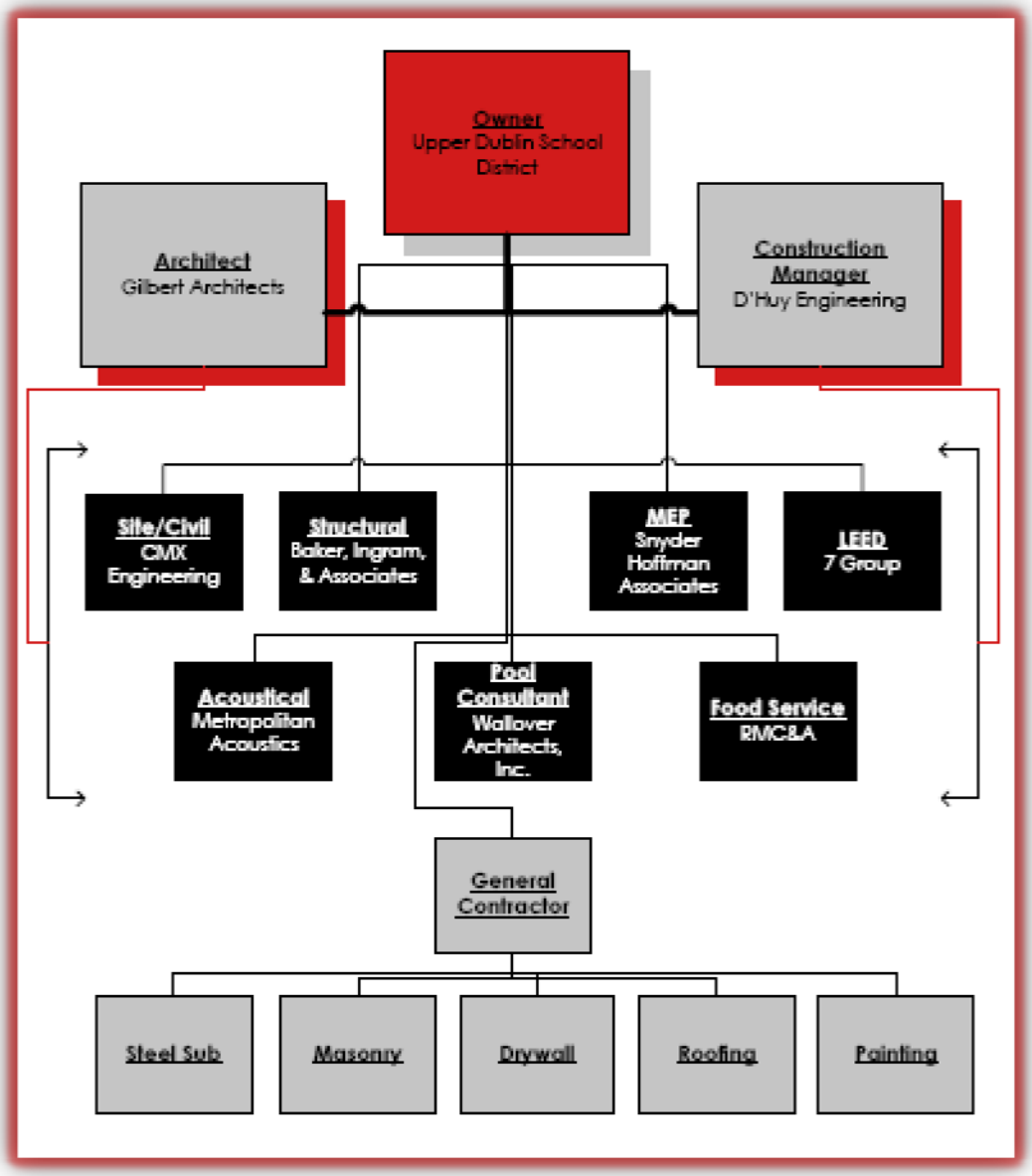


Figure 7: Project Organizational Chart

As you can see from **Figure 7**, all of the contracts go through the owner. The thick black lines from the owner to the architect and CM indicate a strong relationship directly with the owner. The architect and the CM work together to provide the owner with what they want. These lines also indicate a Lump Sum contract with the owner. The thin black

lines represent GMP contracts with the owner. The red lines to the central grouping of black boxes are consultants to the Architect/CM. They provide expert design advice in their major area of work. It is very important to have all these consultants on a project this size to ensure proper design for all of the building systems and functions. There is no contractual agreement for the red line connection.

All GMP contracts were bid separately to contractors in the surrounding area. This method of multiple prime contracts is required by state law in Pennsylvania for school construction, so this method is appropriate for the project. By using this method, the owner also has the ability to select the most qualified contractors for each area of specialty. The architect and the CM help to provide professional advice for each selection. The general contractor has his own subcontractors throughout the construction of this project. Finally, for general insurance purposes, performance bonds were required for this project. A copy of the performance bond agreement document can be found in **Appendix G**.

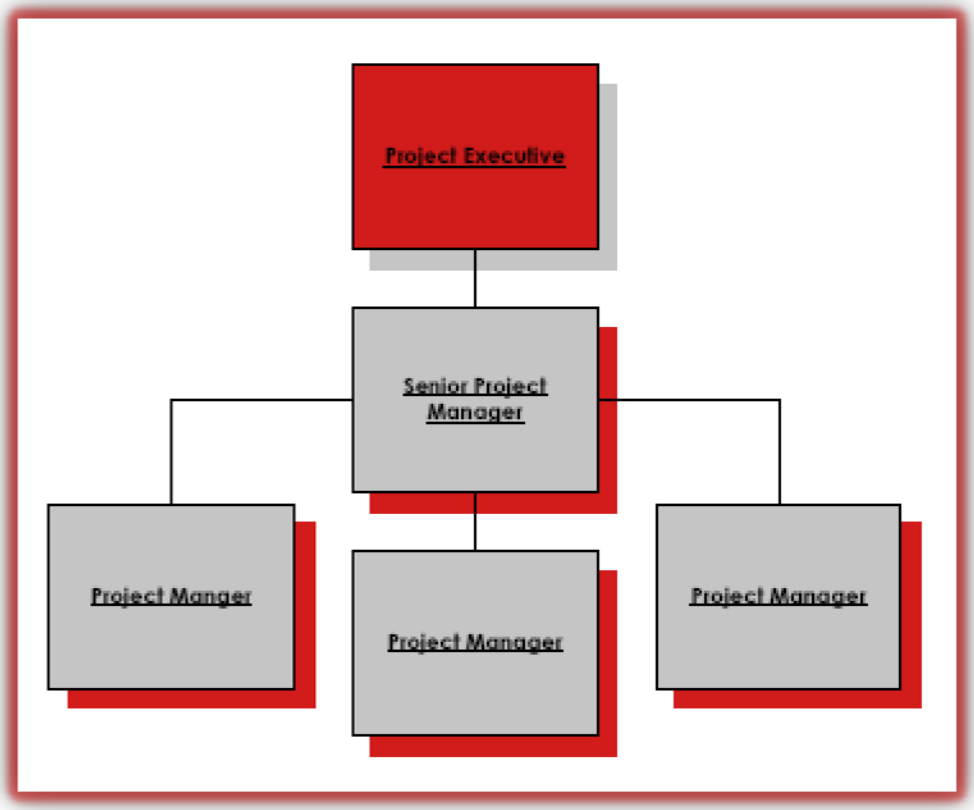


Figure 8: CM Organizational Chart

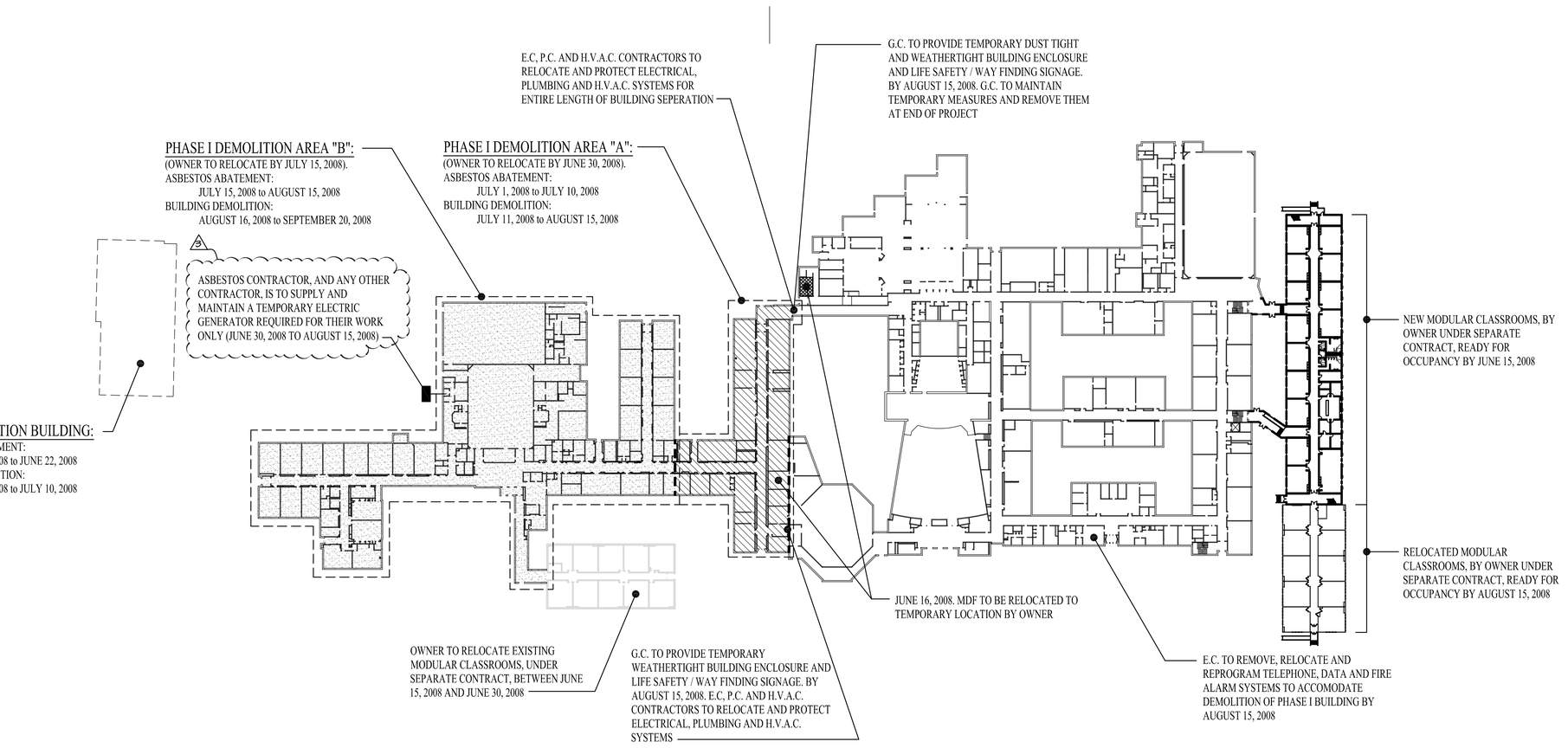
As you can see in **Figure 8**, above, the staffing plan for the Construction Manager (D'Huy Engineering) composes of different levels of project managers. This professional staff works together to implement the best strategy for each situation on the project. This is done on the field and through D'Huy Engineering's web-based project management software. This software allows them to keep all project information in one localized place for everyone on the project to access. This makes communication and general project knowledge much easier.

D'Huy Engineering has been part of the entire process of this project, from conceptual design and consulting to selection of subcontractors for the project. D'Huy is responsible for scheduling and implementation of the site phasing plans. They are also in charge of general project management duties, such as checking on LEED requirements and handling change orders.

Throughout the summer, the CM project team provided building tours of the construction site to the people in the community. This was a great way for the people of the Upper Dublin School District to see where their tax money was going, and to be educated about all the sustainable concepts used throughout the building.

Appendix A

Milestone Phasing Activities



1 PHASE IA & PARTIAL PHASE IB (MAY 30, 2008 to SEPTEMBER 20, 2008)

SCALE: NONE

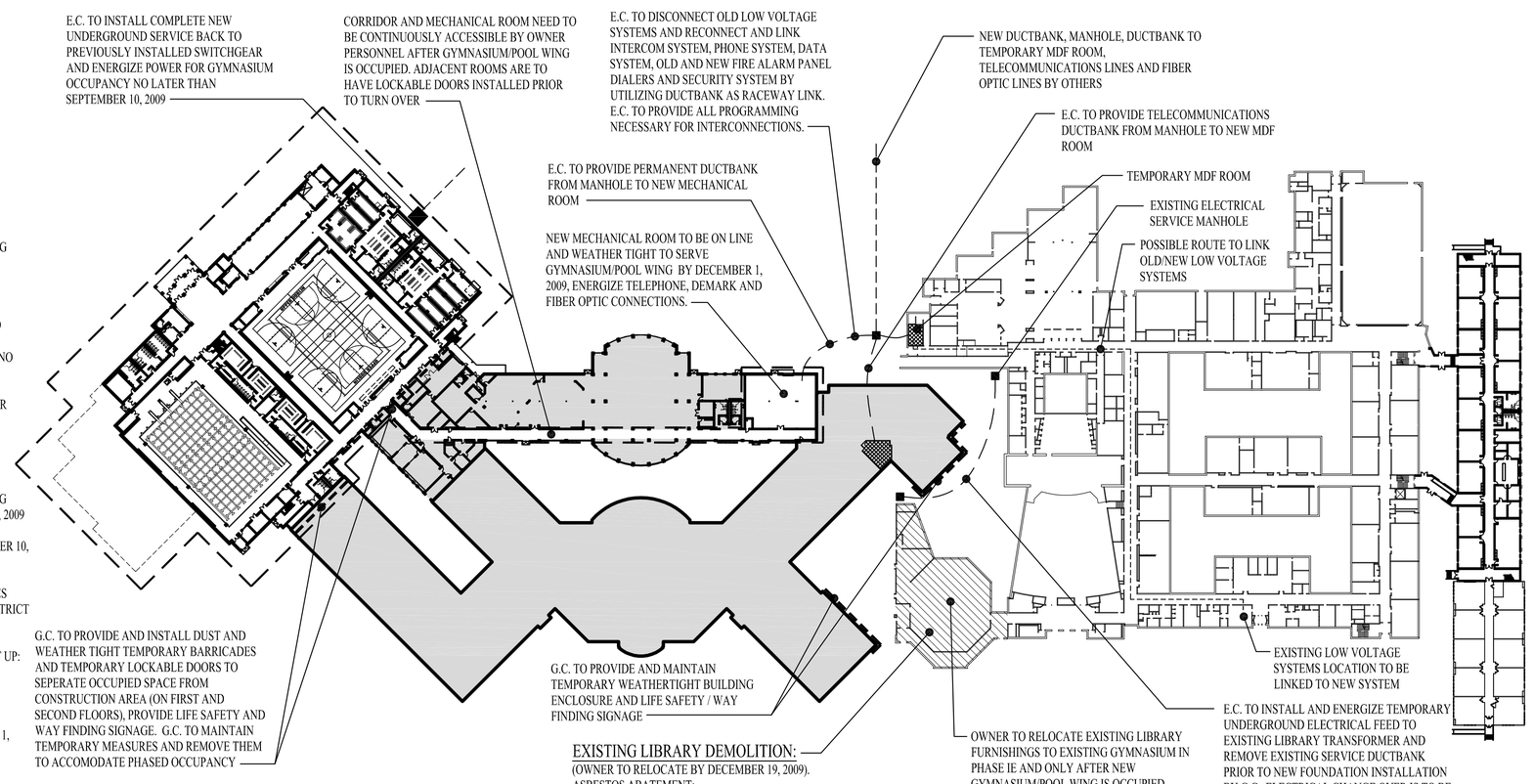
NOTE ALL PHASES:

E.C. WILL BE RESPONSIBLE FOR ALL TEMPORARY / PERMANENT CONNECTIONS, WORK OR PROGRAMMING TO PROVIDE OPERATION OF PHONES, FIRE ALARM, SECURITY, CLOCK AND INTERCOM SYSTEMS THROUGHOUT THE CONSTRUCTION PERIOD TO PERMIT EACH PHASE OF DEMOLITION AND KEEP SYSTEMS FUNCTIONING FOR OCCUPANCY.

M.C. TO COMPLETE TEMPORARY / PERMANENT WORK AND MODIFICATIONS TO HVAC SYSTEMS, DUCTWORK, EQUIPMENT AND CONTROLS TO MAINTAIN OPERATION IN OCCUPIED PORTIONS OF THE BUILDING FOR EACH PHASE OF DEMOLITION AND KEEP SYSTEMS FUNCTIONING FOR OCCUPANCY.

P.C. TO COMPLETE TEMPORARY / PERMANENT WORK AND MODIFICATIONS TO DOMESTIC WATER, ROOF DRAINS AND SANITARY SYSTEMS TO KEEP OCCUPIED PORTIONS OF THE BUILDING IN SERVICE FOR EACH PHASE OF DEMOLITION AND KEEP SYSTEMS FUNCTIONING FOR OCCUPANCY.

G.C. TO COMPLETE TEMPORARY / PERMANENT WORK AND MODIFICATIONS TO EXTERIOR BUILDING ENVELOPE, SITE INFRASTRUCTURE, ROADWAYS, EGRESS PATHS, DUST CONTROL AND SIGNAGE TO KEEP OCCUPIED PORTIONS OF THE BUILDING IN SERVICE FOR EACH PHASE OF DEMOLITION AND PROVIDE SYSTEMS FOR NEW CONSTRUCTION OCCUPANCY.



