ARCHITECTURAL ENGINEERING SENIOR THESIS

George Mason University
Student Union Building I

Fairfax, VA

Technical Assignment I

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10/5/2009

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Executive Summary

The Technical Assignment 1 provides an introduction to the George Mason University Student Union Building I. This assignment takes an in-depth look at the existing conditions and specific construction management techniques that were used on the project. This report includes the following sections:

- Project Schedule Summary
- Building Systems Summary
- Project Cost Evaluation
- Site Plan
- Local Conditions
- Client Information
- Project Delivery System
- Staffing Plan

The GMU SUB I project is a $17 million addition to the existing Student Union Building. The four story addition is located on the Fairfax, Virginia Campus. George Mason University selected Hess Construction + Engineering Services as the Design-Builder. Hess Construction + Engineering Services has an extensive background in constructing educational facilities. Hess has consequently staffed the project accordingly with a staff that has a vast knowledge of educational facilities and tight construction sites. This project is very distinctive in the sense that the construction site is very small. This concept will be further detailed in the Site Plan Section.

Project Schedule Summary

Please See Project Schedule Summary in Appendix Page # 1

The schedule is broken down into three phases. These phases consist of the BCOM Building Approval, Site Plan/Foundation/Superstructures Approval and the Construction of Student Union Building I.

Key Elements of the Pre-Construction Sequence

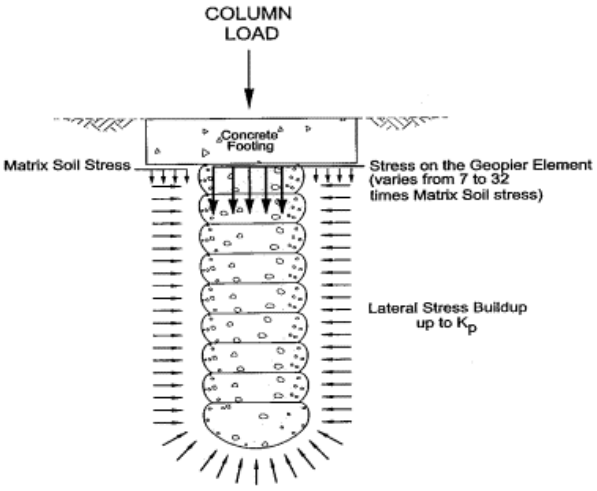
The pre-construction phase in this project is very important. The Bureau of Capital Outlay Management (BCOM) Submission and Approval process is a lengthy, tedious process. To become more familiar with the BCOM process, the project management team from Hess Construction + Engineering Services went through a BCOM certified course. Due to the fact that the project is design-build the pre-construction phase is very coordination heavy in the early stages of the project. There are regular meetings with BCOM and the design team to allow the project to move as quickly and efficiently as possible.

Key Elements of the Construction Sequence

Site Excavation & Foundation Sequence

This sequence is currently taking place on site at George Mason University. During the process, the first order of work was the removal of trees on the North and South Side of the project. This process laid the way for a new ADA sidewalk that connects from the Mason Pond Parking Deck across Aquia Creek Lane connecting to the Union Building. After these areas were complete, the demolition of the parking lot was slated. The asphalt parking lot spanned the entire area of the Student Union Building's Floor plan.

Upon completion of the demolition, the foundation work for the Geopier System began. This process involves the drilling of a 30" diameter hole to various depths and arrangements. Subsequently, lifts of 12" aggregate will be placed into the hole and compacted to form a bell shape. Once this process is completed this will furnish a net allowable bearing capacity of 6,000 psi at the bottom surface of the footing element.



Geopier Cutaway

Please See Structural Foundation/First Floor Plan in Appendix Page # 2

Structural Sequence
The structural phasing for the Student Union Building is as followed:

- Phase One – 2nd and 3rd Floors, Northeast portion of SUB I
- Phase Two - 2nd and 3rd Floors, Northwest portion of SUB I
- Phase Three – 4th and Roof, Northeast portion of SUB I
- Phase Four - 4th and Roof, Northwest portion of SUB I
- Phase Five - 2nd and 3rd Floors, Southeast portion of SUB I
- Phase Six - 4th and Roof, Southeast portion of SUB I
- Phase Seven - 2nd and 3rd Floors, Southwest portion of SUB I
- Phase Eight - 4th and Roof, Southwest portion of SUB I

The steel will be erected strictly from the North side of each phase to the South side. The reason the steel is sequenced in this manner is due to the fact that the George Mason site is so tight. The erection of a new Data Center to the North of the project adds further compaction to an already tight site and restricted the steel from being erected from South to North.

Please See Steel Erection Phasing Plan in Appendix Page # 3

Finish Sequence
Interior finishes will be one the longest items in the construction schedule sequence, consisting of 80 days. It will begin on January 28, 2009, immediately after the exterior skin is finished. This sequence will run simultaneously with the MEP Main Distribution and Equipment installation. To ease the construction process between Architectural, Structural and MEP item, Building Information Modeling will be used for coordination purposes. BIM has been involved throughout the entire design of the Student Union Project. Although three dimensional modeling is being used, two dimensional drawings take precedence in any dispute.

As stated before, major overhead MEP work will run simultaneously as the interior work. As of now the interior work will be completed in this manner:

- Metal Studs Wall Rough-In
- MEP In Wall Rough-In
- Door Frame Installation
- Gypsum Wall Board Installation
- Paint First Coat
- Ceiling Grid Work
- MEP Drops to Grid
- Finish Paint
- Flooring
- Acoustical Ceiling Tile Installation
- Doors and Hardware

Building Systems Summary

Yes/No	Work Scope
Yes	Demolition
Yes	Structural Steel Frame
Yes	Cast In Place Concrete
No	Precast Concrete
Yes	Mechanical System
Yes	Electrical System
Yes	Masonry
Yes	Curtain Wall
Yes	Support of Excavation

Demolition
Selective demolition was required for several portions of the project. The site-work contractor C.W Strittmatter Inc. was responsible for the demolition of the following activities:

- Existing High Temperature Water Tunnel (HTW)
- Existing Parking Lot and Walkways
- Existing Loading Dock
- Existing Gatehouses
- Existing Light Poles
- Tree Removal
- Existing Student Union Building I

High Temperature Water Tunnel (HTW) – George Mason University confirmed there was no asbestos inside the exiting HTW Tunnel. The existing HTW pipes were then capped. The removal of (2) 136' of 3" HTW pipe and the demolition of 136' of concrete that made up the 10' x 3'- 9" HTW Tunnel followed.

Existing Parking Lot and Walkways – The asphalt parking lot and concrete walkways in front of the existing Student Union Building I will be demolished to allow for construction of the Student Union Building I addition. The area that is to be demolished is roughly 21,000 sq. ft.

Existing Loading Dock – The entire existing 21' x 10' concrete loading dock (South) will be demolished to make allow for (2) 30" geopiers with steel columns and the new 26' x 7'- 9" concrete slab loading dock.

Existing Gatehouses – (2) existing gatehouses located on Aquia Creek Lane will be removed. The metal from the gatehouses will be recycled/reused. The 5" concrete pad that is supports the gatehouses will be demolished.

Existing Light Poles – (12) existing light poles will be removed along with their concrete bases and associated conduit/wiring. These light poles will be reused to light new sidewalks on site.

Tree Removal – George Mason University wanted to save as many trees as possible that did not interfere with the building pad. Their main concern for a specific type of tree was any tree 6" or larger in diameter and NOT a pine tree. GMU wanted to approve any trees that were sought to be removed outside the building pad. Both on the North and South roughly sixty trees were removed, many of these trees were in the building pad. Eight trees were removed from the site and moved to another place on campus. It is planned to replant 16 trees deciduous trees consisting of October Glory Red Maple, Japanese Zeicova, White Fringetree, and Yoshino Cherry and 36 shrubs consisting of Blue Princess Holly and Densiformis Yew.

Existing Student Union Building I – The entire Western exterior wall on the existing Student Union Building I is to be demolished. This wall is 3 stories of 135 linear feet of wall per floor.

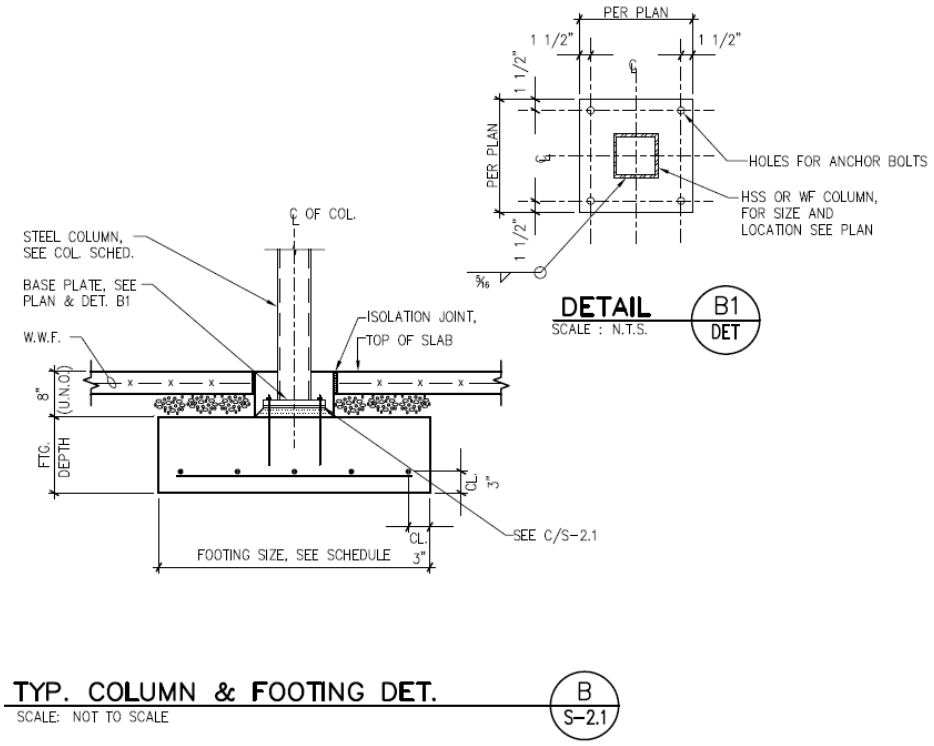
Structural Steel Frame

The structural system used in the George Mason University Student Union Building I is structural steel.

The design loads for the Student Union Building I are as followed:

- Live Loads
  - Assembly Areas – 100 psf
  - Administrative Offices – 80 psf + 20 psf (Partitions)
  - Stairs and Corridors – 100 psf
  - Storage (Light) – 125 psf
  - Mechanical Rooms – 150 psf (or Heavier per Equipment Weight)
  - Roof – 30 psf
- Snow Loads
  - Ground Snow Load (Pg) – 25 psf
  - Snow Exposure Factor (Ce) – 1.0
  - Snow Importance Factor (I) - 1.2
  - Flat Roof Snow Load (Pf) – 26 psf + Snow Drift
    (All Roof Areas are Designed for Minimum 30 psf Live/Snow Load)

The Student Union Building will use wide flange beams and columns that conform to ASTM A992/A992M–06a. The Headed Stud–Type Shear Connectors conform to ASTM A108–07. These are Cold-Finished, Grade 1015 or 1020 shear connectors. Anchor Bolts conform to ASTM A307–07a, the anchor bolts are rated at 60,000 PSI Tensile Strength and are of the non-headed type. High–Strength Threaded Fasteners are specified to conform to either ASTM A325–07, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength, or ASTM A490–06, Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.



The total floor thickness is 5.5". The structural slab is comprised of 3.5" 4,000 psi lightweight concrete over a 2" 18 gauge composite steel deck supported on steel beams. The slab is reinforced with 6" x 6" – W4.0 x W4.0 W.W.F.

The roof deck shall be 1.5" 20 gauge Type B steel deck. The roof system consists of a fully adhered fiberglass-reinforced PVC Energy Star sheet roofing system with a minimum of 3" insulation. This roofing makeup is then supported on top of K-Series steel joists.

Crane specifications have not been received by steel erector at time of submission.

The steel erection plan will have eight phases as stated in the Project Schedule Summary - Structural Sequence.

Please See Steel Erection Phasing Plan in Appendix Page # 3

Cast In Place Concrete

Slab On Grade will consist of 5" 3,500 psi normal-weight concrete. The total floor thickness is 5.5". The slab will be reinforced with 6"x6" – W2.9 x W2.9 W.W.F. The slab will be placed on a 15 mil vapor barrier and 6" of washed gravel sub grade.

The structural slab is comprised of 3.5" 4,000 psi lightweight concrete over a 2" 18 gauge composite steel deck supported on steel beams. The slab is reinforced with 6" x 6" – W4.0 x W4.0 W.W.F.

