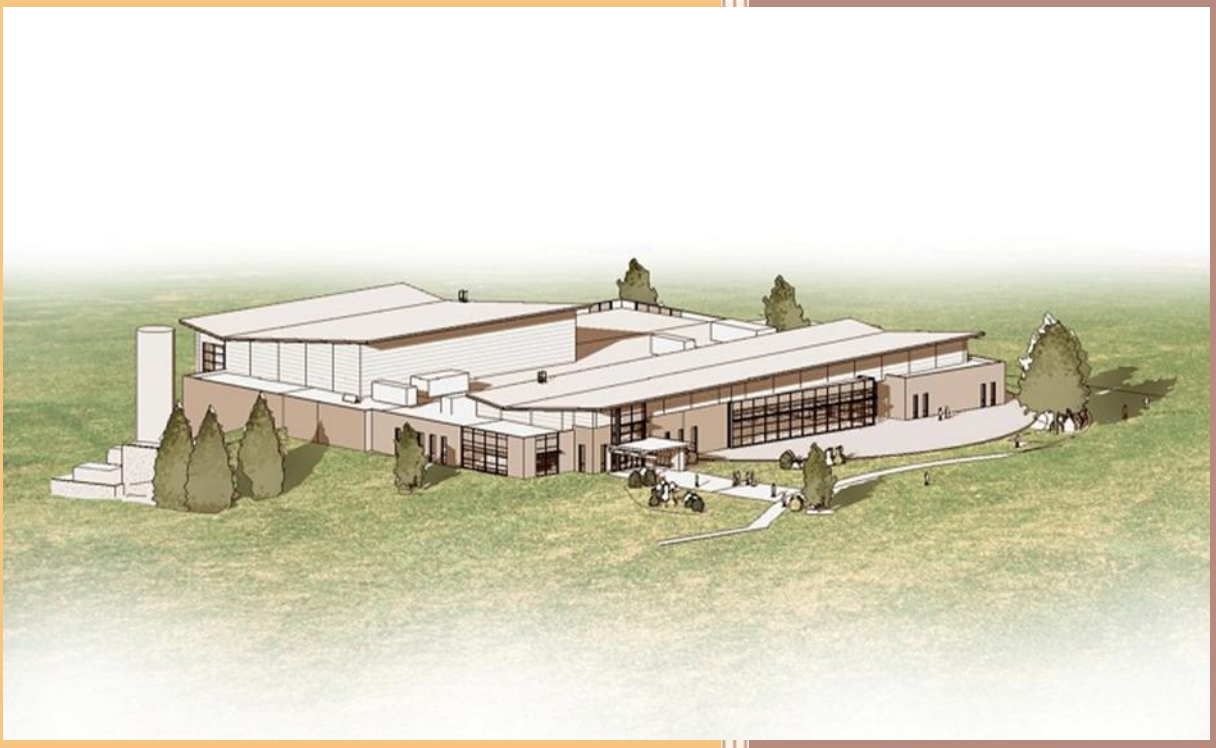
Student Life Building

Technical Report 1



Northampton Community College

Tannersville, Pa

Kendall Slivka

Faculty Advisor; Dr. Robert Leicht

Executive Summary

The Student Life Building is one part of the development of Northampton Community College's new Monroe Campus. The Campus will be located in Tannersville Pa, about two miles from the existing Monroe Campus. The design was completed in October 2011 with the help of MKSD Architects and D'Huy Engineering, Inc. Construction began in spring 2012 and the project should be complete by January 2014. The project delivery system for construction is design-bid-build and follows Pennsylvania laws that guide the construction of public properties. Also following construction laws in Pennsylvania, four prime contractors have been awarded the job; a general, HVAC, electrical, and plumbing.

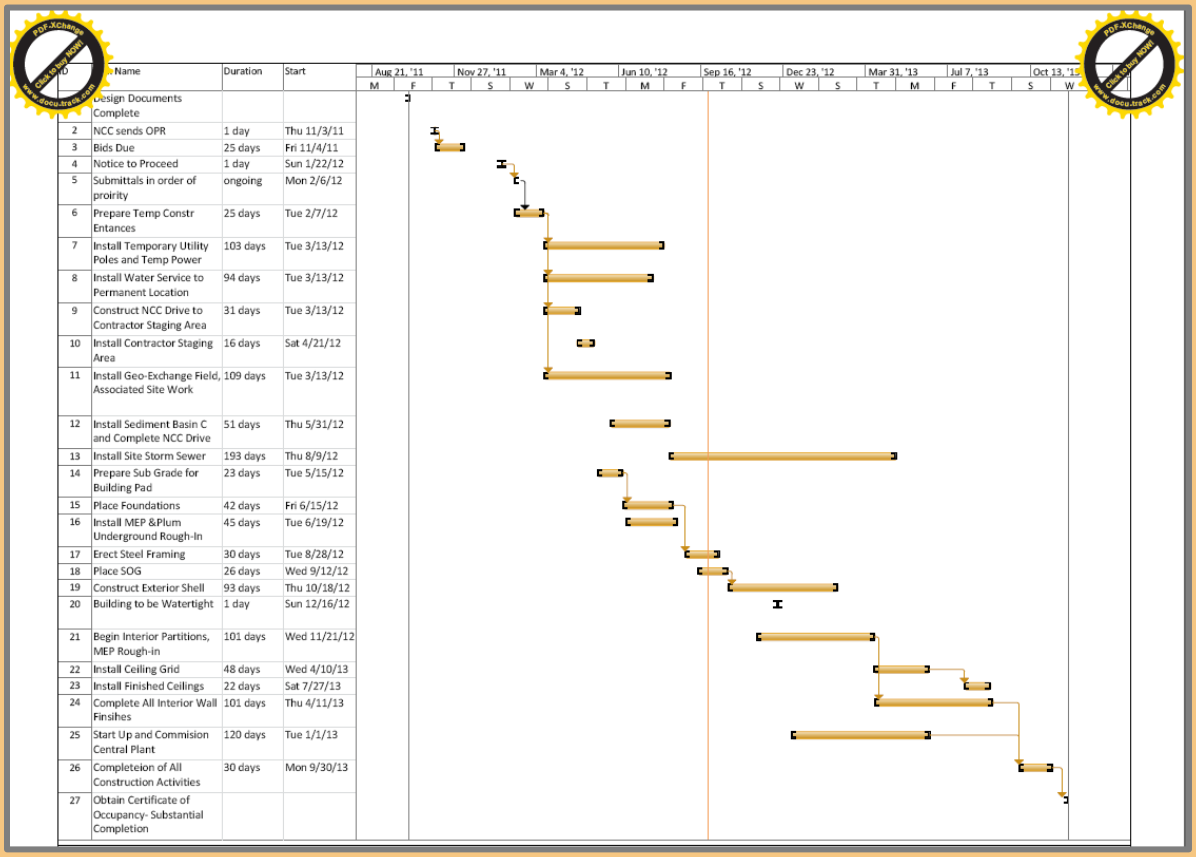
The Student Life Building will be the hub of campus life. The 68,000 ft^2 structure will house a gymnasium, fitness center, cafeteria, meeting spaces, and the central plant. The central plant will house mechanical and electrical equipment for the other two buildings on campus. A geoexchange well field will be positioned behind the Student Life Building, and the mechanical rooms will be centralized in the basement. The well field, along with two heater/chillers will be the primary source for hot and chilled water for the campus' HVAC needs.

The campus budget has been set around $80 million and the cost for the Student Life Building is estimated at $18.5million. This price compared to the total square foot design seems high, but the cost difference can be applied to the machinery in the central plant. Also, the site work of the Student Life building includes trenches to the other two campus buildings.

Table of Contents

Project Schedule Summary

*****A copy of the Summary Schedule is attached in Appendix A*



ID	Name	Duration	Start
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The student Life Building is being completed as the first installment of a 3 building campus. The Construction period spans 3-4 years. The summary schedule shows key elements throughout design procurement and construction of the Student Life Building. The building design phase could arguably have begun when the College purchased land in 2005. Geological testing was done to the site in both 2008 and 2010. Northampton ended their design phase in October 2011 when MKSD Architects presented their construction drawings.

The procurement process began when Northampton Community College started the bidding process, sending out their project requirements on November 3, 2011, and accepting bids in December. D'Huy Engineering Inc helped with the selection of contractors who then received their notice to proceed in late January 2012.The procurement process lasted into March 2012 when work onsite began.

Access roads were created for laborers and equipment, and sediment basins needed to be formed before any foundation work could begin. From May 15, 2012 until June 14, 2012 the sub-grade for the Student Life Center was prepared. Excavation surrounding the Student Life Center was a predecessor to the excavation of the other two campus buildings. The earliest date for foundations to be poured was June 14. While foundations were being poured, underground rough-in of MEP was being completed. The slab process began September 12, 2012 and should have duration of about 35 days.

Once the slab is poured and cured, the steel erection can begin. The scheduled duration is about 40 days, so the structural frame should be finished by late December. While steel is being erected the metal decking will also be placed and the floors can be poured. Interior partitions and MEP rough in can begin in early February. Finalizations of the wall rough ins and inspection is scheduled for June 2013.

The brick veneer, curtain walls, and metal panels can begin to be placed in January and should be finalized by April. Once the building is water tight at the end of February, interior finished can begin. This process should be complete in November 2013. There is a 30 day buffer at the end of the project that will allow for completion of construction activities. Certificate of occupancy should be received in January 2014.