NEW GYMNASIUM / POOL WING AND NEW MECHANICAL ROOM (BOTH FLOORS) INTERIM COMPLETION MILESTONES:

FOUNDATIONS COMPLETE: NOVEMBER 1, 2008

UNDERGROUND MECHANICAL ELECTRICAL AND PLUMBING UTILITIES COMPLETE: JANUARY 1, 2009

STRUCTURAL STEEL COMPLETE: APRIL 1, 2009

BEGIN EXTERIOR MASONRY: NO LATER THAN APRIL 1, 2009

COMPLETE ROOFING TO KEEP BUILDING WEATHERTIGHT: NO LATER THAN MAY 30, 2009

EXCAVATE, FORM AND COMPLETE POOL SHELLS: NO LATER THAN JULY 1, 2009

PERMANENT AND TEMPORARY BUILDING ENCLOSURE & TEMPORARY H.V.A.C.: AUGUST 1, 2009

COMPLETE ALL MECHANICAL, ELECTRICAL AND PLUMBING ROUGH IN, IN WALLS AND ABOVE CEILINGS: SEPTEMBER 1, 2009

ENERGIZE PERMANENT POWER: NO LATER THAN SEPTEMBER 10, 2009

INSTALL ALL CEILING GRID, COMPLETE WALL ENCLOSURES AND ENERGIZE PERMANENT H.V.A.C. WITH A.T.C. ON A DISTRICT PROVIDED COMPUTER: NO LATER THAN OCTOBER 1, 2009

COMPLETE WOOD FLOOR INSTALLATION AND POOL START UP: NOVEMBER 1, 2009

SUBSTANTIAL COMPLETION: NOVEMBER 15, 2009

FINAL COMPLETION FOR OWNER OCCUPANCY: DECEMBER 1, 2009

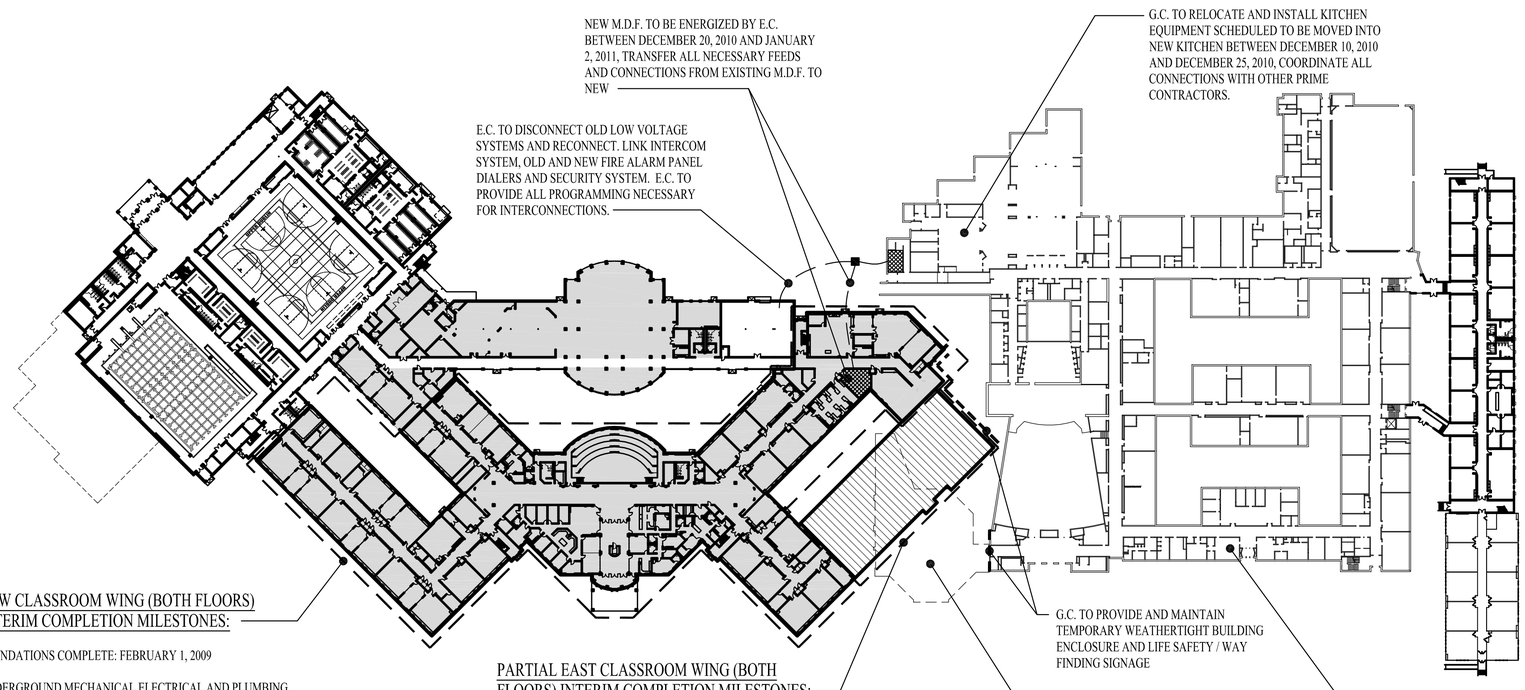
EXISTING LIBRARY DEMOLITION:

(OWNER TO RELOCATE BY DECEMBER 19, 2009).
ASBESTOS ABATEMENT:
DECEMBER 20, 2009 to JANUARY 4, 2010
BUILDING DEMOLITION:
JANUARY 5, 2010 to JANUARY 20, 2010

ALL PERMANENT SYSTEMS THAT ARE COMPLETED, COMMISSIONED AND PUT INTO OPERATION FOR PHASED OCCUPANCY WILL BE SERVICED BY THE OWNER. ALL INCOMPLETE AND TEMPORARY SYSTEMS WILL BE MAINTAINED AND SERVICED BY THE INSTALLING CONTRACTOR

2 COMPLETION OF PHASE IB to PARTIAL PHASE IE (SEPTEMBER 20, 2008 to JANUARY 10, 2010)

SCALE: NONE



NEW CLASSROOM WING (BOTH FLOORS) INTERIM COMPLETION MILESTONES:

FOUNDATIONS COMPLETE: FEBRUARY 1, 2009

UNDERGROUND MECHANICAL ELECTRICAL AND PLUMBING UTILITIES COMPLETE: MARCH 15, 2009

STRUCTURAL STEEL COMPLETE: NO LATER THAN JUNE 30, 2009

START EXTERIOR MASONRY: NO LATER THAN JUNE 15, 2009

COMPLETE ROOFING TO KEEP BUILDING WEATHERTIGHT: NO LATER THAN SEPTEMBER 1, 2009

COMPLETE BUILDING ENCLOSURE & TEMPORARY H.V.A.C.: NO LATER THAN NOVEMBER 15, 2010

COMPLETE MECHANICAL, ELECTRICAL AND PLUMBING ROUGH IN, IN WALLS AND CEILINGS: BEFORE JANUARY 1, 2010

ENERGIZE PERMANENT POWER: NO LATER THAN JUNE 15, 2010

ENERGIZE PERMANENT H.V.A.C. WITH A.T.C. ON DISTRICT PROVIDED COMPUTER: AUGUST 1, 2010

INSTALL ALL CEILING GRID AND WALL ENCLOSURES: AUGUST 1, 2010

INSTALL ALL FINISHES AND FINAL TERMINATIONS: NOVEMBER 15, 2010

COMPLETE AND CLEAN ALL SECOND FLOOR AREAS FOR OWNER MOVE IN: NOVEMBER 1, 2010

COMPLETE AND CLEAN ALL AREAS FOR OWNER OCCUPANCY: DECEMBER 1, 2010

PARTIAL EAST CLASSROOM WING (BOTH FLOORS) INTERIM COMPLETION MILESTONES:

FOUNDATIONS COMPLETE: MARCH 1, 2010

UNDERGROUND MECHANICAL ELECTRICAL AND PLUMBING UTILITIES COMPLETE: MARCH 30, 2010

STRUCTURAL STEEL COMPLETE: NO LATER THAN MAY 1, 2010

START EXTERIOR MASONRY: NO LATER THAN APRIL 15, 2010

COMPLETE ROOFING TO KEEP BUILDING WEATHERTIGHT: NO LATER THAN JUNE 30, 2010

COMPLETE BUILDING ENCLOSURE & TEMPORARY H.V.A.C.: NO LATER THAN JULY 15, 2010

COMPLETE MECHANICAL, ELECTRICAL AND PLUMBING ROUGH IN, IN WALLS AND CEILINGS: BEFORE SEPTEMBER 1, 2010

INSTALL ALL CEILING GRID AND WALL ENCLOSURES: NO LATER THAN OCTOBER 1, 2010

ENERGIZE PERMANENT POWER: NO LATER THAN AUGUST 15, 2010

ENERGIZE PERMANENT H.V.A.C. WITH A.T.C. ON DISTRICT PROVIDED COMPUTER: NO LATER THAN OCTOBER 1, 2010

COMPLETE AND CLEAN ALL SECOND FLOOR AREAS FOR OWNER MOVE IN: NO LATER THAN NOVEMBER 1, 2010

COMPLETE ALL FINISHES AND FINAL TERMINATIONS: NO LATER THAN NOVEMBER 15, 2010

COMPLETE AND CLEAN FOR OWNER OCCUPANCY: NO LATER THAN DECEMBER 1, 2010

ALL PERMANENT SYSTEMS THAT ARE COMPLETED, COMMISSIONED AND PUT INTO OPERATION FOR PHASED OCCUPANCY WILL BE SERVICED BY THE OWNER. ALL INCOMPLETE AND TEMPORARY SYSTEMS WILL BE MAINTAINED AND SERVICED BY THE INSTALLING CONTRACTOR

COMPLETE STAIRWELLS, ELEVATORS AND SECOND FLOOR OF PHASE I CONSTRUCTION BY NOVEMBER 10, 2010 TO PERMIT OWNER TO BEGIN MOVING AND INSTALL FURNISHINGS AND EQUIPMENT

3 COMPLETION OF PHASE IE to PHASE IH (JANUARY 10, 2010 to DECEMBER 31, 2010)

SCALE: NONE

DATE 04/04/2008

PH1.4 SHEET NO.

PROJECT NO. 0645

CAD NO.

DRAWN BY

REVISION DATE(S) 3 04/29/2008

P.D.E. PROJECT NO. 3404

BUILDING PHASING PLANS - PHASE I

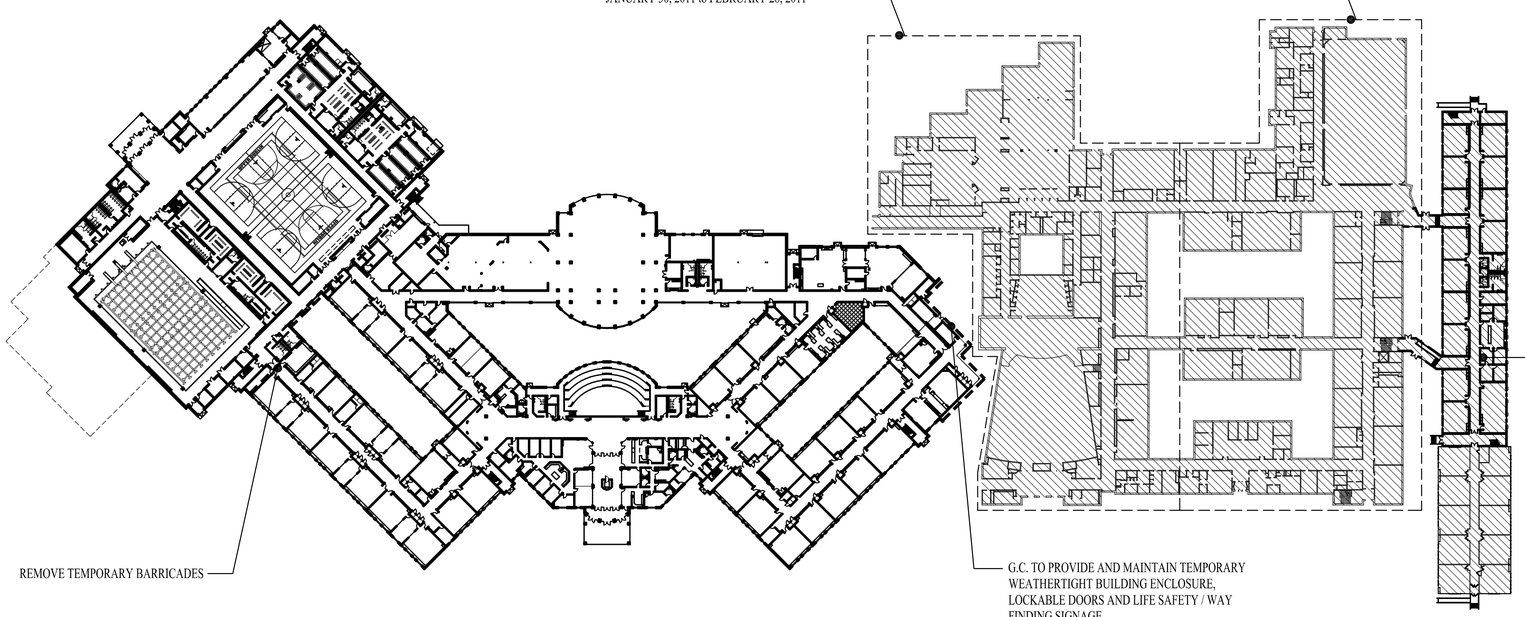
NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
TOWNSHIP OF UPPER DUBLIN, MONTGOMERY COUNTY, PA

gilbert

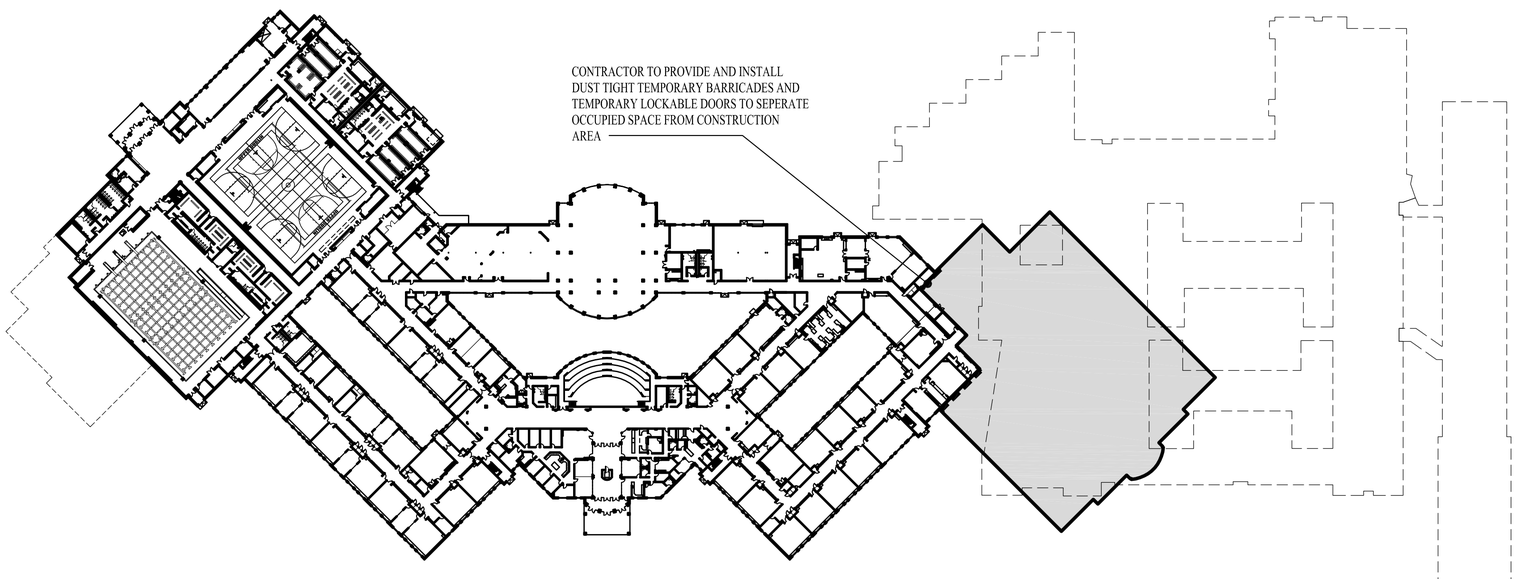
Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA17603
P: 717.291.1077 F: 717.392.3923
100 South Broad Street, Suite A
Middletown, DE 19709
P: 302.449.2492 F: 302.449.2493
10451 Mill Run Circle , Suite 400
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802

ADDENDA SET 5/13/08

D'HUY ENGINEERING, Inc.
DEI
CONSULTING ENGINEERS



4 PHASE IIA (JANUARY 3, 2011 to JUNE 1, 2011)
SCALE: NONE



PHASE II AUDITORIUM WING (ALL FLOORS, ALL AREAS) INTERIM COMPLETION MILESTONES:

FOUNDATIONS COMPLETE: JUNE 1, 2011

UNDERSLAB MECHANICAL, ELECTRICAL AND PLUMBING UTILITIES COMPLETE: JULY 15, 2011

STRUCTURAL STEEL COMPLETE: AUGUST 30, 2011

COMMENCE EXTERIOR MASONRY: NO LATER THAN AUGUST 15, 2011

COMPLETE ROOFING TO KEEP BUILDING WEATHERTIGHT: NO LATER THAN SEPTEMBER 30, 2011

COMPLETE BUILDING ENCLOSURE AND PROVIDE TEMPORARY HEAT: NO LATER THAN NOVEMBER 1, 2011

COMPLETE ALL WALL MECHANICAL, ELECTRICAL AND PLUMBING ROUGH IN: NO LATER THAN JANUARY 30, 2012

ABOVE CEILING MECHANICAL, ELECTRICAL AND PLUMBING COMPLETE: NO LATER THAN MARCH 1, 2012

COMPLETE WALL ENCLOSURES WITH (1) COAT OF PAINT AND CEILING GRID: NO LATER THAN APRIL 1, 2012

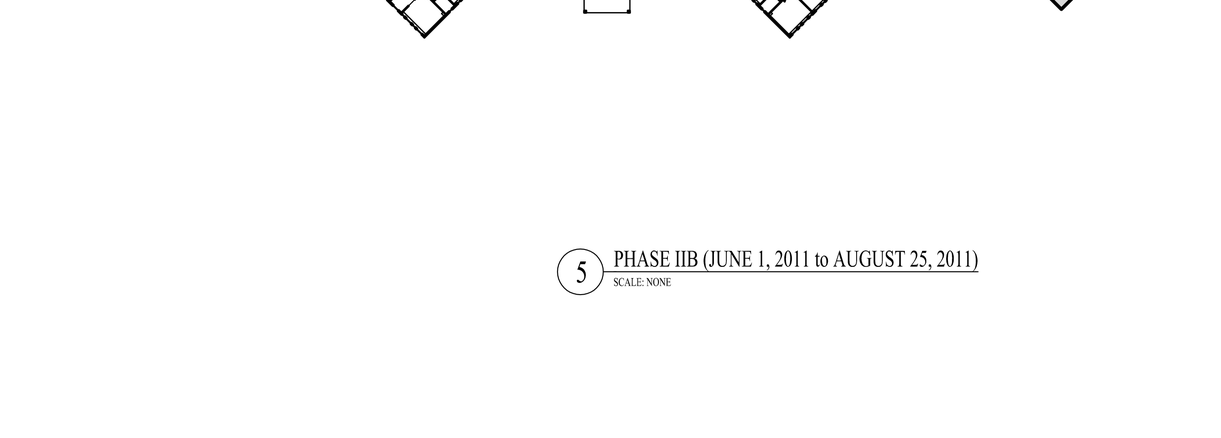
ENERGIZE PERMANENT POWER: NO LATER THAN MARCH 15, 2012

PERMANENT HVAC AND INSTALL COMPLETE A.T.C. ON A DISTRICT PROVIDED COMPUTER: NO LATER THAN MAY 1, 2012

SUBSTANTIAL COMPLETION PHASE II BUILDING FUNCTIONAL TESTING AND PUNCH LIST: JULY 1, 2012

FINAL COMPLETION PHASE II BUILDING: AUGUST 1, 2012

5 PHASE IIB (JUNE 1, 2011 to AUGUST 25, 2011)
SCALE: NONE



COMPLETE PHASE II CONSTRUCTION BY AUGUST 1, 2012

6 PHASE IIC (AUGUST 25, 2011 to JUNE 1, 2012)
SCALE: NONE

DATE 04/04/2006
PH1.5
SHEET NO.
PROJECT NO. 0646
CAD NO.
DRAWN BY
REVISION DATE(S)
P.D.E. PROJECT NO. 3404

BUILDING PHASING PLANS - PHASE II

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
TOWNSHIP OF UPPER DUBLIN, MONTGOMERY COUNTY, PA

gilbert
Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA17603
P: 717.291.1077 F: 717.392.3923
100 South Broad Street, Suite A
Middletown, DE 19709
P: 302.449.2492 F: 302.449.2493
10451 Mill Run Circle , Suite 400
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802

ADDENDA SET 5/13/08

D'HUY ENGINEERING, Inc.
DEI
CONSULTING ENGINEERS

Appendix B

D4Cost Estimate

Statement of Probable Cost

Upper Dublin High School Estimate - Jun 2008 - PA - Other

Prepared By:	**Stephen Kelchaw** **Penn State University**	Prepared For:	**Technical Assignment 1** **Chris Magent**
	, **Fax:**		, **Fax:**
Building Sq. Size:	**342669**	Site Sq. Size:	**5673690**
Bid Date:		Building use:	**Educational**
No. of floors:	**2**	Foundation:	**CON**
No. of buildings:	**1**	Exterior Walls:	**CMU**
Project Height:	**45**	Interior Walls:	**CMU**
1st Floor Height:	**14.8**	Roof Type:	**MET**
1st Floor Size:	**175000**	Floor Type:	**CON**
		Project Type:	**NEW**

Division		Percent	Sq. Cost	Amount
00	**Procurement and Contracting Require**	**2.04**	**5.54**	**1,898,843**
	Procurement and Contracting Require	2.04	5.54	1,898,843
01	**General Requirements**	**3.95**	**10.75**	**3,682,523**
	General Requirements	3.95	10.75	3,682,523
02	**Site Work**	**6.24**	**16.97**	**5,816,429**
	Site Work	6.24	16.97	5,816,429
03	**Concrete**	**4.80**	**13.08**	**4,480,695**
	Concrete	4.80	13.08	4,480,695
04	**Masonry**	**8.06**	**21.94**	**7,519,786**
	Masonry	8.06	21.94	7,519,786
05	**Metals**	**5.36**	**14.60**	**5,003,633**
	Metals	5.36	14.60	5,003,633
06	**Wood & Plastics**	**1.37**	**3.74**	**1,280,104**
	Wood & Plastics	1.37	3.74	1,280,104
07	**Thermal & Moisture Protection**	**2.93**	**7.98**	**2,734,454**
	Thermal & Moisture Protection	2.93	7.98	2,734,454
08	**Doors & Windows**	**3.21**	**8.72**	**2,989,544**
	Doors & Windows	3.21	8.72	2,989,544
09	**Finishes**	**5.42**	**14.75**	**5,055,844**
	Finishes	5.42	14.75	5,055,844
10	**Specialties**	**0.93**	**2.53**	**868,196**
	Specialties	0.93	2.53	868,196
11	**Equipment**	**2.13**	**5.80**	**1,987,176**
	Equipment	2.13	5.80	1,987,176
12	**Furnishings**	**2.28**	**6.21**	**2,127,328**
	Furnishings	2.28	6.21	2,127,328
13	**Special Construction**	**0.96**	**2.62**	**898,030**
	Special Construction	0.96	2.62	898,030
14	**Conveying Systems**	**0.23**	**0.63**	**217,204**
	Conveying Systems	0.23	0.63	217,204
15	**Mechanical**	**8.66**	**23.56**	**8,073,985**
	Mechanical	8.66	23.56	8,073,985
16	**Electrical**	**5.95**	**16.21**	**5,553,961**
	Electrical	5.95	16.21	5,553,961
21	**Fire Suppression**	**0.82**	**2.24**	**767,683**
	Fire Suppression	0.82	2.24	767,683