Mechanical System

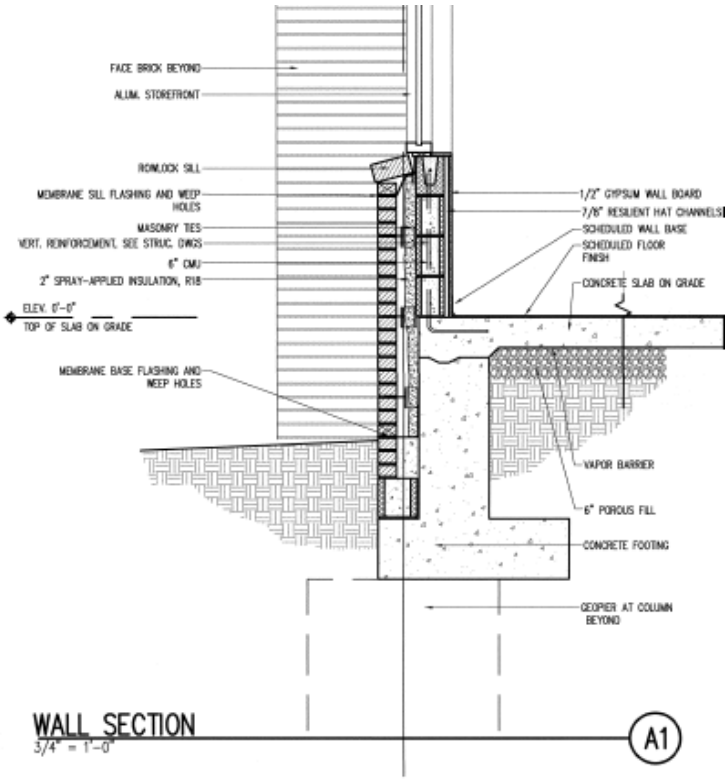
- Mechanical Rooms are located on the 1st and 4th Floors of the Student Union Building Project
- Two AHU Units (1st and 4th Floor) – 30,000 CFM, 460 Volts, 3 Phase
- Six Types of VAV Boxes – Max CFM ranging from 400 to 1200 CFM
- Two 700 Nominal CFM Fan Coil Units – 120 Volt, Single Phase
- Two Base Mounted 300 GPM Hot Water Pumps – 480 Volts, 3 Phase
- Rectangular metal ducts and plenums for HVAC main distribution systems in pressure classes from minus 2 inches to plus 10 inches water gage - Galvanized Sheet Steel: Lock forming quality, conforming to ASTM A653/A653M-07
- Fire Suppression – All Occupancy Areas are Light Hazard (0.10 GPM/SQ. FT.) except Electrical, Mechanical, and Copy Rooms which are Ordinary Hazard Group I (0.15 GPM /SQ. FT.) Automatic Sprinklers are provided throughout the building with a Group 2A fire area (VUSBC 903.2)

Electrical System

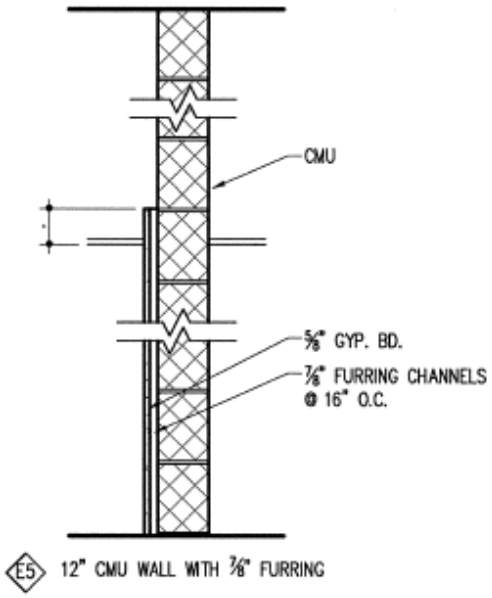
- Total Load for Existing and New Student Union Buildings – 1384.5 KVA, includes:
  - Existing Building Highest Demand Load – 528 KVA
  - New Motor Load – 421.8 KVA
  - New Receptacle Load – 235.5 KVA
  - New Lighting Load – 89.8 KVA
- Fusible Disconnect Switch, 480-30-30 Amp with 20 Amp Fuses
- AHU Units have a Single Point Power Connection

Masonry

Floors one through four have similar wall enclosures. The wall system consists of 1/2" gypsum wall board with a 7/8" resilient hat channel. This is followed by 6" CMU and 2" R18 Spray applied insulation. Hot dipped galvanized steel masonry ties secure the brick veneer to the CMU. The brick veneer will consist of a color to balance the brick of the existing Student Union Building and will also have an accent color to complement the exposed horizontal concrete bands of the existing building. Continuous membrane base flashing and weep holes will allow for proper drainage.



Masonry shear walls were used to reinforce the structure of the building. These walls will be reinforced with #5 Rebar at 8" O.C. and an 8 gauge horizontal bed joint reinforcement at every course.



Curtain Wall System

All four floors will have aluminum storefront window system adding ample daylighting to the building. The windows will be heavy commercial grade, AAMA 101, Performance Grade 45 double hung and fixed. The construction will be a thermal–break type with a CFR: 45 or better; U–Value: 0.70 or better; Air Infiltration rate: less than 0.3–cfm/sq. ft. at 6.24–lbs/sq. ft.; no water penetration at 15–lbs/sq. ft. The minimum frame depth will be 3 ¼ inch.

Support of Excavation

In accordance with the Hess Construction + Engineering Services Safety Policy, temporary excavation greater than 4' should be properly shored or sloped away from the excavation with a minimum grade of 1.5H:1V.

Project Cost Evaluation

Cost Summary

George Mason University SUB I - Costs		
	Cost	**Cost/SQ. FT.**
Construction Cost*	$14,212,337	$251.22
Total Project Cost	$17,550,000	$310.21

*Construction Cost excludes land costs, site work, permitting, etc.

Building Systems Cost

George Mason University SUB I – Building Systems Costs		
Building System	**Cost**	**Cost/SQ. FT.**
Structural Steel	$1,250,000	$22.10
Elevators	$120,000	$2.13
Mechanical	$3,650,000	$64.52
Fire Protection	$200,000	$3.54
Electrical	$2,025,000	$35.80

D4 Cost Estimate

Please See D4 Cost Estimate in Appendix Page # 4-5

Using the D4 Cost Estimating Program, a parametric estimate was prepared for the GMU SUB I project. The project was selected based on similarities in type and use of the building, number of floors, project height, and square footage. The total project cost for the D4 estimate was $6,953,836 or $122.92 per square foot. The D4 estimate was $10,596,164 less than the total project cost for the Student Union Building project.

RS Means Cost Estimate

Please See RS Means Cost Estimate Reference in Appendix Page # 6-7

Using the 2009 RS Means Square Foot Cost Estimate Book, a square foot estimate was prepared for the project. Type M.160 – College Student Union Building was used for this specific estimate.

Building Parameters	
Area (SF)	56,575
Perimeter (LF) * 4 Floors	564'-1 7/8"
Avg. Story Height	13'-10 1/2"

Brick face with concrete block back-up was used in the estimate with a steel structure. Since the largest square footage available was 55,000 sq. ft., that specific cost of $154.45/sq. ft. was used.

George Mason University SUB I – RS Means			
Base Cost/sq. ft.	$154.45	Per Unit Adjust	Notes
Height Adjust	+$4.59	2.45	Per 1 ft
Perimeter Adjust	-1.37	1.15	Per 100 LF
Subtotal	$157.67		
Location Factor	0.93		Fairfax, VA
Total Cost/sq. ft.	$146.64		

Additions include:

- 3,500 lb Elevator: +$69,800
- Nickel Cadmium Emergency Lights: $805 each (185 fixtures)= +$148,925

Total Cost: $8,499,181.89

The RS Means estimate was $9,050,818.11 less that the total project cost for the Student Union Building project.

Conclusion
Both the D4 and the RS Means estimates were around $10 million less than the actual project cost for the GMU project. There are several possibilities for the differing costs.

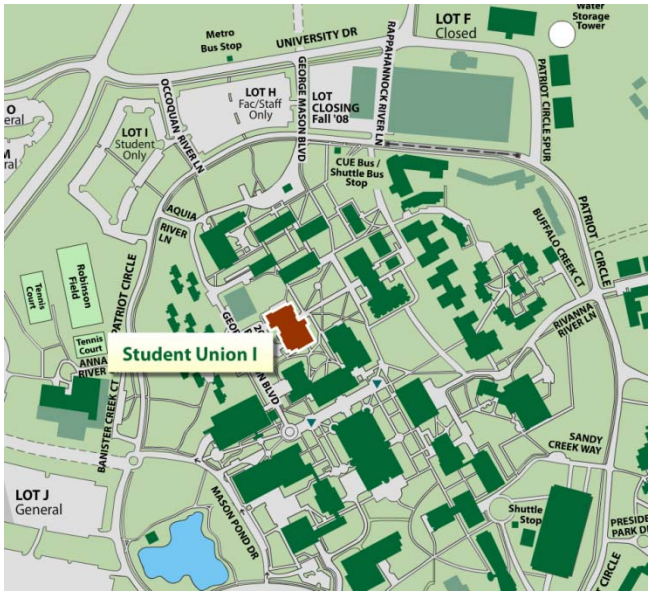
- The project includes a 30,000 sq. ft. mechanical renovation in the existing Student Union Building.
- Select demolition will be done to connect the existing and new Student Union Buildings.
- Geopier systems will be used for deep foundations.
- Extensive site work was done with the relocation of the main transformer, the main and secondary conduit lines associated with the transformer, and the relocation of the emergency generator.

Site Plan of Existing Conditions

Please See Existing Conditions and Demo Plan in Appendix Page # 8

Please See Site Plan in Appendix Page # 9-10

Please See Utilities Layout in Appendix Page # 11



The George Mason University Student Union Building I is located on the Fairfax, Virginia Campus. The project is off of Aquia Creek Lane. The project is surrounded by a newly constructed 3 story Data Center (North), an existing 3 story Student Union Building (West), a 2 story Student Housing complex (East), and the 1 story Harris Theatre.

The item that makes this construction project so unique is that the site is very compact. The site is so tight, there will be no construction parking allowed on-site. Workers have the option to pay for a semester log parking spot. George Mason will also allow for on-campus construction material deliveries for the project at an alternate location if needed.

There are two main utilities relocation that will be done. The first is the relocation of the main transformer. This activity will also consist of the installation of main and secondary runs. The second is the demolition and reconstruction of a new HTW tunnel, as stated in the demolition section of the building system section.

Local Conditions

Preferred Methods of Construction in the Region

The recent construction around the Fairfax Campus has been a steel superstructure with a brick veneer to complement the other buildings around campus and reflect the character of the university as an institution with a rich past, vibrant present, and promising future. Buildings should be tall enough to define adjoining spaces. This will require a minimum 3-story or 45 feet high building. Well-developed and articulated rooflines are encouraged and both sloped roofs and flat roofs are accepted.

Availability for Construction Parking

Due to such a confined site, parking is particularly limited on the SUB I construction site. Parking is available in an on-campus parking lot, for a cost per semester. To alleviate such costs, many subcontractors choose to park in the numerous Fairfax City free parking lots and carpool to the campus.

Recycling

According to the LEED Scorecard performed by Chris Flaherty of Hess Construction + Engineering Services, Hess plans to divert 93% of the construction waste management. PDS Recycling (Manassas, VA) will pick up the waste. The waste is then taken to a warehouse owned by Broad Run Recycling (Manassas, VA) and sorted to maximize the recyclables. The remaining trash that cannot be recycled is then taken to a landfill.

Soil Report

Geotechnical Consulting & Testing Inc. performed a subsurface evaluation by drilling (9) test boring. The borings were at refusal depths from 10 to 40 feet below the ground surface. Soils classified are in accordance with ASTM D2488 “Description and Identification of Soils” and the Unified Soil Classification System.

George Mason University Student Union Building I is located in a Piedmont Physiographic Province. The ground has a rolling upland surface underlying by complexly folded and faulted crystalline rocks. The rocks are generally fine to coarse grained, lustrous, greenish-gray, reddish weathering, quartz-rich schist, and lesser mica schist, phyllite, and gneiss.

The existing Student Union Building I is supported on a deep foundation system consisting of drilled piers. The maximum column loads for the building addition are anticipated at 480 kips and maximum wall loads of approximately 1 kip per linear foot. Due to the presence of deep undocumented existing fill, a deep foundation system is recommended for support of the proposed building addition. Based on the subsurface information and anticipated loads of the building, the estimated settlement of the 30” geopiers will not exceed 1/2”.

Please See Soil Boring Location Plan Diagram in Appendix Page # 12

Local Conditions

Ground Water Conditions

Ground water observations were made during the drilling of the test borings by visual examination, upon completion of the drilling, and after a 24 hour period.