Building Systems Summary

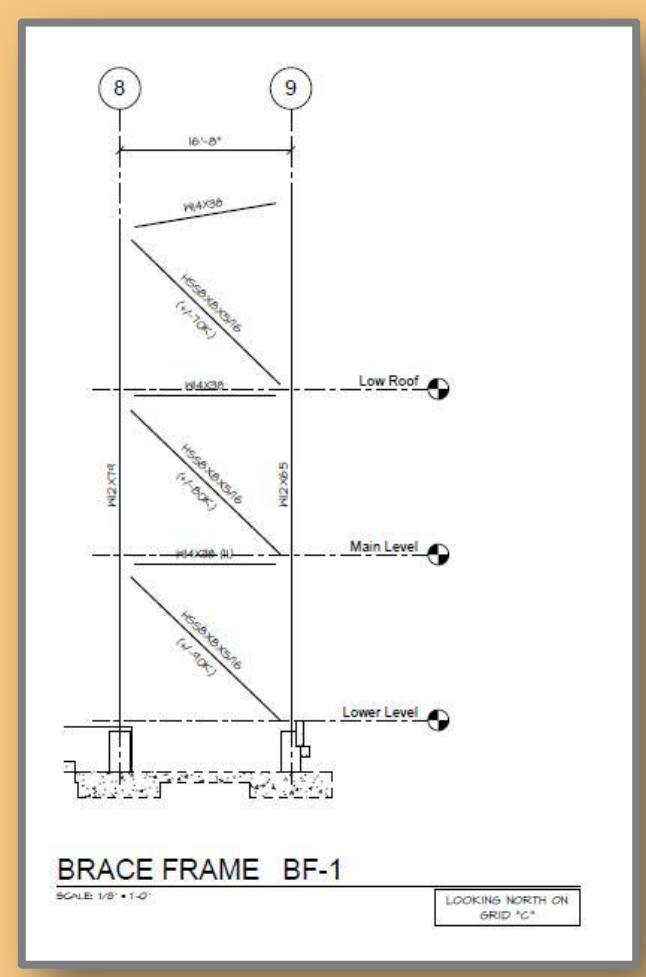
Yes	No	Work Scope
	X	Demolition
X		Structural Steel Framing
X		Cast in Place Concrete
	X	Precast Concrete
X		Mechanical Systems
X		Electrical Systems
X		Masonry
X		Curtain Wall
	X	Support of Excavation

Demolition

The site for the Monroe Campus is considered a greenfield because there has not been previous construction. The is no true demolition needed on the site, however extensive site work will be completed. Access roads and a construction entrance from Railroad Ave need to be created before any other work can begin. There are not any known utilities under the site, so they will need to be brought to the building locations. The picture below shows a view on the site looking toward Railroad Ave and gives an understanding of the undisturbed nature of the site.

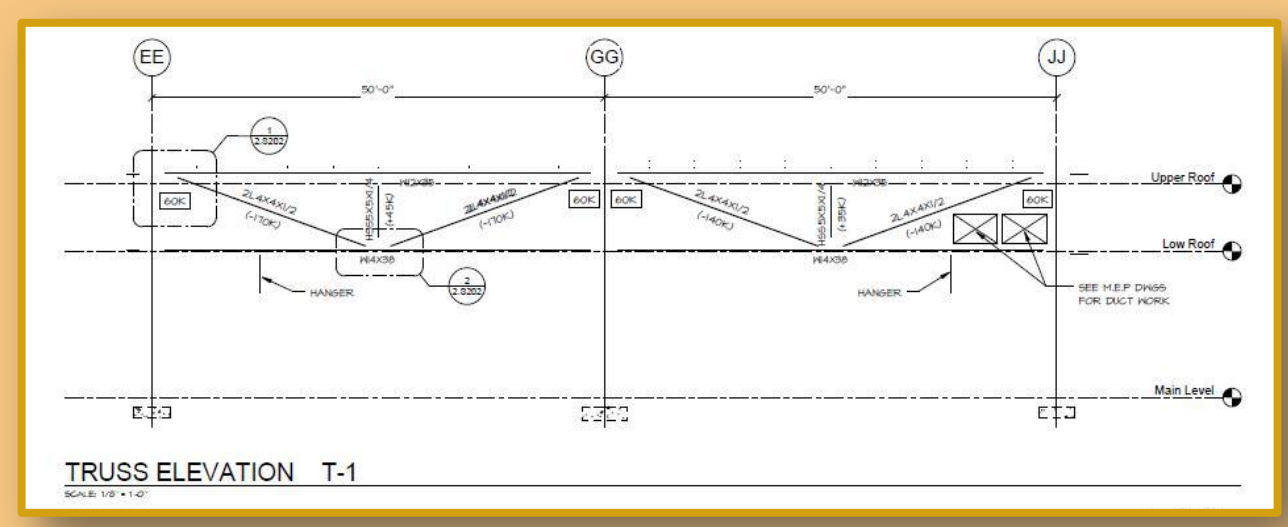
Structural Steel

The Student Life Building is designed to have a structural steel frame. The design criteria states that it will need to support a total floor load of 159 PSF, a roof design load of about 50PSF and a snow load of about 30PSF.



Despite the building only having one floor, the framing system will be made up of three layers. The first layer is the lower level, which will house the mechanical equipment and maintenance rooms, the main level will have two structural layers. A lower frame will cover most of the building, and a higher frame that will make up the gymnasium. The framing system on the lower level is made up primarily of W10x33 columns that are pinned into footings in the composite slab. Reinforcement in the slab will be 6x6-W2.9-2.9 W.W.R at -2” from the top of slab. The main floor will be mainly by W18x40 and W 18x35 beams. These beams will then support the composite floor deck shown in TD1.

The roof framing system for the building is sectioned into two layers – the lower and upper. The lower level roof plan is somewhat sloped but has a much simpler frame than the upper. The gymnasium has a high, sloped roof line and to support it, a truss bracing system is used. It can be seen in the detail T-1 from sheet 2.S202. There is also



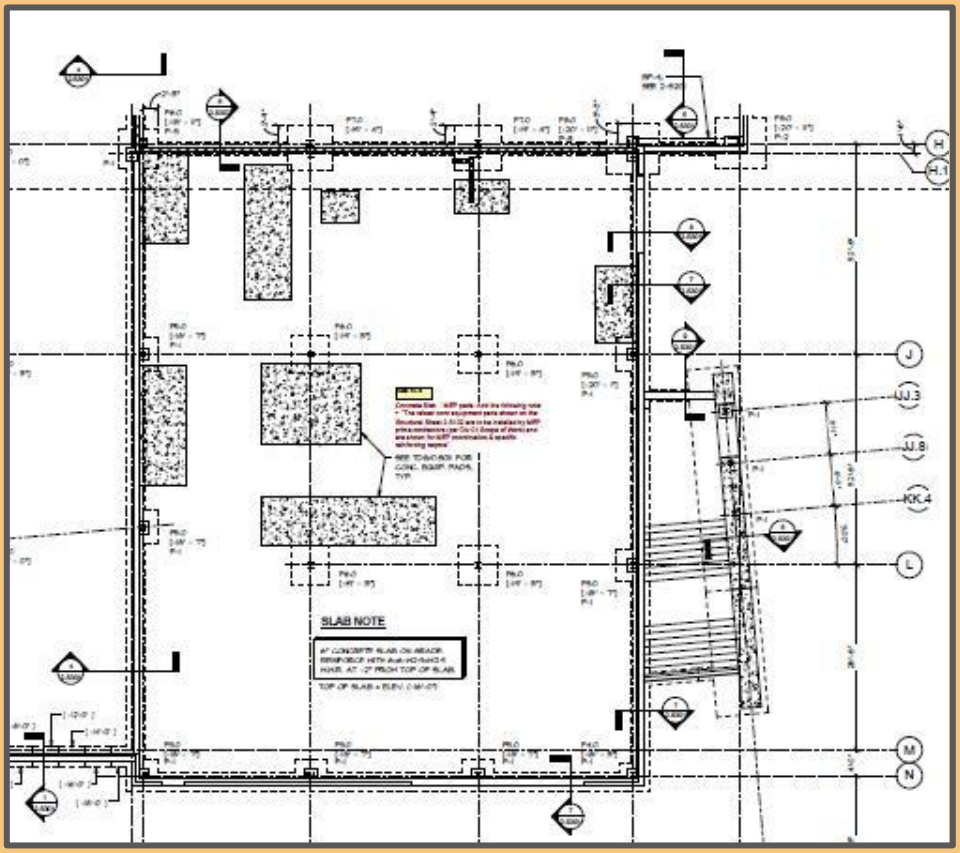
a diagonal bracing system used between specific column lines. An example is shown between column lines 8 and 9 on sheet 2.S201

The crane size, type and location have not yet been specified. It is considered a means and methods of the General Contractor and the Structural Steel Company.

