



THE PENNSYLVANIA STATE
UNIVERSITY:
INTRAMURAL BUILDING PHASE III

TECHNICAL REPORT NUMBER 1

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Option: Construction Management

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Date: September 14, 2016

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EXECUTIVE SUMMARY

The purpose of this report is to present a technical evaluation of the Penn State Intramural Building renovation and addition. This report will be the first of three reports, and will provide research and information regarding the project. This part of the project will be the third of its kind. All information included in this report may change, as the construction continues on the project.

Penn State is not only known as an academic university, but also is home to many successful athletic teams. In recent years, Penn State has been named one of the most active campuses in the country. To continue to provide for the ever more active student body, Penn State has set out to create the most up to date and state of the art facilities for their students. Currently on the University Park campus, there are three major buildings to house student activities. These facilities provide space and equipment to students ranging from occasional gym goers to division one athletes. Penn State recently has invested significant funds into one of these three buildings. That building is the Intramural Building, located at the corner of University Drive and Curtain Road. The IM building is the closest recreational facility to the Bryce Jordan Center, Beaver Stadium, and the Pegula Ice Arena, making it a key symbol of the University.

The project seeks to renovate the existing basement and add a new section of the building. The new construction will see a two story addition that will house a rock climbing wall, an indoor turf field, and various lounges and examination rooms. The addition will also contain a mezzanine that will connect to the existing one. The addition will add just under 62,000 square feet to the building. The project is currently ongoing and the end of the project will make the facility accessible to the student body for the entire fall 2017 semester. The building will be up to date and provide the students with one of the best facilities in the country.

SITE LOGISTICS

One of the biggest challenges for any project are the site logistics. The site of the project sits on a lot with the existing Intramural Building. The building is in very close proximity with the Bryce Jordan Center, the Shields Building, Beaver Stadium and the Pegula Ice Arena. This meant that student traffic and pedestrians were very important to take into account during construction. Another challenge dealt with working on a relatively small site and working around the existing building. To better allow for staging and laydown areas, Mortenson, the general contractor on the site, has their main operating office in the existing basement of the IM Building. The area used for construction consists of the area running between the existing building and University Drive. The gate for construction is also located off UD, and allows for easy deliveries to the site. The site also featured a temporary staging area, during the demolition phase of the project. This is located in the north west corner of the site, and since has been landscaped back to prior conditions. Another key feature of the site is the requirement of keeping lane open through the site, and through the staging area in order to provide emergency services to the building. All details and other information can be found in the site plans included in the appendix of this report. See Appendix A.

PROJECT SCHEDULE

The project consisted of two major phases. The first being the demolition of parts of the existing building, and two being the major construction sequence for the addition. The demolition to the existing project started in the beginning of October of 2015 and the owner, Penn State was able to move back into the space in the middle of August 2016. The new construction of Phase III is scheduled to be complete during the beginning of September of 2017, allowing the building to be utilized for almost all of the fall 2017 semester. This is the driving force for the semester as the turf field and rock climbing walls will be utilized as soon as possible by the University. Other major events will drive the schedule including the pouring of the slabs, steel erection, installing the advanced equipment for the facility including televisions, monitors and scoreboards, and testing of these same systems. The project features unique mechanical systems and electric systems that will impact the schedule. For a summary of all major events in the schedule please refer to the appendix included in this report. See Appendix C.

BUILDING SYSTEMS

DEMOLITION

Phase 3 of the project required the demolition to parts of the existing building. First demolition occurred in the existing basements in order to create new mechanical rooms. During the demolition of these spaces concrete, bricks, CMUs, steel handrails, wooden lockers, ceilings and floor finishes, and fixtures were removed. Any bricks, lockers or other reusable materials were salvaged and will be implemented into the new construction, if possible. The demolition of the exterior façade will require the demolition of curtain wall, storefront and the additional brick façade. All materials were to be removed from site promptly unless otherwise noted. All materials that could be salvaged were protected. Some examples include saving the face brick and reusing the lockers and metal fixtures.

STRUCTURAL STEEL FRAME

The addition to the Intramural building will consist of primarily steel framing. The structure was designed as a non-self-supporting steel frame. In order to accurately erect the steel, coordination must take place between the other trades. Crucial components to the erection of the steel include metal decking, slabs, concrete walls, masonry walls and light gauge metal framing. Field connections are to be bolted, while shop connections were to be welded or bolted depending on strength and distribution requirements. The steel columns were designed to withstand a 675 foot-pound moment. Other structural elements were also designed to this factor including the base plates, foundations and anchor bolts.

CAST IN PLACE CONCRETE

Cast in place concrete was used for several key parts of the building. All footings, and slabs were cast in place. No precast concrete will be used on this phase of the project. Footing, piers and pile caps will use 3000 psi concrete. All interior slabs will use 3500 psi, while all exterior slabs will use 4500 psi concrete.

MASONRY

Masonry will be included both as an interior finish and as an exterior finish. Brick veneer will be used as the building is supported by steel members. The masonry on the project will serve no structural purpose.

SUPPORT OF EXCAVATION

The existing building is already supported, and the additional excavation for the site will not require any additional support. Dewatering systems were constructed to ensure the site to stay dry during construction. The location of the site, and no surrounding building allowed for sloped earthwork. The plans do call for special filtration when pumping water from any ditch or depression, and the contractor must follow the guidelines about removing the water in a safe manner.