22	**Plumbing**	**2.82**	**7.67**	**2,627,012**
	Plumbing	2.82	7.67	2,627,012
23	**HVAC**	**8.26**	**22.48**	**7,701,649**
	HVAC	8.26	22.48	7,701,649
26	**Electrical**	**7.26**	**19.77**	**6,775,852**
	Electrical	7.26	19.77	6,775,852
27	**Communications**	**1.42**	**3.85**	**1,319,837**
	Communications	1.42	3.85	1,319,837
28	**Electronic Safety and Security**	**0.50**	**1.36**	**465,833**
	Electronic Safety and Security	0.50	1.36	465,833
31	**Earthwork**	**4.36**	**11.86**	**4,062,387**
	Earthwork	4.36	11.86	4,062,387
32	**Exterior Improvements**	**6.07**	**16.53**	**5,665,297**
	Exterior Improvements	6.07	16.53	5,665,297
33	**Utilities**	**3.97**	**10.79**	**3,698,278**
	Utilities	3.97	10.79	3,698,278
Total Building Costs		**100.00**	**272.19**	**93,271,565**
Total Non-Building Costs		**100.00**	**0.00**	**0**
Total Project Costs		--	--	**93,271,565**

Appendix C

RS Means Source Data

Costs per square foot of floor area

Exterior Wall	S.F. Area	50000	70000	90000	110000	130000	150000	170000	190000	210000
	L.F. Perimeter	850	1140	1420	1700	1980	2280	2560	2840	3120
Face Brick with Concrete Block Back-up	Steel Frame	166.05	162.30	160.10	158.65	157.65	157.15	156.55	156.10	155.75
	R/Conc. Frame	167.85	163.40	160.85	159.15	157.95	157.35	156.70	156.10	155.70
Decorative Concrete Block	Steel Frame	161.20	157.00	154.60	153.00	151.90	151.35	150.70	150.25	149.85
	R/Conc. Frame	160.00	155.80	153.45	151.80	150.75	150.15	149.55	149.00	148.65
Limestone with Concrete Block Back-up	Steel Frame	185.30	180.15	177.05	175.00	173.55	172.95	172.15	171.45	170.90
	R/Conc. Frame	189.65	184.45	181.35	179.30	177.85	177.25	176.45	175.75	175.25
Perimeter Adj., Add or Deduct	Per 100 L.F.	3.90	2.80	2.15	1.70	1.45	1.25	1.15	1.00	0.90
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	1.95	1.95	1.80	1.70	1.75	1.75	1.75	1.75	1.65
For Basement, add $31.60 per square foot of basement area										

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from $91.70 to $215.95 per S.F.

Common additives

Description	Unit	$ Cost
Bleachers, Telescoping, manual		
To 15 tier	Seat	115 - 160
16-20 tier	Seat	235 - 288
21-30 tier	Seat	249 - 300
For power operation, add	Seat	45.50 - 71.50
Carrels Hardwood	Each	660 - 990
Clock System		
20 room	Each	16,000
50 room	Each	39,100
Elevators, Hydraulic passenger, 2 stops		
1500# capacity	Each	62,800
2500# capacity	Each	66,300
Emergency Lighting, 25 watt, battery operated		
Lead battery	Each	282
Nickel cadmium	Each	805
Flagpoles, Complete		
Aluminum, 20' high	Each	1650
40' high	Each	3475
Fiberglass, 23' high	Each	1775
39'-5" high	Each	3325

Description	Unit	$ Cost
Kitchen Equipment		
Broiler	Each	4025
Cooler, 6 ft. long, reach-in	Each	4925
Dishwasher, 10-12 racks per hr.	Each	4950
Food warmer, counter, 1.2 KW	Each	735
Freezer, 44 C.F., reach-in	Each	3725
Lockers, Steel, single tier, 60" or 72"	Opening	191 - 310
2 tier, 60" or 72" total	Opening	107 - 141
5 tier, box lockers	Opening	65 - 83.50
Locker bench, lam. maple top only	L.F.	21
Pedestals, steel pipe	Each	63.50
Seating		
Auditorium chair, all veneer	Each	238
Veneer back, padded seat	Each	288
Upholstered, spring seat	Each	277
Classroom, movable chair & desk	Set	65 - 120
Lecture hall, pedestal type	Each	227 - 680
Sound System		
Amplifier, 250 watts	Each	2350
Speaker, ceiling or wall	Each	191
Trumpet	Each	365

Important: See the Reference Section for Location Factors

Model costs calculated for a 2 story building with 15' story height and 130,000 square feet of floor area

School, High, 2-3 Story

				Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE							
1010	Standard Foundations	Poured concrete; strip and spread footings		S.F. Ground	2.64	1.32	
1020	Special Foundations	N/A		—	—	—	
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base		S.F. Slab	4.74	2.37	4.2%
2010	Basement Excavation	Site preparation for slab and trench for foundation wall and footing		S.F. Ground	.17	.09	
2020	Basement Walls	4' foundation wall		L.F. Wall	78	1.19	
B. SHELL							
	B10 Superstructure						
1010	Floor Construction	Concrete slab without drop panel, concrete columns		S.F. Floor	21.80	10.90	15.7%
1020	Roof Construction	Concrete slab without drop panel		S.F. Roof	15.22	7.61	
	B20 Exterior Enclosure						
2010	Exterior Walls	Face brick with concrete block backup	*75% of wall*	S.F. Wall	30.84	10.57	
2020	Exterior Windows	Window wall	*25% of wall*	Each	67	7.64	15.8%
2030	Exterior Doors	Metal and glass		Each	1899	.42	
	B30 Roofing						
3010	Roof Coverings	Single-ply membrane and standing seam metal; polyisocyanurate insulation		S.F. Roof	11.40	5.70	4.9%
3020	Roof Openings	Roof hatches		S.F. Roof	.10	.05	
C. INTERIORS							
1010	Partitions	Concrete block	*25 S.F. Floor/L.F. Partition*	S.F. Partition	11.35	5.45	
1020	Interior Doors	Single leaf kalamein fire doors	*700 S.F. Floor/Door*	Each	875	1.25	
1030	Fittings	Toilet partitions, chalkboards		S.F. Floor	1.44	1.44	
2010	Stair Construction	Concrete filled metal pan		Flight	15,800	.73	21.0%
3010	Wall Finishes	75% paint, 15% glazed coating, 10% ceramic tile		S.F. Surface	3.10	2.98	
3020	Floor Finishes	70% vinyl composition tile, 20% carpet, 10% terrazzo		S.F. Floor	6.56	6.56	
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars		S.F. Ceiling	6.38	6.38	
D. SERVICES							
	D10 Conveying						
1010	Elevators & Lifts	One hydraulic passenger elevator		Each	80,600	.62	0.5%
1020	Escalators & Moving Walks	N/A		—	—	—	
	D20 Plumbing						
2010	Plumbing Fixtures	Kitchen, bathroom and service fixtures, supply and drainage	*1 Fixture/860 S.F. Floor*	Each	3956	4.60	
2020	Domestic Water Distribution	Gas fired water heater		S.F. Floor	.96	.96	5.2%
2040	Rain Water Drainage	Roof drains		S.F. Roof	1.22	.61	
	D30 HVAC						
3010	Energy Supply	Oil fired hot water, wall fin radiation		S.F. Floor	4.33	4.33	
3020	Heat Generating Systems	N/A		—	—	—	
3030	Cooling Generating Systems	Chilled water, cooling tower systems		S.F. Floor	14.78	14.78	16.2%
3050	Terminal & Package Units	N/A		—	—	—	
3090	Other HVAC Sys. & Equipment	N/A		—	—	—	
	D40 Fire Protection						
4010	Sprinklers	Sprinklers, light hazard		S.F. Floor	2.04	2.04	1.7%
4020	Standpipes	N/A		—	—	—	
	D50 Electrical						
5010	Electrical Service/Distribution	2000 ampere service, panel board and feeders		S.F. Floor	1.37	1.37	
5020	Lighting & Branch Wiring	Fluorescent fixtures, receptacles, switches, A.C. and misc. power		S.F. Floor	9.67	9.67	12.8%
5030	Communications & Security	Alarm systems, internet wiring, communications systems and emergency lighting		S.F. Floor	3.57	3.57	
5090	Other Electrical Systems	Emergency generator, 250 kW		S.F. Floor	.52	.52	
E. EQUIPMENT & FURNISHINGS							
1010	Commercial Equipment	N/A		—	—	—	
1020	Institutional Equipment	Laboratory casework and counters		S.F. Floor	1.59	1.59	2.0 %
1030	Vehicular Equipment	N/A		—	—	—	
1090	Other Equipment	Built-in athletic equipment , bleachers and scoreboard		S.F. Floor	.77	.77	
F. SPECIAL CONSTRUCTION							
1020	Integrated Construction	N/A		—	—	—	0.0 %
1040	Special Facilities	N/A		—	—	—	
G. BUILDING SITEWORK		**N/A**					
					Sub-Total	118.08	**100%**
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)				*25%*	29.54	
	ARCHITECT FEES				*7%*	10.33	
					Total Building Cost	**157.95**	

Appendix D

RS Means Estimate Table

Estimate Name:	**Upper Dublin High School**
Building Type:	**School, High, 2-3 Story with Face Brick with Concrete Block Back-up / Steel Frame**
Location:	**NORRISTOWN, PA**
Story Count:	**2**
Story Height (L.F.):	**15**
Floor Area (S.F.):	**368000**
Labor Type:	**Union**
Basement Included:	**No**
Data Release:	**Year 2008**
Cost Per Square Foot:	**$150.81**
Building Cost:	**$55,496,000**

Costs are derived fror

Scope differences and market conditions can cause costs to vary significantly.

Parameters are not within the ranges recommended by RSMeans.

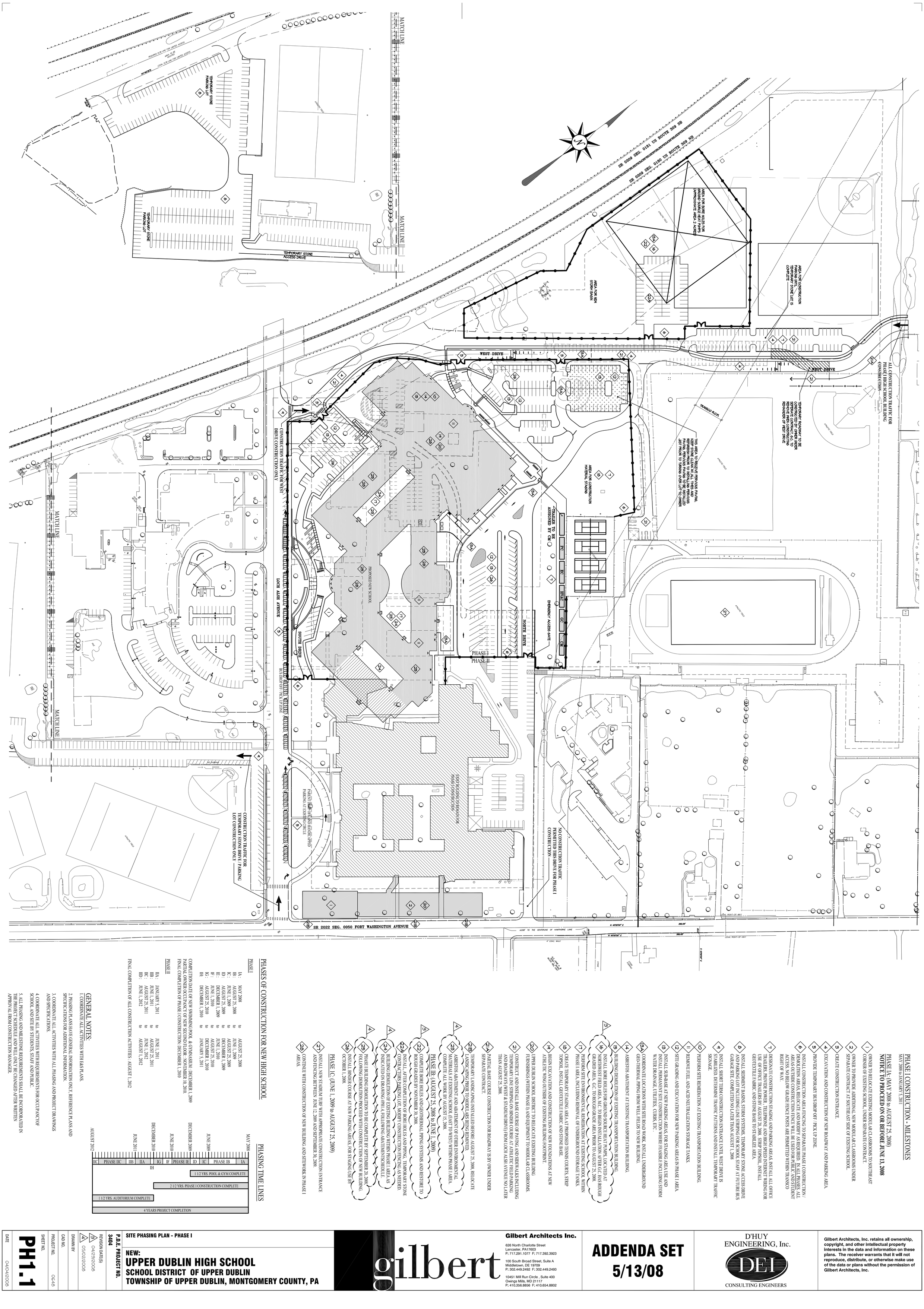
		% of Total	Cost Per S.F.	Cost
A Substructure		**3.70%**	**$4.17**	**$1,535,000**
A1010	**Standard Foundations**		**$0.90**	**$330,500**
	Strip footing, concrete, reinforced, load 5.1 KLF, soil bearing capacity 3 KSF, 12			
	Spread footings, 3000 PSI concrete, load 100K, soil bearing capacity 6 KSF, 4' -			
	Spread footings, 3000 PSI concrete, load 150K, soil bearing capacity 6 KSF, 5' -			
A1030	**Slab on Grade**		**$2.52**	**$929,000**
	Slab on grade, 4" thick, non industrial, reinforced			
A2010	**Basement Excavation**		**$0.09**	**$31,500**
	Excavate and fill, 30,000 SF, 4' deep, sand, gravel, or common earth, on site st			
A2020	**Basement Walls**		**$0.66**	**$244,000**
	Foundation wall, CIP, 4' wall height, direct chute, .148 CY/LF, 7.2 PLF, 12" thick			
B Shell		**29.10%**	**$32.79**	**$12,067,000**
B1010	**Floor Construction**		**$11.22**	**$4,127,500**
	Steel column, W8, 100 KIPS, 16' unsupported height, 31 PLF			
	Steel column, W10, 150 KIPS, 16' unsupported height, 45 PLF			
	Floor, concrete, slab form, open web bar joist @ 2' OC, on W beam and colum			
	Fireproofing, gypsum board, fire rated, 2 layers, 1" thick, 8" steel column, 3 hc			
B1020	**Roof Construction**		**$3.82**	**$1,405,000**
	Floor, steel joists, beams, 1.5" 22 ga metal deck, on columns, 25'x25' bay, 20"			
B2010	**Exterior Walls**		**$6.77**	**$2,492,500**
	Brick wall, composite double wythe, standard face/CMU back-up, 8" thick, per			
B2020	**Exterior Windows**		**$4.49**	**$1,651,000**
	Aluminum flush tube frame, thermo-break frame, 2.25" x 4.5", 5'x6' opening, 2			
	Glazing panel, insulating, 1/2" thick, 2 lites 1/8" float glass, tinted			
B2030	**Exterior Doors**		**$0.45**	**$165,000**
	Door, aluminum & glass, with transom, narrow stile, double door, hardware, 6			
	Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-0" x 7'-0" o			
	Door, steel 24 gauge, overhead, sectional, manual operation, 8'-0" x 8'-0" ope			
B3010	**Roof Coverings**		**$6.03**	**$2,218,000**
	Roofing, single ply membrane, EPDM, 60 mils, fully adhered			
	Formed roofing, zinc-copper alloy, standing seam, 2-1/2" min slope, .020" thic			
	Insulation, rigid, roof deck, polyisocyanurate, 2#/CF, 2" thick, R14.29			
	Insulation, rigid, roof deck, polyisocyanurate, tapered for drainage			
	Base flashing, aluminum, .016" thick, fabric 2 sides, .025" aluminum reglet, .03			
	Roof edges, aluminum, duranodic, .050" thick, 6" face			
B3020	**Roof Openings**		**$0.02**	**$8,000**

	Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", galvanized steel, 1			
C Interiors		**23.00%**	**$25.96**	**$9,553,000**
C1010	**Partitions**		**$5.62**	**$2,067,500**
	Concrere block (CMU) partition, light weight, hollow, 6" thick, no finish			
	1/2" fire ratedgypsum board, taped & finished, painted on metal furring			
C1020	**Interior Doors**		**$1.22**	**$450,500**
	Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0"			
C1030	**Fittings**		**$1.21**	**$445,500**
	Toilet partitions, cubicles, ceiling hung, stainless steel			
	Chalkboards, liquid chalk type, aluminum frame & chalktrough			
C2010	**Stair Construction**		**$0.56**	**$204,500**
	Stairs, steel, cement filled metal pan & picket rail, 16 risers, with landing			
C3010	**Wall Finishes**		**$3.60**	**$1,325,000**
	Painting, masonry or concrete, latex, brushwork, primer & 2 coats			
	Painting, masonry or concrete, latex, brushwork, addition for block filler			
	Wall coatings, acrylic glazed coatings, maximum			
	Ceramic tile, thin set, 4-1/4" x 4-1/4"			
C3020	**Floor Finishes**		**$6.84**	**$2,518,500**
	Carpet, tufted, nylon, roll goods, 12' wide, 36 oz			
	Carpet, padding, add to above, minimum			
	Terrazzo, maximum			
	Vinyl, composition tile, maximum			
C3030	**Ceiling Finishes**		**$6.91**	**$2,541,500**
	Acoustic ceilings, 3/4"mineral fiber, 12" x 12" tile, concealed 2" bar & channel			
D Services		**40.80%**	**$45.95**	**$16,909,000**
D1010	**Elevators and Lifts**		**$0.86**	**$316,500**
	2 - Hydraulic, passenger elevator, 2500 lb, 2 floors, 100 FPM			
	Hydraulic passenger elevator, 2500 lb., 2 floor, 125 FPM			
D2010	**Plumbing Fixtures**		**$4.78**	**$1,757,500**
	Water closet, vitreous china, bowl only with flush valve, floor mount			
	Urinal, vitreous china, wall hung			
	Lavatory w/trim, wall hung, PE on CI, 20" x 18"			
	Kitchen sink w/trim, countertop, stainless steel, 44" x 22" triple bowl			
	Service sink w/trim, PE on CI, corner floor, wall hung w/rim guard, 24" x 20"			
	Shower, stall, baked enamel, terrazzo receptor, 36" square			
	Water cooler, electric, wall hung, wheelchair type, 7.5 GPH			
D2020	**Domestic Water Distribution**		**$0.94**	**$345,500**
	Gas fired water heater, commercial, 100< F rise, 600 MBH input, 576 GPH			
D2040	**Rain Water Drainage**		**$0.37**	**$136,500**
	Roof drain, CI, soil,single hub, 4" diam, 10' high			
	Roof drain, CI, soil,single hub, 4" diam, for each additional foot add			
	Roof drain, CI, soil,single hub, 5" diam, 10' high			
	Roof drain, CI, soil,single hub, 5" diam, for each additional foot add			
D3010	**Energy Supply**		**$4.80**	**$1,768,000**
	Commercial building heating system, fin tube radiation, forced hot water, 100			
D3030	**Cooling Generating Systems**		**$15.54**	**$5,720,500**
	Packaged chiller, water cooled, with fan coil unit, schools and colleges, 60,000			
D4010	**Sprinklers**		**$2.33**	**$857,500**
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 50,000 SF			
	Wet pipe sprinkler systems, steel, light hazard, each additional floor, 50,000 SI			