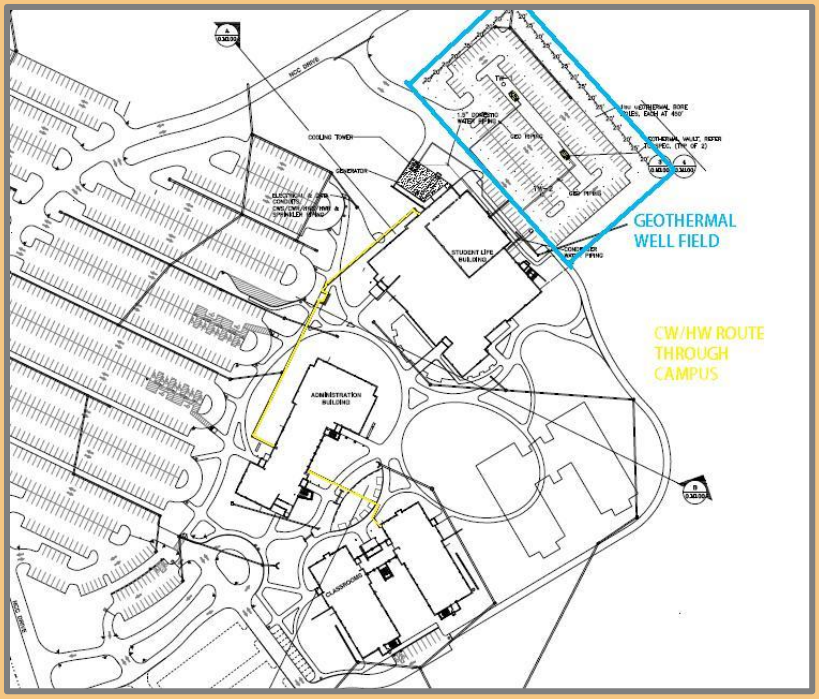
Cast in Place Concrete

All Concrete within The Student Life building will cast in place. This includes footings, slabs on grade, foundation walls, concrete toppings and building walls. The contract documents state that formwork must be designed erected and maintained according to ACI 301. Also, formwork must be created so that tolerance limits are within ACI117. Forms should be cleaned, maintained, and coated with a form release agent as per manufacturer's instructions.

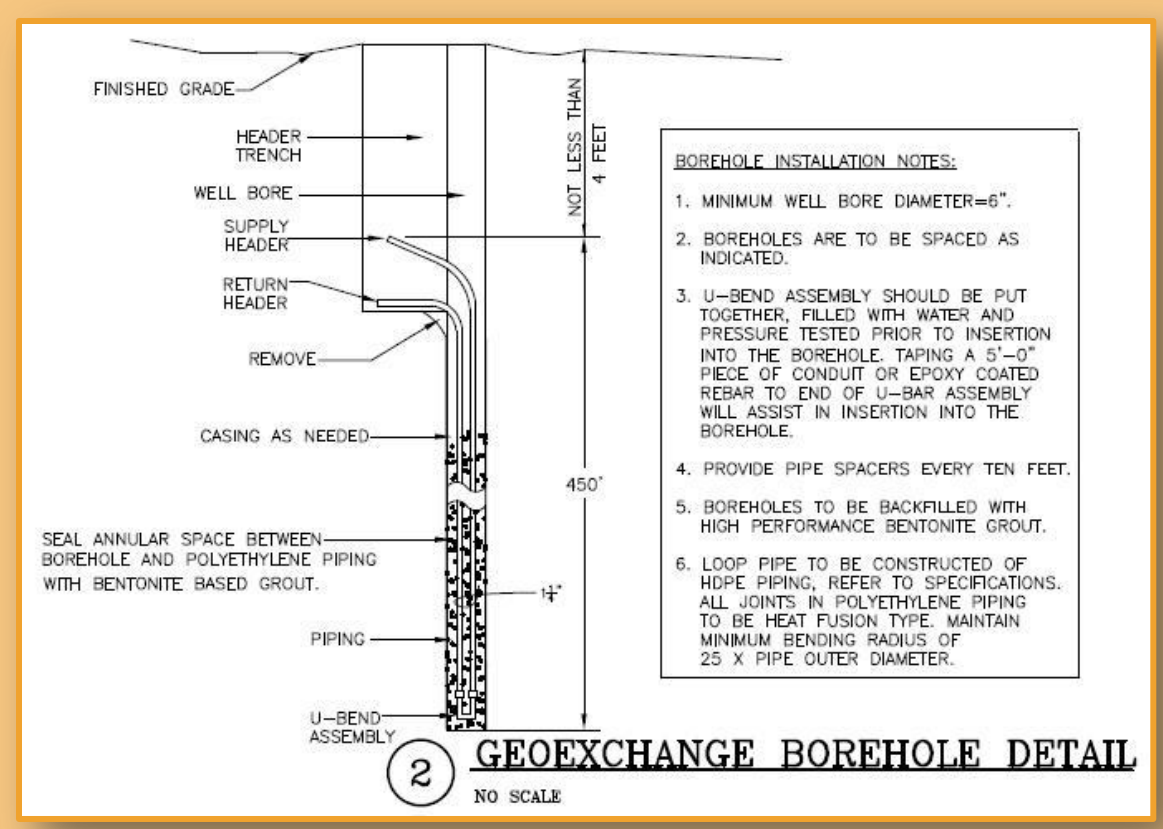
Before placing concrete, formwork and reinforcing should be inspected. Water should not be added to the concrete while being delivered to the site or during placement. Placement should be done in a continuous horizontal layering motion. No concrete should be poured on top of concrete that has already hardened. The foundation plan shows extra pads that will be poured to support mechanical equipment. The form if the pads is vital the mechanical system's quality.



Mechanical Systems



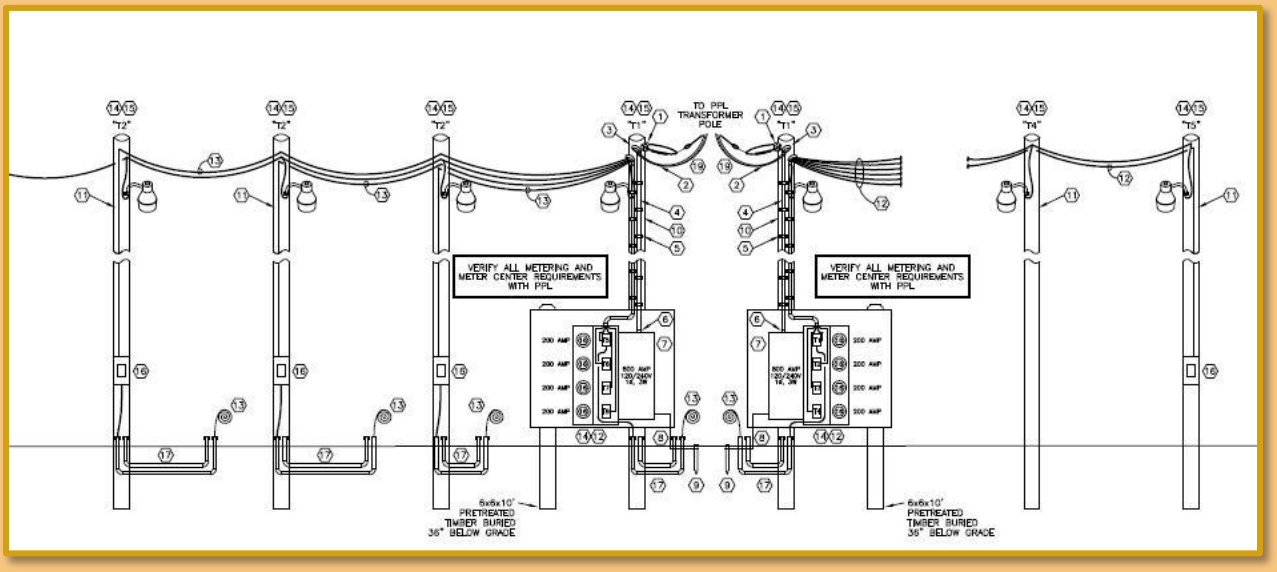
The central plant for the Monroe Campus will be housed in the Student Life Building. The lower level of the building will have rooms for the mechanical and electrical equipment and a room for sprinkler system control. In the other two buildings on campus, a Variable Air Volume system will be used. The mechanical system used in the Student Life Building will be Constant Air Volume. The system will rely on two chiller/heaters that are able to provide both heating and cooling to all three buildings, but an electric boiler will be installed in the mechanical room as a backup. The chiller/heaters will send water back and forth to a geothermal well field constructed behind the Student Life Building. Approximately 160 geo-exchange boreholes will be drilled below the parking lot. The site utility plan shows the path that water will take from the Student Life Building throughout campus and back.



Fire suppression systems on the Monroe Campus will be water based. The systems in all three buildings need to meet NFPA standards 13 and 24. These standards state that there needs to be an automatic system and a source of water that can be used in an emergency. As shown on sheets 2.FP100 and 2.FP500, a 30,000 gallon water storage tank will be constructed near the loading dock. The sprinkler heads will be placed uniformly within the ceiling grid and lighting fixtures. Also, the construction documents call for an 'additional layer of upright sprinkler heads above ceilings and panels.'