CURTAIN WALL

Curtain walls will be located on the side of the addition facing University Drive. These windows will allow for the space to all be partially day lighted. The glass ranged from ¼” to 7/16”. There are three major types of glass used on the curtain wall. These include clear GT-2T glass, annealed laminated glass and regular laminated glass. The curtain wall is a store front system, meaning there will be no structural load on the wall.

MECHANICAL

The primary mechanical system used for this phase of the project is called a hybrid ventilation system. This system utilizes the use of automatic windows and fans to bring in outside air when certain moisture and temperature levels are met. This system cuts down on the energy to heat and cool the space during times of preferable weather. To provide the necessary cooling and heating for non-ideal times the addition will seek to add 7 new air handling units ranging in size from 2100 pounds (224x51x38) to 8600 pounds (293x12676). The largest unit, which will supply the turf field will supply approximately 23400 CFM. Also included in the addition will be 12 new exhaust fans, 6 unit heaters, and 36 VAV terminals spread as necessary throughout the building. As mentioned previously a split air conditioning unit will be installed, having an outdoor and an indoor unit. A fined tube radiation system is part of the existing building, and will be added upon by the addition. The bulk of the equipment that will be added to the addition will be found in the basement mechanical rooms. There are two major mechanical rooms in the building, as well as several roof top units. Both mechanical rooms are located in the existing building.

ELECTRICAL

The electrical system of the addition will utilize strictly LED lights. The light will have daylight sensors that will help dim the lights when ample amounts of natural lighting are indicated. The lighting system will consist of renovations to existing fixtures and the addition of new features. A new 75 KVA transformer will be installed, and will replace the current transformer in the Phase II electrical room. The existing transformer will be salvaged and reused in the new addition. The traffic lights located at the intersection of University and Curtain road are fed from inside the Intramural Building. Special consideration had to be taken to safely rewire this part of the electrical system. Because the project is addition, all power is able to be taken from within the existing building. To account for all the extra equipment and lighting two 400 amp panelboards will be installed, as well as a 225 amp, a 300 amp and a 100 amp. The entire building is fed through two exterior transformers which feed 480/277V. One is used for power and the second is used during emergency situations.

COST EVALUATION

The current estimate from the official estimating team is approximately just over 17 million dollars. A square foot estimate was then completed to determine the similarities and differences in the prices. The square foot price was based from a typical gymnasium. The price for the square foot estimate was very low. This is due to many reasons. Some of the main reasons include that Phase III is a mixed use building with high tech equipment, is two stories compared to the one story gymnasium, and that the project features a state of the art design for the whole building. Breakdowns of the mechanical systems, electrical systems, and structural systems were also completed. These values are shown below. For the square foot estimate percentages were given as a part of the entire project cost. After the total cost was found, these secondary values could also be found. All information can be found in the table below. For values from RS Means and other calculations please see the appendix section of this report. See Appendix C.

Initial Building Cost Anaylasis					
	Total Project Cost	Building Construction Cost	Mechanical	Electrical	Structural
Actual Cost	\$ 17,115,238.00	\$ 15,368,113.00	\$ 3,000,655.00	\$ 2,004,726.00	\$ 4,293,897.00
Per Square Foot	\$ 279.22	\$ 250.72	\$ 48.95	\$ 32.71	\$ 70.05
Estimated Cost	\$ 9,540,165.00	N/A	\$ 877,695.18	\$ 1,068,498.48	\$ 1,078,038.65
Per Square Foot	\$ 155.64	N/A	\$ 14.32	\$ 17.43	\$ 17.33

CLIENT INFORMATION

Ultimately the project belongs to the university, however there are many parties involved with the building. In theory the student body is the owner of the project. The funds for the project come from the University's student funds. The quality of the project was crucial to the success of the project. As stated before, Penn State wants to create and maintain the best facilities for the student body. Safety was a major concern for the project as students are constantly visiting the gym and cars are constantly driving on University Drive. This means the team had to take safety very seriously.