Summary of Ground Water Conditions

Boring Number	During Drilling	Upon Completion	After 24 Hours	Approximate Elevation
B-1	25.0’	23.0’	11.0’	EL 411
B-2	Dry	Dry	11.0’	EL 410
B-3	28.0’	24.0’	12.0’	EL 410
B-4	25.0’	21.5’	15.0’	EL 411
B-5	38.0’	29.5’	8.3’	EL 418

Client Information

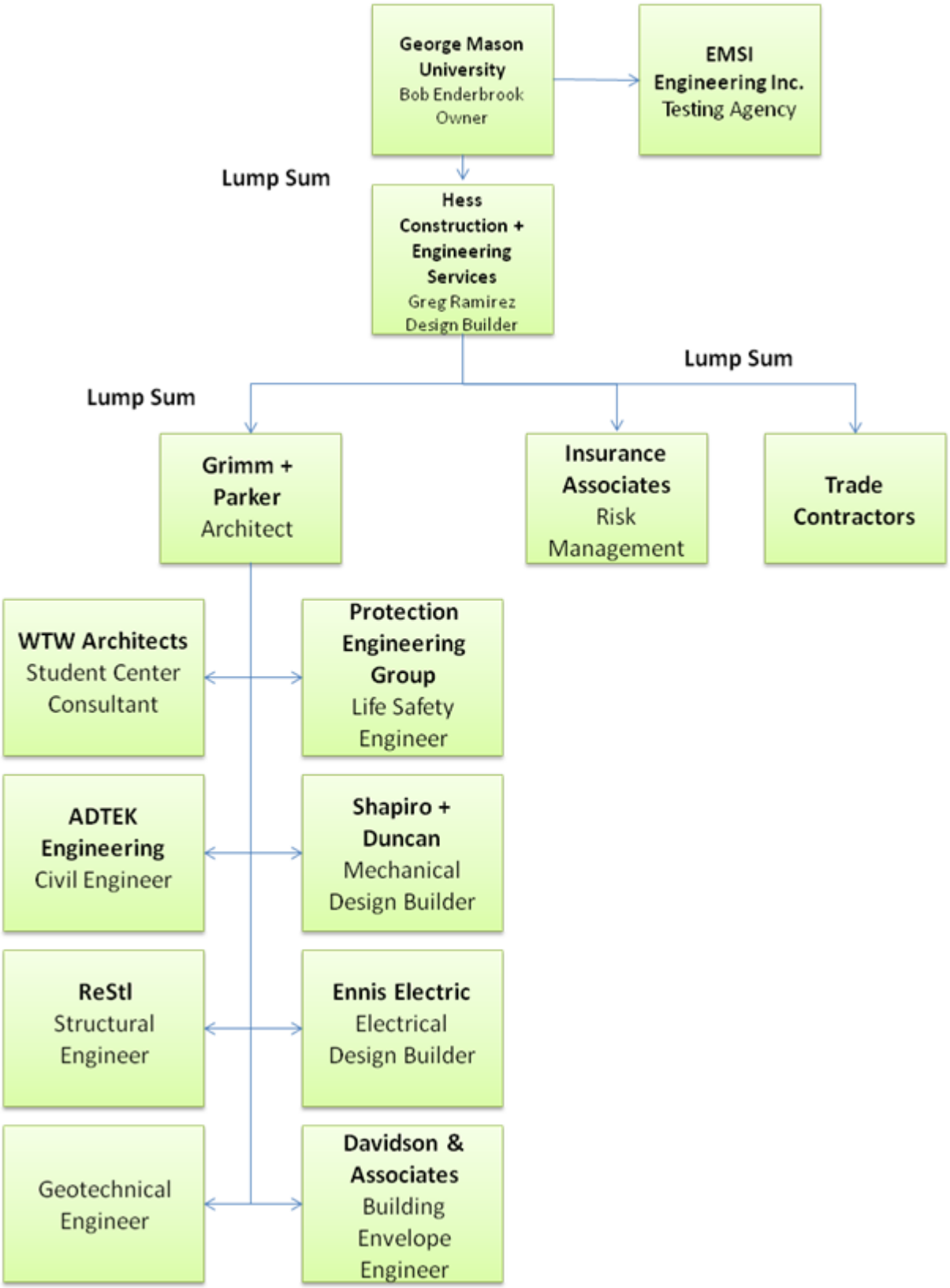
George Mason University has had a rapid growth in all the campuses over the last couple decades. George Mason's student population has increase to over 18,000 undergraduates. Accompanying the growth has been an increased demand for on-campus Student Union support and office space at George Mason University develops its educational operation. The addition will house meeting spaces, office, and student service and activity spaces. With this in mind, George Mason University has decided to implement a design-build process to construct an addition to the existing Student Union Building I. This process will be in accordance with the Commonwealth of Virginia design-build procedures. At the current time, George Mason University is very familiar with the construction process and design-build contracts. Currently, George Mason University has eight construction projects being performed on the Fairfax, Virginia campus.

Cost was vital when preparing the design of this building. The university had a $20,627,000 budget slated for this project. Safety is very important for the university. The existing student union building, which is directly next to and will eventually connect to the new SUB I project, will remain open for student and faculty. With construction being performed directly next to this building, as well as all over campus the safety of the students and faculty poses a major issue. When proposing for this project one important aspect of the presentation was the schedule portion. The design-builders had to propose a thirty activity CPM schedule. This included a description of how the schedule was going to be maintained in addition to, any long lead time items that will come into effect. Finally, quality is another crucial part of this project for GMU. As stated in the RFP, "The University intends to realize a project that meets its requirement for efficient and durable facilities as well as meeting contemporary standards for the student centers for intuitions for higher learning. It is its intension to encourage innovative planning resulting in the enhancement of campus life of students through the design of its facilities and its surroundings."

To meet the owner's satisfaction, the master plan delineates a new campus framework to create an academic setting that is compact, rational and readable. Pedestrian "streets", semi-enclosed quadrangles, quality open spaces and vistas combine in a coherent whole. The campus framework provides a flexible structure for future campus program elements while creating a unique sense of place. The framework is comprised of six fundamental elements:

- Arrival
- Main streets and quadrangles
- Connections
- View and Landmarks
- Natural systems
- Compact Core

Project Delivery System



Project Delivery System

There are essentially three key players in the project delivery of the George Mason University Student Union Building I project. As stated in the client information section, George Mason University is the owner of this project. All third party inspections are subcontracted out to EMSI Engineering, Inc. The delivery method chosen by GMU itself is Design-Build. Essentially, all construction that is being performed on the Fairfax Campus is Design-Build. Hess Construction + Engineering Services is the design builder and Grimm + Parker is the Architect. Hess Construction + Engineering Services was chosen for their competitive low bid and expert knowledge in construction in the education field. Grimm + Parker is a key designer in educational facilities in the DC, Maryland, Virginia area.

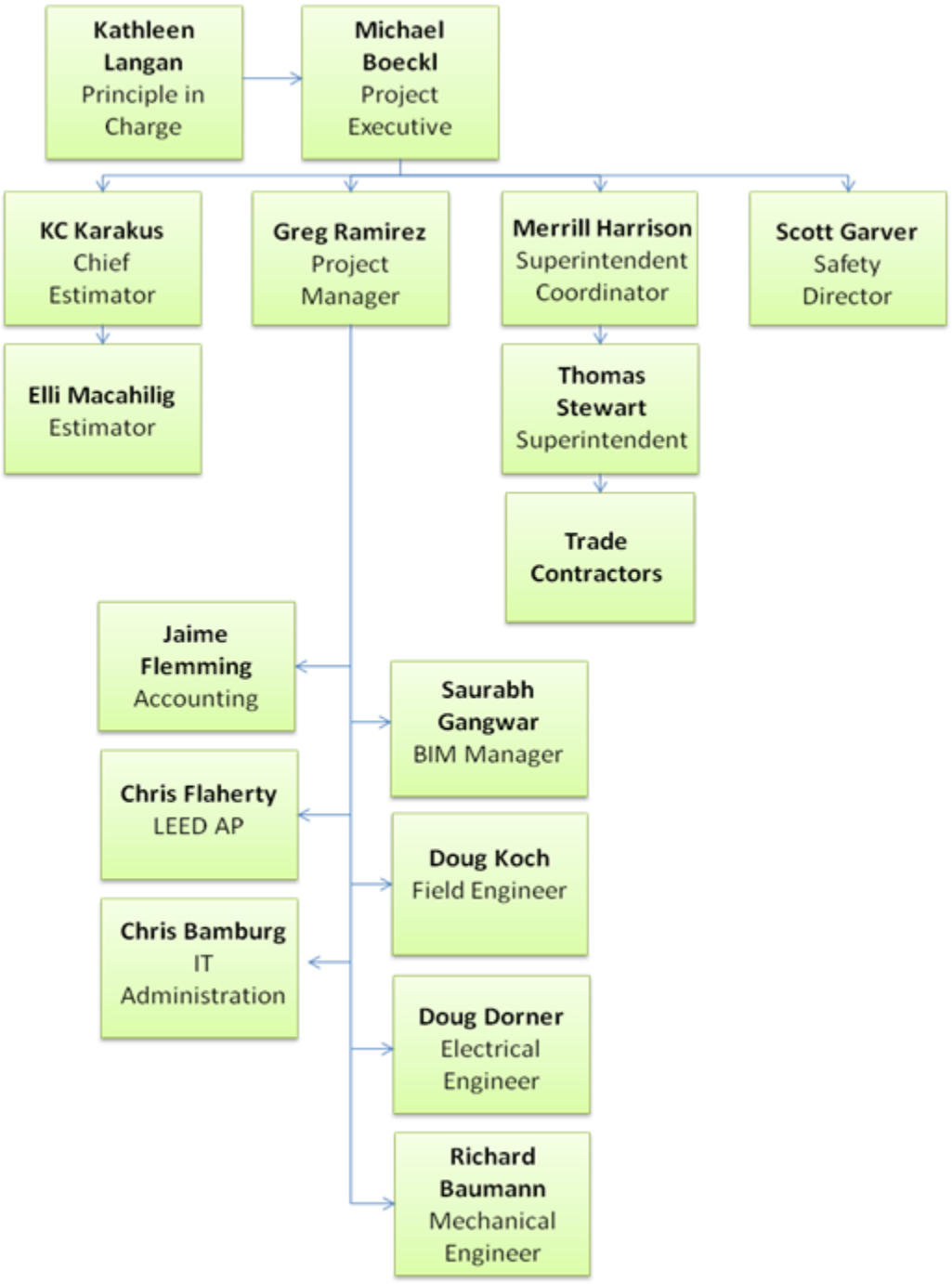
Grimm + Parker performs its design services out of its home office in Bethesda, Maryland. Grimm + Parker has several consultants for each major design portions of the project. This includes mechanical, electrical, life safety, structural, civil, etc. These groups each perform designs of their respected division, code analysis, and preliminary Building Information Modeling.

The trade contractors to Hess Construction + Engineering Services are contracted under lump sum and were selected through the lowest competitive bid.

Under the Commonwealth of Virginia, a Standard Performance Bond (CO-10) and a Standard Labor and Material Payment Bond (CO-10.1) were used between the contractor, surety, and owner. In effort to insure this risk management, Insurance Associates were brought in for this specific task.

Based on George Mason experience with construction and Design-Build projects and Hess Construction + Engineering Services/Grimm + Parker expertise in their respected educational construction and design, it is assessed that this particular delivery system and contracts are appropriate.

Staffing Plan



HESS CONSTRUCTION + ENGINEERING SERVICES

Staffing Plan

This is the typical staffing plan for Hess Construction + Engineering Services. Hess's main focus is on educational construction in the DC, Maryland, and Virginia areas. This staffing plan shows both the on-site and in-home office personnel. The main focus will be on the on-site staff. This particular staffing plan also is for later in the project. At this current time, the GMU project is still in the early phases of construction.

Project Executive
The project executive is responsible for the entire staff for this specific project. Michael is a key contact person between the owner, architect, and the trade contractors' project managers. Michael attends the weekly owner's meeting at GMU. With an architecture background, Michael has played a vital role in the design process of the Student Union Building.

Project Manager
The project manager is responsible for the successful completion of the SUB I project. Greg's main responsibilities consist of writing and reviewing contracts, payment requisitions, and overall preparation of project schedule. Greg also works on preparing subcontractors' project procedure, processing change orders, and establishing a schedule of values.

BIM Manager
The BIM manager is responsible for the overall BIM process. Saurabh acts as a liaison between the subcontractor's BIM/IT personnel. He gathers all the BIM models, compiles the models together, and performs clash detection tests in Navisworks.

Field Engineer
The field engineer is responsible for tracking and distributing RFI's, reviewing submittal, and photographing the progression of the project.

Superintendent
The superintendent is responsible for the coordination between subcontractors on-site, maintaining the schedule, and creating a look-a-head schedule for future construction activities. Merrill in charge of quality control observations and maintains quality control through detailed daily reports.