D5010	**Electrical Service/Distribution**		**$0.49**	**$180,000**
	Service installation, includes breakers, metering, 20' conduit & wire, 3 phase,			
	Feeder installation 600 V, including RGS conduit and XHHW wire, 2000 A			
	Switchgear installation, incl switchboard, panels & circuit breaker, 2000 A			
D5020	**Lighting and Branch Wiring**		**$11.24**	**$4,137,500**
	Receptacles incl plate, box, conduit, wire, 8 per 1000 SF, .9 W per SF, with trar			
	Wall switches, 2.0 per 1000 SF			
	Miscellaneous power, 1.2 watts			
	Central air conditioning power, 4 watts			
	Motor installation, three phase, 460 V, 15 HP motor size			
	Motor feeder systems, three phase, feed to 200 V 5 HP, 230 V 7.5 HP, 460 V 1			
	Fluorescent fixtures recess mounted in ceiling, 2 watt per SF, 40 FC, 10 fixture			
D5030	**Communications and Security**		**$4.08**	**$1,501,500**
	Communication and alarm systems, includes outlets, boxes, conduit and wire,			
	Communication and alarm systems, includes outlets, boxes, conduit and wire,			
	Communication and alarm systems, includes outlets, boxes, conduit and wire,			
	Communication and alarm systems, includes outlets, boxes, conduit and wire,			
	Internet wiring, 2 data/voice outlets per 1000 S.F.			
D5090	**Other Electrical Systems**		**$0.51**	**$188,000**
	Generator sets, w/battery, charger, muffler and transfer switch, diesel engine			
E Equipment & Furnishings		**3.40%**	**$3.82**	**$1,406,500**
E1020	**Institutional Equipment**		**$1.56**	**$574,000**
	Architectural equipment, laboratory equipment, counter tops, acid proof, eco			
	Architectural equipment, laboratory equipment, counter tops, stainless steel			
	Architectural equipment, laboratory equipment, cabinets, wall, open			
	Architectural equipment, laboratory equipment, cabinets, base, drawer units			
E1090	**Other Equipment**		**$2.26**	**$832,500**
	1 - Flagpoles, aluminum, tapered, ground set, 40' high, excludes base or found			
	2 - Clock equipments, master time clock system, clocks & bells, 50 rooms, excl			
	1600 - School equipment, bleachers, for integral power operation, add, max			
	208 - Bleachers, telescoping, school equipment, manual, 21 to 30 tier, maximu			
	347 - Bleachers, telescoping, school equipment, manual, 16 to 20 tier, maximu			
	1045 - Bleachers, telescoping, school equipment, manual, to 15 tier, maximum			
	Architectural equipment, school equipment basketball backstops, suspended t			
	Architectural equipment, school equipment bleachers-telescoping, manual op			
	Architectural equipment, school equipment, weight lifting gym, universal, eco			
	Architectural equipment, school equipment, scoreboards, basketball, 1 side, e			
F Special Construction		**0.00%**	**$0.00**	**$0**
G Building Sitework		**0.10%**	**$0.06**	**$22,000**
G2040	**Site Development**		**$0.06**	**$22,000**
	Specialties, flagpole, on grade, aluminum, tapered, 59' high			
SubTotal		**100%**	**$112.75**	**$41,492,500**
Contractor Fees (General Conditions,Overhead,Profit)		**25.00%**	**$28.19**	**$10,373,000**
Architectural Fees		**7.00%**	**$9.87**	**$3,630,500**
User Fees		**0.00%**	**$0.00**	**$0**
Total Building Cost			**$150.81**	**$55,496,000**

Appendix E

Phasing Site Plans



PHASE I CONSTRUCTION - MILESTONES

MAY 2008 to JANUARY 5, 2011

PHASE IA: (MAY 2008 to AUGUST 25, 2008)

NOTICE TO PROCEED ON OR BEFORE JUNE 13, 2008

1. OWNER TO RELOCATE EXISTING MODULAR CLASSROOMS TO SOUTHEAST CORNER OF EXISTING SCHOOL, UNDER SEPARATE CONTRACT.
2. OWNER TO PROVIDE ADDITIONAL NEW MODULAR CLASSROOMS UNDER SEPARATE CONTRACT AT SOUTHEAST SIDE OF EXISTING SCHOOL.
3. CREATE CONSTRUCTION ENTRANCE.
4. EXCAVATION AND CONSTRUCTION OF NEW ROADWAY AND PARKING AREA.
5. PROVIDE TEMPORARY BUS DROP OFF / PICK UP ZONE.
6. INSTALL CONSTRUCTION AREA FENCING TO SEPARATE PHASE I CONSTRUCTION / DEMOLITION AREAS. RELOCATE AND MODIFY AS REQUIRED. IN ALL PHASES, ALL AREAS OUTSIDE CONSTRUCTION FENCE WILL BE USED FOR PUBLIC AND STUDENT ACCESS. NO BELOW GRADE FENCE POSTS ARE PERMITTED WITHIN TRANSCO RIGHT OF WAY.
7. DESIGNATE CONSTRUCTION STAGING AND PARKING AREAS. INSTALL ALL OFFICE TRAILERS. PROVIDE POWER, TELEPHONE AND HIGH SPEED INTERNET WIRING FOR USE OF OFFICE TRAILERS BY AUGUST 20, 2008. STRIP TOPSOIL. INSTALL GEOTEXTILE FABRIC AND STONE BASE TO STABILIZE AREA.
8. INSTALL SEDIMENT BASINS, STORM SYSTEMS, TEMPORARY STONE ACCESS DRIVE AND PARKING LOT INCLUDING LINE STRIPING FOR SCHOOL STAFF AT FUTURE BUS GARAGE SITE. COMPLETED NO LATER THAN AUGUST 1, 2008
9. INSTALL SHORT TERM CONSTRUCTION ENTRANCE UNTIL WEST DRIVE IS STABILIZED. DETERMINE TRAFFIC PATTERNS AND INSTALL TEMPORARY TRAFFIC SIGNAGE.
10. PERFORM SITE REMEDIATION AT EXISTING TRANSPORTATION BUILDING.
11. REMOVE FUEL AND ACID NEUTRALIZATION STORAGE TANKS.
12. SITE GRADING AND EXCAVATION FOR NEW PARKING AREAS IN PHASE I AREA.
13. INSTALL SUB-BASE AT NEW PARKING AREAS, FOR STAGING AREA USE, AND INSTALL PERMANENT SITE CONSTRUCTION WHERE FEASIBLE INCLUDING STORM WATER DRAINAGE, UTILITIES, CURBS, ETC.
- 3.4. COORDINATE LOCATIONS WITH SITE ROAD WORK. INSTALL UNDERGROUND GEO-THERMAL PIPING FROM WELL FIELDS TO NEW BUILDING.
14. ASBESTOS ABATEMENT AT EXISTING TRANSPORTATION BUILDING.
15. BUILDING DEMOLITION OF EXISTING TRANSPORTATION BUILDING.
- 3 16. INSTALL BORE HOLES FOR GROUND SOURCE HEAT PUMPS, LOCATED AT NORTHWEST FIELD AREA, M.C. TO BEGIN INSTALLATION AFTER G.C. HAS ROUGH GRADED AREA. G.C. TO ROUGH GRADE AREA PRIOR TO AUGUST 25, 2008.
17. PERFORM SITE ENVIRONMENTAL REMEDIATION AT EXISTING SCHOOL WITHIN PHASE I AREA, INCLUDING REMOVAL OF UNDERGROUND STORAGE TANKS.
18. CREATE TEMPORARY STAGING AREA AT PROPOSED TENNIS COURTS. STRIP TOPSOIL, INSTALL GEOTEXTILE FABRIC AND STONE BASE.
19. BEGIN EXCAVATION AND CONSTRUCTION OF NEW FOUNDATIONS AT NEW ATHLETIC WING OUTSIDE OF EXISTING BUILDING FOOTPRINT.
20. UPPER DUBLIN SCHOOL DISTRICT TO RELOCATE EXISTING BUILDING FURNISHINGS (WITHIN PHASE I) AND EQUIPMENT TO MODULAR CLASSROOMS.
21. CONSTRUCT AND INSTALL BASE COURSE OF PAVING AND SIDEWALKS INCLUDING TEMPORARY LINE STRIPING ON BINDER COURSE AT ATHLETIC FIELD PARKING AND ROADWAYS (WEST & STADIUM DRIVE) FROM LOCH ALSH AVENUE NO LATER THAN AUGUST 25, 2008.
- 2 A. PARTIAL BASE COURSE CONSTRUCTION FOR ROADWAY IS BY OWNER UNDER SEPARATE CONTRACT.
- 2 B. TEMPORARY LANDSCAPING INSTALLED BEFORE AUGUST 25, 2008. RELOCATE LANDSCAPING PRIOR TO MODULARS BEING REMOVED.
- 4 23. ASBESTOS ABATEMENT AND ABATEMENT OF OTHER ENVIRONMENTAL MATERIALS AT EXISTING SCHOOL (EAST TO WEST) WITHIN PHASE I AREA. COMPLETE ALL WORK BY AUGUST 15, 2008.

PHASE IB: (AUGUST 25, 2008 to JUNE 1, 2009)

- 3 22. COMPLETE BORE HOLES AND GEOTHERMAL PIPING SYSTEMS AND RESTORE TO ROUGH GRADES BY NOVEMBER 30, 2008.
- 22A. INSTALL, AFTER COMPLETION OF BORE HOLES AND PIPING, TEMPORARY STONE CONTRACTORS PARKING LOT. MODIFY CONSTRUCTION FENCING AS NEEDED.
- 4 24. BUILDING DEMOLITION OF EXISTING BUILDING WITHIN PHASE I AREA AS INDICATED ON DRAWING #PH1.4, FOLLOWING ABATEMENT SCHEDULE.
- 4 25. PHASE I BUILDING DEMOLITION TO BE COMPLETE BY SEPTEMBER 20, 2008. FOLLOWING DEMOLITION PROCEED WITH CONSTRUCTION OF NEW BUILDING.
26. INSTALL BINDER COURSE AT NEW PARKING AREAS, FOR STAGING USE BY OCTOBER 1, 2008.

PHASE IC: (JUNE 1, 2009 to AUGUST 25, 2009)

27. INSTALL NEW STADIUM TURF WITH APPROPRIATE CONSTRUCTION ENTRANCE AND FENCING BETWEEN JUNE 12, 2009 AND SEPTEMBER 30, 2009.
28. CONTINUE WITH CONSTRUCTION OF NEW BUILDING AND SITEWORK IN PHASE I AREAS.

PHASES OF CONSTRUCTION FOR NEW HIGH SCHOOL

PHASE I

IA:	MAY 2008	to	AUGUST 25, 2008
IB:	AUGUST 25, 2008	to	JUNE 1, 2009
IC:	JUNE 1, 2009	to	AUGUST 25, 2009
ID:	AUGUST 25 2009	to	DECEMBER 1, 2009
IE:	DECEMBER 1, 2009	to	JUNE 1, 2010
IF:	JUNE 1, 2010	to	AUGUST 25, 2010
IG:	AUGUST 25, 2010	to	DECEMBER 1, 2010
IH:	DECEMBER 1, 2010	to	JANUARY 5, 2011

COMPLETION DATE OF NEW SWIMMING POOL & GYMNASIUM : DECEMBER 1, 2009
PARTIAL OWNER OCCUPANCY OF NEW SECOND FLOOR : NOVEMBER 10, 2010
FINAL COMPLETION OF PHASE I CONSTRUCTION: DECEMBER 1, 2010

PHASE II

IIA:	JANUARY 5, 2011	to	JUNE 1, 2011
IIB:	JUNE 1, 2011	to	AUGUST 25, 2011
IIC:	AUGUST 25, 2011	to	JUNE 1, 2012
IID:	JUNE 1, 2012	to	AUGUST 1, 2012

FINAL COMPLETION OF ALL CONSTRUCTION ACTIVITIES : AUGUST 1, 2012

GENERAL NOTES:

1. COORDINATE ALL ACTIVITIES WITH E&S PLANS.
2. PHASING PLANS HAVE GENERAL INFORMATION ONLY. REFERENCE PLANS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. COORDINATE ALL ACTIVITIES WITH ALL PHASING AND PROJECT DRAWINGS AND SPECIFICATIONS.
4. COORDINATE ALL ACTIVITIES WITH REQUIREMENTS FOR OCCUPANCY OF SCHOOL AND SITE BY STUDENTS, STAFF AND PUBLIC.
5. ALL PHASING AND MILESTONE REQUIREMENTS SHALL BE INCORPORATED IN THE PROJECT SCHEDULE AND WILL ONLY BE CHANGED AFTER WRITTEN APPROVAL FROM CONSTRUCTION MANAGER.

PHASING TIME LINES

SITE PHASING PLAN - PHASE I

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
TOWNSHIP OF UPPER DUBLIN, MONTGOMERY COUNTY, PA

P.D.E. PROJECT NO. 3404

REVISION DATE(S)
3 04/29/2008
4 05/02/2008

DRAWN BY

CAD NO.

PROJECT NO. 0646

SHEET NO. **PH1.1**

DATE 04/04/2008

gilbert

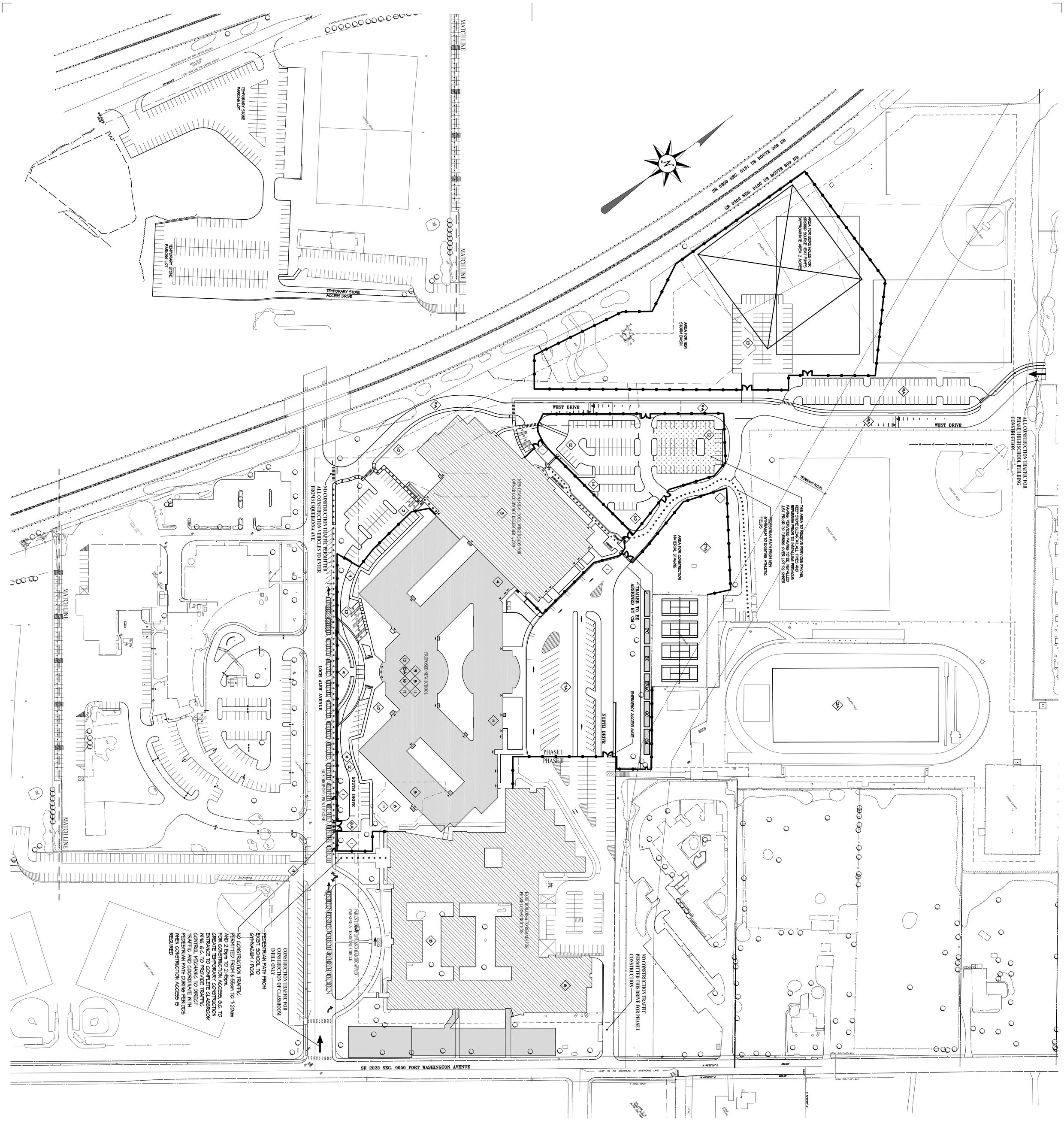
Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA17603
P: 717.291.1077 F: 717.392.3923

100 South Broad Street, Suite A
Middletown, DE 19709
P: 302.449.2492 F: 302.449.2493

10451 Mill Run Circle , Suite 400
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802

ADDENDA SET
5/13/08

D'HUY ENGINEERING, Inc.
DEI
CONSULTING ENGINEERS



PHASE ID: (AUGUST 25, 2009 to DECEMBER 1, 2009)

1 MODIFY TEMPORARY CONSTRUCTION FENCING AND PROVIDE WALKWAYS FROM PHASE I CONSTRUCTION (EXISTING SCHOOL) TO ATHLETIC WING, FOR USE BY SCHOOL.

2 RECONFIGURE FENCING AS REQUIRED. PROVIDE FINAL PAVING AND LINE STRIPING. TURN OVER SMALL PARKING AREA AT SOUTH CORNER OF NEW ATHLETIC WING FOR OWNER'S USE.

2A COMPLETE NEW STADIUM TURF AND RELATED ITEMS READY FOR OWNER OCCUPANCY NO LATER THAN SEPTEMBER 30, 2009.

3 FINAL COMPLETION DATE FOR NEW SWIMMING POOL AND GYMNASIUM DECEMBER 1, 2009.

4 THIS PORTION OF NEW BUILDING MUST BE WEATHERTIGHT, ENCLOSED, SECURE AND HEATED ADEQUATELY TO PERMIT ALL UTILITIES THAT SERVICE GYMNASIUM / POOL TO PASS THRU THIS POTION OF THE BUILDING. INSTALLATION OF ALL SYSTEMS MUST BE COMPLETE BEFORE TURNING OVER GYMNASIUM / POOL TO OWNER. OWNER'S PERSONEL MUST BE PROVIDED ACCESS TO MECHANICAL ROOM THRU REMAINDER OF PROJECT.

5 CONTINUE WITH CONSTRUCTION OF NEW BUILDING WITHIN PHASE I AREA.

PHASE IE: (DECEMBER 1, 2009 to JUNE 1, 2010)

6 OWNER TO RELOCATE EXISTING LIBRARY FURNISHINGS TO EXISTING GYMNASIUM.

6A INSTALL SHORT TERM CONSTRUCTION ENTRANCE AND CONSTRUCT STONE BASE. AT EXTENSION OF SOUTH DRIVE. INSTALL BINDER COURSE AS WEATHER PERMITS.

7 CONTRACTOR TO BEGIN ASBESTOS ABATEMENT AND DEMOLITION OF EXISTING LIBRARY. AFTER RELOCATION OF EXISTING LIBRARY, AND CONTINUE CONSTRUCTION OF PHASE I AREAS.

PHASE IF: (JUNE 1, 2010 to AUGUST 25, 2010)

8 CONTINUE WITH CONSTRUCTION OF NEW BUILDING WITHIN PHASE I AREA.

9 INSTALL NEW SITE IMPROVEMENTS AS FEASIBLE OR REQUIRED TO COMPLETE PHASE I OCCUPANCY, INCLUDING PEDESTRIAN PLAZA, ALONG LOCH ALSH AVENUE - PARKING AREAS, CURBS, SIDEWALKS, ROADS, WITHIN FENCED AREA, EXISTING CURBS, SIDEWALKS AND PARKING TO REMAIN INTACT UNTIL PHASE IID.

9A CLEAN ALL BINDER COURSE AREAS IN PARKING LOTS AND ROADWAYS. REPAIR ANY DAMAGED AREAS. INSTALL LEVELING COURSE AS REQUIRED AND PROVIDE FINAL PAVING AND STRIPING.