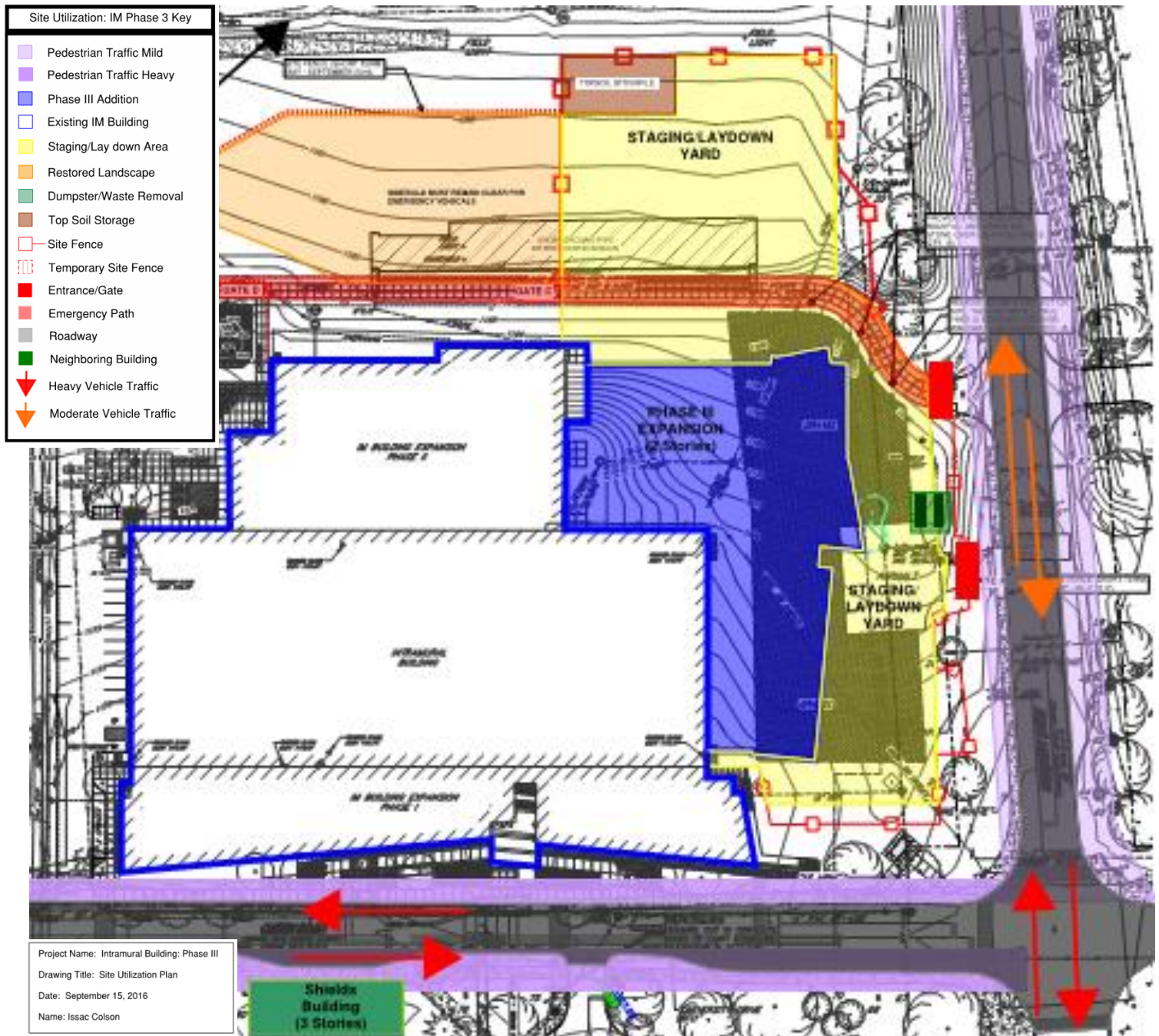
PROJECT DELIVERY SYSTEM

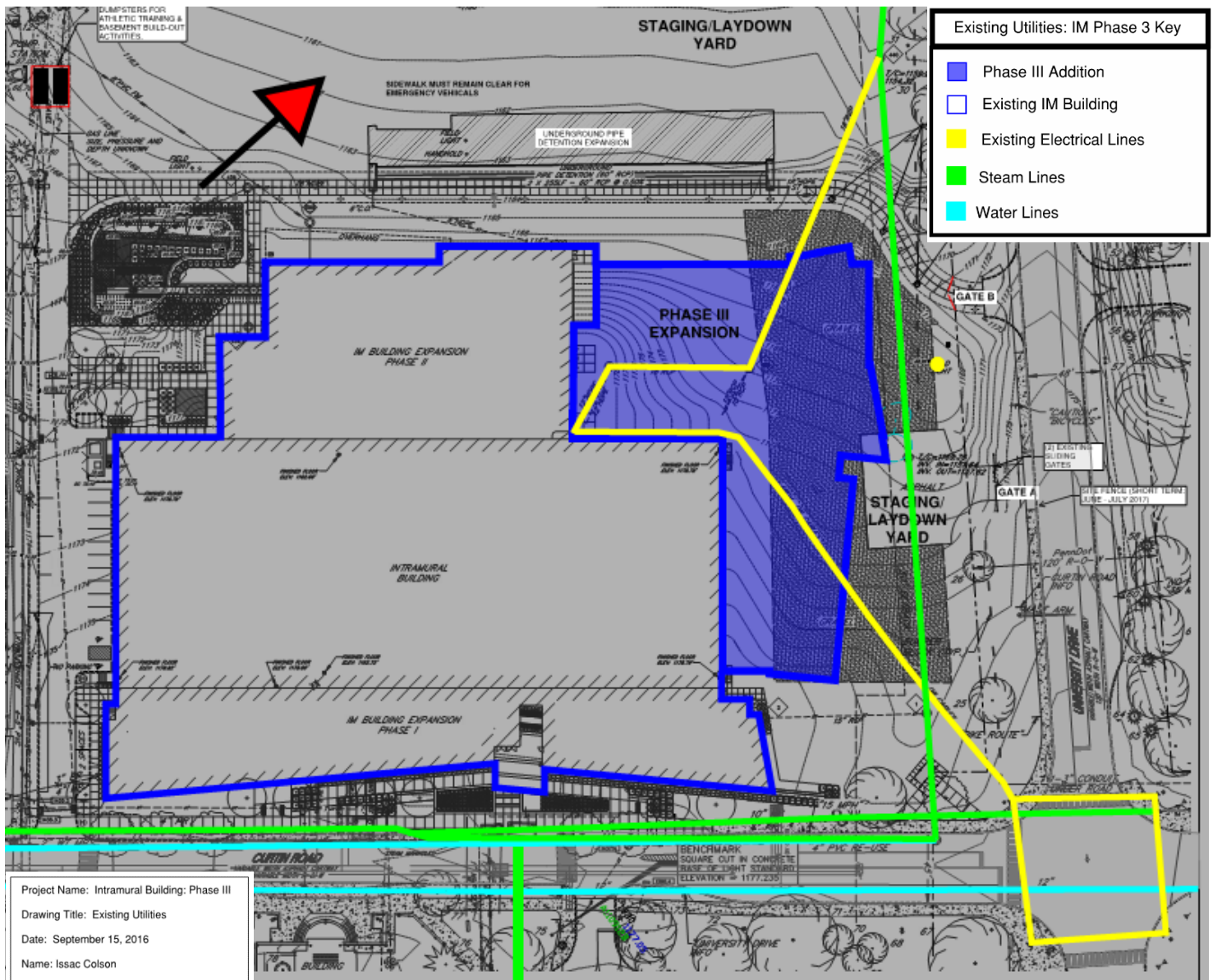
Ultimately Penn State is the owner of the project, however the Office of the Physical Plant manages all construction project completed by Penn State. The architect, Moody Nolan, and the general contractor, Mortenson, each have a contract with Penn State separately. Moody Nolan has contracts with other design professionals, separately. The project is a CM at risk delivery. Mortenson, then chooses the subcontractors they want to bring onto the project. Some of these contractors include Somerset Steel for steel erection, Westmoreland Electric for electrical work, RH Marcon as the roofing subcontractor, Sweetland Engineering as the civil engineer, Nittany Building Specialties to complete all curtain wall systems, and Myco as the mechanical contractor. Mortenson and most of the team have completed the other phases of the project, thus increasing the fluidity of the project. See Appendix D for the organizational chart.