Appendix

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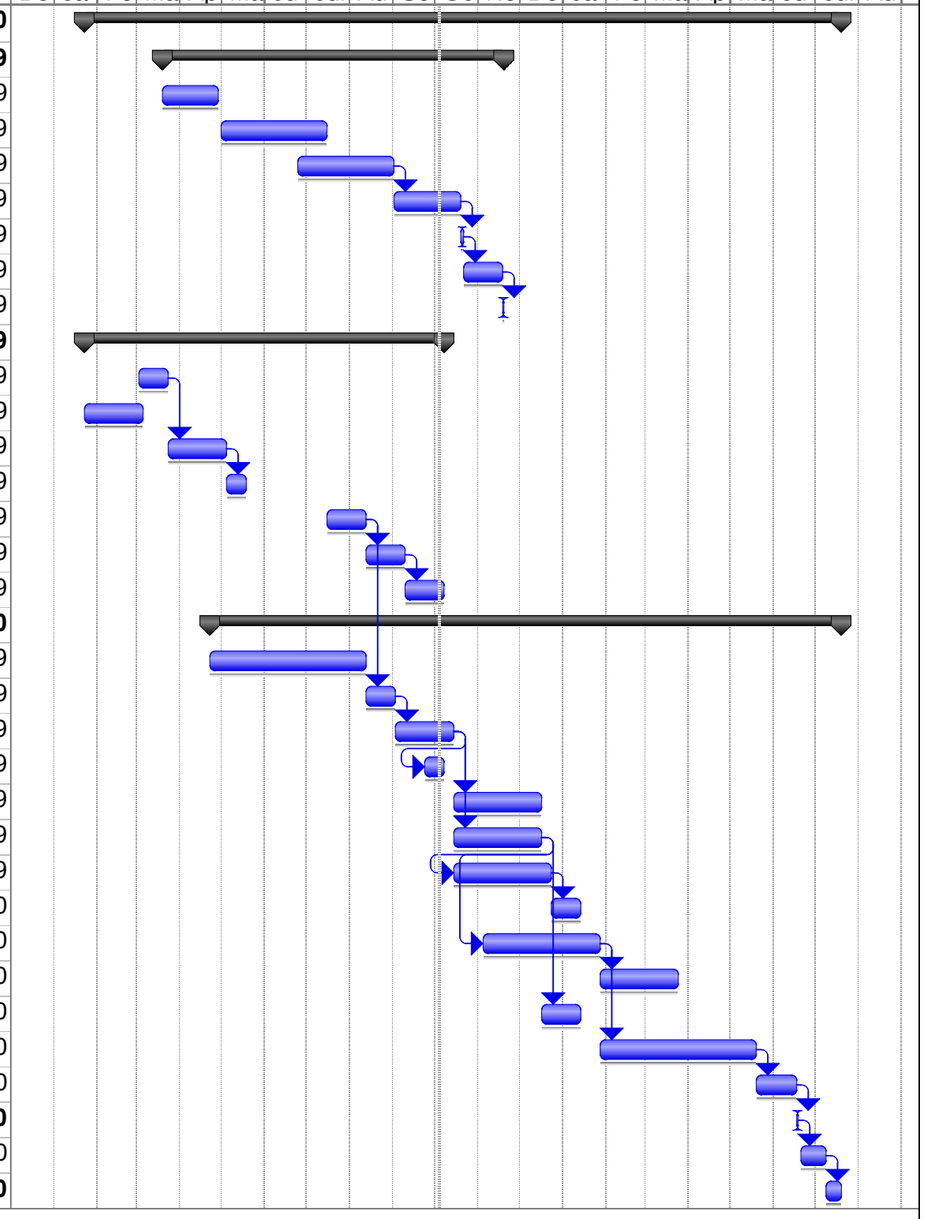
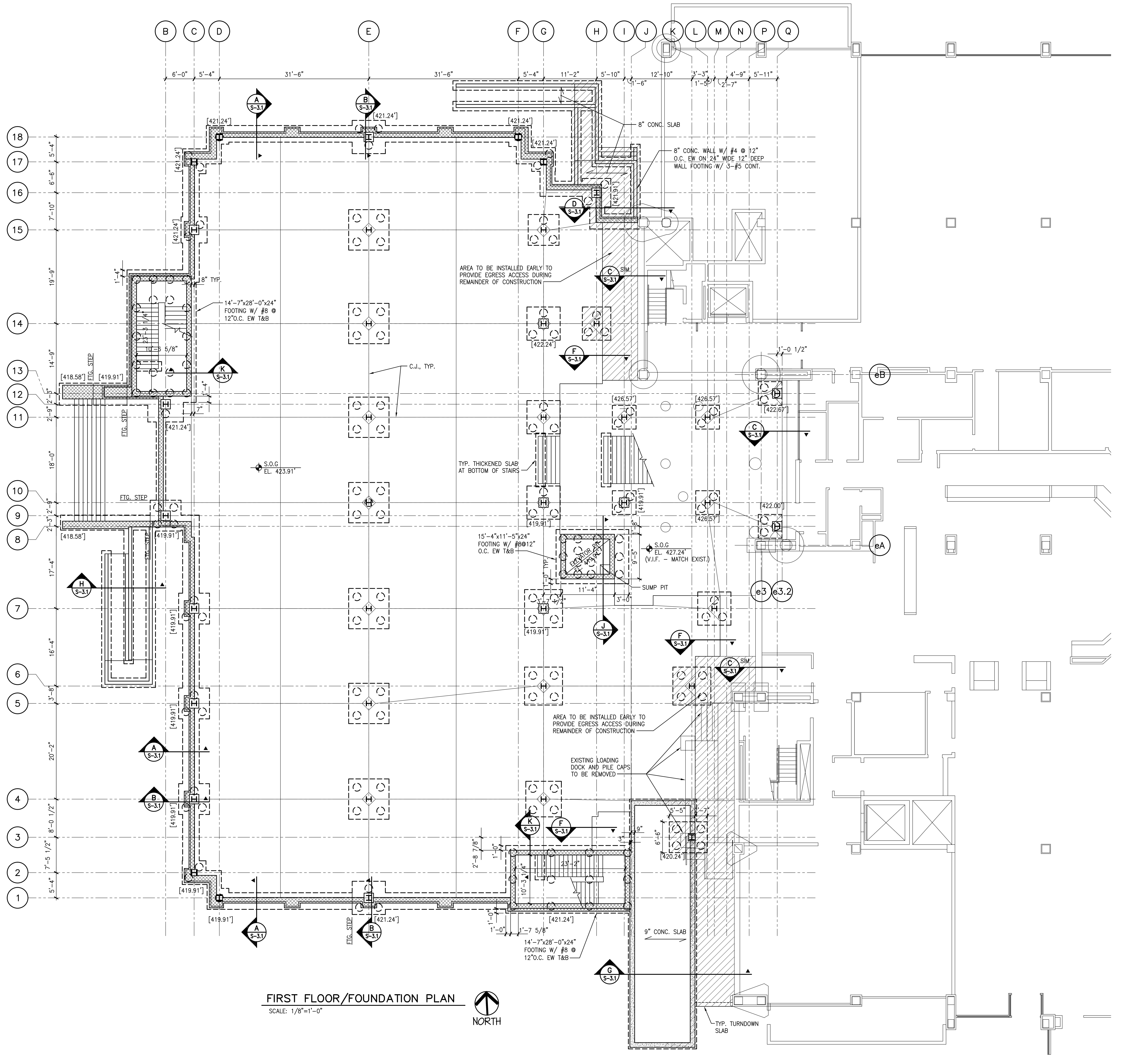
ID	Task Name	Duration	Start	Finish
1	**STUDENT UNION BUILDING I**	**387 days**	**Fri 1/23/09**	**Mon 7/19/10**
2	**BCOM BUILDING APPROVAL**	**175 days**	**Fri 3/20/09**	**Thu 11/19/09**
3	Schematic Design (incl. BCOM Submission)	28 days	Fri 3/20/09	Tue 4/28/09
4	Preliminary Design (100% DD) (incl. BCOM Submission)	54 days	Fri 5/1/09	Wed 7/15/09
5	Working Drawings (100% CD) (incl. BCOM Submission & Re-subm	49 days	Thu 6/25/09	Tue 9/1/09
6	Working Drawing Comments II from BCOM & Re-submission	34 days	Wed 9/2/09	Mon 10/19/09
7	Meeting with BCOM to present re-submission	2 days	Tue 10/20/09	Wed 10/21/09
8	Working Drawings Approval	4 wks	Thu 10/22/09	Wed 11/18/09
9	Building Permit Issued	1 day	Thu 11/19/09	Thu 11/19/09
10	**SITE PLAN, FOUNDATION, SUPERSTRUCTURE APPROVALS**	**184 days**	**Fri 1/23/09**	**Wed 10/7/09**
11	Geotechnical Study/Utility Verification	15 days	Tue 3/3/09	Mon 3/23/09
12	Site Plan Completion	30 days	Fri 1/23/09	Thu 3/5/09
13	Verification of infrastructure with Building Design	30 days	Tue 3/24/09	Mon 5/4/09
14	Submission for Water, Sewer, Storm, E&S, Grading	2 wks	Tue 5/5/09	Mon 5/18/09
15	Site Plan Approval	4 wks	Thu 7/16/09	Wed 8/12/09
16	Foundation Permit Approval	4 wks	Thu 8/13/09	Wed 9/9/09
17	Superstructure Permit Approval	4 wks	Thu 9/10/09	Wed 10/7/09
18	**CONSTRUCTION**	**323 days**	**Thu 4/23/09**	**Mon 7/19/10**
19	Long Lead Equipment Procurement	80 days	Thu 4/23/09	Wed 8/12/09
20	Site Mobilization/ Pre-Construction/ Site Security	15 days	Thu 8/13/09	Wed 9/2/09
21	Site Excavation & Foundation Work	30 days	Thu 9/3/09	Wed 10/14/09
22	MEP Below Grade	10 days	Thu 9/24/09	Wed 10/7/09
23	Structural Frame	45 days	Thu 10/15/09	Wed 12/16/09
24	Concrete Slab on Grade & Decks	45 days	Thu 10/15/09	Wed 12/16/09
25	Set MEP Sleeves/ Duct Penetrations (Deck to Roof)	50 days	Thu 10/15/09	Wed 12/23/09
26	MEP Risers	15 days	Thu 12/24/09	Wed 1/13/10
27	Exterior Skin	60 days	Thu 11/5/09	Wed 1/27/10
28	MEP Main Distribution/ Equipment Installation	40 days	Thu 1/28/10	Wed 3/24/10
29	Roofing	20 days	Thu 12/17/09	Wed 1/13/10
30	Interior Finishes	80 days	Thu 1/28/10	Wed 5/19/10
31	Building Commissioning	21 days	Thu 5/20/10	Thu 6/17/10
32	**Building Addition Substantial Completion**	1 day	Fri 6/18/10	**Fri 6/18/10**
33	University FF&E Installation	14 days	Mon 6/21/10	Thu 7/8/10
34	**Occupancy of Addition**	7 days	Fri 7/9/10	**Mon 7/19/10**



Project: GMU SUB I:Tech 1
Date: Sun 10/4/09

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



FIRST FLOOR/FOUNDATION PLAN

SCALE: 1/8"=1'-0"

FOUNDATION PLAN NOTES

1. FINISHED FLOOR ELEVATION TO BE 423.91' UNLESS OTHERWISE NOTED
2. SLAB ON GRADE SHALL CONSIST OF 5" NORMAL-WEIGHT CONCRETE, REINFORCED WITH 6"x6"-W2.9xW2.9 W.W.F., ON MIN. 15 MIL VAPOR BARRIER AND 6" WASHED GRAVEL SUBGRADE.
3. SLOPE FINISH CONC. SLABS TO FLOOR DRAINS PER ARCH. DRAWINGS.
4. COORDINATE ALL SLAB DEPRESSIONS WITH FINISH PRODUCT TO BE INSTALLED. SEE ARCH. DWGS.
5. REFER TO S-0.x SERIES FOR GENERAL NOTES
   REFER TO S-2.x SERIES FOR TYPICAL DETAILS.
   REFER TO S-3.x SERIES FOR SECTIONS
6. MASONRY SHEAR WALL REINF. SHALL BE PROVIDED W/#5@8"O.C. (V.) AND 8 GA HORIZONTAL BED JT. REINF. @ EVERY COURSE U.O.N.
7. TOP OF FOOTING TO BE 423.24' UNLESS NOTED THUS [XXX.XX']
8. [dashed box symbol] DENOTES NUMBER AND LOCATION OF GEOPIER PILES. COORD. WITH GEOPIER INSTALLER FOR FINAL NUMBER AND LOCATIONS.

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

ReSH RESTL DESIGNERS, INC.