PHASE IG: (AUGUST 25, 2010 to DECEMBER 1, 2010)

10 PROCEED WITH SEEDING AND LANDSCAPING WITHIN PHASE I AREA.

11 FINAL CLEAN UP, INSPECTIONS AND SYSTEMS TRAINING FOR PHASE I AREA.

12 CLEAN ALL BINDER COURSE AREAS IN PARKING LOTS AND ROADWAYS. REPAIR ANY DAMAGED AREAS. INSTALL LEVELING COURSE AS REQUIRED AND PROVIDE FINAL PAVING AND STRIPING.

13 RESTORE CONSTRUCTION STAGING AND PARKING AREAS, AND CONSTRUCT FINAL WORK.

14 COMPLETE SITE IMPROVEMENTS IN PHASE I AREA.

15 NOVEMBER 30, 2010 TURN OVER PARTIAL OCCUPANCY OF NEW SECOND FLOOR TO OWNER FOR OWNER INSTALLED FURNISHINGS.

15A FINAL CLEAN UP, INSPECTIONS, AND SYSTEMS TRAINING FOR PHASE I AREAS.

16 PHASE I NEW CONSTRUCTION AREAS READY FOR OWNER OCCUPANCY DECEMBER 1, 2010.

PHASE IH: (DECEMBER 1, 2010 TO JANUARY 5, 2011)

17 OWNER TO COMPLETE MOVING OF FURNISHINGS AND EQUIPMENT TO NEW PHASE I AREAS.

17A CONSOLIDATE AND MAINTAIN CONSTRUCTION STAGING AREA, RELOCATE ALL CONSTRUCTION STAGING TO PHASE II BY APRIL 30, 2011

18 CONTRACTOR COORDINATION FOR PHASE II CONSTRUCTION.

PHASES OF CONSTRUCTION FOR NEW HIGH SCHOOL

PHASE I

IA :	MAY 2008	to	AUGUST 25, 2008
IB :	AUGUST 25, 2008	to	JUNE 1, 2009
IC :	JUNE 1, 2009	to	AUGUST 25, 2009
ID :	AUGUST 25, 2009	to	DECEMBER 1, 2009
IE :	DECEMBER 1, 2009	to	JUNE 1, 2010
IF :	JUNE 1, 2010	to	AUGUST 25, 2010
IG :	AUGUST 25, 2010	to	DECEMBER 1, 2010
IH :	DECEMBER 1, 2010	to	JANUARY 5, 2011

COMPLETION DATE OF NEW SWIMMING POOL & GYMNASIUM - DECEMBER 1, 2009
PARTIAL OWNER OCCUPANCY OF NEW SECOND FLOOR - NOVEMBER 10, 2010.
FINAL COMPLETION OF PHASE I CONSTRUCTION: DECEMBER 1, 2010

PHASE II

IIA :	JANUARY 5, 2011	to	JUNE 1, 2011
IIB :	JUNE 1, 2011	to	AUGUST 25, 2011
IIC :	AUGUST 25, 2011	to	JUNE 1, 2012
IID :	JUNE 1, 2012	to	AUGUST 1, 2012

FINAL COMPLETION OF ALL CONSTRUCTION ACTIVITIES : AUGUST 1, 2012

PHASING TIME LINES

GENERAL NOTES:

1. COORDINATE ALL ACTIVITIES WITH E&S PLANS.
2. PHASING PLANS HAVE GENERAL INFORMATION ONLY. REFERENCE PLANS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. COORDINATE ALL ACTIVITIES WITH ALL PHASING AND PROJECT DRAWINGS AND SPECIFICATIONS.
4. COORDINATE ALL ACTIVITIES WITH REQUIREMENTS FOR OCCUPANCY OF SCHOOL AND SITE BY STUDENTS, STAFF AND PUBLIC.
5. ALL PHASING AND MILESTONE REQUIREMENTS SHALL BE INCORPORATED IN THE PROJECT SCHEDULE AND WILL ONLY BE CHANGED AFTER WRITTEN APPROVAL FROM CONSTRUCTION MANAGER.

D'HUY ENGINEERING, Inc.
DEI
CONSULTING ENGINEERS

ADDENDA SET
5/13/08

Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA17603
P: 717.291.1077 F: 717.392.3923

100 South Broad Street, Suite A
Middletown, DE 19709
P: 302.449.2492 F: 302.449.2493

10451 Mill Run Circle , Suite 400
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802

gilbert

SITE PHASING PLAN - PHASE I

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
TOWNSHIP OF UPPER DUBLIN, MONTGOMERY COUNTY, PA

P.D.E. PROJECT NO. 3404

REVISION DATE(S)

DRAWN BY

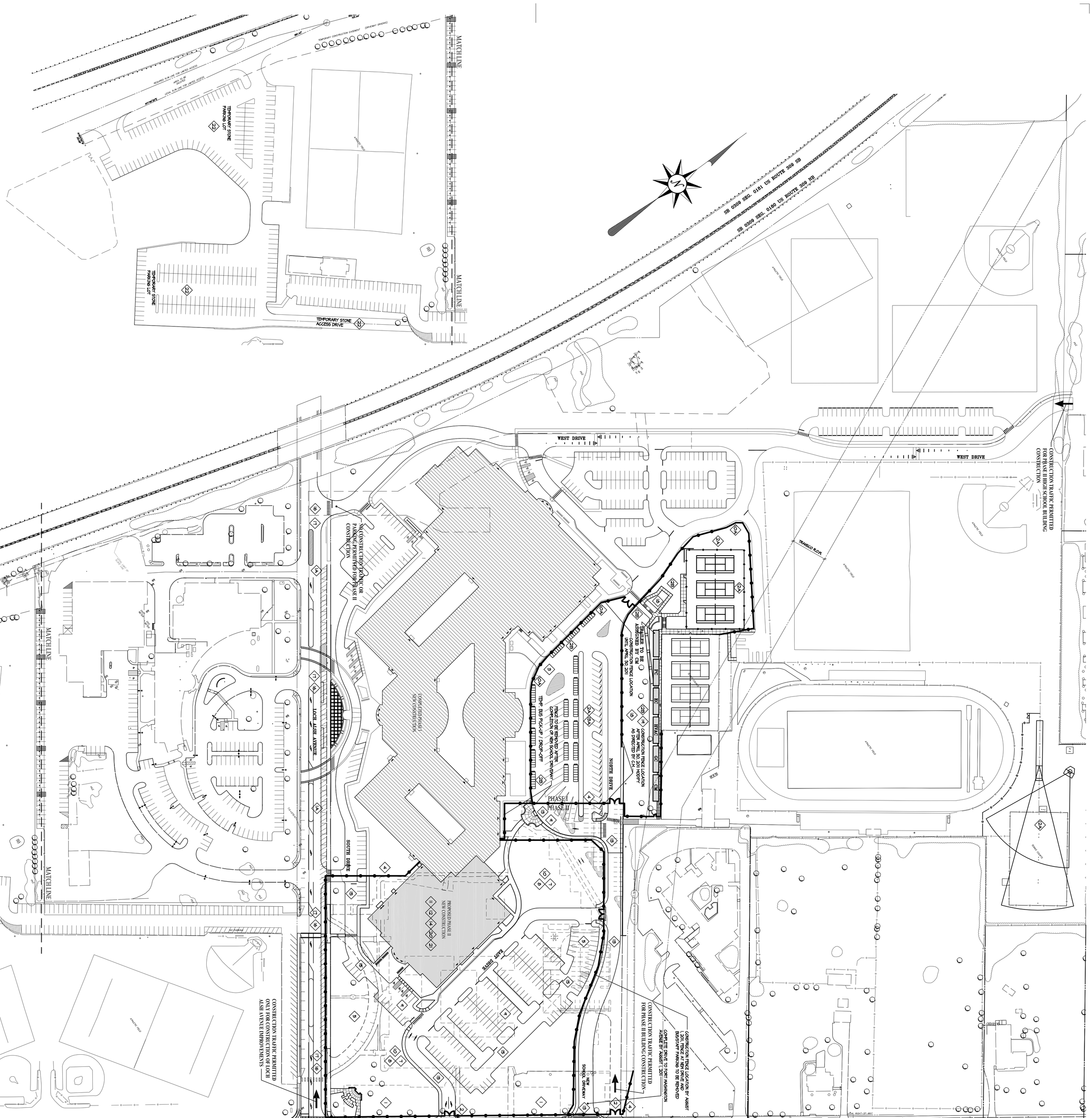
CAD NO.

PROJECT NO. 0646

SHEET NO.

PH1.2

DATE 04/04/2008



PHASE II CONSTRUCTION - MILESTONES

JANUARY 5, 2011 to AUGUST 25, 2012

PHASE IIA: (JANUARY 5, 2011 to JUNE 1, 2011)

*NO DEMOLITION OF EXISTING BUILDINGS WITHIN PHASE II AREAS MAY BEGIN UNTIL ALL OF PHASE I NEW CONSTRUCTION IS COMPLETE AND IS OCCUPIED BY OWNER.

1. OWNER TO REMOVE MODULAR CLASSROOMS, UPON COMPLETION OF PHASE I BUILDING, FROM SITE UNDER SEPERATE CONTRACT.
1A. BUS PARKING / PICKUP TO REMAIN AT LOCH ALSH AVENUE UNTIL APRIL 30, 2011.
2. CREATE NEW CONSTRUCTION ENTRANCE.
2A. CONSOLIDATE ALL CONSTRUCTION STAGING, RELOCATE TO PHASE II BY APRIL 30, 2011.
2B. PROVIDE 35' WIDE CLEAR AREA, INSTALL (UPTO (3) 12' WIDE GATES IN FENCING FOR SCHOOL DELIVERIES AND ACCESS UNTIL APRIL 30, 2011. THEREAFTER ENTIRE AREA SHAL BE TURNED OVER TO SCHOOL.
3. PROVIDE TEMPORARY BUS DROP OFF / PICK UP ZONE SIGNAGE AND STRIPING BY APRIL 30, 2011.
4. INSTALL CONSTRUCTION AREA FENCE TO SEPARATE PHASE II CONSTRUCTION / DEMOLITION AREAS. ALL AREAS OUTSIDE CONSTRUCTION FENCE WILL BE USED FOR PUBLIC AND STUDENT ACCESS. NO BELOW GRADE FENCE POSTS ARE PERMITTED WITHIN TRANSCO RIGHT OF WAY.
5. DESIGNATE CONSTRUCTION STAGING AND PARKING AREAS.
6. DETERMINE, WITH OWNER, TRAFFIC PATTERNS AND INSTALL TEMPORARY TRAFFIC SIGNAGE.
7. SITE AND BUILDING ENVIRONMENTAL REMEDIATION WITHIN PHASE II AREA.
8. BEGIN BUILDING DEMOLITION OF EXISTING BUILDING IN PHASE II AREA.
9. EXCAVATION AND STORM WATER DRAINAGE AT FUTURE BUS PICK-UP, STAFF PARKING, DRIVEWAYS AND OTHER PARKING AREAS.
10. COMPLETE EXISTING BUILDING DEMOLITION AND CREATE STONE STAGING AREA.
10A. RELOCATE STAGING AREA AND CONSTRUCTION FENCE BY APRIL 30, 2011. CONTINUE BUS PICK UP / DROP OFF AT LOCH ALSH AVENUE UNTIL STAGING IS RELOCATED TO PHASE II AREA
11. BEGIN EXCAVATION AND CONSTRUCTION OF NEW BUILDING FOUNDATIONS IN PHASE II AREA.

PHASE IIB: (JUNE 1, 2011 to AUGUST 25, 2011)

12. CONTINUE WITH CONSTRUCTION OF NEW BUILDING WITHIN PHASE II AREA.
12A. COMPLETE PERMANENT SITE IMPROVEMENTS.
12B. MAINTAIN TEMPORARY CONSTRUCTION FOR ACCESS AND FUTURE REMOVAL OF OFFICE TRAILERS.
13. INSTALL CURBS AND PAVING AT FUTURE BUS PICK-UP AND STAFF PARKING AREAS, INCLUDING DRIVEWAY TO FORT WASHINGTON AVENUE. READY FOR USE BY OWNER NO LATER THAN AUGUST 25, 2011. RELOCATE CONSTRUCTION FENCE AS NEEDED.
13A. CLEAN ALL BINDER COURSE AREAS IN PARKING LOTS AND ROADWAYS, REPAIR ANY DAMAGED AREAS, INSTALL LEVELING COURSE AS REQUIRED AND PROVIDE FINAL PAVING AND STRIPING, COMPLETE BY JULY 30, 2011.

PHASE IIC: (AUGUST 25, 2011 to JUNE 1, 2012)

14. CONTINUE WITH CONSTRUCTION OF NEW BUILDING WITHIN PHASE II AREA.
15. INSTALL NEW SITE IMPROVEMENTS IN PHASE II AREA - SIDEWALKS, CURBS, PARKING AREAS, LANDSCAPING AND PLANTING.

PHASE IID: (JUNE 1, 2012 to AUGUST 1, 2012)

16. BEGIN ROAD AND SITE IMPROVEMENTS ALONG LOCH ALSH AVENUE - CURBS AND SIDEWALKS - AFTER JUNE 15, 2012.
17. COMPLETE ROAD AND SITE IMPROVEMENTS INCLUDING COMPLETION OF PEDESTRIAN PLAZA AT LOCH ALSH AVENUE BY AUGUST 25, 2012.
18. REMOVE OFFICE TRAILERS AND COMPLETE PERMANENT SITE IMPROVEMENTS AND ATHLETIC FIELDS FOR ENTIRE PROJECT, INCLUDING SIDEWALKS, RAMPS AND STAIRS.
19. RESTORE CONSTRUCTION OFFICE TRAILER COMPOUND INCLUDING REMOVAL OF TEMPORARY UTILITIES.
20. FINAL CLEAN UP, INSPECTIONS AND SYSTEMS TRAINING FOR PHASE II AREA.
21. PHASE II NEW CONSTRUCTION AREAS READY FOR OWNER OCCUPANCY, AUGUST 1, 2012.
22. TEMPORARY OFF SITE PARKING LOT TO BE RESTORED BY SEPERATE CONTRACT (NOT IN THIS CONTRACT)

PHASES OF CONSTRUCTION FOR NEW HIGH SCHOOL

PHASE I

IA:	MAY 2008	to	AUGUST 25, 2008
IB:	AUGUST 25, 2008	to	JUNE 1, 2009
IC:	JUNE 1, 2009	to	AUGUST 25, 2009
ID:	AUGUST 25, 2009	to	DECEMBER 1, 2009
IE:	DECEMBER 1, 2009	to	JUNE 1, 2010
IF:	JUNE 1, 2010	to	AUGUST 25, 2010
IG:	AUGUST 25, 2010	to	DECEMBER 1, 2010
IH:	DECEMBER 1, 2010	to	JANUARY 5, 2011

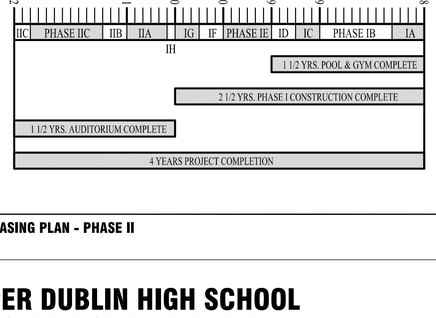
COMPLETION DATE OF NEW SWIMMING POOL & GYMNASIUM : DECEMBER 1, 2009
PARTIAL OWNER OCCUPANCY OF NEW SECOND FLOOR : NOVEMBER 10, 2010.
FINAL COMPLETION OF PHASE I CONSTRUCTION: DECEMBER 1, 2010

PHASE II

IIA:	JANUARY 5, 2011	to	JUNE 1, 2011
IIB:	JUNE 1, 2011	to	AUGUST 25, 2011
IIC:	AUGUST 25, 2011	to	JUNE 1, 2012
IID:	JUNE 1, 2012	to	AUGUST 1, 2012

FINAL COMPLETION OF ALL CONSTRUCTION ACTIVITIES : AUGUST 1, 2012

PHASING TIME LINES



GENERAL NOTES:

1. COORDINATE ALL ACTIVITIES WITH E&S PLANS.
2. PHASING PLANS HAVE GENERAL INFORMATION ONLY, REFERENCE PLANS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. COORDINATE ALL ACTIVITIES WITH ALL PHASING AND PROJECT DRAWINGS AND SPECIFICATIONS.
4. COORDINATE ALL ACTIVITIES WITH REQUIREMENTS FOR OCCUPANCY OF SCHOOL AND SITE BY STUDENTS, STAFF AND PUBLIC.
5. ALL PHASING AND MILESTONE REQUIREMENTS SHALL BE INCORPORATED IN THE PROJECT SCHEDULE AND WILL ONLY BE CHANGED AFTER WRITTEN APPROVAL FROM CONSTRUCTION MANAGER.

SITE PHASING PLAN - PHASE II

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
TOWNSHIP OF UPPER DUBLIN, MONTGOMERY COUNTY, PA

P.D.E. PROJECT NO.
3404

REVISION DATE(S)

DRAWN BY

CAD NO.

PROJECT NO. 0648

SHEET NO.

PH1.3

DATE 04/04/2008

gilbert

Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA17603
P: 717.291.1077 F: 717.392.3923