STAFFING PLAN

The staffing plan for the project has members from the corporate office involved, as well as members on site at the Intramural Building. The Director of Operations is in charge of the project from Mortenson, the general contractor, and is working from the corporate office. Under the director, is the Project Executive and the Field Operations Manager. They remain at the corporate office in Minneapolis and regularly check in on the project to make sure all is going well. They also are very vocal with Penn State to ensure the project is running smoothly. Everyone else involved on the project remains at the site and will be there every day. This includes a senior project manager, a superintendent, an assistant project manager, two field engineers and a safety engineer. This set up is fairly normal for a construction project of this size. The organizational chart can be found in the appendix portion of this report. See Appendix D.

APPENDIX A: SITE UTILIZATION PLAN AND EXISTING UTILITIES PLAN





APPENDIX B: PROJECT SCHEDULE SUMMARY

IM Phase 3			Classic Schedule Layout				15-Sep-16 16:40														
Activity ID	Activity Name	Original Duration	Remaining Duration	Schedule % Complete	Start	Finish					2017										
							Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
📁 AE481 IM Phase 3		258	258	0%	15-Sep-16	11-Sep-17	▶ 11-Sep-17, 4														
🟢 A1000	Basement Buildout Demolition	23	23	0%	15-Sep-16	17-Oct-16	▶▶														

Page 1 of 1

TASK filter: All Activities

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APPENDIX C: PROJECT COST SUMMARY

Project Divisions and Pricing	
Final Clean Up	\$ 49,440.00
Selective Demolition	\$ 139,600.00
Regulated Material Abatement Allowance	\$ 5,000.00
Site Fence	\$ 91,880.00
Earthwork and Hardscape	\$ 1,524,975.00
Rock Excavation Allowance	\$ 30,000.00
Sinkhole Grouting Allowance	\$ 50,000.00
Post-Mounted Site Signage Allowance	\$ 2,000.00
Micropiles	\$ 68,570.00
Landscaping	\$ 142,800.00
Concrete, Millwork/Casework, Framing Ceiling	\$ 2,984,354.00
Masonry	\$ 606,250.00
Structural Steel	\$ 894,563.00
Turf Filled Brick Relief Angle Allowance	\$ 25,000.00
Additional Structural Steel Allowance	\$ 8,000.00
Metal Fabrications	\$ 332,550.00
Additional Metal Fabrications Allowance	\$ 5,860.00
Metal Panels and Roofing	\$ 1,629,965.00
Snow Removal Allowance	\$ 30,000.00
Doors, Frames, Hardware,	\$ 127,341.00
Overhead Coiling Doors	\$ 14,190.00
Overhead Door at Turf Filed Allowance	\$ 50,000.00
Curtainwall, Storefront and Glazing	\$ 1,233,084.00
Tile Carpet, Flooring	\$ 436,106.00
Athletic Wood Flooring	\$ 32,730.00
Painting	\$ 251,477.00
Painting Touch ups	\$ 15,000.00
Graphics	\$ 200,000.00
Laundry Equipment	\$ 27,470.00
Food Service Equipment	\$ 24,000.00
Athletic Equipment, Scoreboards	\$ 84,300.00
Climbing Walls	\$ 389,436.00
Enclose Top of Bouldering wall	\$ 8,736.00
Realistic Rock Climbing Wall Allowance	\$ 132,429.00
Synthetic Turf	\$ 162,839.00
Window Treatments	\$ 15,912.00
Squash Courts	\$ 134,500.00
Plumbing and HVAC	\$ 3,000,655.00
Rock Excavation Allowance Mechanical	\$ 10,000.00
Rock Excavation Allowance Mechanical (Basement)	\$ 20,000.00
Fire Suppression System	\$ 203,890.00
Electrical and Low Voltage	\$ 1,835,264.00
Audio Visual Equipment	\$ 85,162.00