HESS

WTW ARCHITECTS

2 Bethesda Metro Center
Suite 1350
Bethesda, MD 20814
Tel 240.223.0500
Fax 240.223.0510

1355 Beverly Road
Suite 105
McLean, VA 22101
Tel 703.903.9100
Fax 703.903.9755

11720 Beltsville Drive
Suite 600
Calverton, MD 20705
Tel 301.595.1000
Fax 301.595.0089

GRIMM + PARKER ARCHITECTS

GP# 20901

FOUNDATION/FIRST FLOOR PLAN

GEORGE MASON UNIVERSITY SUB 1 : VA PC 247-17485
FAIRFAX, VA

DATE	DESCRIPTION
4/22/09	FNDN PKG
6/3/09	STEEL PRICING
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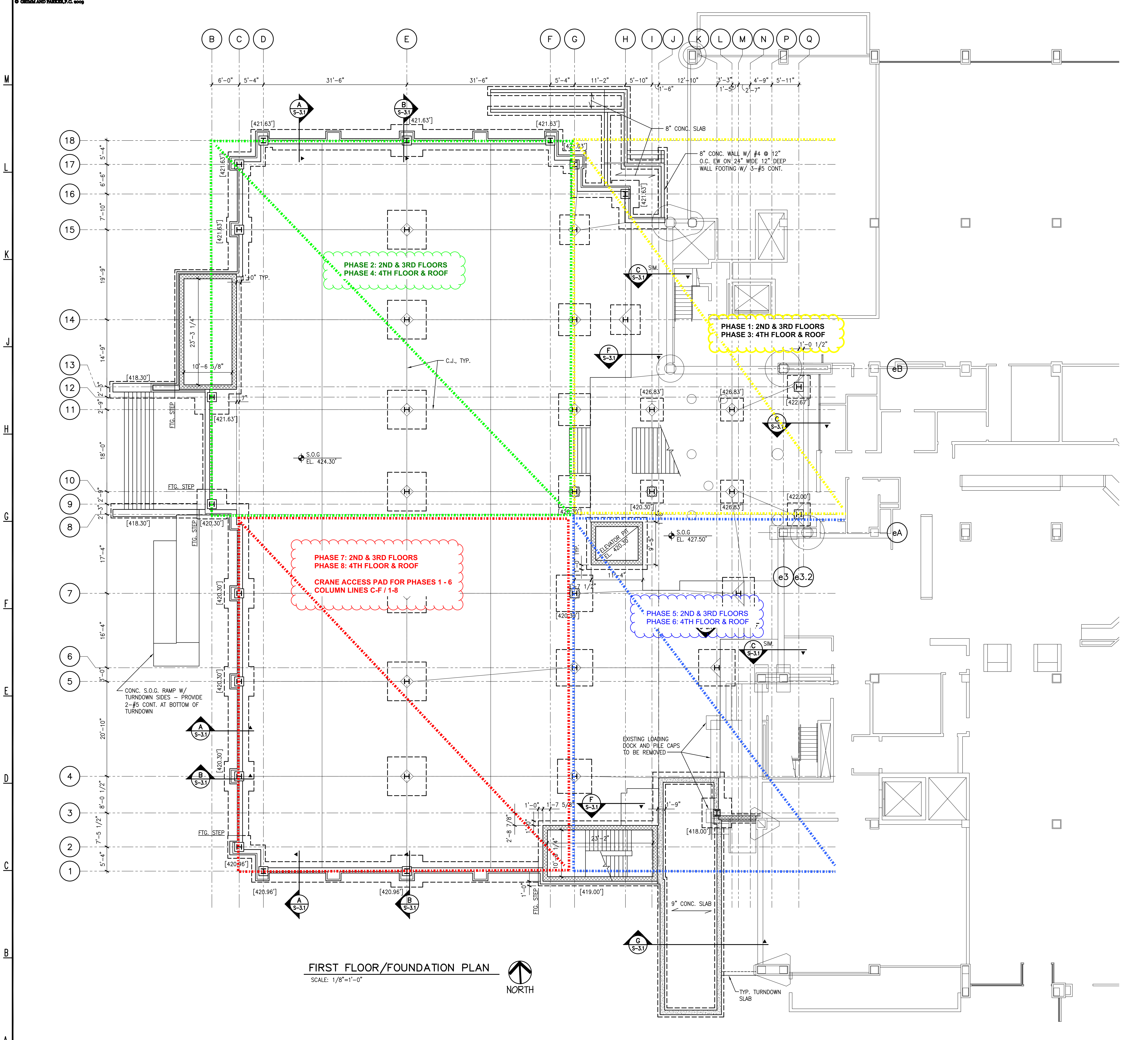
S-1.1

06/12/2009 BCOM
Fndn/Site Submission



FIRST FLOOR/FOUNDATION PLAN

SCALE: 1/8"=1'-0"

FOUNDATION PLAN NOTES

1. FINISHED FLOOR ELEVATION TO BE 424.30' UNLESS OTHERWISE NOTED
2. SLAB ON GRADE SHALL CONSIST OF 5" NORMAL–WEIGHT CONCRETE, REINFORCED WITH 6"x6"–W2.9xW2.9 W.W.F., ON MIN. 15 MIL VAPOR BARRIER AND 6" WASHED GRAVEL SUBGRADE.
3. SLOPE FINISH CONC. SLABS TO FLOOR DRAINS PER ARCH. DRAWINGS.
4. COORDINATE ALL SLAB DEPRESSIONS WITH FINISH PRODUCT TO BE INSTALLED. SEE ARCH. DWGS.
5. REFER TO S–0.x SERIES FOR GENERAL NOTES
REFER TO S–2.x SERIES FOR TYPICAL DETAILS.
REFER TO S–3.x SERIES FOR SECTIONS
6. MASONRY SHEAR WALL REINF. SHALL BE PROVIDED W/#5@8"O.C. (V.) AND 8 GA HORIZONTAL BED JT. REINF. @ EVERY COURSE U.O.N.
7. TOP OF FOOTING TO BE 423.63' UNLESS NOTED THUS [XXX.XX']

0 4' 8' 16'
SCALE: 1/8" = 1'–0"

RESTL DESIGNERS, INC.

HESS
WMW ARCHITECTS

2 Bethesda Metro Center
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Bethesda, MD 20814
Tel 240.223.0500
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GRIMM + PARKER ARCHITECTS

GP# 20901

FOUNDATION/FIRST FLOOR PLAN

GEORGE MASON UNIVERSITY SUB 1 : VA PC 247–17485
FAIRFAX, VA

DATE	DESCRIPTION
4/22/09	FNDN PKG

S-1.1

05/12/2009 BCOM
PD SUBMISSION

Statement of Probable Cost

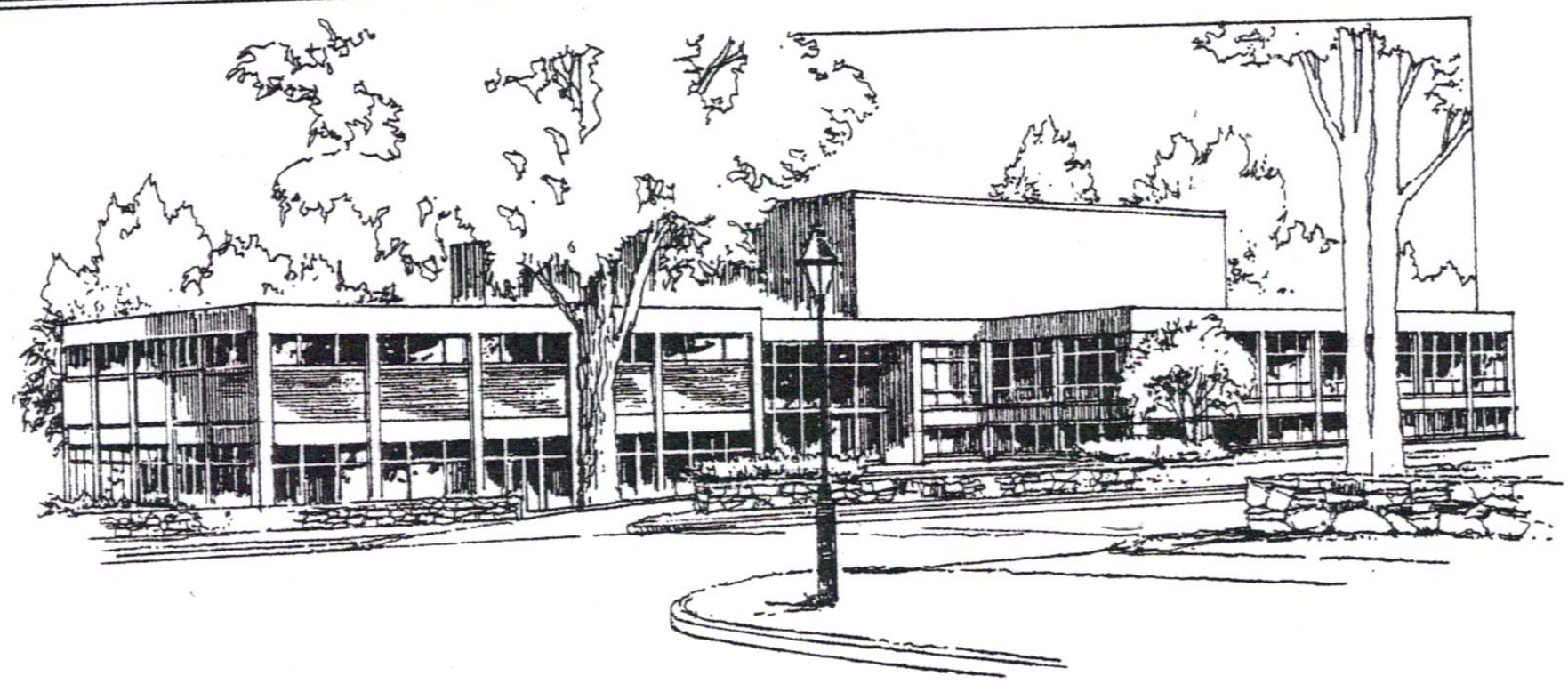
George Mason Univ. SUB I - May 2009 - VA - Other

Prepared By:	**Hess Construction + Engineering Services** **804 W. Diamond Ave. Suite 300** **Gaithersburg, MD 20878** **301-670-9000 Fax:**	Prepared For:	**,** **Fax:**
Building Sq. Size:	**56575**	Site Sq. Size:	**62000**
Bid Date:	**11/1/1993**	Building use:	**Educational**
No. of floors:	**4**	Foundation:	**PRG**
No. of buildings:	**1**	Exterior Walls:	**MAS**
Project Height:	**66.3**	Interior Walls:	**DRY**
1st Floor Height:	**13.4**	Roof Type:	**MEM**
1st Floor Size:	**13718**	Floor Type:	**CAR**
		Project Type:	**ADD**

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**6.66**	**7.50**	**424,289**
	General Conditions	6.66	7.50	424,289
01	**General Requirements**	**4.00**	**4.50**	**254,566**
	Constr. Facilities & Temp. Controls	1.21	1.36	76,969
	Modification Procedures	2.79	3.14	177,597
03	**Concrete**	**17.67**	**19.90**	**1,125,665**
	Concrete	4.23	4.76	269,390
	Precast	11.93	13.43	760,064
	Reinforcement	1.51	1.70	96,211
04	**Masonry**	**5.29**	**5.95**	**336,737**
	Masonry & Grout	5.29	5.95	336,737
05	**Metals**	**15.86**	**17.86**	**1,010,212**
	Structural Framing	15.86	17.86	1,010,212
06	**Wood & Plastics**	**1.33**	**1.50**	**84,665**
	Architectural Woodwork	0.97	1.09	61,575
	Rough Carpentry	0.36	0.41	23,091
07	**Thermal & Moisture Protection**	**2.80**	**3.15**	**178,375**
	Fireproofing	1.28	1.45	81,779
	Joint Sealers	0.22	0.24	13,854
	Membrane Roofing	1.03	1.16	65,423
	Waterproofing	0.27	0.31	17,318
08	**Doors & Windows**	**4.59**	**5.17**	**292,480**
	Glazing & Glass	2.75	3.10	175,103
	Hardware	1.09	1.22	69,272
	Metal Doors & Frames	0.76	0.85	48,105
09	**Finishes**	**14.08**	**15.85**	**896,683**
	Gypsum Board	8.31	9.35	529,159
	Painting	2.11	2.38	134,695
	Resilient Flooring	1.96	2.21	125,074
	Tile	1.69	1.90	107,756
10	**Specialties**	**0.76**	**0.85**	**48,105**
	Specialties	0.76	0.85	48,105
14	**Conveying Systems**	**1.51**	**1.70**	**96,211**
	Elevators	1.51	1.70	96,211
15	**Mechanical**	**13.72**	**15.44**	**873,593**
	Fire Protection	2.42	2.72	153,937
	HVAC	7.98	8.98	507,992
	Plumbing	3.32	3.74	211,663
16	**Electrical**	**11.74**	**13.21**	**747,557**
	Basic Materials & Methods	11.74	13.21	747,557

Total Building Costs		**100.00**	**112.58**	**6,369,137**
02	**Site Work**	**100.00**	**9.43**	**584,699**
	Demolition	10.48	0.99	61,258
	Earthwork	14.92	1.41	87,240
	Foundation & Load Bearing Elements	16.87	1.59	98,619
	Paving & Surfacing	57.74	5.44	337,582
Total Non-Building Costs		**100.00**	**9.43**	**584,699**
Total Project Costs		**--**	**--**	**6,953,836**

M.160 College, Student Union



Costs per square foot of floor area

Exterior Wall	S.F. Area	15000	20000	25000	30000	35000	40000	45000	50000	55000
	L.F. Perimeter	354	425	457	513	568	583	629	644	683
Brick Face with Concrete Block Back-up	Steel Frame	175.50	170.30	165.10	162.65	160.85	158.20	157.05	155.20	154.45
	R/Conc. Frame	162.30	157.10	**151.85**	149.40	147.65	145.05	143.80	142.05	141.20
Precast Concrete Panel	Steel Frame	176.95	171.65	166.25	163.70	161.95	159.15	157.95	156.10	155.25
	R/Conc. Frame	164.15	158.70	153.30	150.75	148.85	146.10	144.90	143.00	142.15
Limestone Face Concrete Block Back-up	Steel Frame	191.75	184.95	177.65	174.35	172.05	168.20	166.65	164.05	162.95
	R/Conc. Frame	178.55	171.70	164.40	161.15	158.80	155.00	153.45	150.85	149.70
Perimeter Adj., Add or Deduct	Per 100 L.F.	8.95	6.70	5.35	4.40	3.80	3.30	3.00	2.75	2.45
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	2.25	2.00	1.65	1.60	1.55	1.35	1.30	1.25	1.15

For Basement, add $35.00 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 $123.70 to $252.40 per S.F.