Electrical Systems

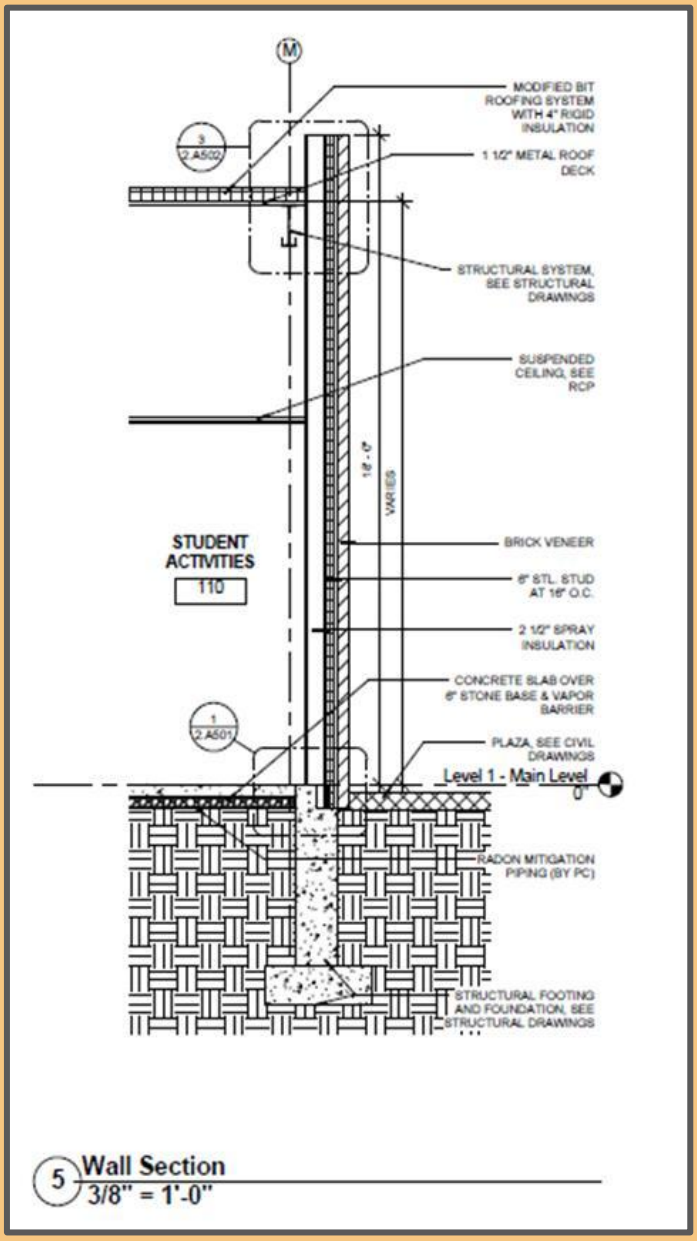
The electrical system can be split into the temporary electric needs of the site and the permanent. The temporary site utilities call for pole connections to be placed along the access roads. The site should be lit from dusk until dawn. An example of the temporary poles is shown in detail.



The permanent electrical system will be made to run the Student Life Building and Central Plant. There are two transformers feeding the building. Both will bring 12.5kV into the electrical room and step that down to 480/277 3 phase power. There is also an emergency generator that will supply power to the building and central plant if needed.

Masonry

Masonry appears both in the structure and the façade of the Student Life Center. Within the structure, concrete masonry units are used in the gymnasium. In that section of the building, painted CMUs are the load bearing wall partition. The façade of the Student Life Building has a brick veneer. Because it is a veneer, the brick is not load-bearing. Connections to the structural steel can be seen in the detail view.



Curtain Wall

The exterior of the Student Life Building is made up of numerous materials. Besides the brick veneer, there are large curtain walls and metal panels. The curtain walls are glazed aluminum curtain walls with a 1” thick glass and ½” airspace. The connection to structural steel is similar to the masonry.

The curtain wall should be able to withstand a wind load of 20psf without any failure. Failure is defined in the contract documents as glass breakage, noise or vibration, and thermal stresses being transferred through the glass to the structure.

Support of Excavation

The geotechnical report found water in one of 26 of the holes that were drilled. Also, the spring that was located in both 2008 and 2010 was decided to be irrelevant to the foundation design. Because the Excavation is not excessively deep, the shallow footings were sufficient and no dewatering system or excavation support was needed.

LEED

Northampton Community College has a strong belief in sustainability. They promote it as one of their values that student's need to learn, and as a result any construction the college creates seeks LEED silver rating. The owner teamed up with designers and completed their LEED summary draft. The building systems chosen play a large part in the path to being a LEED accredited building. The Energy and Efficiency section of the points system will be greatly helped by the geothermal wells and central plant. Also, they have been able to avoid excessive light pollution and lessen the amount of water being used through their landscape designs.

Because of their planning and whole building approach in the beginning of the project, NCC has designed all building systems in the campus around the sustainable efforts and will be able to achieve their LEED Silver goal.

Project Cost Evaluation

In the building cost estimates performed for the Monroe Campus, the Student Life Building and the Central Plant are considered two different entities. However, because the Central Plant will be housed in the lower level of the building, I will combine the totals. Actual construction costs are estimated to be $18,522,363. Compared to the 68,000ft^2 area, the cost of the Student Life Center is about $273. This price may seem high compared to a similar building, but the mechanical equipment will help to heat and cool the other buildings on campus.

Total project cost of the Student Life Building is more complicated to determine. Site work and contracts have been awarded based on all three structures, and the overall cost for the campus will be $80.3 million. By using the square footage of the other two buildings to find each building's percent of the total square footage, it can be determined that the total cost of the Student Life Building is $26,504,150. The total cost per square foot is approximately $390.

Major building systems within the Student Life Building greatly affect the overall cost. Three of the largest building systems are the mechanical, electrical, and structural steel. The mechanical system includes the central plant equipment and the building's own HVAC equipment. Combined, the system will cost about $4,894,500. This price will include Facility Management Systems, the geo-exchange wells and piping, 2 chiller/heaters an electric boiler, ductwork, hydronic piping and insulation, VAV boxes, exhaust fans, grilles, registers, diffusers and an energy recovery unit. The price of the electrical system for the Student Life Building will obviously include all branch conduit and wire, switches and breakers, panels, switchboards, light switches and fixtures. It will also contain the duct bank that will feed the other two buildings, power feeds for the central plant, and a 250kW generator. Total pricing of the electrical system is approximately $1,762,637. Finally the structural steel system within the building will include all structural steel members, all roof decking, exterior structural metal, stair and landing metal, and any other miscellaneous steel described in the contract documents.

The square footage estimate that I prepared for the Student Life Building determined the building's construction to cost about $12.2 million. I created the estimate using RS Means CostWorks software. The cost information is attached in Appendix B. In the estimate, I made the following assumptions;

Assumptions/Revisions to Standard Data

Location factor of Stroudsburg Pa is sufficient

Perimeter = 890 LF

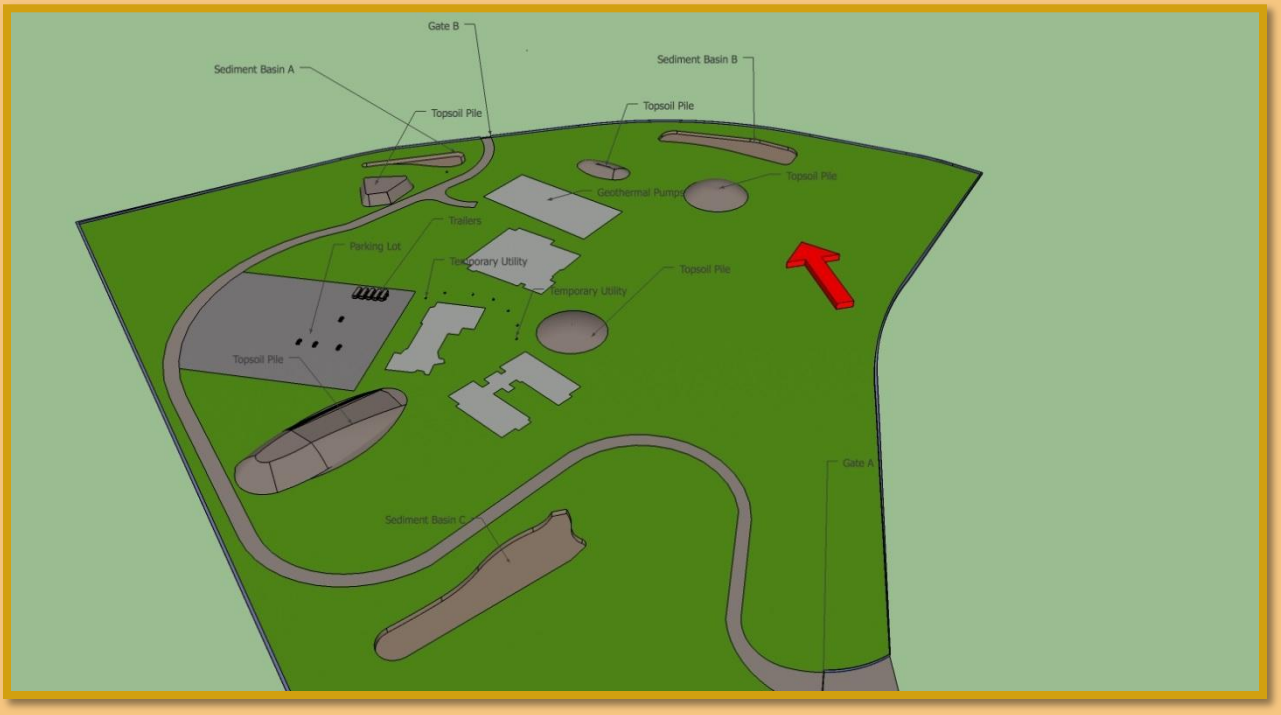
Building Type, College Student Union

Structural Steel Frame with brick face and CMU backing

The assemblies estimate for the MEP system is attached in Appendix C. The total in this estimate was $1.6 million. Compared to the estimates already prepared, the estimates I have created are somewhat low. I think that the mechanical equipment being used in the central plant can account for a lot of the differences. The types of equipment listed in the RS Means data are not specifically what is being used, especially because a combination of systems is being put in place to support all three buildings. Also the square foot estimate was being compared to a brick face, not a brick veneer, and the varying roof height was not accounted for.