100 South Broad Street, Suite A
Middletown, DE 19709
P: 302.449.2492 F: 302.449.2493

10451 Mill Run Circle , Suite 400
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802

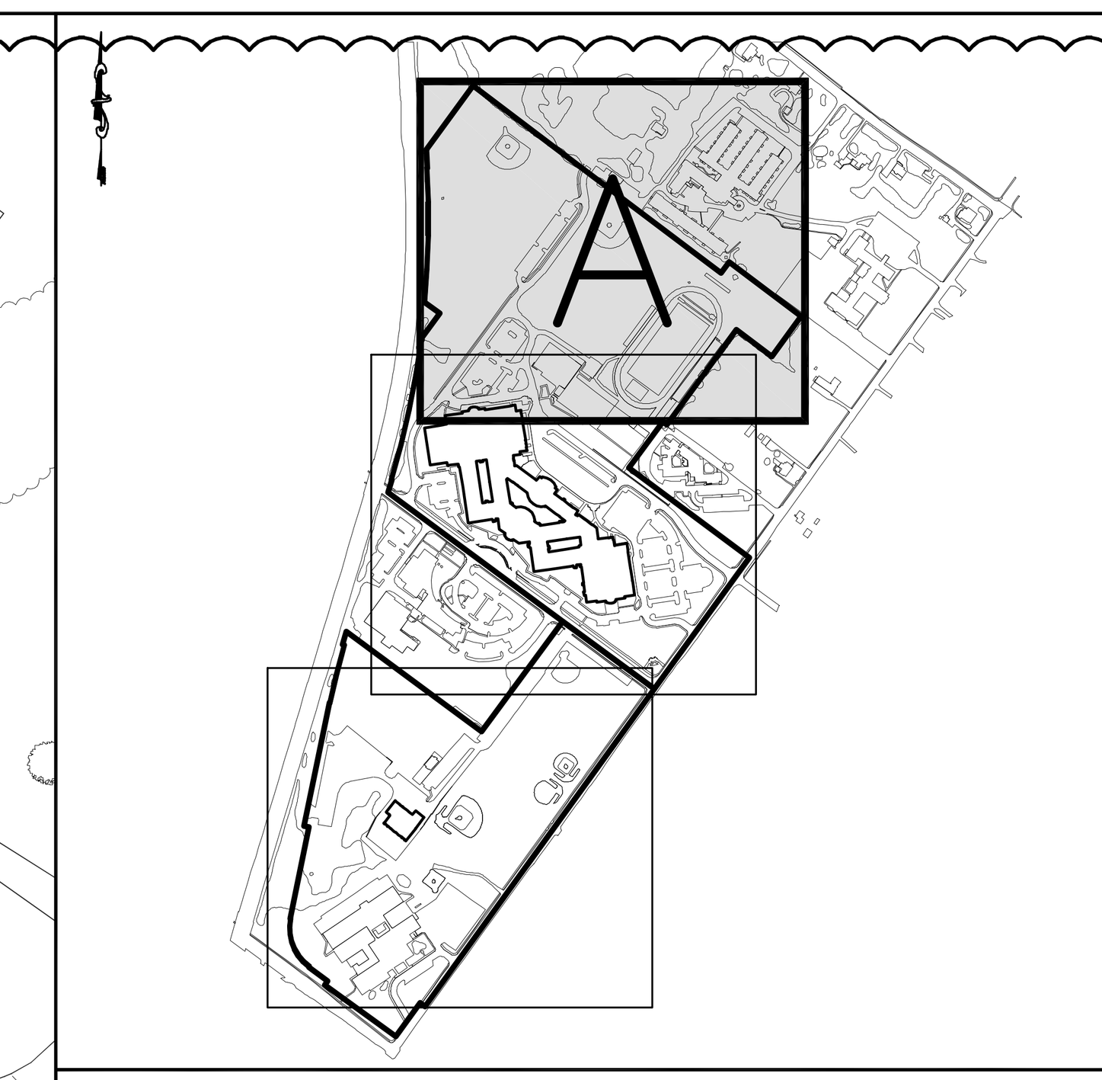
ADDENDA SET
5/13/08

D'HUY ENGINEERING, Inc.
DEI
CONSULTING ENGINEERS

Appendix F

Site Utility Plans

KEY MAP



SANITARY SEWER NOTES

1. ALL SANITARY SEWER CONSTRUCTION SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS AND STANDARDS OF THE TOWNSHIP/AUTHORITY AND IS SUBJECT TO INSPECTION BY THE TOWNSHIP/AUTHORITY AND ITS ENGINEER.
2. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING:
   A. A LIST OF THE PROPOSED SUPPLIERS FOR ALL MATERIALS TO BE USED IN CONNECTION WITH THE SEWER CONSTRUCTION.
   B. SHOP DRAWINGS OF THE PRECAST MANHOLES, MANHOLE STEPS AND MANHOLE FRAMES AND COVERS TO BE USED.
   C. CERTIFICATION FROM THE PIPE MANUFACTURER THAT THE PIPE MEETS OR EXCEEDS THE REQUIREMENTS OF THE TOWNSHIP/AUTHORITY SPECIFICATIONS.
3. ALL 8"ø SANITARY SEWER LINES SHALL BE TYPE PSM SDR-35 OR TYPE PS-46 PVC. ALL SANITARY SEWER LINES OVER 12' DEEP, INCLUDING THE 18"ø SEWER LINE, SHALL BE DIP CLASS 50 – CEMENT MORTAR LINED (DOUBLE THICKNESS PER ANSI A21.4/AWWA C-104, AND SEAL COATED) WITH AN ASPHALTIC OUTSIDE COATING. ALL LATERALS SHALL BE SCHEDULE 40 PVC EXCEPT AS NOTED AND SHALL BE BEDDED TO MEET MANUFACTURERS SPECIFICATIONS AND/OR APPROVAL OF THE TOWNSHIP.
4. CONTRACTOR TO ENSURE THAT ALL SANITARY MAINS AND LATERALS HAVE A MINIMUM OF 18-INCH VERTICAL CLEARANCE AND 10 FT HORIZONTAL CLEARANCE BETWEEN ANY OTHER UTILITY CROSSING. OTHERWISE CONTRACTOR SHALL ENCASE MAIN OR LATERAL IN CONCRETE WITH A MINIMUM OF 10 LF EACH SIDE OF CROSSING. CLEANOUTS TO BE PLACED AT A MAXIMUM OF 100-FT INTERVAL AND AT ALL BENDS.
5. ALL SANITARY SEWER MANHOLES PROPOSED TO BE INSTALLED OR ADJUSTED WITHIN ANY EASEMENT PROPOSED OR EXISTING, SHALL BE INSTALLED WITH WATERTIGHT FRAMES AND COVERS. ANY MAHOLE TO BE INSTALLED OR ADJUSTED OUTSIDE OF PAVED AREAS SHALL BE INSTALLED A MINUMUM OF 12" ABOVE FINISH GRADE.
6. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

WATER LINE NOTES

1. ALL POTABLE WATER PIPES SHALL HAVE A MINIMUM COVER OF FOUR (4) FEET. POTABLE WATER AND SANITARY SEWER LINE CROSSINGS SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF EIGHTEEN (18) INCHES OR A MINIMUM HORIZONTAL SEPARATION OF TEN (10) FEET. IF THESE CLEARANCES CANNOT BE MET, THE WATER LINE MUST THEN BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING. IF THE POTABLE WATER PASSES BENEATH THE SANITARY, NO MATTER HOW MUCH CLEARANCE, THE POTABLE WATER MUST BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING.
2. PROPOSED WATER LINE MATERIALS AND SIZES SHALL BE AS INDICATED ON THE PLANS.
3. PROPOSED WATER SERVICE(S) SHALL BE STANDARD COPPER PIPE.
4. ALL WATER LINE CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH THE WATER AUTHORITY LATEST STANDARDS AND SPECIFICATIONS.
5. ALL WATER LINE VALVES, FITTINGS, ETC. SHALL BE INSTALLED WITH MEGALUG THRUST CONSTRAINTS.
6. ALL WATER LINES ARE TO BE PRESSURE TESTED TO 150 P.S.I. IN SECTIONS BETWEEN VALVES. THE TEST PRESSURE SHALL BE MAINTAINED FOR A PERIOD NOT LESS THAN 1 HOUR. SHOULD ANY PRESSURE TEST DISCLOSE AN INABILITY TO HOLD THE TEST PRESSURE, THE CONTRACTOR SHALL LOCATE AND CORRECT DEFECTS AND RETEST TO THE SATISFACTION OF THE GOVERNING WATER AUTHORITY.
7. ALL WATER LINES MUST BE SURVEY STAKED PRIOR TO CONSTRUCTION, WITH STAKES PROVIDED AT INTERVALS OF 50 FEET, AS WELL AS AT ALL FITTING LOCATIONS AND UTILITY CROSSINGS. STAKES SHOULD BE MARKED WITH WRITTEN ELEVATIONS FOR BOTTOM OF WATER PIPE (INCLUDES BOTTOM OF OTHER UTILITY PIPE ELEVATIONS AT ALL UTILITY CROSSINGS TO VERIFY CLEARANCE). FIRE HYDRANTS AND WATER SERVICE CURB STOPS MUST ALSO BE FIELD STAKED AND ELEVATIONS INDICATING TOP-OF-CURB OR FINISHED GRADE SHOWN ON THE PLANS.
8. ALL WATER MAINS MUST BE CONSTRUCTED WITH DOUBLE CEMENT LINED, THICKNESS CLASS 52 DUCTILE IRON PIPE WITH TYTON JOINTS AND WITH AN INTERNAL SEAL COAT AND EXTERNAL ASPHALT SEAL COAT IN ACCORDANCE WITH AWWA C104. MECHANICAL JOINTS AND MEGALUG RESISTANT GLANDS MUST BE USED WITH ALL FITTINGS.
9. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PUBLIC UTILITIES NOTES

1. ALL PUBLIC UTILITIES REQUIRED TO SERVICE THIS LAND DEVELOPMENT SHALL BE PLACED UNDERGROUND.
2. BECAUSE GAS SERVICE IS TO BE REVISED, GAS UTILITY DESIGN PLANS AND DATA SHALL BE SUBMITTED BY THE GAS COMPANY. A PRECONSTRUCTION MEETING WITH THE DEVELOPER, UTILITY CONTRACTOR, GAS COMPANY REPRESENTATIVES, TOWNSHIP ENGINEER AND THE TOWNSHIP SHALL BE HELD PRIOR TO CONSTRUCTION.
3. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP – CALL BEFORE YOU DIG

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT 287 OF 1974, AS AMENDED BY ACT 181 OF 2006, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. SERIAL NO. 1527739

COMMONWEALTH OF PENNSYLVANIA – REGISTERED PROFESSIONAL ENGINEER – STUART K. A. GAUSE – No. PE052618E

STUART K. A. GAUSE
PROFESSIONAL ENGINEER, PA. LIC. No. PE052618E

SEE GENERAL INFORMATION SHEET FOR ALL PERTINENT NOTES AND LEGEND INFORMATION.

50 0 50 100
GRAPHIC SCALE IN FEET

–NOTICE–

THIS DRAWING AND ALL INFORMATION CONTAINED HEREIN IS AUTHORIZED FOR USE ONLY BY THE PARTY FOR WHOM THE WORK WAS CONTRACTED OR TO WHOM IT IS CERTIFIED.

THIS DRAWING MAY NOT BE COPIED, REUSED, DISCLOSED, DISTRIBUTED OR RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF CMX.

REVISION NO.	DATE	REVISION
19	06/01/08	REVISED PER CONDITIONS OF FINAL APPROVAL
18	05/30/08	ADDENDA DOCUMENTS
17	05/23/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
16	04/25/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
15	04/04/08	BID DOCUMENTS
14	03/18/08	MONTGOMERY COUNTY CONSERVATION DISTRICT SUBMISSION
1	07/05/07	TENTATIVE SKETCH PLAN SUBMISSION

UTILITY PLAN - PHASE 1A/1 (VIEW A)

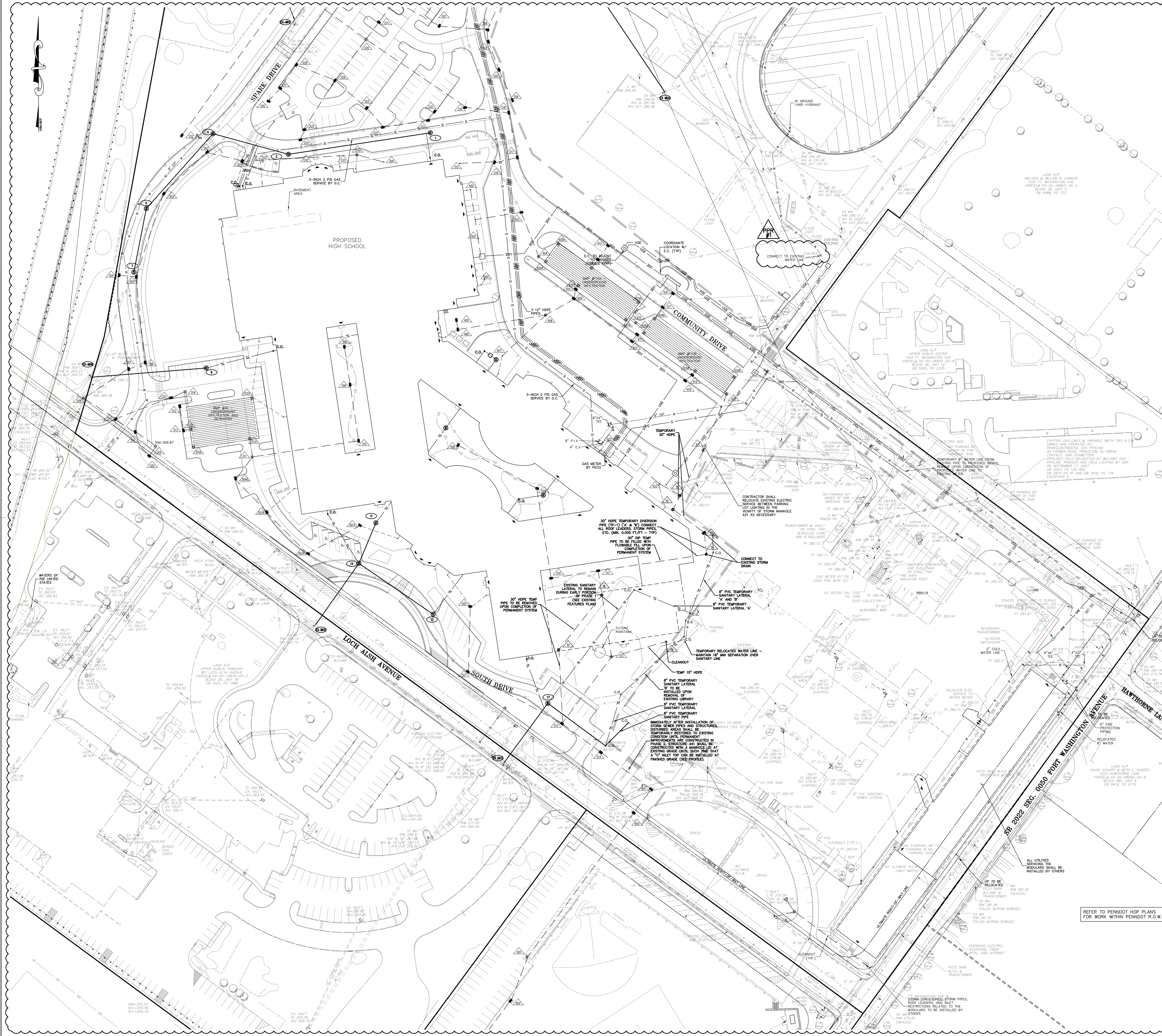
NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
UPPER DUBLIN TOWNSHIP, MONTGOMERY COUNTY, PA

P.D.E. PROJECT NO.	3404
CMX PROJECT NO.	0604040
SCALE	1" = 50'
DRAWN BY	JAC / SAL
DESIGNED BY	SKAG / MRS
PROJECT NO.	0648
SHEET NO.	38 of 111
	C6.1
DATE	05/29/07

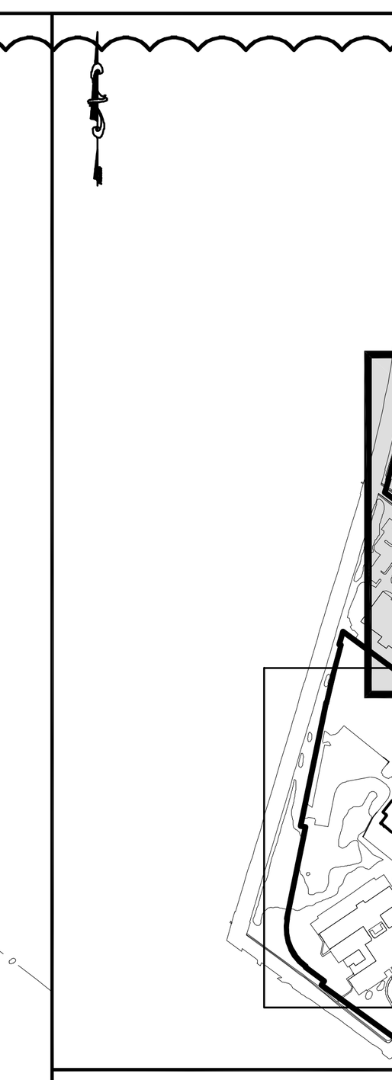
gilbert
Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA 17603
P: 717.291.1077 F: 717.392.3923
10451 Mill Run Circle
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802
100 South Broad Street, Suite A
Wilmington, DE 19809
P: 302.791.0522 F: 302.791.9095

ADDENDA DOCUMENTS MAY 13, 2008

CMX
ARIZONA • FLORIDA • MARYLAND • NEVADA • NEW JERSEY
NEW YORK • PENNSYLVANIA • MEXICO
1555 BUSTARD ROAD, SUITE 50T, LANSDALE, PA 19446-5728
TEL 215.361.6050, FAX 215.361.6160



KEY MAP



SANITARY SEWER NOTES

1. ALL SANITARY SEWER CONSTRUCTION SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS AND STANDARDS OF THE TOWNSHIP/AUTHORITY AND IS SUBJECT TO INSPECTION BY THE TOWNSHIP/AUTHORITY AND ITS ENGINEER.
2. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING:
   A. A LIST OF THE PROPOSED SUPPLIERS FOR ALL MATERIALS TO BE USED IN CONNECTION WITH THE SEWER CONSTRUCTION.
   B. SHOP DRAWINGS OF THE PRECAST MANHOLES, MANHOLE STEPS AND MANHOLE FRAMES AND COVERS TO BE USED.
   C. CERTIFICATION FROM THE PIPE MANUFACTURER THAT THE PIPE MEETS OR EXCEEDS THE REQUIREMENTS OF THE TOWNSHIP/AUTHORITY SPECIFICATIONS.
3. ALL 8"ø SANITARY SEWER LINES SHALL BE TYPE PSM SDR-35 OR TYPE PS-46 PVC. ALL SANITARY SEWER LINES OVER 12' DEEP, INCLUDING THE 18"ø SEWER LINE, SHALL BE DIP CLASS 50 - CEMENT MORTAR LINED (DOUBLE THICKNESS PER ANSI A21.4/AWWA C-104, AND SEAL COATED) WITH AN ASPHALTIC OUTSIDE COATING. ALL LATERALS SHALL BE SCHEDULE 40 PVC EXCEPT AS NOTED AND SHALL BE BEDDED TO MEET MANUFACTURERS SPECIFICATIONS AND/OR APPROVAL OF THE TOWNSHIP.
4. CONTRACTOR TO ENSURE THAT ALL SANITARY MAINS AND LATERALS HAVE A MINIMUM OF 18-INCH VERTICAL CLEARANCE AND 10 FT HORIZONTAL CLEARANCE BETWEEN ANY OTHER UTILITY CROSSING. OTHERWISE CONTRACTOR SHALL ENCASE MAIN OR LATERAL IN CONCRETE WITH A MINIMUM OF 10 LF EACH SIDE OF CROSSING. CLEANOUTS TO BE PLACED AT A MAXIMUM OF 100-FT INTERVAL AND AT ALL BENDS.
5. ALL SANITARY SEWER MANHOLES PROPOSED TO BE INSTALLED OR ADJUSTED WITHIN ANY EASEMENT PROPOSED OR EXISTING, SHALL BE INSTALLED WITH WATERTIGHT FRAMES AND COVERS. ANY MAHHOLE TO BE INSTALLED OR ADJUSTED OUTSIDE OF PAVED AREAS SHALL BE INSTALLED A MINIMUM OF 12" ABOVE FINISH GRADE.
6. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

WATER LINE NOTES

1. ALL POTABLE WATER PIPES SHALL HAVE A MINIMUM COVER OF FOUR (4) FEET. POTABLE WATER AND SANITARY SEWER LINE CROSSINGS SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF EIGHTEEN (18) INCHES OR A MINIMUM HORIZONTAL SEPARATION OF TEN (10) FEET. IF THESE CLEARANCES CANNOT BE MET, THE WATER LINE MUST THEN BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING. IF THE POTABLE WATER PASSES BENEATH THE SANITARY, NO MATTER HOW MUCH CLEARANCE, THE POTABLE WATER MUST BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING.
2. PROPOSED WATER LINE MATERIALS AND SIZES SHALL BE AS INDICATED ON THE PLANS.
3. PROPOSED WATER SERVICE(S) SHALL BE STANDARD COPPER PIPE.
4. ALL WATER LINE CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH THE WATER AUTHORITY LATEST STANDARDS AND SPECIFICATIONS.
5. ALL WATER LINE VALVES, FITTINGS, ETC. SHALL BE INSTALLED WITH MEGALUG THRUST CONSTRAINTS.
6. ALL WATER LINES ARE TO BE PRESSURE TESTED TO 150 P.S.I. IN SECTIONS BETWEEN VALVES. THE TEST PRESSURE SHALL BE MAINTAINED FOR A PERIOD NOT LESS THAN 1 HOUR. SHOULD ANY PRESSURE TEST DISCLOSE AN INABILITY TO HOLD THE TEST PRESSURE, THE CONTRACTOR SHALL LOCATE AND CORRECT DEFECTS AND RETEST TO THE SATISFACTION OF THE GOVERNING WATER AUTHORITY.
7. ALL WATER LINES MUST BE SURVEY STAKED PRIOR TO CONSTRUCTION, WITH STAKES PROVIDED AT INTERVALS OF 50 FEET, AS WELL AS AT ALL FITTING LOCATIONS AND UTILITY CROSSINGS. STAKES SHOULD BE MARKED WITH WRITTEN ELEVATIONS FOR BOTTOM OF WATER PIPE (INCLUSES BOTTOM OF OTHER UTILITY PIPE ELEVATIONS AT ALL UTILITY CROSSINGS TO VERIFY CLEARANCE). FIRE HYDRANTS AND WATER SERVICE CURB STOPS MUST ALSO BE FIELD STAKED AND ELEVATIONS INDICATING TOP-OF-CURB OR FINISHED GRADE SHOWN ON THE PLANS.
8. ALL WATER MAINS MUST BE CONSTRUCTED WITH DOUBLE CEMENT LINED, THICKNESS CLASS 52 DUCTILE IRON PIPE WITH TYTON JOINTS AND WITH AN INTERNAL SEAL COAT AND EXTERNAL ASPHALT SEAL COAT IN ACCORDANCE WITH AWWA C104. MECHANICAL JOINTS AND MEGALUG RESISTANT GLANDS MUST BE USED WITH ALL FITTINGS.
9. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PUBLIC UTILITIES NOTES

1. ALL PUBLIC UTILITIES REQUIRED TO SERVICE THIS LAND DEVELOPMENT SHALL BE PLACED UNDERGROUND.
2. BECAUSE GAS SERVICE IS TO BE REVISED, GAS UTILITY DESIGN PLANS AND DATA SHALL BE SUBMITTED BY THE GAS COMPANY. A PRECONSTRUCTION MEETING WITH THE DEVELOPER, UTILITY CONTRACTOR, GAS COMPANY REPRESENTATIVES, TOWNSHIP ENGINEER AND THE TOWNSHIP SHALL BE HELD PRIOR TO CONSTRUCTION.
3. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

CONSTRUCTION SEQUENCE OF TEMPORARY UTILITIES IN VICINITY OF EXISTING MEDIA CENTER

1. UPON REMOVAL OF BUILDING TO WEST OF EXISTING MEDIA CENTER, INSTALL TEMPORARY SANITARY LATERAL 'A' FROM EXISTING KITCHEN TO CONNECT TO EXISTING LINE APPROX. 200' NORTH OF SANITARY MANHOLE 17.
2. INSTALL TEMPORARY STORM PIPE FROM STRUCTURE 421 TO 513.
3. UPON REMOVAL OF MEDIA CENTER (DELAYED UNTIL LATER PORTION OF PHASE 1) INSTALL STORM PIPE FROM T6 TO 513. REMOVE TEMPORARY STRUCTURE T6 AND T7 AND ASSOCIATED PIPING.
4. INSTALL TEMPORARY SANITARY LATERAL 'B' AND REMOVE LOWER PORTION OF TEMPORARY SANITARY LATERAL 'A' AND EXISTING SANITARY LATERAL TO SANITARY MANHOLE 17.
5. RELOCATE WATER SERVICE IN VICINITY OF MEDIA CENTER.
6. UPON REMOVAL OF EAST PORTION OF EXISTING SCHOOL BUILDING REMOVE TEMPORARY WATER SERVICE AND SANITARY LATERAL.
7. UPON INSTALLATION OF PERMANENT STORM PIPE SYSTEM DOWNSTREAM OF STRUCTURE 421 REMOVAL/FILL TEMPORARY STORM PIPES AND STRUCTURES AS NOTED ON PROFILES.