Common additives

Description	Unit	$ Cost
Carrels Hardwood	Each	660 - 990
Elevators, Hydraulic passenger, 2 stops		
2000# capacity	Each	64,800
2500# capacity	Each	66,300
3500# capacity	Each	69,800
Emergency Lighting, 25 watt, battery operated		
Lead battery	Each	282
Nickel cadmium	Each	805
Escalators, Metal		
32" wide, 10' story height	Each	143,000
20' story height	Each	172,000
48" wide, 10' Story height	Each	152,000
20' story height	Each	180,500
Glass		
32" wide, 10' story height	Each	137,000
20' story height	Each	165,000
48" wide, 10' story height	Each	48,300
20' story height	Each	175,000

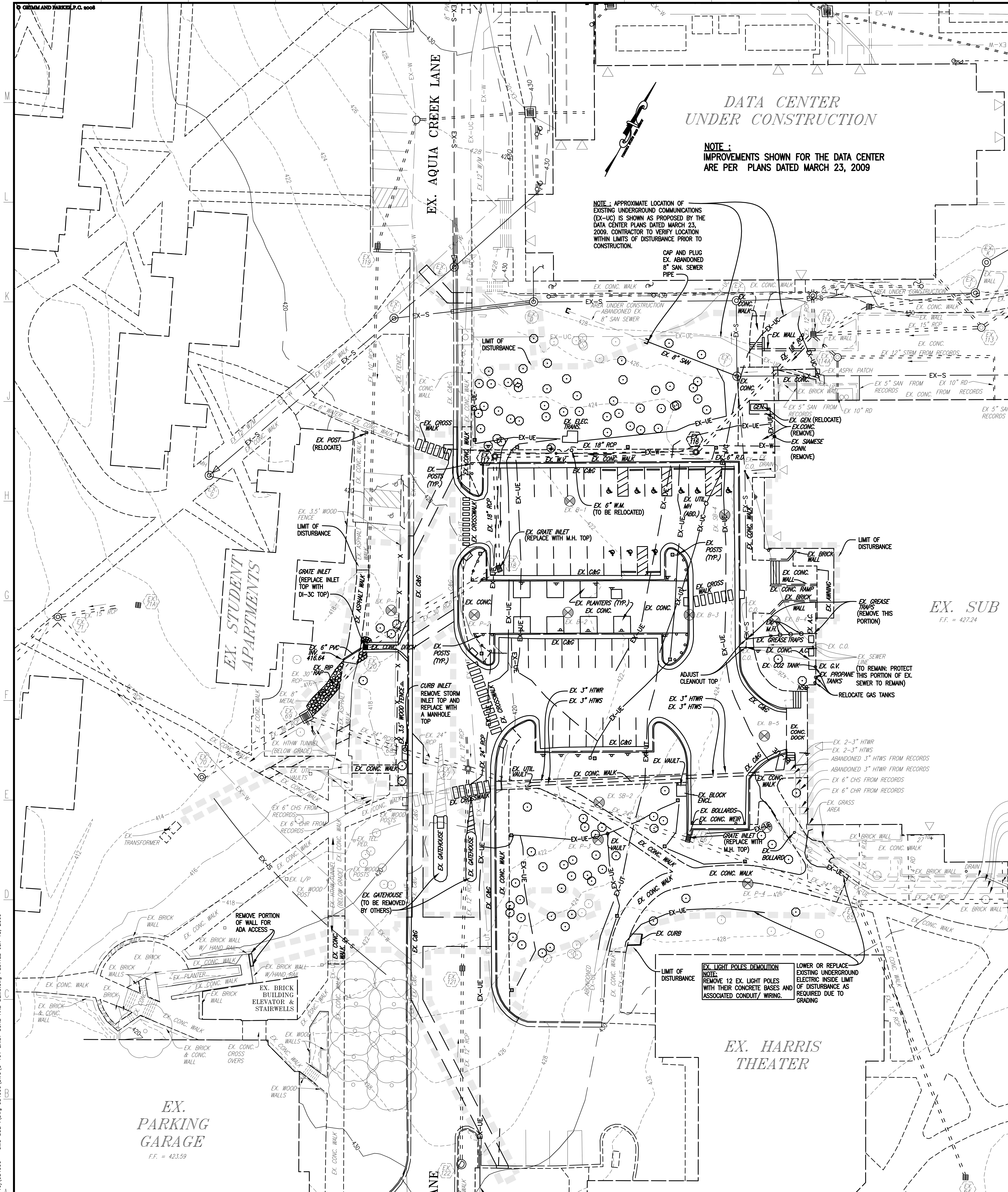
Description	Unit	$ Cost
Lockers, Steel, Single tier, 60" or 72"	Opening	191 - 310
2 tier, 60" or 72" total	Opening	107 - 141
5 tier, box lockers	Opening	65 - 83.50
Locker bench, lam. maple top only	L.F.	21
Pedestals, steel pipe	Each	63.50
Sound System		
Amplifier, 250 watts	Each	2350
Speaker, ceiling or wall	Each	191
Trumpet	Each	365

Important: See the Reference Section for Location Factors

Model costs calculated for a 2 story building with 12′ story height and 25,000 square feet of floor area

College, Student Union

				Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE							
1010	Standard Foundations	Poured concrete; strip and spread footings		S.F. Ground	4.54	2.27	
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	5.4%
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	1.43	
B. SHELL							
B10 Superstructure							
1010	Floor Construction	Concrete flat plate		S.F. Floor	27	13.50	18.6%
1020	Roof Construction	Concrete flat plate		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	30.85	10.15	
2020	Exterior Windows	Window wall	*25% of wall*	Each	37.60	4.14	12.9%
2030	Exterior Doors	Double aluminum and glass		Each	2385	.39	
B30 Roofing							
3010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPS composite insulation		S.F. Roof	5.74	2.87	2.6%
3020	Roof Openings	Roof hatches		S.F. Roof	.10	.05	
C. INTERIORS							
1010	Partitions	Gypsum board on metal studs	*14 S.F. Floor/L.F. Partition*	S.F. Partition	5.81	4.15	
1020	Interior Doors	Single leaf hollow metal	*140 S.F. Floor/Door*	Each	875	6.25	
1030	Fittings	N/A		—	—	—	
2010	Stair Construction	Cast in place concrete		Flight	7725	1.24	22.5%
3010	Wall Finishes	50% paint, 50% vinyl wall covering		S.F. Surface	2.10	3	
3020	Floor Finishes	50% carpet, 50% vinyl composition tile		S.F. Floor	6.57	6.57	
3030	Ceiling Finishes	Suspended fiberglass board		S.F. Ceiling	4.30	4.30	
D. SERVICES							
D10 Conveying							
1010	Elevators & Lifts	One hydraulic passenger elevator		Each	81,000	3.24	2.9%
1020	Escalators & Moving Walks	N/A		—	—	—	
D20 Plumbing							
2010	Plumbing Fixtures	Toilet and service fixtures, supply and drainage	*1 Fixture/1040 S.F. Floor*	Each	2153	2.07	
2020	Domestic Water Distribution	Gas fired water heater		S.F. Floor	.66	.66	2.7%
2040	Rain Water Drainage	Roof drains		S.F. Roof	.56	.28	
D30 HVAC							
3010	Energy Supply	N/A		—	—	—	
3020	Heat Generating Systems	Included in D3050		—	—	—	
3030	Cooling Generating Systems	N/A		—	—	—	16.0 %
3050	Terminal & Package Units	Multizone unit, gas heating, electric cooling		S.F. Floor	18.20	18.20	
3090	Other HVAC Sys. & Equipment	N/A		—	—	—	
D40 Fire Protection							
4010	Sprinklers	Wet pipe sprinkler system		S.F. Floor	2.46	2.46	2.2%
4020	Standpipes	N/A		—	—	—	
D50 Electrical							
5010	Electrical Service/Distribution	600 ampere service, panel board and feeders		S.F. Floor	2.26	2.26	
5020	Lighting & Branch Wiring	Fluorescent fixtures, receptacles, switches, A.C. and misc. power		S.F. Floor	11.60	11.60	
5030	Communications & Security	Alarm systems, internet wiring, communications systems and emergency lighting		S.F. Floor	2.24	2.24	14.3%
5090	Other Electrical Systems	Emergency generator, 11.5 kW		S.F. Floor	.15	.15	
E. EQUIPMENT & FURNISHINGS							
1010	Commercial Equipment	N/A		—	—	—	
1020	Institutional Equipment	N/A		—	—	—	
1030	Vehicular Equipment	N/A		—	—	—	0.0 %
1090	Other Equipment	N/A		—	—	—	
F. SPECIAL CONSTRUCTION							
1020	Integrated Construction	N/A		—	—	—	
1040	Special Facilities	N/A		—	—	—	0.0 %
G. BUILDING SITEWORK		**N/A**					
				Sub-Total		113.54	**100%**
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)			*25%*		28.37	
	ARCHITECT FEES			*7%*		9.94	
				Total Building Cost		**151.85**	


DATA CENTER
UNDER CONSTRUCTION
NOTE :
IMPROVEMENTS SHOWN FOR THE DATA CENTER
ARE PER PLANS DATED MARCH 23, 2009
NOTE : APPROXIMATE LOCATION OF EXISTING UNDERGROUND COMMUNICATIONS (EX-UC) IS SHOWN AS PROPOSED BY THE DATA CENTER PLANS DATED MARCH 23, 2009. CONTRACTOR TO VERIFY LOCATION WITHIN LIMITS OF DISTURBANCE PRIOR TO CONSTRUCTION.
CAP AND PLUG EX. ABANDONED 8" SAN. SEWER PIPE
EX. AQUIA CREEK LANE
EX. STUDENT APARTMENTS
EX. SUB
F.F. = 427.24
EX. HARRIS THEATER
EX. ROBIN HALL
EX. PARKING GARAGE
F.F. = 423.59
EX. LIGHT POLES DEMOLITION
NOTE:
REMOVE 12 EX. LIGHT POLES WITH THEIR CONCRETE BASES AND ASSOCIATED CONDUIT/ WIRING.
LOWER OR REPLACE EXISTING UNDERGROUND ELECTRIC INSIDE LIMIT OF DISTURBANCE AS REQUIRED DUE TO GRADING
REMOVE PORTION OF WALL FOR ADA ACCESS
EX. BRICK BUILDING ELEVATOR & STAIRWELLS
EX. GATEHOUSE (TO BE REMOVED BY OTHERS)
CURB INLET REMOVE STORM INLET TOP AND REPLACE WITH A MANHOLE TOP
GRATE INLET (REPLACE INLET TOP WITH DI-3C TOP)
LIMIT OF DISTURBANCE
EX. GRATE INLET (REPLACE WITH M.H. TOP)
EX. 6" W.M. (TO BE RELOCATED)
ADJUST CLEANOUT TOP
EX. GREASE TRAPS (REMOVE THIS PORTION)
(TO REMAIN: PROTECT THIS PORTION OF EX. SEWER TO REMAIN)
Relocate GAS TANKS
EX. GEN. (RELOCATE)
EX. CONC. (REMOVE)
EX. SIAMESE CONN. (REMOVE)
EX. POST (RELOCATE)
ABANDONED 3" HTWS FROM RECORDS
ABANDONED 3" HTWR FROM RECORDS
EX 6" CHS FROM RECORDS
EX 6" CHR FROM RECORDS

EX. STORM STRUCTURE TABLE

EX. 61	EX. GRATE INLET TOP=435.06' IN =430.81' 4" RCP TO 81 IN=429.26' 18" RCP FROM 3446 OUT=428.76' 18" RCP TO 79
EX. 62	EX. GRATE INLET TOP=432.22' IN=426.00' 15" RCP FROM 80 OUT=425.78' 18" RCP TO 78
EX. 63	EX. GRATE INLET TOP=433.33' IN=424.08' 18" RCP FROM 79 IN=429.18' 4" CMP FROM HALL A IN=427.21' 6" PVC FROM ? IN=426.51' 6" CMP FROM ?
EX. 64	EX. GRATE INLET TOP=434.76' IN=428.08' 8" BMP FROM ? IN=429.55' 8" BMP FROM MORRIS OUT=427.88' 12" RCP TO 77
EX. 65	EX. STORM M.H. TOP = 428.25 INV. IN = 421.15 (24") INV. IN = 423.00 (12") INV. IN = 422.03 (4") INV. OUT = 421.17 (24")
EX. 67	EX. M.H. TOP = 419.47 INV. IN = 413.21 (24") INV. IN = 413.79 (15") INV. IN = 413.91 (12") INV. OUT = 412.93 (24")
EX. 69	EX. GRATE INLET TOP = 414.89 INV. IN = 409.85 (30") INV. IN = 411.85 (24") INV. IN = 410.10 (8") INV. OUT = 409.39 (36")
EX. 70	EX. M.H. TOP = 413.89 INV. IN = 407.41 (36") INV. OUT = 407.15 (36")
EX. 71	STORM M.H. TOP = 412.11 INV. IN = 406.17 (36") INV. IN = 407.47 (15") INV. OUT = 406.01
EX. 72	EX. CONC. END WALL INV. = 403.67 (36")
EX. 73	EX. DITCH INV. = 404.00
EX. 74	CONC. HEADWALL INV. = 398.09 (66")
EX. 75	EX. M.H. TOP = 409.96 INV. IN = 397.10 (66") INV. OUT = 396.99 (66")
EX. 76	EX. CONC. END WALL INV. = 396.58 (66")
EX. 113	EX. M.H. TOP = 426.92 INV. IN = 423.68 (15") INV. OUT = 423.49 (15")
EX. 114A	EX. M.H. (FROM ROOF DRAINS)
EX. 114	EX. GRATE INLET TOP = 428.04 INV. IN = 420.98 (12") INV. IN = 422.98 (15") INV. OUT = 420.76 (18")
EX. 119	EX. GRATE INLET TOP=422.59' OUT=420.65' 10" RCP TO 120
EX. 121	GRATE INLET TOP=422.43' IN=418.13' 12" RCP FROM 84 OUT=417.78' 12" RCP TO 75
EX. 122	CURB INLET TOP=428.48' IN=423.56' 12" RCP FROM ? OUT=423.53' 12" RCP TO 83