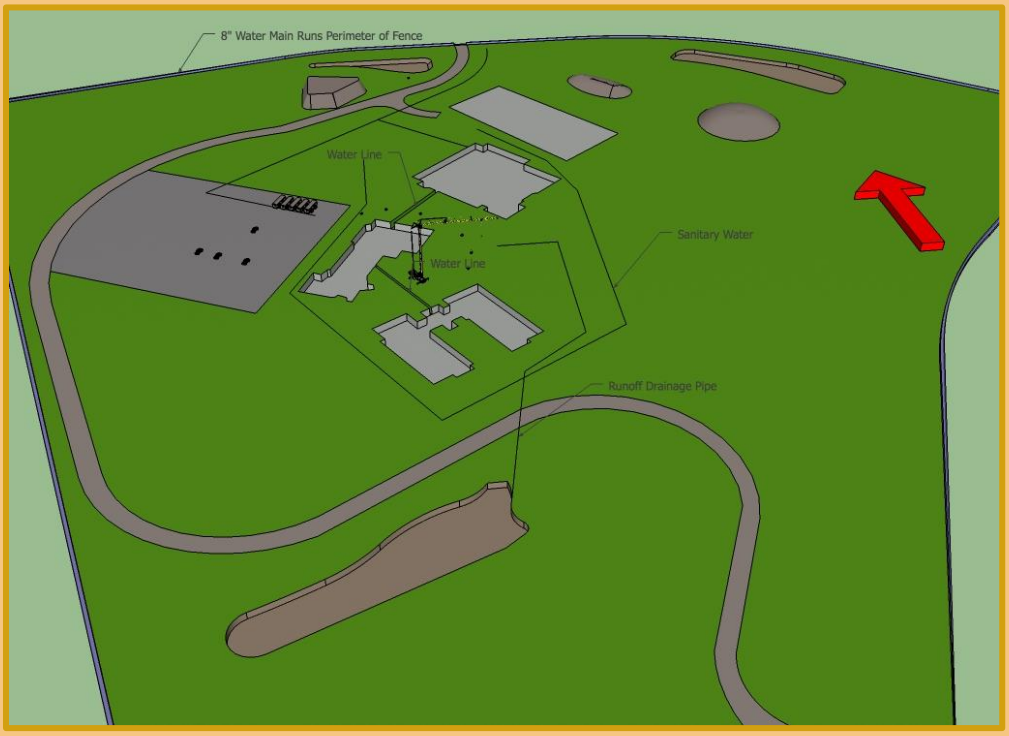
Site Plan

Existing Conditions

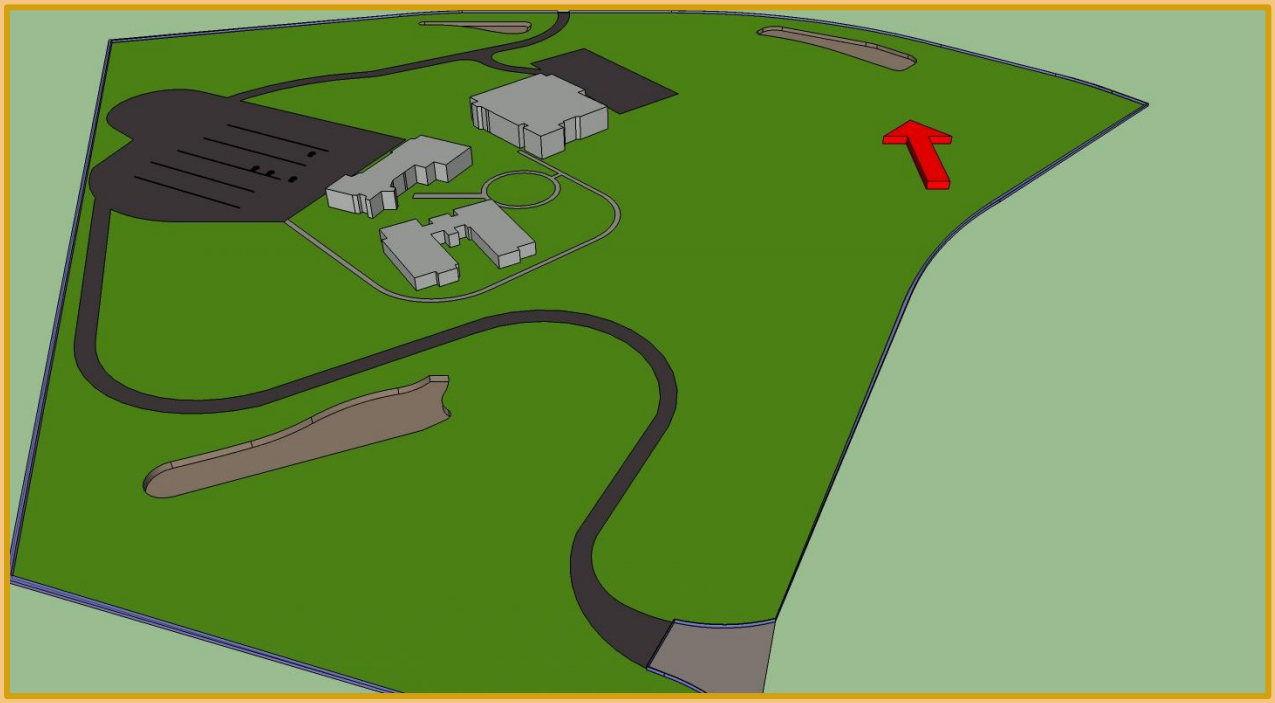


Site Layout

Phase 2



Phase 3



Local Conditions

The Monroe Campus will be constructed on a 72 acre site in Pocono Township, Pennsylvania. The site is a greenfield because there has been no previous construction. It's considered in the Glaciated Low Plateau of the Appalachian Plateaus Province. The region generally consists of rolling hills and valleys, and specifically, the site has a slight slope and was covered with grass and clusters of trees.

The Monroe Campus sits on a geological makeup of about 4 layers. Under the topsoil is a layer of medium to coarse sand that contains some silt and clay. Below that is a layer of gravel sized rock fragments and more coarse sand. Finally there are intermittent layers of Sandstone and Siltstone. The geotechnical report shows that shallow spread footings with foundations of varying strengths will be sufficient for the Student Life Center and the other two buildings on campus. The report also showed that topsoil onsite can be cleared and used later and compacted for load bearing fills.

Water conditions on site are more problematic than soil breakdown. 26 borings were performed and groundwater was observed in 1. A spring/seed was also observed on railroad drive, however by the end of site investigations, it had stopped flowing. Soil in that area was saturated, but overall there shouldn't be standing water or excessive seepage during excavation. The site is situated between two different watersheds. Because of this, basins along the site's outer rim must be created. They will help manage the flow of the runoff, and ensure the separation of the watersheds.

Client Info

Northampton Community College is an accredited college offering Associate's degrees in Science, Applied Science, and Arts. They have a main campus in Bethlehem, Pa, an existing branch campus in Tannersville, Pa – about 2 miles from the site – and over 50 satellite sites throughout the area. NCC's Monroe Campus has seen a significant increase in enrollment since its completion in 1988. Enrollment in fall 2010 reached 2,377 students compared to the 92 person class of 1988. Predicting more growth, the new campus has been designed to provide services to 5,000 students.