Project Totals	
Total Project Cost	\$ 17,115,328.00
Construction Costs	\$ 15,368,113.00
Structural Systems	\$ 4,293,897.00
Electrical	\$ 2,004,726.00
Fire Suppression	\$ 203,890.00
Mechanical	\$ 3,000,655.00

COMMERCIAL/INDUSTRIAL/
INSTITUTIONAL

M.310

Gymnasium

Costs per square foot of floor area

	S.F. Area	12000	16000	20000	25000	30000	35000	40000	45000	50000
Interior Wall	L.F. Perimeter	440	520	600	700	708	780	841	910	999
Concrete Block	Lam. Wood Arches	160.60	156.25	153.70	151.55	147.70	146.40	145.20	144.40	143.60
	Rigid Steel Frame	158.50	154.20	151.55	149.45	145.55	144.30	143.15	142.25	141.35
Brick with Concrete Block Back-up	Lam. Wood Arches	185.35	178.20	173.90	170.45	163.60	161.45	159.35	158.05	156.75
	Rigid Steel Frame	183.25	176.20	172.00	168.35	161.75	159.60	157.40	156.10	154.80
Sandwich	Lam. Wood Arches	156.00	152.20	149.85	148.00	144.70	143.60	142.55	141.85	141.30
	Rigid Steel Frame	154.10	150.25	148.00	146.10	142.85	141.70	140.65	139.95	139.45
Adj., Add or Deduct	Per 100 L.F.	6.70	5.05	3.95	3.20	2.65	2.30	2.00	1.75	1.60
Adj., Add or Deduct	Per 1 Ft.	0.95	0.85	0.70	0.70	0.60	0.55	0.55	0.50	0.45

Basement—Not Applicable

Costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for local conditions and owner's requirements. Reported completed project costs, for this type of structure, range from \$74.75 to \$223.00 per S.F.

On additives

	Unit	\$ Cost	Description	Unit	\$ Cost
Painting, manual			Lockers, Steel, single tier, 60" or 72"	Opening	198 - 3
5 tier	Seat	128 - 178	2 tier, 60" or 72" total	Opening	123 - 1
7 tier	Seat	264 - 325	5 tier, box lockers	Opening	69 - 82
7 tier	Seat	280 - 340	Locker bench, lam., maple top only	L.F.	22.5
Painting, add	Seat	51.50 - 81	Pedestals, steel pipe	Each	69
Paint, Mesh top	S.F.	12.60	Sound System		
	S.F.	4.15	Amplifier, 250 watts	Each	187
Paint, covered	S.F.	7	Speaker, ceiling or wall	Each	19
	S.F.	9.30	Trumpet	Each	38
	S.F.	6.10	Emergency Lighting, 25 watt, battery operated		
	Each	3325 - 9150	Lead battery	Each	29
	Each	2225 - 2850	Nickel cadmium	Each	78
	Each	2500 - 7050			

			Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total	
A. SUBSTRUCTURE							
1000	Standard Foundations	Footed concrete, strip and spread footings	N/A				
1010	Special Foundations	N/A	S.F. Ground	1.65	1.65		
1020	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	4.96	4.96	8.0%	
1030	Basement Excavation	Site preparation for slab and trench for foundation wall and footing	S.F. Ground	.17	.17		
1040	Basement Walls	4" foundation wall	L.F. Wall	68	2.38		
B. SHELL							
B10 Superstructure							
1010	Floor Construction	N/A					
1020	Roof Construction	Wood deck on laminated wood arches	S.F. Roof	19.25	19.25	16.8%	
B20 Exterior Enclosure							
1010	Exterior Walls	Reinforced concrete block (end walls included)	90% of wall S.F. Wall	12.70	8.5	11.3%	
1020	Exterior Windows	Metal horizontal pivoted	Each	507	3.8		
1030	Exterior Doors	Aluminum and glass, hollow metal, steel overhead	Each	1933			
B30 Roofing							
1010	Roof Coverings	EPDM, 60 mils, fully adhered; polyisocyanurate insulation	S.F. Roof	4.99	4.99	4.3%	
1020	Roof Openings	N/A					
C. INTERIORS							
1010	Partitions	Concrete block	50 S.F. Floor/L.F. Partition S.F. Partition	8.85	1.77	20.0%	
1020	Interior Doors	Single leaf hollow metal	Each	1052	2.10		
1030	Finings	Toilet partitions	S.F. Floor	.22	.22		
1040	Steel Construction	N/A					
1010	Wall Finishes	50% paint, 50% ceramic tile	S.F. Surface	9.25	3.70		
1020	Floor Finishes	90% hardwood, 10% ceramic tile	S.F. Floor	14.15	14.15		
1030	Ceiling Finishes	Mineral fiber tile on concealed steel bars	15% of area S.F. Ceiling	6.57	.99		
D. SERVICES							
D10 Conveying							
1010	Elevators & Lifts	N/A				0.0%	
1020	Escalators & Moving Walks	N/A					
D20 Plumbing							
1010	Plumbing Fixtures	Toilet and service fixtures, supply and drainage	1 Fixture/515 S.F. Floor	Each	3960	7.69	10.1%
1020	Domestic Water Distribution	Electric water heater	S.F. Floor	3.90	3.90		
1040	Rain Water Drainage	N/A					
D30 HVAC							
1010	Energy Supply	N/A				9.2%	
1020	Heat Generating Systems	Included in D3050					
1030	Cooling Generating Systems	N/A	S.F. Floor	10.61	10.61		
1040	Terminal & Package Units	Single zone rooftop unit, gas heating, electric cooling					
1090	Other HVAC Sys. & Equipment	N/A					
D40 Fire Protection							
1010	Sprinklers	Wet pipe sprinkler system	S.F. Floor	3.38	3.38	3.1%	
1020	Standpipes	Standpipe	S.F. Floor	.85	.85		
D50 Electrical							
1010	Electrical Service/Distribution	400 ampere service, panel board and feeders	S.F. Floor	1.03	1.03	11.3%	
1020	Lighting & Branch Wiring	High efficiency fluorescent fixtures, receptacles, switches, A.C. and misc. power	S.F. Floor	8.84	8.84		
1030	Communications & Security	Addressable alarm systems, sound system and emergency lighting	S.F. Floor	2.74	2.74		
1090	Other Electrical Systems	Emergency generator, 7.5 kW	S.F. Floor	.21	.21		
E. EQUIPMENT & FURNISHINGS							
1010	Commercial Equipment	N/A					
1020	Institutional Equipment	N/A					
1030	Vehicular Equipment	N/A	S.F. Floor	6.33	6.33		
1090	Other Equipment	Bleachers, sauna, weight room					
F. SPECIAL CONSTRUCTION							
1020	Integrated Construction	N/A					
1040	Special Facilities	N/A					
G. BUILDING SITEWORK							
						Sub-Total 114.88	
						25% 28.77	
						7% 10.05	
CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)							
ARCHITECT FEES							
Total Building Cost						153.70	