RECONSTRUCT TOP OF STORM STRUCTURE TABLE

STRUCTURE	EXISTING	PROPOSED
EX. 66	EX. GRATE INLET TOP = 423.67 INV. IN = 417.80 (24") INV. OUT = 417.37 (24")	MANHOLE TOP TOP = 423.31
EX. 68	EX. CURB INLET TOP = EEEE CURB INLET INACCESSIBLE	MANHOLE TOP TOP = 418.90
EX. 118	EX. GRATE INLET TOP = 420.01 INV. IN = 413.13 (18") INV. OUT = 412.60 (30")	MANHOLE TOP TOP = 420.04
EX. 120	EX. GRATE INLET TOP = 415.90 INV. IN = 412.21 (30") INV. OUT = 411.23 (30")	DI-3C TOP TOP = 418.60

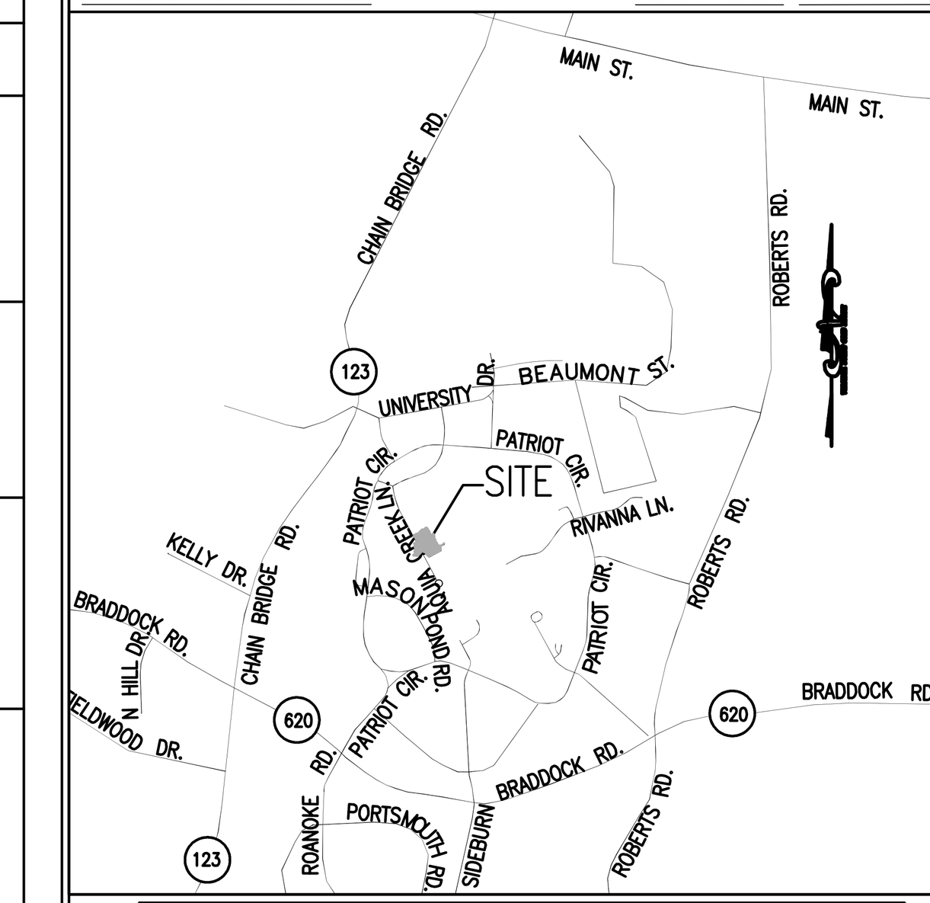
DEMO. STORM STRUCTURE TABLE

STRUCTURE	EXISTING	PROPOSED
EX. 116	EX. M.H. TOP = 424.16 INV. IN = 416.41 (18") INV. OUT = 416.38 (18")	GRATE INLET TOP = 421.45 116
EX. 117	EX. M.H. TOP = 422.03 INV. IN = 414.53 (18") INV. OUT = 414.29 (18")	NONE

EX. SANITARY M.H. TABLE

EX. A	EX. SAN MH TOP=429.27' (±) IN=419.35' FROM EX. J IN=418.95 FROM EX. F OUT=418.95' TO EX. D
EX. D	EX. SAN MH TOP=426.50' (±) IN=418.36' FROM EX. A IN=423.95 FROM DATA CENTER OUT=418.26' TO EX. C
EX. E	EX. SAN MH TOP=424.61' IN=418.86' 8" PVC FROM D IN=421.71' 8" MBP FROM AQUIA IN=417.57' 8" MBP FROM F IN=417.61' 10" MBP FROM H OUT=417.02' 12" MBP TO G
EX. F	EX. SAN MH TOP = 425.50' (±) IN = 419.20' 8" PVC FROM ? IN = 419.70' 8" PVC FROM ? IN = 419.66' 6" BMP FROM EX.BLDG IN = 419.21' 4" BMP FROM ? OUT = 419.13' 8" TO EX. A
EX. G	EX. SAN. M.H. TOP = 417.46 IN = 409.41' 12" PVC FROM E IN = 409.68' 6" PVC FROM ? IN = 409.49' 6" PVC FROM ? OUT = 409.31' 12" BMP TO ?
EX. H	EX. SAN MH TOP=433.96' IN=423.76' 10" PVC FROM ? OUT=421.38' 10" PVC TO E

VICINITY MAP SCALE: 1" : 2000'



SHEET LIST

Sheet Number	Sheet Title
101	EXISTING CONDITIONS AND DEMO PLAN
201	SITE PLAN
202	GRADING PLAN
301	E & S CONTROL PHASE-1A
302	E & S CONTROL PHASE-1B
303	E & S CONTROL PHASE 2
304	STORM DRAINAGE DIVIDES
305	EROSION AND SEDIMENT CONTROL NOTES & DETAILS
306	EROSION AND SEDIMENT CONTROL NOTES
401	STORM SEWER PROFILES
402	WATER AND SANITARY PROFILES
403	STORM SEWER COMPUTATIONS
404	UTILITY NOTES
501	DETAILS
502	DETAILS
L-101	LANDSCAPE PLAN
L-102	LANDSCAPE NOTES & DETAILS

COMMONWEALTH OF VIRGINIA
MATTHEW R. LARSEN
CERTIFICATE No. 040252
JUN 12 2009
PROFESSIONAL ENGINEER

LEGEND:
CONC. = CONCRETE
CONSTR. = CONSTRUCTION
RCP = REINFORCED CONCRETE PIPE
S.S. = SANITARY SEWER
SAN. = SANITARY
M.H. = MANHOLE
C&G = CURB AND GUTTER
ABD. = ABANDONED
W.M. = WATER METER
W.V. = WATER VALVE
L/P = LIGHT POLE
TW = TOP OF WALL
ELEC. = ELECTRIC
TRANS. = TRANSFORMER
R.D. = ROOF DRAIN
A.C. = AIR CONDITIONER
G.V. = GAS VALVE
C.O. = CLEANOUT
RPS = RESERVE PARKING SIGN
NPS = NO PARKING SIGN
NSS = NO SMOKING SIGN
20 MPS = 20 MINUTE PARKING SIGN
HC = HANDICAP RAMP
UTIL. = UTILITY
TEL. = TELEPHONE
PED. = PEDESTAL

DEMOLITION LEGEND

ITEM	TO REMAIN	TO BE DEMOLISHED
CONTOURS	33	33
BUILDING(S)		
PAVEMENT		
CONCRETE PAVEMENT & WALKS		
CONCRETE C & G (LARGE SCALE)		
CONCRETE C & G (SMALL SCALE)		
LIMITS OF DISTURBANCE		
CONCRETE CURB (LARGE SCALE)		
CONCRETE CURB (SMALL SCALE)		
SANITARY SEWER (& MANHOLE) & STRUCT #	-EX-S-	-EX-S-
SANITARY SEWER CLEAN OUT	-EX-S- EX. C.O.	-EX-S- EX. C.O.
STORM SEWER		
STORM SEWER STRUCTURE/DRAIN INLET & STRUCT #		
WATER MAIN	EX-W	EX-W
FIRE HYDRANT (& VALVE)	EX-W	EX-W
GAS MAIN (& VALVE)	G	G
OVERHEAD POWER LINE (& POLE)	EX-OE	EX-OE
OVERHEAD TELEPHONE LINE (& POLE)	EX-OT	EX-OT
POLE GUY WIRE (& ANCHOR)		
UNDERGROUND POWER LINE	EX-UE	EX-UE
UNDERGROUND TELEPHONE LINE	EX-UT	EX-UT
UNDERGROUND COMMUNICATION LINE	EX-UC	EX-UC
STEPS		
FENCE		
TREES/SHRUBS		
WOODED AREA		
POWER & MISCELLANEOUS POLE		
SIGN		
METERS: CABLE, ELEC, GAS, TELEPHONE, WATER		
BORING LOCATION	EX. P-2 EX. B-2	
UNDERGROUND FUEL TANK		

GRAPHIC SCALE
20 0 20
1" = 20'-0"

FESS CONSTRUCTION + ENGINEERING SERVICES

WTW ARCHITECTS

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GRIMM + PARKER ARCHITECTS

GP# 20901

EXISTING CONDITIONS AND DEMO PLAN

GEORGE MASON UNIVERSITY SUB 1 : VA PC 247-17485
FAIRFAX, VA

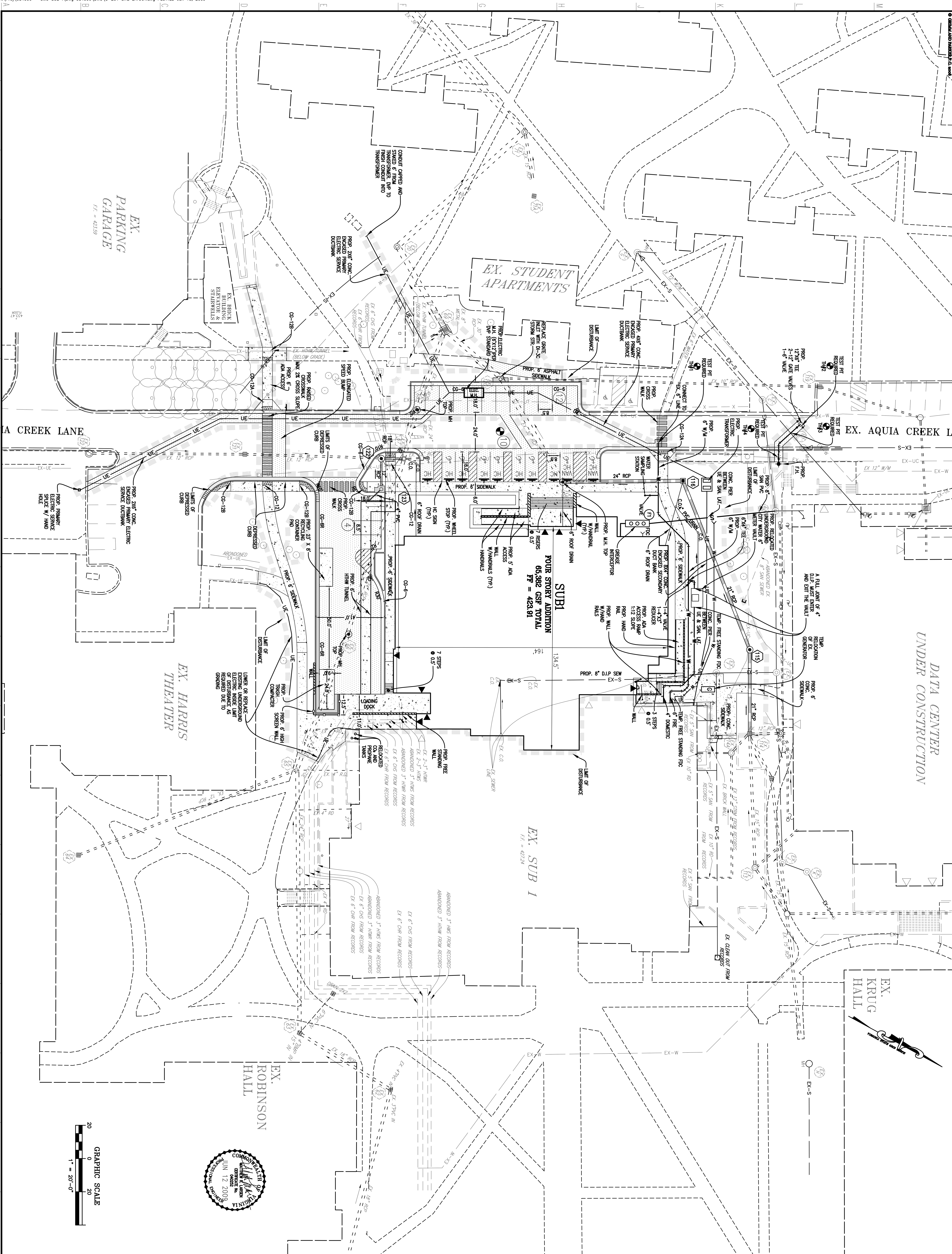
DATE	DESCRIPTION

SCALE: 1" : 20'