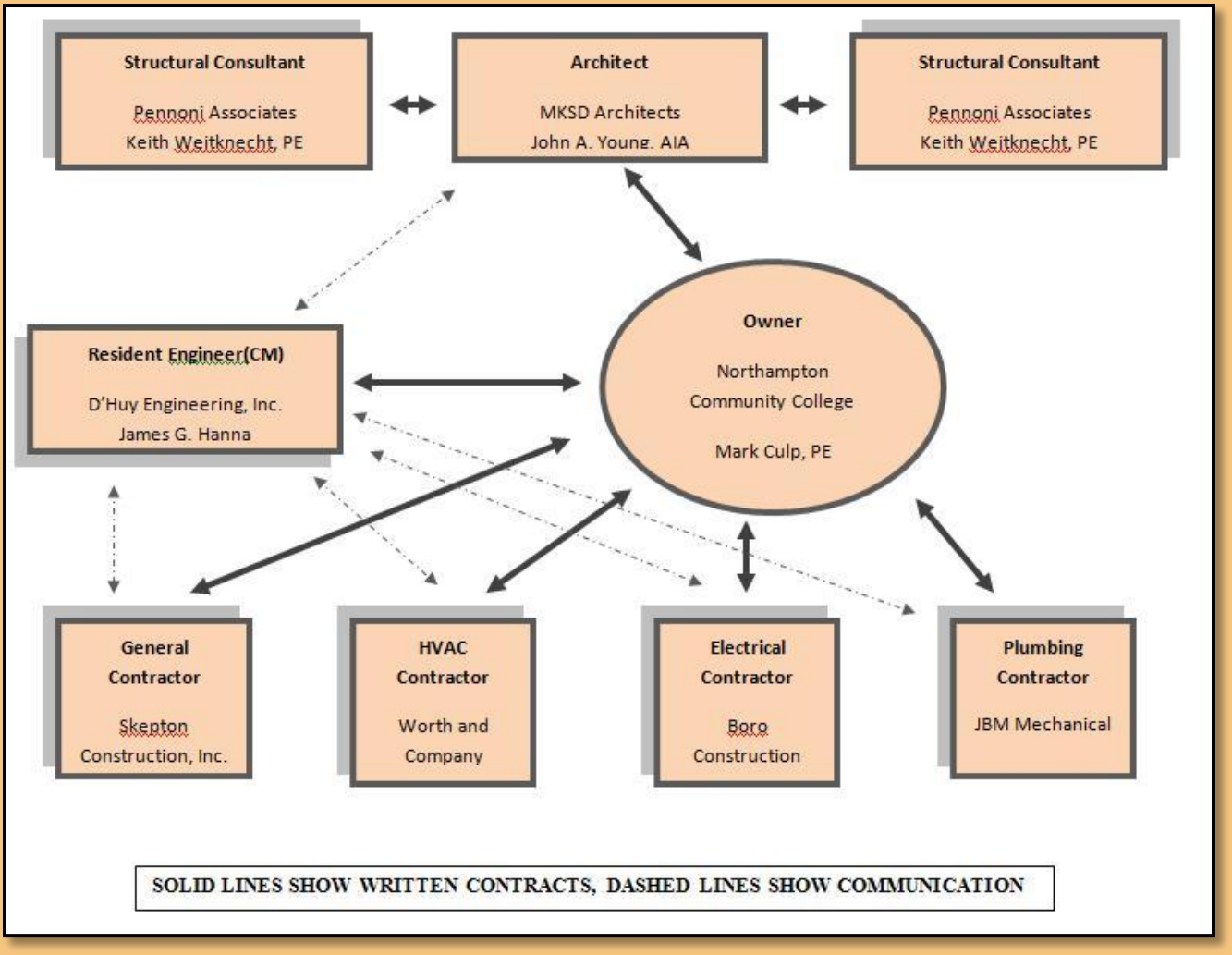
The College purchased the 72 acre site in 2005 for $2Million and has set a budget for about $72 million for the completion of the Campus. They have received

funding from the Pennsylvania Department of Education Committee, Monroe County, and private fundraising efforts. Monroe County and Northeastern Pennsylvania have named construction of the new Monroe Campus as the most important economic priority of the area.

Schedule is extremely important to the Owner. As a college, they are working on a schedule that cannot easily be adjusted. Spring 2015 will be the first semester students can experience the new Monroe Campus. If the project is delayed, an entire semester could be lost. In order to ensure the schedule is kept, liquidated damages have been placed in the contract documents. For every day that the project is behind, the General Contractor will owe $4000. Also, the other contractors will owe $2000/day. The liquidated damages are a risk management factor that ensures a timely completion.

Northampton Community College states excellence as one of their core values. They believe in the providing quality education and training experiences and the new campus will help them reach that goal. In their Owner Project Requirements, they explicitly describe what is expected of the new campus. They have even stated in the contract documents that third party agencies will perform quality assurance tests on the building.

Project Delivery System



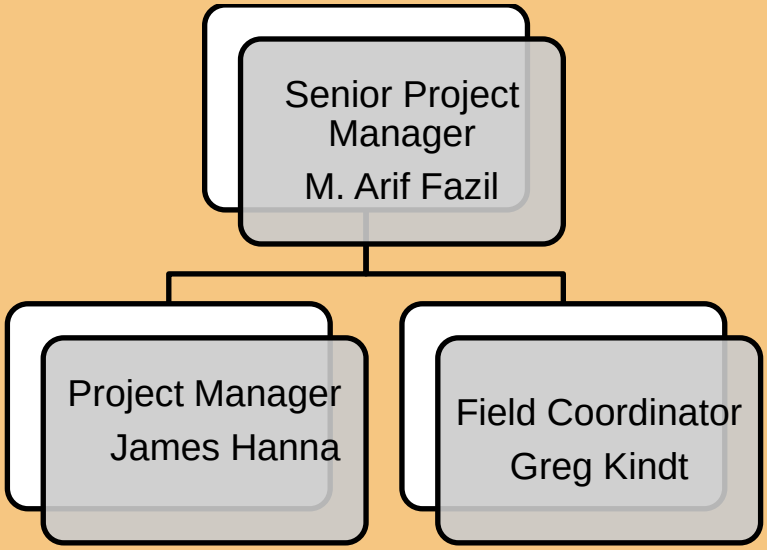
The Student Life Building was bid as part of a package including the Enrollment and Classroom Centers. The entire package followed a design-bid-build delivery system. Northampton Community College recognized the need for expansion and because they receive expansion funds from the Pennsylvania Department of Education and Monroe County, the expansion is considered a public project. In Pennsylvania, there are laws that state public projects like the Monroe Campus are to be publically bid. Along with this, the contract is traditionally awarded to the lowest responsible bidder.

Despite the project being publically bid, the owner is able to negotiate contracts with professional consultants. NCC came to D'Huy Engineering Inc, seeking their service as a Construction Manager Advisor. D'Huy was able then to help the owner create their project requirements and then a request for proposal. MKSD was chosen as the architect and the other consulting firms were brought on by MKSD. The owner will

hold a contract with the architect and CM advisor. The Architect then holds contracts **with the consulting firms.**

Once design documents were complete, the project had to be bid to four prime contractors. The system of prime contractors is used because the project is public. Those awarded to the project will be the lowest responsible bidder that qualifies. Qualifications include a good financial standing, an appropriate safety rating and at least 3 similar type projects in the last 5 years. D'Huy Engineering, the CM firm, is considered not at risk because they do not hold contracts with these four companies.

Staffing Plan



D'Huy Engineering Inc. is a relatively small Construction management firm. As shown above, the staffing plan for the Monroe campus is not extensive. This does not however have any indication of the importance of the project or the amount of attention it will receive. The team that has been assigned the Monroe Campus consists of a senior project manager who is actually a principal of the firm. The project manager, Jim Hana, has over 30 years experience in the construction industry and has been a project manager at D'Huy for the past 11 years. Greg Kindt, the field coordinator also has a large amount of experience. Because of the smaller nature of the firm, these men have much experience working together and D'Huy is confident that the owner's expectations will be surpassed.

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22	Install Ceiling Grid	48 days	Wed 4/10/13	Fri 6/14/13
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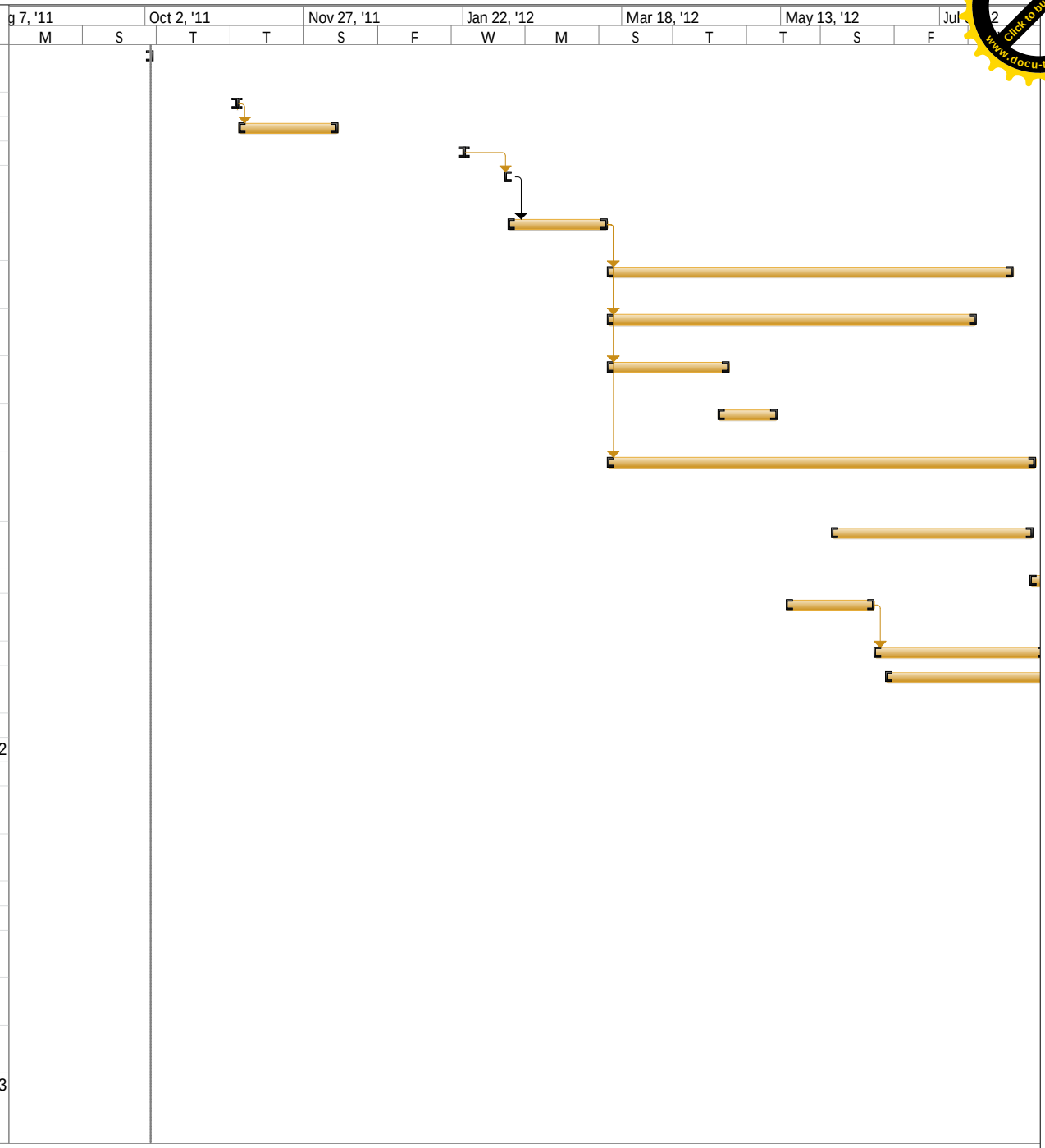