ALL TEMPORARY STORM STRUCTURES (IDENTIFIED AS T#) SHALL BE REMOVED UPON INSTALLATION OF PERMANENT SYSTEMS

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP - CALL BEFORE YOU DIG

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT 287 OF 1974, AS AMENDED BY ACT 181 OF 2006, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. SERIAL NO. 1527739

REFER TO PENNDOT HOP PLANS FOR WORK WITHIN PENNDOT R.O.W.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — STUART K. A. GAUSE — NO. PE052618E

STUART K. A. GAUSE
PROFESSIONAL ENGINEER, PA. LIC. No. PE052618E

SEE GENERAL INFORMATION SHEET FOR ALL PERTINENT NOTES AND LEGEND INFORMATION.

GRAPHIC SCALE IN FEET: 50 0 50 100

3 4 PPR #1

REVISION NO.	DATE	REVISION
19	06/01/08	REVISED PER CONDITIONS OF FINAL APPROVAL
18	05/30/08	ADDENDA DOCUMENTS
17	05/23/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
16	04/25/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
15	04/04/08	BID DOCUMENTS
14	03/18/08	MONTGOMERY COUNTY CONSERVATION DISTRICT SUBMISSION
1	07/05/07	TENTATIVE SKETCH PLAN SUBMISSION

CMX
ARIZONA • FLORIDA • MARYLAND • NEVADA • NEW JERSEY
NEW YORK • PENNSYLVANIA • MEXICO
1555 BUSTARD ROAD . SUITE 50T . LANSDALE, PA 19446-5728
TEL 215.361.6050 . FAX 215.361.6160

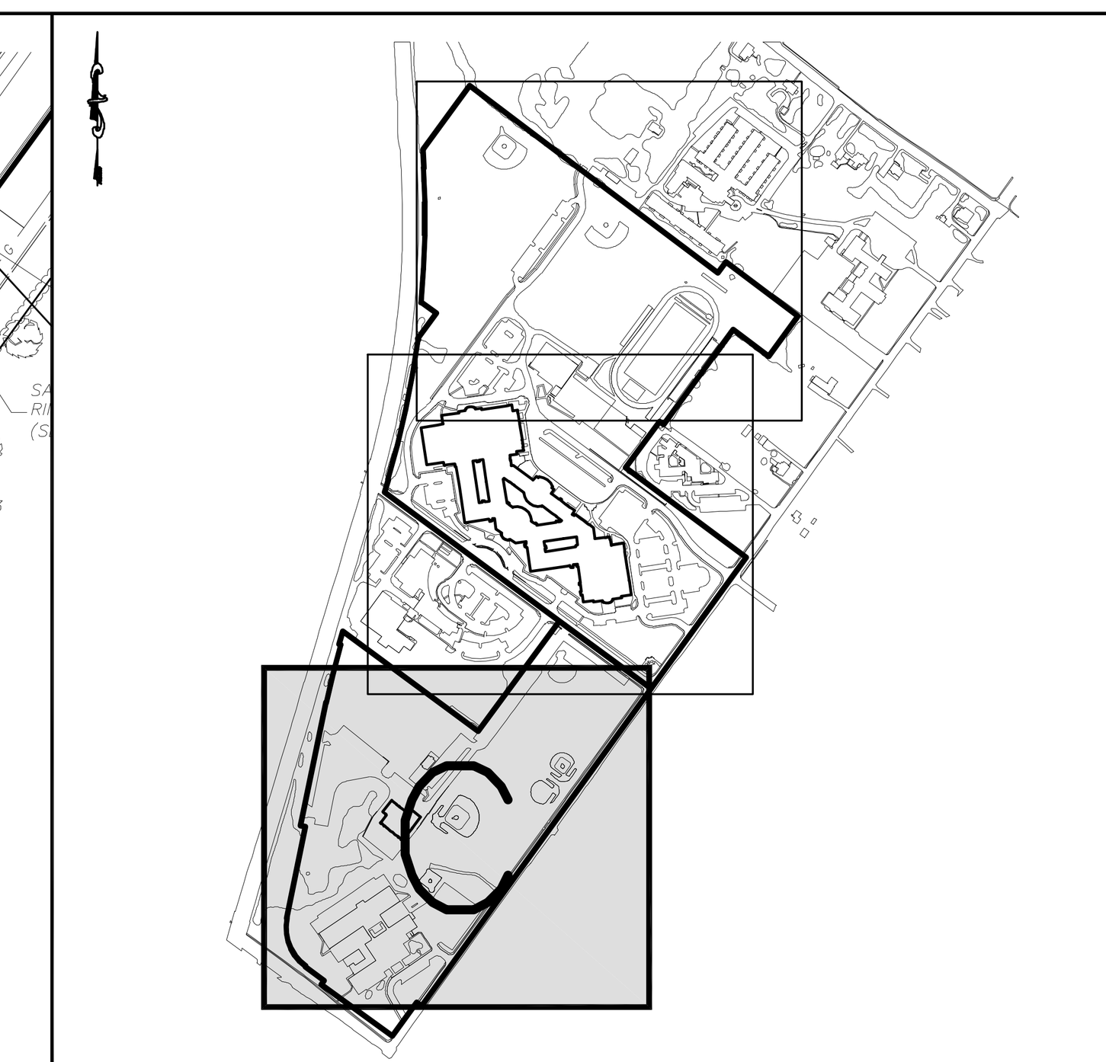
ADDENDA DOCUMENTS
MAY 13, 2008

gilbert
Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA 17603
P: 717.291.1077 F: 717.392.3923
10451 Mill Run Circle
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802
100 South Broad Street, Suite A
Wilmington, DE 19809
P: 302.791.0522 F: 302.791.9095

UTILITY PLAN - PHASE 1A/1 (VIEW B)

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
UPPER DUBLIN TOWNSHIP, MONTGOMERY COUNTY, PA

P.D.E. PROJECT NO.	3404
CMX PROJECT NO.	0604040
SCALE	1" = 50'
DRAWN BY	JAC / SAL
DESIGNED BY	SKAG / MRS
PROJECT NO.	0648
SHEET NO.	39 of 111
	C6.2
DATE	05/29/07



KEY MAP

SANITARY SEWER NOTES

1. ALL SANITARY SEWER CONSTRUCTION SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS AND STANDARDS OF THE TOWNSHIP/AUTHORITY AND IS SUBJECT TO INSPECTION BY THE TOWNSHIP/AUTHORITY AND ITS ENGINEER.
2. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING:
   A. A LIST OF THE PROPOSED SUPPLIERS FOR ALL MATERIALS TO BE USED IN CONNECTION WITH THE SEWER CONSTRUCTION.
   B. SHOP DRAWINGS OF THE PRECAST MANHOLES, MANHOLE STEPS AND MANHOLE FRAMES AND COVERS TO BE USED.
   C. CERTIFICATION FROM THE PIPE MANUFACTURER THAT THE PIPE MEETS OR EXCEEDS THE REQUIREMENTS OF THE TOWNSHIP/AUTHORITY SPECIFICATIONS.
3. ALL 8"ø SANITARY SEWER LINES SHALL BE TYPE PSM SDR-35 OR TYPE PS-46 PVC. ALL SANITARY SEWER LINES OVER 12' DEEP, INCLUDING THE 18"ø SEWER LINE, SHALL BE DIP CLASS 50 - CEMENT MORTAR LINED (DOUBLE THICKNESS PER ANSI A21.4/AWWA C-104, AND SEAL COATED) WITH AN ASPHALTIC OUTSIDE COATING. ALL LATERALS SHALL BE SCHEDULE 40 PVC EXCEPT AS NOTED AND SHALL BE BEDDED TO MEET MANUFACTURERS SPECIFICATIONS AND/OR APPROVAL OF THE TOWNSHIP.
4. CONTRACTOR TO ENSURE THAT ALL SANITARY MAINS AND LATERALS HAVE A MINIMUM OF 18-INCH VERTICAL CLEARANCE AND 10 FT HORIZONTAL CLEARANCE BETWEEN ANY OTHER UTILITY CROSSING. OTHERWISE CONTRACTOR SHALL ENCASE MAIN OR LATERAL IN CONCRETE WITH A MINIMUM OF 10 LF EACH SIDE OF CROSSING. CLEANOUTS TO BE PLACED AT A MAXIMUM OF 100-FT INTERVAL AND AT ALL BENDS.
5. ALL SANITARY SEWER MANHOLES PROPOSED TO BE INSTALLED OR ADJUSTED WITHIN ANY EASEMENT PROPOSED OR EXISTING, SHALL BE INSTALLED WITH WATERTIGHT FRAMES AND COVERS. ANY MAHHOLE TO BE INSTALLED OR ADJUSTED OUTSIDE OF PAVED AREAS SHALL BE INSTALLED A MINUMUM OF 12" ABOVE FINISH GRADE.
6. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

WATER LINE NOTES

1. ALL POTABLE WATER PIPES SHALL HAVE A MINIMUM COVER OF FOUR (4) FEET. POTABLE WATER AND SANITARY SEWER LINE CROSSINGS SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF EIGHTEEN (18) INCHES OR A MINIMUM HORIZONTAL SEPARATION OF TEN (10) FEET. IF THESE CLEARANCES CANNOT BE MET, THE WATER LINE MUST THEN BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING. IF THE POTABLE WATER PASSES BENEATH THE SANITARY, NO MATTER HOW MUCH CLEARANCE, THE POTABLE WATER MUST BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING.
2. PROPOSED WATER LINE MATERIALS AND SIZES SHALL BE AS INDICATED ON THE PLANS.
3. PROPOSED WATER SERVICE(S) SHALL BE STANDARD COPPER PIPE.
4. ALL WATER LINE CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH THE WATER AUTHORITY LATEST STANDARDS AND SPECIFICATIONS.
5. ALL WATER LINE VALVES, FITTINGS, ETC. SHALL BE INSTALLED WITH MEGALUG THRUST CONSTRAINTS.
6. ALL WATER LINES ARE TO BE PRESSURE TESTED TO 150 P.S.I. IN SECTIONS BETWEEN VALVES. THE TEST PRESSURE SHALL BE MAINTAINED FOR A PERIOD NOT LESS THAN 1 HOUR. SHOULD ANY PRESSURE TEST DISCLOSE AN INABILITY TO HOLD THE TEST PRESSURE, THE CONTRACTOR SHALL LOCATE AND CORRECT DEFECTS AND RETEST TO THE SATISFACTION OF THE GOVERNING WATER AUTHORITY.
7. ALL WATER LINES MUST BE SURVEY STAKED PRIOR TO CONSTRUCTION, WITH STAKES PROVIDED AT INTERVALS OF 50 FEET, AS WELL AS AT ALL FITTING LOCATIONS AND UTILITY CROSSINGS. STAKES SHOULD BE MARKED WITH WRITTEN ELEVATIONS FOR BOTTOM OF WATER PIPE (INCLUDES BOTTOM OF OTHER UTILITY PIPE ELEVATIONS AT ALL UTILITY CROSSINGS TO VERIFY CLEARANCE). FIRE HYDRANTS AND WATER SERVICE CURB STOPS MUST ALSO BE FIELD STAKED AND ELEVATIONS INDICATING TOP-OF-CURB OR FINISHED GRADE SHOWN ON THE PLANS.
8. ALL WATER MAINS MUST BE CONSTRUCTED WITH DOUBLE CEMENT LINED, THICKNESS CLASS 52 DUCTILE IRON PIPE WITH TYTON JOINTS AND WITH AN INTERNAL SEAL COAT AND EXTERNAL ASPHALT SEAL COAT IN ACCORDANCE WITH AWWA C104. MECHANICAL JOINTS AND MEGALUG RESISTANT GLANDS MUST BE USED WITH ALL FITTINGS.
9. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PUBLIC UTILITIES NOTES

1. ALL PUBLIC UTILITIES REQUIRED TO SERVICE THIS LAND DEVELOPMENT SHALL BE PLACED UNDERGROUND.
2. BECAUSE GAS SERVICE IS TO BE REVISED, GAS UTILITY DESIGN PLANS AND DATA SHALL BE SUBMITTED BY THE GAS COMPANY. A PRECONSTRUCTION MEETING WITH THE DEVELOPER, UTILITY CONTRACTOR, GAS COMPANY REPRESENTATIVES, TOWNSHIP ENGINEER AND THE TOWNSHIP SHALL BE HELD PRIOR TO CONSTRUCTION.
3. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP - CALL BEFORE YOU DIG

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT 287 OF 1974, AS AMENDED BY ACT 181 OF 2006, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. SERIAL NO. 1527739

CMX
ARIZONA • FLORIDA • MARYLAND • NEVADA • NEW JERSEY
NEW YORK • PENNSYLVANIA • MEXICO
1555 BUSTARD ROAD . SUITE 50T . LANSDALE, PA 19446-5728
TEL 215.361.6050 . FAX 215.361.6160

ADDENDA DOCUMENTS
MAY 13, 2008

Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA 17603
P: 717.291.1077 F: 717.392.3923
10451 Mill Run Circle
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802
100 South Broad Street, Suite A
Wilmington, DE 19809
P: 302.791.0522 F: 302.791.9095
gilbert

UTILITY PLAN - PHASE 1A/1 (VIEW C)

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
UPPER DUBLIN TOWNSHIP, MONTGOMERY COUNTY, PA

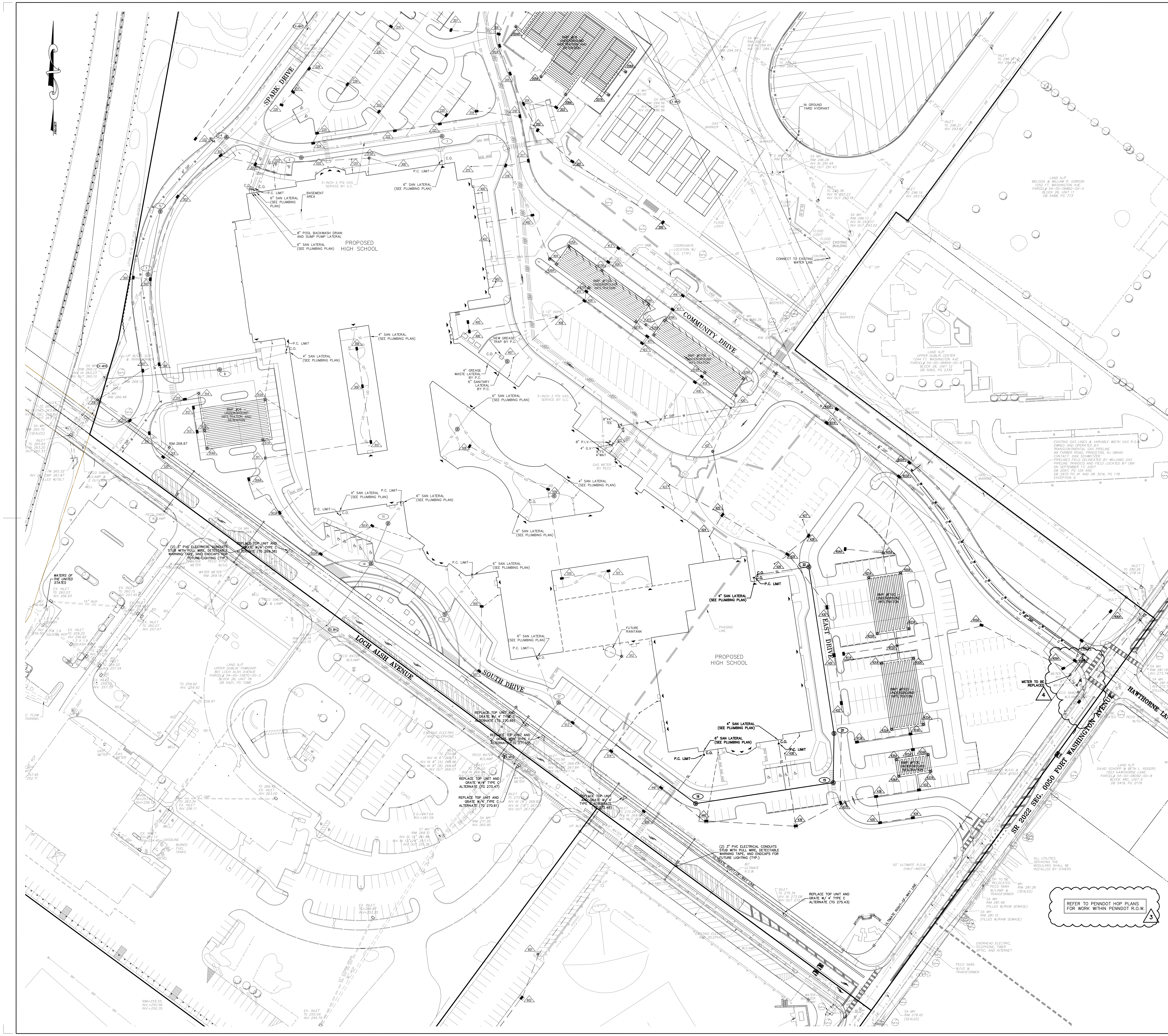
STUART K. A. GAUSE
PROFESSIONAL ENGINEER, PA. LIC. No. PE052618E
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER STUART K. A. GAUSE No. PE052618E

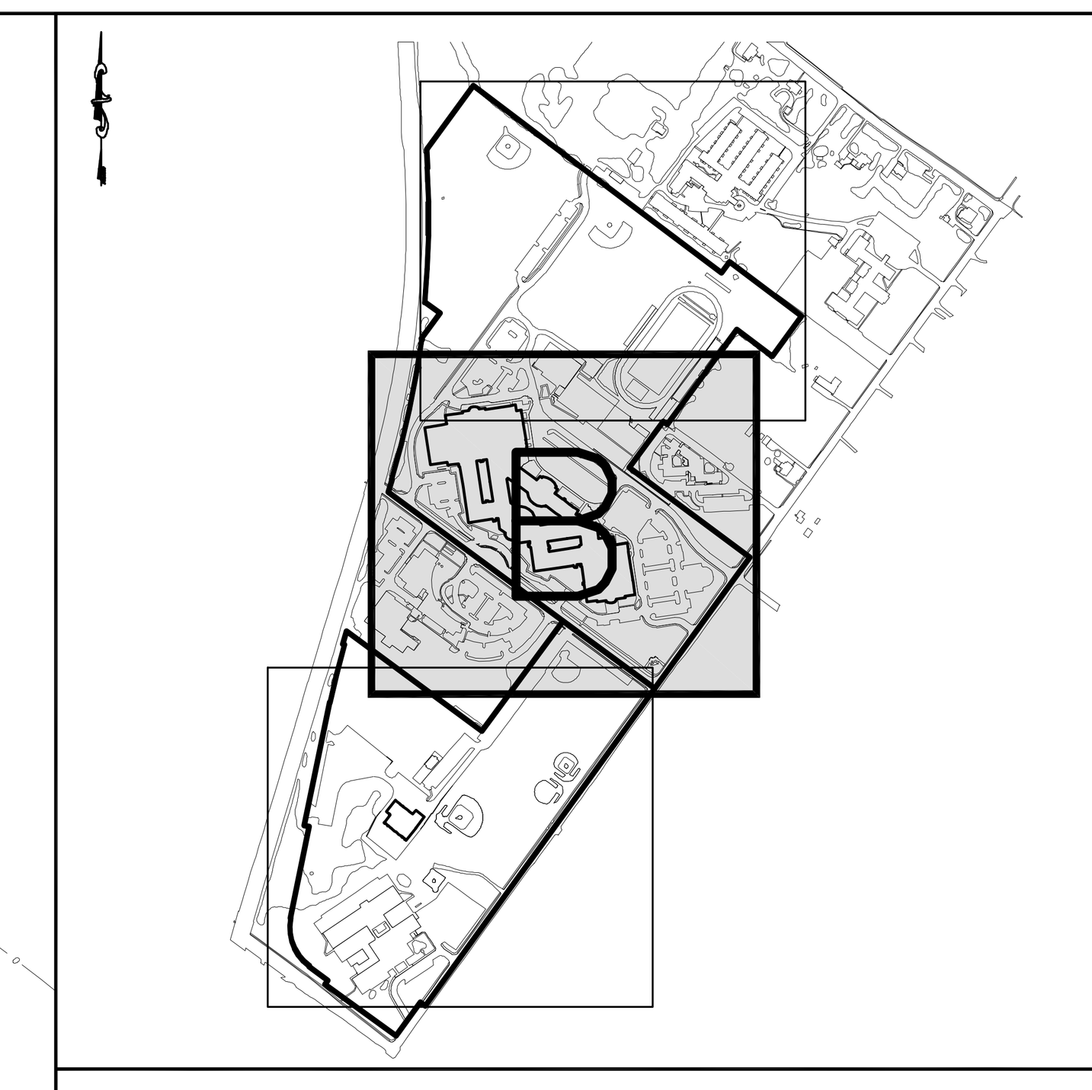
SEE GENERAL INFORMATION SHEET FOR ALL PERTINENT NOTES AND LEGEND INFORMATION.