C-101

06/12/09 BCOM
SITE / FOUNDATION

I:\Proj\084006 – GMU SUB I\Dwg 084006\DWG\C-201 SITE LAYOUT.dwg PLOTTED Jun 18, 2009



EX. PARKING GARAGE
F.F. = 423.59
EX. BRICK BUILDING ELEVATOR & STAIRWELLS
EX. STUDENT APARTMENTS
EX. AQUIA CREEK LANE
EX. HARRIS THEATER
SUB1
FOUR STORY ADDITION
65,382 GSF TOTAL
FF = 423.91
EX. SUB 1
F.F. = 427.24
DATA CENTER UNDER CONSTRUCTION
EX. KRUG HALL
EX. ROBINSON HALL
LOADING DOCK
CONDUIT CAPPED AND STAKED 6' FROM TRANSFORMER. DVP TO FINISH CONDUIT INTO TRANSFORMER
PROP. 2X6" CONC. ENCASED PRIMARY ELECTRIC SERVICE DUCTBANK
PROP. ELECTRIC M.H. (6'X12') PER DVP STANDARD
REPLACE GRATE INLET WITH DI-3C STORM STR.
LIMIT OF DISTURBANCE
PROP. 4X6" CONC. ENCASED PRIMARY ELECTRIC SERVICE DUCTBANK
PROP. 6' ASPHALT SIDEWALK
TEST PIT REQUIRED
PROP. 12"X6" TEE 2-12" GATE VALVES 1-6" VALVE
PROP. ELONGATED SPEED BUMP
PROP. RAISED CROSSWALK MAX 2% CROSS SLOPE
PROP. 6' ADA ACCESS
LIMITS OF DEPRESSED CURB
PROP. PRIMARY ELECTRIC SERVICE SPLICE W/ HAND HOLE
PROP. 23' X 8' RECYCLING CONTAINER PAD
PROP. 6' HTHW TUNNEL
PROP. 6' SIDEWALK
PROP. TRASH COMPACTER
PROP. 6' HIGH SCREEN WALL
LOWER OR REPLACE EXISTING UNDERGROUND ELECTRIC INSIDE LIMIT OF DISTURBANCE AS REQUIRED DUE TO GRADING
RELOCATED CO2 AND PROPANE TANKS
PROP. FREE STANDING WALL
7 STEPS @ 0.5'
WATER SAMPLING STATION
24" RCP
GREASE INTERCEPTOR
PROP. 8X4" CONC. ENCASED SECONDARY DUCT BANK
6" ROOF DRAIN
PROP. ADA ACCESS RAMP 1:12 SLOPE
PROP. HAND RAIL
PROP. WALL W/HAND RAILS
PROP. 8" D.I.P SEW
TEMP. FREE STANDING FDC
A FULL JOINT OF 4" D.I.P. MUST ENTER AND EXIT THE VAULT
TEMP. RELOCATION OF EX. GENERATOR
PROP. 6' CONC. SIDEWALK
PROP. RELOCATED UNDERGROUND CITY WATER 6" METER VAULT
PROP. ELECTRIC TRANSFORMER
CONC. PIER BETWEEN UE & SAN. LAT.
EX. CLEAN OUT FROM RECORDS
GRAPHIC SCALE
1" = 20'-0"
COMMONWEALTH OF VIRGINIA
MATTHEW R. LARSEN
CERTIFICATE No. 040252
JUN 12 2009
PROFESSIONAL ENGINEER
VIRGINIA STATE GRID NORTH

C-201

SCALE: 1" : 20'

06/12/09 BCOM
SITE / FOUNDATION

DATE | DESCRIPTION

SITE PLAN

GEORGE MASON UNIVERSITY SUB 1 : VA PC 247-17485
FAIRFAX, VA

GP# 20901

GRIMM + PARKER ARCHITECTS

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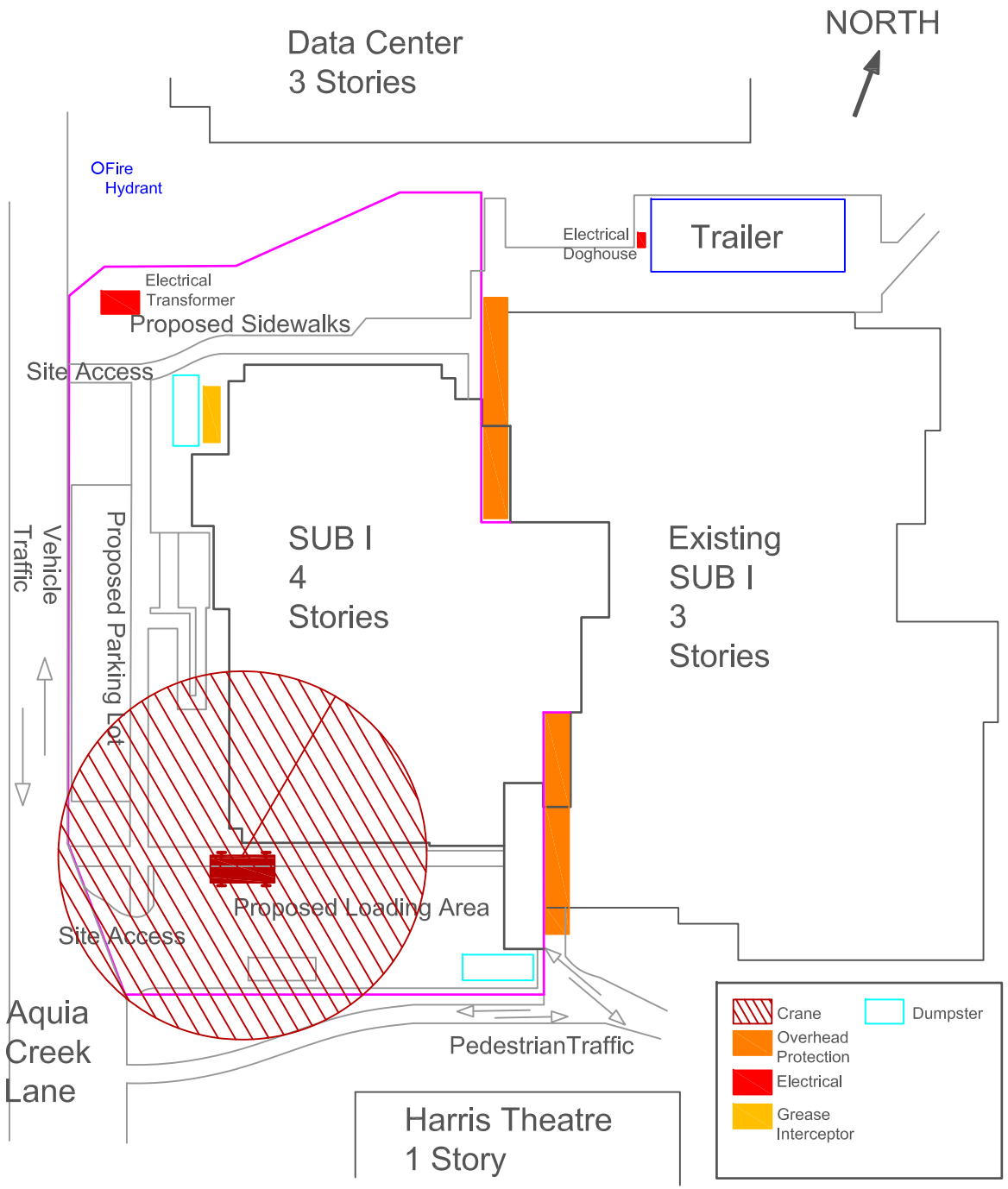


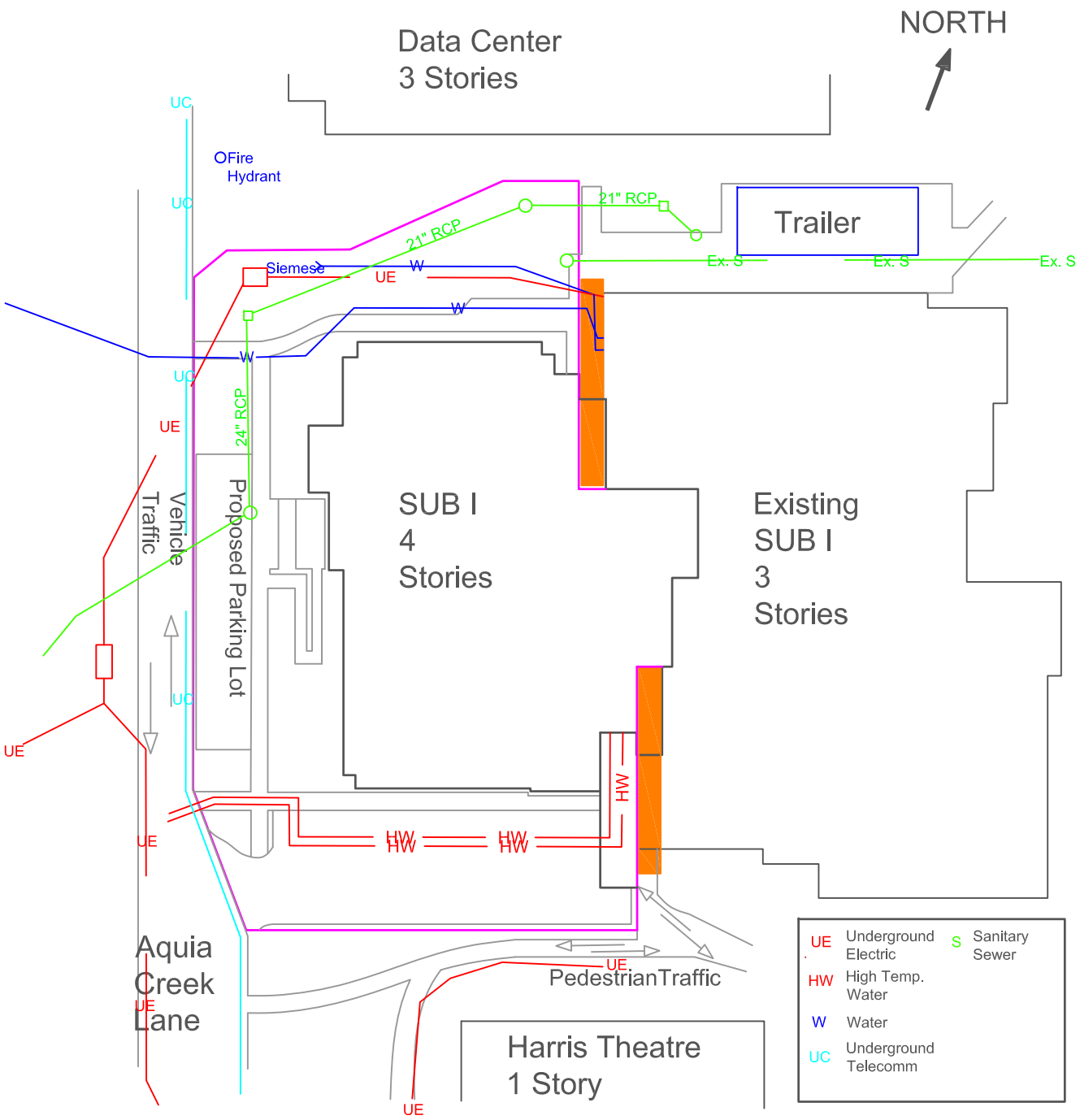
10/5/09

Brett Robinson

Site Plan

SUB I

GEORGE MASON UNIVERSITY



SUB I

Utilities

Brett Robinson

10/5/09

GEORGE MASON UNIVERSITY

BASE MAP PROVIDED BY:	
ADTEK ENGINEERS	

FIELD BOOKS
HARD COPIES

Geotechnical Consulting & Testing, Inc.

21505 Greenoak Way - Dulles, Virginia 20166
Phone:(703)421-4000 Fax:(703)421-8000

	DATE 3/26/09
CHECKED BY: MH	
SCALE 1 INCH = 20 FEET	

GMU SUB 1 ADDITION
TEST BORING LOCATION PLAN
FAIRFAX COUNTY, VIRGINIA

JOB NUMBER: 28D-4534R
SHEET 1 OF 1 SHEETS