

AE 481W

TECHNICAL ASSIGNMENT 3

Submitted 11/29/2010

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Construction Management

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[The following report presents a technical summary of the Office Renovation Building project. Within this assignment an in depth discussion of the renovation project will be discussed through constructability challenges, schedule acceleration scenarios, and value engineering topics that have taken place on the project. This assignment also identifies several areas for improvement on the project and applicable technical analyses.]

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Executive Summary

The Office Renovation Building is one of the largest civil buildings owned by the General Services Administration. Completed in 1932, the structure houses 1.8 million square feet of office space for a variety of government agencies. Located in a downtown metropolitan area in the northeastern part of the United States, the \$500 million project is scheduled for completion in multiple phases during the next 13 years. While over 3,500 workers continue to occupy the historic building, the project will use a swing space completed in phase 1 of its construction to move employees out of the construction zones. Gilbane Building Company and Grunley Construction have formed a joint venture to act as the project's general contractor for phases 1, 2, and 3.

This report's analysis will focus strictly on the second phase of the renovation. During this phase, the structure's entire façade will undergo complete restoration in addition to the abatement and demolition of the corresponding area's interior offices. Also, the construction of an Electrical Equipment Enclosure (EEE) is to be erected within one of the building's interior courtyards.



The purpose of this third technical assignment is to analyze what challenges and difficulties the project team has encountered during the renovation project. Research has identified what specific constructability challenges and schedule acceleration scenarios have been presented during construction. Additionally, a variety of problematic activities that may be further investigated are described within the contents of this report. The report concludes with an overview of what technical analysis methods present the opportunity to provide valuable insight in delivering a more efficient and better quality product.



All of these sections under this technical assignment have been designed to help this student gain a more in depth perspective on what efforts can be made to help improve the value of the project. Following this assignments completion, more time will be taken to see how Building Information Modeling can help to more easily coordinate the project's schedule with its phase planning. Also, sustainability practices and LEED credits

will be analyzed to investigate the feasibility of the project achieving LEED Platinum status. Other topics that may contribute to the delivery of a structure of higher quality and efficiency will also be researched.

Constructability Challenges

Prevalent throughout the construction industry, the project team experiences and is forced to overcome a variety of constructability challenges specific to each project. The Office Renovation Building project is no exception, this section will discuss some of the major constructability challenges that have taken place during the building's modernization.

Working Within an Occupied Space

Working within the constraints of a building renovation that is to remain fully operational throughout construction has its challenges. Various activities specific to the Office Renovation Building project include the relocation of tenants, abatement and noise impacts, parking restrictions, and the altering of pedestrian traffic flows. The Gilbane-Grunley Joint Venture (GGJV) project team has taken the necessary precautions to help minimize any impacts on the building's occupants.

For each phase of construction to take place on the Office Renovation Building, building occupants will be forced to temporarily relocate so that the project's renovation work may commence. Having been contracted for the first three of eight phases of the project, GGJV has been able to manage the construction a temporary office facility in the most northern courtyard of the building during phase 1. This facility will house building tenants that have moved in correspondence with the work taking place in each respective phase. Please refer to **Appendix A: Phase Sequencing** for a breakdown of each phase. The construction of this office space has made it possible to relocate tenants with minimal impact towards their location and productivity within the building.

Noise impacts have been a reoccurring disturbance to building tenants located next to the construction line of the current phase of construction. To help minimize this distraction, GGJV has utilized the use of two week notices to notify all influenced occupants in regards to any disruptions that may take place. Currently, tenants have been very receptive of the communication efforts of the GGJV team, and with ample notice, occupants have been able to schedule around construction impacts accordingly. Any excessive disturbances that have been particularly distracting to building tenants located near the project's current construction line have been scheduled to take place either at night or over the duration of a weekend.