GRAPHIC SCALE IN FEET: 50 0 50 100

REVISION NO.	DATE	REVISION
19	06/01/08	REVISED PER CONDITIONS OF FINAL APPROVAL
18	05/30/08	ADDENDA DOCUMENTS
17	05/23/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
16	04/25/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
15	04/04/08	BID DOCUMENTS
14	03/18/08	MONTGOMERY COUNTY CONSERVATION DISTRICT SUBMISSION
1	07/05/07	TENTATIVE SKETCH PLAN SUBMISSION

P.D.E. PROJECT NO.	3404
CMX PROJECT NO.	0604040
SCALE	1" = 50'
DRAWN BY	JAC / SAL
DESIGNED BY	SKAG / MRS
PROJECT NO.	0648
SHEET NO.	40 of 111
	C6.3
DATE	05/29/07





KEY MAP

SANITARY SEWER NOTES

1. ALL SANITARY SEWER CONSTRUCTION SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS AND STANDARDS OF THE TOWNSHIP/AUTHORITY AND IS SUBJECT TO INSPECTION BY THE TOWNSHIP/AUTHORITY AND ITS ENGINEER.
2. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING:
   A. A LIST OF THE PROPOSED SUPPLIERS FOR ALL MATERIALS TO BE USED IN CONNECTION WITH THE SEWER CONSTRUCTION.
   B. SHOP DRAWINGS OF THE PRECAST MANHOLES, MANHOLE STEPS AND MANHOLE FRAMES AND COVERS TO BE USED.
   C. CERTIFICATION FROM THE PIPE MANUFACTURER THAT THE PIPE MEETS OR EXCEEDS THE REQUIREMENTS OF THE TOWNSHIP/AUTHORITY SPECIFICATONS.
3. ALL 8"ø SANITARY SEWER LINES SHALL BE TYPE PSM SDR-35 OR TYPE PS-46 PVC. ALL SANITARY SEWER LINES OVER 12' DEEP, INCLUDING THE 18"ø SEWER LINE, SHALL BE DIP CLASS 50 - CEMENT MORTAR LINED (DOUBLE THICKNESS PER ANSI A21.4/AWWA C-104, AND SEAL COATED) WITH AN ASPHALTIC OUTSIDE COATING. ALL LATERALS SHALL BE SCHEDULE 40 PVC EXCEPT AS NOTED AND SHALL BE BEDDED TO MEET MANUFACTURERS SPECIFICATIONS AND/OR APPROVAL OF THE TOWNSHIP.
4. CONTRACTOR TO ENSURE THAT ALL SANITARY MAINS AND LATERALS HAVE A MINIMUM OF 18-INCH VERTICAL CLEARANCE AND 10 FT HORIZONTAL CLEARANCE BETWEEN ANY OTHER UTILITY CROSSING. OTHERWISE CONTRACTOR SHALL ENCASE MAIN OR LATERAL IN CONCRETE WITH A MINIMUM OF 10 LF EACH SIDE OF CROSSING. CLEANOUTS TO BE PLACED AT A MAXIMUM OF 100-FT INTERVAL AND AT ALL BENDS.
5. ALL SANITARY SEWER MANHOLES PROPOSED TO BE INSTALLED OR ADJUSTED WITHIN ANY EASEMENT PROPOSED OR EXISTING, SHALL BE INSTALLED WITH WATERTIGHT FRAMES AND COVERS. ANY MAHHOLE TO BE INSTALLED OR ADJUSTED OUTSIDE OF PAVED AREAS SHALL BE INSTALLED A MINUMUM OF 12" ABOVE FINISH GRADE.
6. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

WATER LINE NOTES

1. ALL POTABLE WATER PIPES SHALL HAVE A MINIMUM COVER OF FOUR (4) FEET. POTABLE WATER AND SANITARY SEWER LINE CROSSINGS SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF EIGHTEEN (18) INCHES OR A MINIMUM HORIZONTAL SEPARATION OF TEN (10) FEET. IF THESE CLEARANCES CANNOT BE MET, THE WATER LINE MUST THEN BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING. IF THE POTABLE WATER PASSES BENEATH THE SANITARY, NO MATTER HOW MUCH CLEARANCE, THE POTABLE WATER MUST BE ENCASED IN CONCRETE FOR 10 LF ON EACH SIDE OF THE CROSSING.
2. PROPOSED WATER LINE MATERIALS AND SIZES SHALL BE AS INDICATED ON THE PLANS.
3. PROPOSED WATER SERVICE(S) SHALL BE STANDARD COPPER PIPE.
4. ALL WATER LINE CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH THE WATER AUTHORITY LATEST STANDARDS AND SPECIFICATIONS.
5. ALL WATER LINE VALVES, FITTINGS, ETC. SHALL BE INSTALLED WITH MEGALUG THRUST CONSTRAINTS.
6. ALL WATER LINES ARE TO BE PRESSURE TESTED TO 150 P.S.I. IN SECTIONS BETWEEN VALVES. THE TEST PRESSURE SHALL BE MAINTAINED FOR A PERIOD NOT LESS THAN 1 HOUR. SHOULD ANY PRESSURE TEST DISCLOSE AN INABILITY TO HOLD THE TEST PRESSURE, THE CONTRACTOR SHALL LOCATE AND CORRECT DEFECTS AND RETEST TO THE SATISFACTION OF THE GOVERNING WATER AUTHORITY.
7. ALL WATER LINES MUST BE SURVEY STAKED PRIOR TO CONSTRUCTION, WITH STAKES PROVIDED AT INTERVALS OF 50 FEET, AS WELL AS AT ALL FITTING LOCATIONS AND UTILITY CROSSINGS. STAKES SHOULD BE MARKED WITH WRITTEN ELEVATIONS FOR BOTTOM OF WATER PIPE (INCLUDES BOTTOM OF OTHER UTILITY PIPE ELEVATIONS AT ALL UTILITY CROSSINGS TO VERIFY CLEARANCE). FIRE HYDRANTS AND WATER SERVICE CURB STOPS MUST ALSO BE FIELD STAKED AND ELEVATIONS INDICATING TOP-OF-CURB OR FINISHED GRADE SHOWN ON THE PLANS.
8. ALL WATER MAINS MUST BE CONSTRUCTED WITH DOUBLE CEMENT LINED, THICKNESS CLASS 52 DUCTILE IRON PIPE WITH TYTON JOINTS AND WITH AN INTERNAL SEAL COAT AND EXTERNAL ASPHALT SEAL COAT IN ACCORDANCE WITH AWWA C104. MECHANICAL JOINTS AND MEGALUG RESISTANT GLANDS MUST BE USED WITH ALL FITTINGS.
9. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PUBLIC UTILITIES NOTES

1. ALL PUBLIC UTILITIES REQUIRED TO SERVICE THIS LAND DEVELOPMENT SHALL BE PLACED UNDERGROUND.
2. BECAUSE GAS SERVICE IS TO BE REVISED, GAS UTILITY DESIGN PLANS AND DATA SHALL BE SUBMITTED BY THE GAS COMPANY. A PRECONSTRUCTION MEETING WITH THE DEVELOPER, UTILITY CONTRACTOR, GAS COMPANY REPRESENTATIVES, TOWNSHIP ENGINEER AND THE TOWNSHIP SHALL BE HELD PRIOR TO CONSTRUCTION.
3. PROVIDE A MINIMUM OF 18" BETWEEN UTILITIES OR PROVIDE AN ENCASEMENT.

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 STOP - CALL BEFORE YOU DIG

ATTENTION ALL CONTRACTORS: LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN DEVELOPED FROM UTILITY COMPANY RECORDS AND/OR ABOVE-GROUND INSPECTION OF THE SITE. COMPLETENESS OR ACCURACY OF TYPE, SIZE, DEPTH OR HORIZONTAL LOCATION OF UNDERGROUND FACILITIES OR STRUCTURES CANNOT BE GUARANTEED. PURSUANT TO REQUIREMENTS OF PENNSYLVANIA LEGISLATIVE ACT 287 OF 1974, AS AMENDED BY ACT 181 OF 2006, CONTRACTORS MUST VERIFY LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND FACILITIES PRIOR TO START OF WORK. SERIAL NO. 1527739

UTILITY LEGEND

EXISTING	DESCRIPTION	PROPOSED
OHU	OVERHEAD WIRES	OHU
UGU	UNDERGROUND WIRES	UGU
OHE	OVERHEAD ELECTRIC	OHE
UGE	UNDERGROUND ELECTRIC	UGE
OHT	OVERHEAD TELEPHONE	OHT
UGT	UNDERGROUND TELEPHONE	UGT
CATV	CABLE TV LINE	CATV
FO	FIBER OPTIC CABLE	FO
G	GAS MAIN	G
GS	GAS SERVICE	GS
SAN	SANITARY SEWER MAIN	
SL	SANITARY SEWER LATERAL	SL
FM	SANITARY SEWER FORCEMAIN	FM
	STORM SEWER	
W	WATER MAIN	W
WS	WATER SERVICE	WS
FS	FIRE SERVICE	FS

REFER TO PENNDOT HOP PLANS FOR WORK WITHIN PENNDOT R.O.W.

STUART K. A. GAUSE
PROFESSIONAL ENGINEER, PA. LIC. No. PE052618E

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — STUART K. A. GAUSE — NO. PE052618E

SEE GENERAL INFORMATION SHEET FOR ALL PERTINENT NOTES AND LEGEND INFORMATION.

50 0 50 100
GRAPHIC SCALE IN FEET

—NOTICE—
THIS DRAWING AND ALL INFORMATION CONTAINED HEREIN IS AUTHORIZED FOR USE ONLY BY THE PARTY FOR WHOM THE WORK WAS CONTRACTED OR TO WHOM IT IS CERTIFIED.
THIS DRAWING MAY NOT BE COPIED, REUSED, DISCLOSED, DISTRIBUTED OR RELIED UPON FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF CMX.

REVISION NO.	DATE	REVISION
19	06/01/08	REVISED PER CONDITIONS OF FINAL APPROVAL
18	05/30/08	ADDENDA DOCUMENTS
17	05/23/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
16	04/25/08	REVISED PER TOWNSHIP ENGINEER REVIEW COMMENTS
15	04/04/08	BID DOCUMENTS
14	03/18/08	MONTGOMERY COUNTY CONSERVATION DISTRICT SUBMISSION
1	07/05/07	TENTATIVE SKETCH PLAN SUBMISSION

CMX
ARIZONA • FLORIDA • MARYLAND • NEVADA • NEW JERSEY
NEW YORK • PENNSYLVANIA • MEXICO
1555 BUSTARD ROAD . SUITE 50T . LANSDALE, PA 19446-5728
TEL 215.361.6050 . FAX 215.361.6160

ADDENDA DOCUMENTS MAY 13, 2008

Gilbert Architects Inc.
626 North Charlotte Street
Lancaster, PA 17603
P: 717.291.1077 F: 717.392.3923
10451 Mill Run Circle
Owings Mills, MD 21117
P: 410.356.8856 F: 410.654.8802
100 South Broad Street, Suite A
Wilmington, DE 19809
P: 302.791.0522 F: 302.791.9095

gilbert

UTILITY PLAN - PHASE 2 (VIEW B)

NEW:
UPPER DUBLIN HIGH SCHOOL
SCHOOL DISTRICT OF UPPER DUBLIN
UPPER DUBLIN TOWNSHIP, MONTGOMERY COUNTY, PA

P.D.E. PROJECT NO.	3404
CMX PROJECT NO.	060404O
SCALE	1" = 50'
DRAWN BY	JAC / SAL
DESIGNED BY	SKAG / MRS
PROJECT NO.	0648
SHEET NO.	41 of 111
	C6.4
DATE	05/29/07

Appendix G

Performance Bond Agreement

PERFORMANCE BOND

And Now, we _____[CONTRACTOR], as Principal (the "Principal"), and _____[SURETY], a Corporation organized and existing under the laws of the _____ of _____ as Surety (the "Surety"), are jointly and severally held and firmly bound to the School District of Upper Dublin, its successors and assigns (the "Obligee"), for the performance of the Contract hereinafter identified and incorporated herein by this reference in the sum of _____[CONTRACT AMOUNT], lawful money of the United States of America to be paid to the Obligee; to which performance or payment, well and truly to be made, we bind ourselves and each of our successors and assigns, jointly and severally.

I. RECITALS

WHERAS, the Principal has submitted to the Obligee a certain proposal, dated _____, 2008 (the "Proposal"), to perform certain work for the Obligee, in connection with the construction of a new High School in School District of Upper Dublin pursuant to plans, specifications and other related documents, which are incorporated into the Proposal by reference (the "Contract Documents"), as prepared by Gilbert Architects Inc. and D'Huy Engineering, Inc.; and

WHEREAS, the Obligee, is a "contracting body" under provisions of Act No. 385 of the General Assembly of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known as and cited as the "Public Works Contractors' Bond Law of 1967" (the "Act");

WHEREAS, the Act, in Section 3 (a), requires that, before an award shall be made to the Principal by the Obligee in accordance with the Proposal, the Principal shall furnish this Bond to the Obligee, with this Bond to become binding upon the award of a contract to the Principal by the Obligee in accordance with the Proposal; and

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee and

WHEREAS, under the Contract Documents, it is provided, inter alia, that if the Principal shall furnish this Bond to the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Proposal, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the "Agreement"), the form of which Agreement is set forth in the Contract Documents.

II. CONDITIONS OF BOND

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if:

(a) the Principal well, truly, and faithfully shall comply with and shall perform the Agreement in accordance with the Contract Documents, at the time and in the manner provided in the Agreement and in the Contract Documents, and if the Principal shall satisfy all claims and demands incurred in or related to the performance of the Agreement by the Principal or growing out of the performance of the Agreement by the Principal, and if the Principal shall indemnify completely and shall hold harmless the Obligee and all of its officers, directors, agents or employees from any and all costs and damages which the Obligee and any or all of its officers, directors, agents and employees may sustain or suffer including, but not limited to, attorney's fees, costs, expenses and interest by reason of the failure of the Principal to do so, and if the Principal shall reimburse completely and pay to the Obligee any and all costs, damages and expenses, including interest and attorney's fees which the Obligee and any or all of its officers, directors, agents and employees may incur by reason of any such default or failure by the Principal, and

(b) the Principal shall remedy, without cost to the Obligee, all defects, deficiencies or failures in any labor, materials or equipment performed or provided by the Principal in its performance of the Agreement which may develop during the period of ***One (1) year from the date of Substantial Completion of each Phase (Addendum No. 2 - 04/22/08)*** by the Principal and [final] acceptance thereof the Obligee of the work to be performed under the Agreement in accordance with the Contract Documents, which defects, in the sole judgment of the Obligee or its legal successors in interests, shall be caused by or shall result from defective or inferior materials or workmanship, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect.

We, the Principal and Surety, further agree to indemnify and hold harmless the Obligee against any and all costs, liabilities, expenses, attorney's fees and obligations which the Obligee sustains by reason of the failure of the Principal or the Surety to comply with the terms of the Contract Documents or this Bond.

It is further agreed that, in the sole discretion of the Obligee and upon notice therefrom, the Surety may be required to perform and carry out the provisions of the Agreement in the event of a breach thereof by the Principal, whereupon the rights and responsibilities of the Surety and the Obligee to each other shall be the same as those of the Principal and the Obligee immediately prior to the breach giving rise to the Surety's obligation hereunder. If the Surety does not proceed promptly to render such performance or cause such performance to be rendered by a third party satisfactory to the Obligee, then the Surety shall be deemed to be in default on this obligation fifteen (15) days after the receipt of notice from Obligee that the Surety shall so proceed, and the Obligee shall be entitled to enforce against Surety any remedy it may then or thereafter have against the Principal.

This Bond every action upon this Bond shall be instituted either in the Court of Common Pleas of Montgomery County, Pennsylvania or in the United States District Court for the Eastern District of Pennsylvania, and not elsewhere.

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Document, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Obligee of any extensions of time for the performance of the Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Obligee toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Obligee as permitted by the Contract Documents and by the Agreement shall not release in any manner whatsoever, the Principal and the Surety, or either of them, their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

It is expressly agreed that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract Documents not increasing the contract price more than twenty percent (20%), so as to bind the Principal and the Surety to the full and faithful performance of the Contract Documents as so amended. The term "Amendment," wherever used in this Bond and whether referring to this Bond, the Contract Documents, or the Agreement, shall include any alteration, addition, extension or modification of any character whatsoever.

If the Principal is a foreign corporation (incorporated under any laws other than those of the Commonwealth of Pennsylvania) then further terms and conditions of this Bond are and shall be that the Principal or the Surety shall not be discharged from liability on this, nor this Bond surrendered until such Principal files with the Obligee a certificate from the Pennsylvania Department of Revenue evidencing the payment in full of all bonus taxes, penalties and interest, and a certificate from the Bureau of Employment and Unemployment Compensation of the Pennsylvania Department of Labor and industry, evidencing the payment of all unemployment compensation, contributions, penalties and corporations, subcontractors thereunder or for such liability has accrued but the time for payment has not arrived, all in accordance with provisions of the Act of June 10,1947, P.L. 493, of the Commonwealth of Pennsylvania.

This Bond is executed and delivered under and subject to the Act, to which reference hereby is made and which is hereby incorporated by reference, provided, however, that in the event of any inconsistencies or ambiguity in the meaning of this Bond and the said Public Works Contractors' Bond Law of 1967 the express terms of this Bond shall govern and control.

IN WITNESS WHEREOF, the Principal and Surety cause this Bond to be signed, sealed and delivered this _____ day of _____, 20__.

ATTEST: [NAME OF CORPORATION]

_____ By: _____
President

(CORPORATE SEAL)

or, if appropriate

WITNESS [NAME OF CORPORATION]

_____ By: _____
Authorized Representative

(CORPORATE SEAL)

*Attach appropriate proof, bearing date of Bond, evidencing authority to act for Corporation

WITNESS _____
Corporate Surety

_____ By: _____
Attorney-in-Fact

(CORPORATE SEAL) Issuing Office:

_____
Address

_____
City, State, Zip

IMPORTANT:

Surety companies executing Bonds must appear on the Commonwealth of Pennsylvania Insurance Department's most current licensed company list and be authorized to transact business as a surety in the Commonwealth of Pennsylvania and have an AM Best rating of "A-" or higher.