COST PER SF: \$155.36

**ADDITIONAL FEATURES TOTAL:
\$33000**

SQUARE FEET: 61297

TOTAL COST: \$9,540,165

PERCENT ELECTRICAL: 11.2%

.112 X 9540165 = \$ 1,068,498.48

PERCENT MECHANICAL: 9.2%

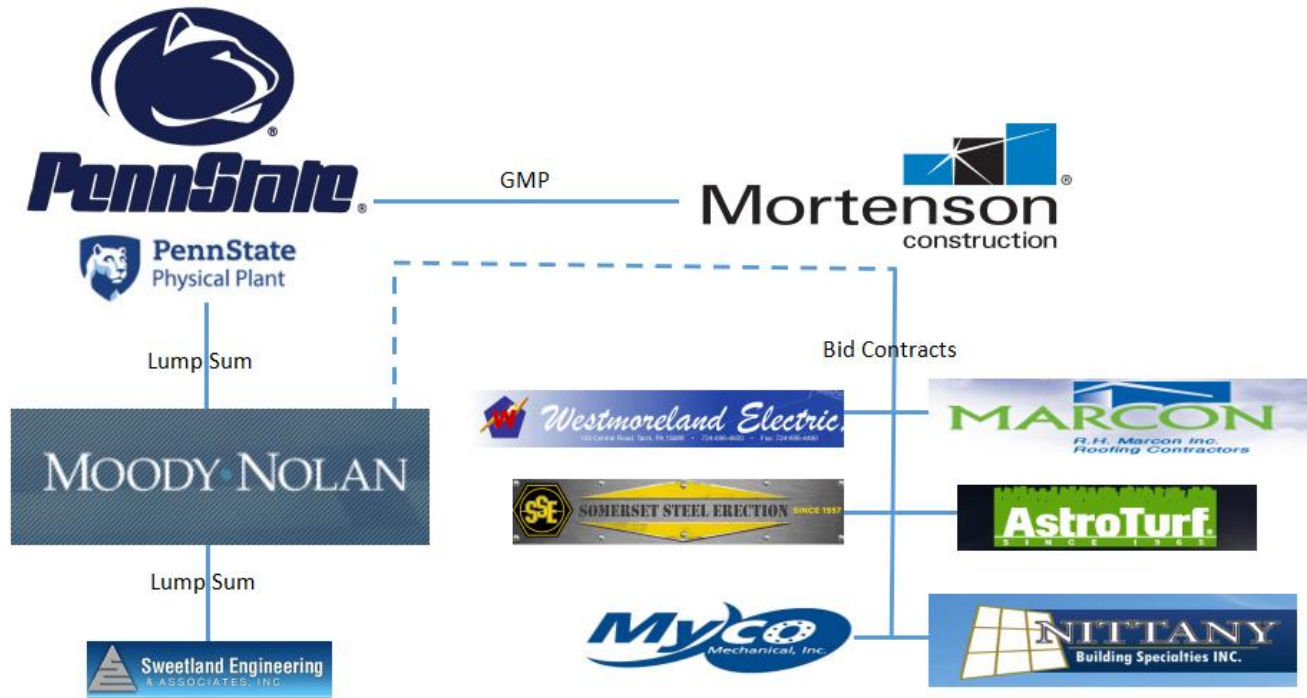
.092 X 9540165 = \$877,695.18

PERCENT STRUCTURAL: 11.3%

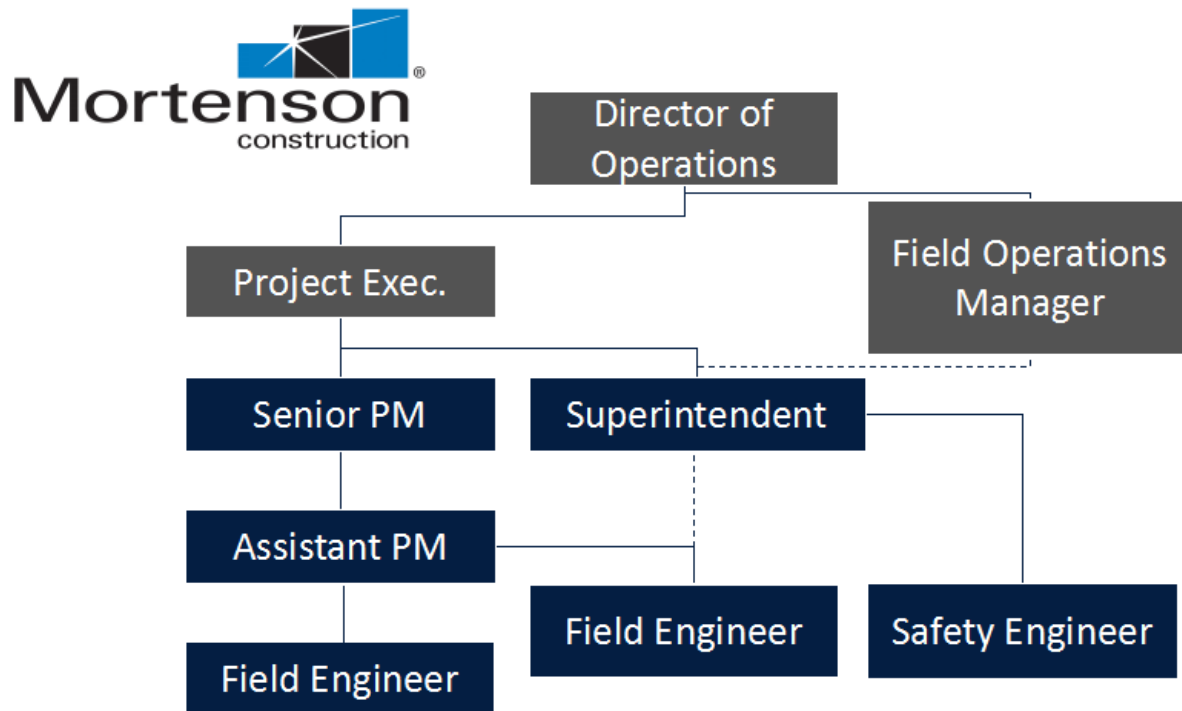
.113 X 9540165 = \$1,078,038.65

APPENDIX D: OVERALL PROJECT ORGANIZATIONAL CHART AND GC STAFFING PLAN

OVERALL PROJECT CHART



MORTENSON STAFFING CHART



APPENDIX E: PRESENTATION SLIDES



Client Information

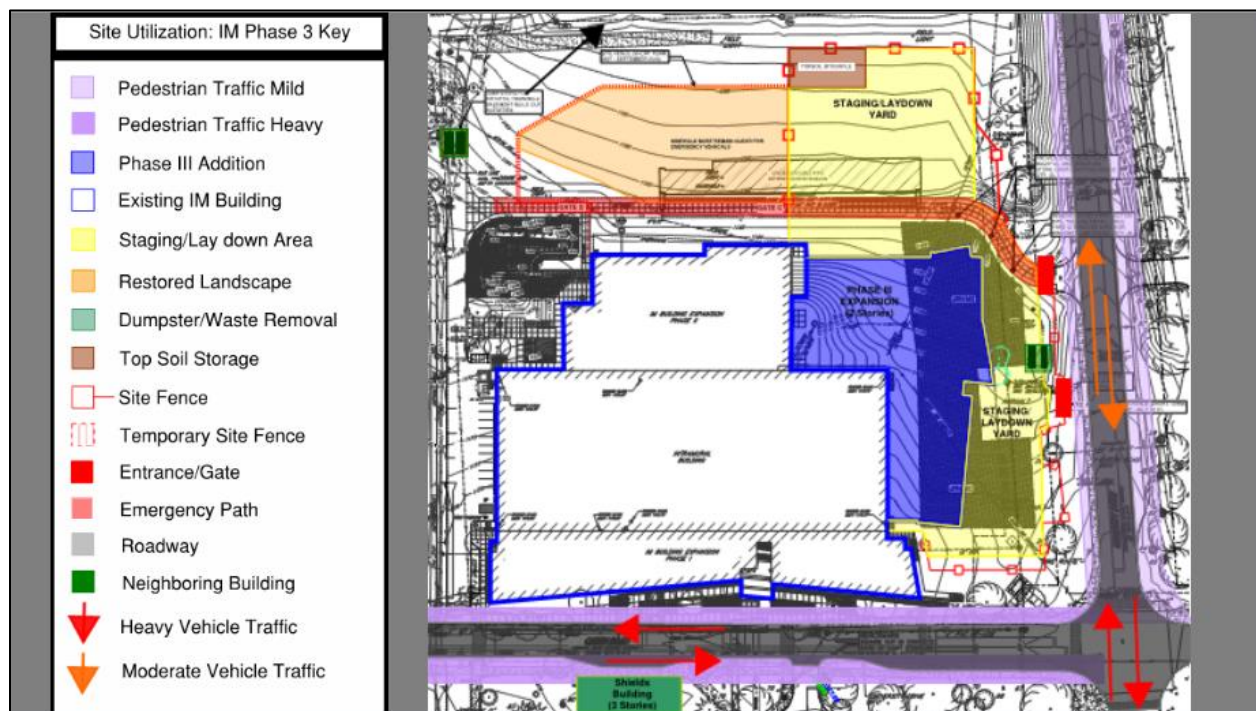
- The owner of the building is Penn State
 - Although the money for this phase of the production comes from student activity fees
- Quality and Safety are the biggest emphasis from Penn State on the project
 - The existing IM building receives heavy pedestrian and student traffic
 - Many cars travel along University Drive and Curtain Road
 - Must take extra precaution to prevent any problems
 - The quality of the project must be top of the line to represent Penn State
- Mortenson, Moody Nolan have completed two previous IM expansions
- The building is to be open for the start of Fall 2017 semester



Project Cost Evaluation

Initial Building Cost Analysis					
	Total Project Cost	Building Construction Cost	Mechanical	Electrical	Structural
Actual Cost	\$ 17,115,238.00	\$ 15,368,113.00	\$ 3,000,655.00	\$ 2,004,726.00	\$ 4,293,897.00
Per Square Foot	\$ 279.22	\$ 250.72	\$ 48.95	\$ 32.71	\$ 70.05
Estimated Cost	\$ 9,540,165.00	N/A	\$ 877,695.18	\$ 1,068,498.48	\$ 1,078,038.65
Per Square Foot	\$ 155.64	N/A	\$ 14.32	\$ 17.43	\$ 17.33

- Building was predicted to be a gymnasium
 - The primary function of the space will be for indoor sports, thus a gym was picked to compare
 - The building will function much like a gym in terms of cooling and humidity
 - Additional money was allotted for scoreboards, benches, lockers etc...
- Estimate still doesn't compare well to real price
 - Due to several reasons
 - Phase III consists of mixed use spaces not just the turf field and athletic areas
 - Building also has up to date technology, TV's, top of the line equipment
 - The building is also two stories, instead of the one story gymnasium



Project Schedule Summary



• **Key Dates:**

- Demolition of existing basement: October 7, 2015
- **Existing Basement Renovation: Finished on August 18, 2016**