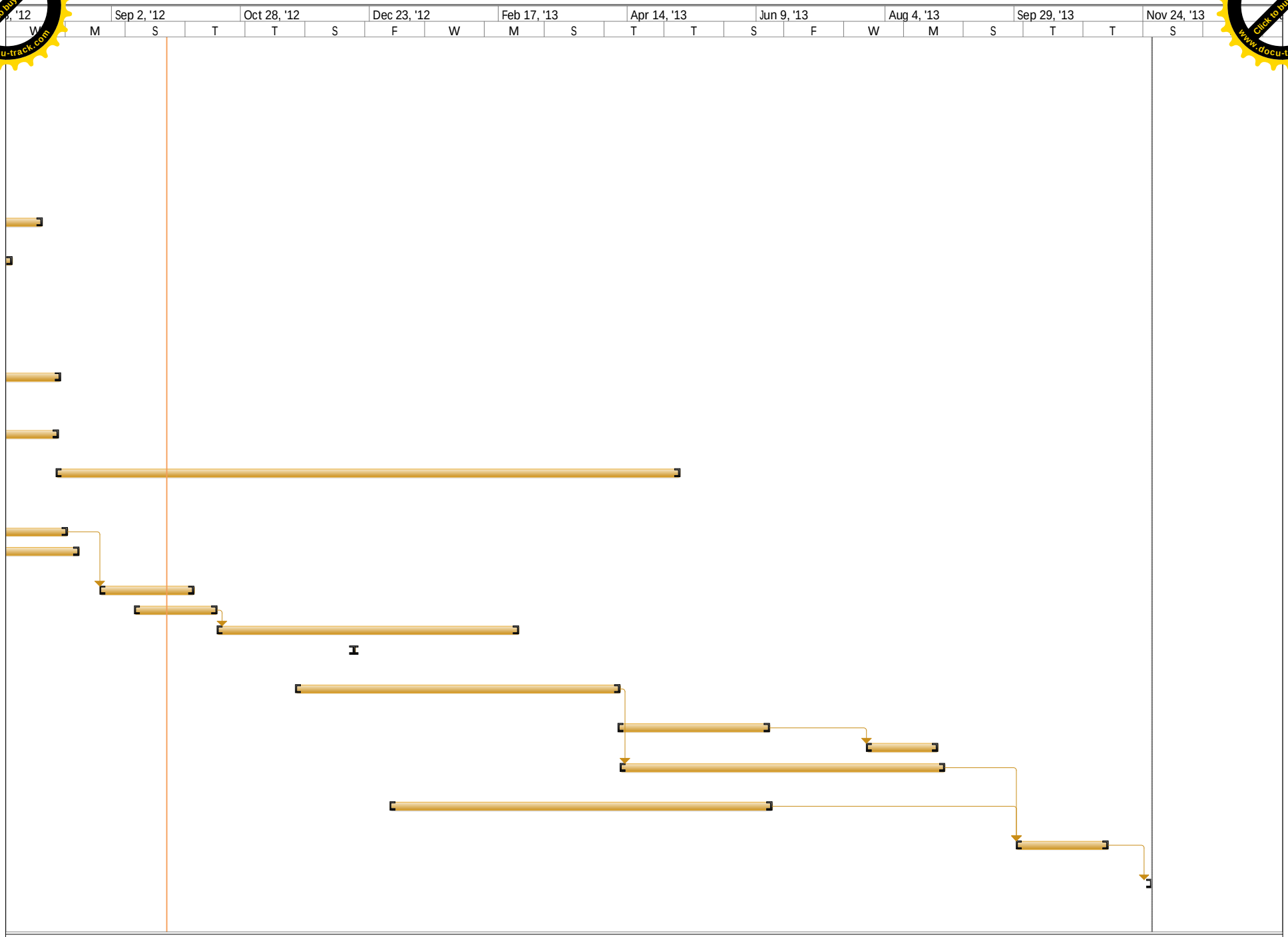

	Square Foot Cost Estimate Report
Estimate Name:	**Square Foot Student Life**
Building Type:	**College, Student Union with Brick Face with Concrete Block Back-up / Steel Frame**
Location:	**STROUDSBURG, PA**
Story Count:	**1**
Story Height (L.F.):	**55**
Floor Area (S.F.):	**68000**
Labor Type:	**Union**
Basement Included:	**Yes**
Data Release:	**Year 2012**
Cost Per Square Foot:	**$177.57**
Building Cost:	**$12,074,500**

Costs are derived from a building model with basic components.

Scope differences and market conditions can cause costs to vary significa

Parameters are not within the ranges recommended by RSMeans.

		% of Total	Cost Per S.F.
A Substructure		**8.40%**	**$13.71**
A1010	**Standard Foundations**		**$2.94**
	12" deep x 24" wide		
	0" square x 20" deep		
A1030	**Slab on Grade**		**$4.60**
	Slab on grade, 4" thick, non industrial, reinforced		
A2010	**Basement Excavation**		**$3.23**
	storage		
A2020	**Basement Walls**		**$2.94**
	thick		
B Shell		**42.90%**	**$70.43**
B1010	**Floor Construction**		**$20.70**
	142 lbs/LF, 4000PSI		
	Steel column, W12, 400 KIPS, 10' unsupported height, 79 PLF		
	bay, 75 PSF superimposed load, 153 PSF total load		
	bay, 24.5" total depth, 125 PSF superimposed load, 200 PSF total		
B1020	**Roof Construction**		**$20.79**
	40 PSF superimposed load, 99 PSF total load		
B2010	**Exterior Walls**		**$16.97**
	perlite core fill		
B2020	**Exterior Windows**		**$6.93**
	intermediate horizontals		
	Glazing panel, plate glass, 1/4" thick, clear		
B2030	**Exterior Doors**		**$0.40**
	0" opening		
B3010	**Roof Coverings**		**$4.62**
	mopped		
	Insulation, rigid, roof deck, composite with 2" EPS, 1" perlite		

	Roof edges, aluminum, duranodic, .050" thick, 6" face		
	Flashing, aluminum, no backing sides, .019"		
	Gravel stop, aluminum, extruded, 4", mill finish, .050" thick		
B3020	**Roof Openings**		**$0.02**
	Skylight, plastic domes, insulated curbs, 30 SF to 65 SF, single glazing		
C Interiors		**16.00%**	**$26.28**
C1010	**Partitions**		**$3.61**
	gypsum board, 2-1/2" @ 24", same opposite face, no insulation		
C1020	**Interior Doors**		**$7.76**
	0" x 7'-0" x 1-3/8"		
C2010	**Stair Construction**		**$1.07**
	Stairs, CIP concrete, w/landing, 20 risers, with nosing		
C3010	**Wall Finishes**		**$3.62**
	2 coats paint on masonry with block filler		
	& 2 coats		
	Vinyl wall covering, fabric back, medium weight		
C3020	**Floor Finishes**		**$6.32**
	Carpet, tufted, nylon, roll goods, 12' wide, 36 oz		
	Carpet, padding, add to above, maximum		
	Vinyl, composition tile, maximum		
C3030	**Ceiling Finishes**		**$3.90**
	support		
D Services		**32.60%**	**$53.52**
D1010	**Elevators and Lifts**		**$5.39**
	2 - Hydraulic, passenger elevator, 2000 lb, 2 floors, 100 FPM		
	Hydraulic passenger elevator, 2500 lb., 2 floor, 125 FPM		
D2010	**Plumbing Fixtures**		**$2.79**
	Water closet, vitreous china, tank type, 2 piece close coupled		
	Urinal, vitreous china, wall hung		
	Lavatory w/trim, vanity top, PE on CI, 19" x 16" oval		
	Kitchen sink w/trim, countertop, stainless steel, 19" x 18" single bowl		
	Service sink w/trim, PE on CI, corner floor, 28" x 28", w/rim guard		
	Shower, stall, baked enamel, molded stone receptor, 32" square		
	Water cooler, electric, floor mounted, dual height, 14.3 GPH		
D2020	**Domestic Water Distribution**		**$0.30**
	Gas fired water heater, commercial, 100< F rise, 200 MBH input, 192 GPH		
D2040	**Rain Water Drainage**		**$0.19**
	Roof drain, CI, soil,single hub, 5" diam, 10' high		
	Roof drain, CI, soil,single hub, 5" diam, for each additional foot add		
D3050	**Terminal & Package Units**		**$19.35**
	ton		
D4010	**Sprinklers**		**$3.18**
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 10,000 SF		
	SF		

D4020	**Standpipes**		**$0.80**
	Wet standpipe risers, class III, steel, black, sch 40, 6" diam pipe, 1 floor		
	floors		
D5010	**Electrical Service/Distribution**		**$0.94**
	4 wire, 120/208 V, 600 A		
	Feeder installation 600 V, including RGS conduit and XHHW wire, 600 A		
	Switchgear installation, incl switchboard, panels & circuit breaker, 600 A		
D5020	**Lighting and Branch Wiring**		**$16.15**
	transformer		
	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		
	15 HP, 575 V 20 HP		
	fixtures @ 32 watt per 1000 SF		
D5030	**Communications and Security**		**$4.26**
	wire, sound systems, 12 outlets		
	Fire alarm command center, addressable without voice, excl. wire & conduit		
	wire, intercom systems, 25 stations		
	wire, master TV antenna systems, 12 outlets		
	Internet wiring, 8 data/voice outlets per 1000 S.F.		
D5090	**Other Electrical Systems**		**$0.16**
	operated, 3 phase, 4 wire, 277/480 V, 11.5 kW		
E Equipment & Furnishings		**0.20%**	**$0.25**
E1090	**Other Equipment**		**$0.25**
	50 - Lockers, steel, baked enamel, single tier, maximum		
F Special Construction		**0.00%**	**$0.00**
G Building Sitework		**0.00%**	**$0.00**

SubTotal	**100%**	**$164.18**
Contractor Fees (General Conditions,Overhead,Profit)	**3.00%**	**$4.93**
Architectural Fees	**5.00%**	**$8.46**
User Fees	**0.00%**	**$0.00**
Total Building Cost		**$177.57**

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Cost
$932,000
$200,000
$312,500
$219,500
$200,000
$4,789,000
$1,407,500
$1,413,500
$1,154,000
$471,000
$27,000
$314,500

$1,500

$1,787,000

$245,500

$527,500

$72,500

$246,500

$430,000

$265,000

$3,639,500

$366,500

$190,000

$20,500

$13,000

$1,315,500

$216,500

$54,500
$64,000
$1,098,000
$290,000
$11,000
$17,000
$17,000
$0
$0
$11,164,500
$335,000
$575,000
$0
$12,074,500

Assemblies Estimate Student Life

Data Release :Year 2012

Assembly Cost Estimate

Quantity	Assembly Number	Source	SubCo	Description	Unit
0	D20102100000			Urinal systems	
4	D20102102000			Urinal, vitreous china, wall hung	Ea.
1	D20101201760			Water closets, battery mount, wall hung, side by side, first closet	Ea.
3	D20101201800			Water closetss, battery mount, wall hung, side by side, each additional water closet, add	Ea.
3	D20108101920			Drinking fountain, 1 bubbler, wall mounted, non recessed, stainless steel, no back	Ea.
2	D20104404340			Service sink w/trim, PE on CI,wall hung w/rim guard, 24" x 20"	Ea.
1	D20107101840			Shower, stall, fiberglass 1 piece, three walls, 36" square	Ea.
4	D20107101800			Shower, stall, fiberglass 1 piece, three walls, 32" square	Ea.
10	D20104301640			Lab sink w/trim, polyethylene, single bowl, single drainboard, 47" x 24"OD	Ea.
2	D20104404340			Service sink w/trim, PE on CI,wall hung w/rim guard, 24" x 20"	Ea.
0	D20202401900			Electric water heater, commercial, 100< F rise, 80 gal, 36 KW 147 GPH	Ea.
1	D20202402260			Electric water heater, commercial, 100< F rise, 500 gal, 240 KW 984 GPH	Ea.
1	D20402106440			Roof drain, steel galv sch 40 grooved, 8" diam piping, 10' high	Ea.
2500	D20908101220			Copper tubing, hard temper, solder, type K, 1/2" diameter	L.F.
1	D30201261120			Boiler, electric, hot water, 2100 KW, 7167 MBH	Ea.
2	D30203301040			Pump, base mounted with motor, end-suction, 5" size, 15 HP, to 1000 GPM	Ea.
1	D30402601010			Commercial kitchen exhaust/make-up air system, rooftop, gas, 2000 CFM	Ea.
1	D30502481000			Geothermal heat pump system, 50 Tons, vertical loops 200' depth, 200 LF per ton,4 gpm per ton	Ea.
1	D30401081030			AHU, field fabricated, built up, cool/heat coils, filters, VAV, 150,000 CFM	Ea.

1	D50309100210			Communication and alarm systems, includes outlets, boxes, conduit and wire, sound systems, 6 outlets	Ea.
1	D50309100220			Communication and alarm systems, includes outlets, boxes, conduit and wire, sound systems, 12 outlets	Ea.
68000	D50303100680			Telephone systems, conduit system with floor boxes, high density	S.F.
68000	D50303101020			Telephone wiring for offices & laboratories, 8 jacks/MSF	S.F.
0	D50201201800			Receptacles and wall switches, 5000 SF, 20 receptacles	S.F.
0	D50201201840			Receptacles and wall switches, 5000 SF, 26 receptacles	S.F.
1	D50201201880			Receptacles and wall switches, 5000 SF, 30 receptacles	S.F.
1	D50201201920			Receptacles and wall switches, 5000 SF, 10 switches	S.F.

Material O&P	Installation O&P	Total O&P	Ext. Material O&P	Ext. Installation O&P	Ext. Total O&P
$ -	$ -	$ -	$ -	$ -	$ -
$ 603.52	$ 802.27	$ 1,405.79	$ 2,414.08	$ 3,209.08	$ 5,623.16
$ 1,768.13	$ 838.04	$ 2,606.17	$ 1,768.13	$ 838.04	$ 2,606.17
$ 1,697.40	$ 792.05	$ 2,489.45	$ 5,092.20	$ 2,376.15	$ 7,468.35
$ 1,296.63	$ 470.12	$ 1,766.75	$ 3,889.89	$ 1,410.36	$ 5,300.25
$ 2,593.25	$ 1,175.30	$ 3,768.55	$ 5,186.50	$ 2,350.60	$ 7,537.10
$ 1,037.30	$ 812.49	$ 1,849.79	$ 1,037.30	$ 812.49	$ 1,849.79
$ 1,037.30	$ 812.49	$ 1,849.79	$ 4,149.20	$ 3,249.96	$ 7,399.16
$ 1,626.68	$ 1,006.67	$ 2,633.35	$ 16,266.80	$ 10,066.70	$ 26,333.50
$ 2,593.25	$ 1,175.30	$ 3,768.55	$ 5,186.50	$ 2,350.60	$ 7,537.10
$ 8,675.60	$ 1,558.55	$ 10,234.15	$ -	$ -	$ -
$ 56,580.00	$ 2,887.15	$ 59,467.15	$ 56,580.00	$ 2,887.15	$ 59,467.15
$ 3,889.88	$ 2,069.55	$ 5,959.43	$ 3,889.88	$ 2,069.55	$ 5,959.43
$ 5.61	$ 8.64	$ 14.25	$ 14,025.00	$ 21,600.00	$ 35,625.00
$ 74,025.50	$ 22,137.00	$ 96,162.50	$ 74,025.50	$ 22,137.00	$ 96,162.50
$ 20,274.50	$ 8,076.65	$ 28,351.15	$ 40,549.00	$ 16,153.30	$ 56,702.30
$ 18,105.60	$ 9,760.10	$ 27,865.70	$ 18,105.60	$ 9,760.10	$ 27,865.70
$ 77,797.50	$ 134,246.00	$ 212,043.50	$ 77,797.50	$ 134,246.00	$ 212,043.50
$ 285,257.50	$ 85,240.00	$ 370,497.50	$ 285,257.50	$ 85,240.00	$ 370,497.50

$ 5,587.28	$ 11,087.15	$ 16,674.43	$ 5,587.28	$ 11,087.15	$ 16,674.43
$ 8,039.08	$ 17,682.40	$ 25,721.48	$ 8,039.08	$ 17,682.40	$ 25,721.48
$ 3.29	$ 3.08	$ 6.37	$ 223,720.00	$ 209,440.00	$ 433,160.00
$ 0.41	$ 2.42	$ 2.83	$ 27,880.00	$ 164,560.00	$ 192,440.00
$ 0.45	$ 2.25	$ 2.70	$ -	$ -	$ -
$ 0.54	$ 2.71	$ 3.25	$ -	$ -	$ -
$ 0.55	$ 2.79	$ 3.34	$ 0.55	$ 2.79	$ 3.34
$ 0.10	$ 0.53	$ 0.63	$ 0.10	$ 0.53	$ 0.63

Total **1603977.54**

Labor Type	Data Release	Zip Code	Notes
STD	Year 2012	183	
STD	Year 2012	183	
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