- Structural steel completed: October 20, 2016
- All concrete poured: November 7, 2016
- Mechanical and Electrical Systems Finishing: May 3, 2016
- Addition enclosed: February 13, 2017
- Sports Equipment finished and installed: June 7, 2017
- Interior Doors and Windows: June 9, 2017
- Testing and commissioning end: August 9, 2017
- Penn State can begin moving into Phase III: August 10, 2017
- **Final Completion: September 9, 2017**

Building Systems Summary

- The addition will be LEED Silver
- **Mechanical System:**
 - “Hybrid System” which allows mechanical system to supply 100% outside air to the space when certain humidity and temperature levels are reached
 - Sensors will open up windows and use fans to bring in the outside air
 - New AHU’s will be installed in two new mechanical rooms in the existing basements of the building
- **Electrical System:**
 - All lights will be LED
 - Lights also will have sensor that can measure the amount of natural lighting in the space
 - The lights will have the ability to dim themselves if too much light is coming in
 - A new transformer will be used in the existing building, and a current one will be transplanted to the new addition
- **Demolition:**
 - As stated before parts of the existing basement will be demolished to house the new mechanical rooms
 - The side of the building facing University Drive will also experience minor demolition to attach the addition to the existing building

Building Systems Summary Cont.

- **Cast in place concrete:**
 - All concrete will be cast in place, including piles, footings, slab on grade and slabs on metal decking with strengths ranging from 1500 psi to 4500 psi
- **Masonry:**
 - The addition will utilize veneer face brick on the exterior and parts of the interior and don't serve a structural purpose
- **Steel:**
 - The building is a steel structured building designed to be non self supporting, meaning decking, concrete and other systems are necessary to be sequenced in the necessary order.
- **Support of excavation**
 - The excavation is open and due to the site and the existing condition now further support for excavation is needed, however a pump for dewatering may be used if necessary
- **Curtain wall**
 - Storefront walls will face University Drive and parts of the side facing Curtain Road. The walls will contain several different types of glass.