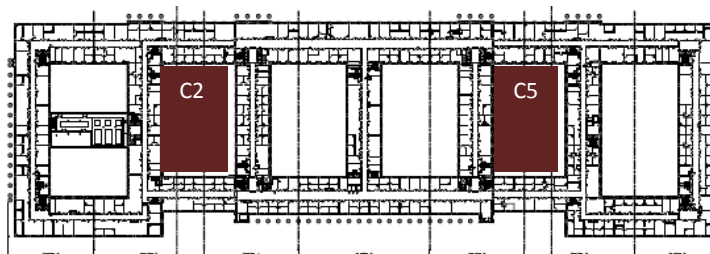


Figure 1: Courtyards 2 and 5 include limited parking spaces for building occupants

Tenant impacts regarding the two parking courtyards within the facility have been the largest challenge for the project team while working in an occupied space. Most of the parking spaces within the courtyards are assigned to high government officials that have been reluctant to relocate their vehicles; GGJV has taken multiple approaches to help satisfy all influenced parties. In an effort to best coordinate activities influencing the parking areas, GGJV has made sure each vehicle owner has significant notice of the dates of these events. With a predetermined schedule of impacts, most vehicle owners will be provided with temporary passes to allow them to park at a garage across the street from the building at no additional cost. This will allow the building occupants to be removed from the area while exterior renovations of the courtyards take place.

Interior View CY2



Exterior View CY2



Figure 2: Overhead protection will be erected throughout all entrances corresponding to the parking courtyards. A total of 5 occupant vehicles will be parking in the center of courtyard 2 during exterior restoration work.

However, several building occupants have refused to accept temporary parking passes and will have their vehicles remain within the courtyard during exterior restorations. Though not ideal, the GGJV project team has coordinated exterior activities to ensure this can take place. Several vehicles will be parked within the center of the courtyard as work continues. Significant overhead protection and safety precautions will be implemented to allow such activity to take place. Please refer to figures 1 and 2 for a visualization of the parking courtyards.

An additional tenant challenge for the Office Renovation Building project involves the constant alteration of pedestrian traffic patterns. Primarily resulting from utility work and exterior restorations, pedestrian walkways and patterns have been significantly altered throughout the renovation. Temporary fencing and signage have allowed the GGJV team to redirect pedestrians to access various entrances of the building while maintaining a safe and productive site. Altering traffic patterns has been a difficult transition for pedestrians. GGJV has worked with building occupants and public transportation officials to help maintain building and bus stop accessibility throughout the various stages of exterior work.

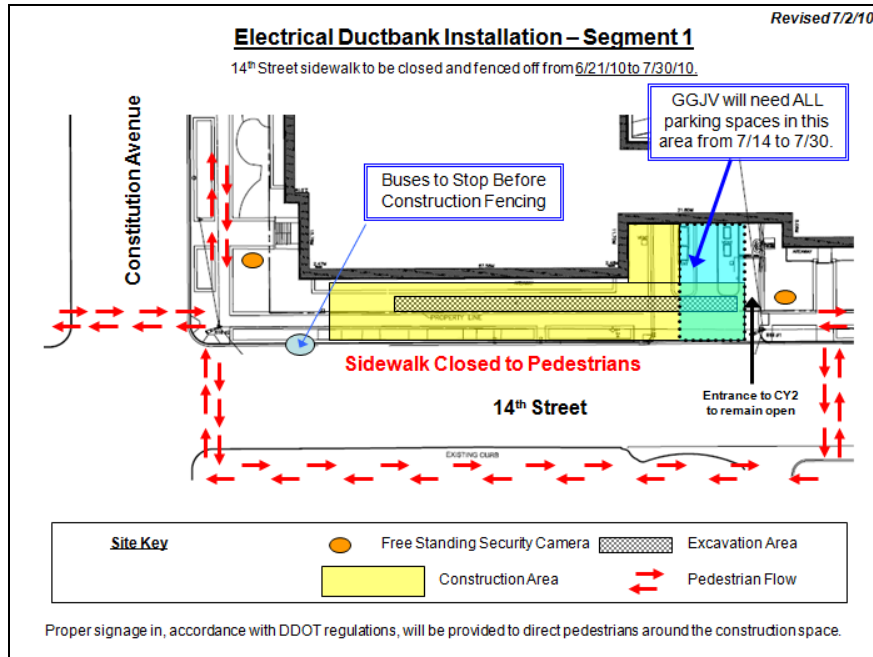


Figure 3 portrays just one example of a tenant impact plan for pedestrian traffic on the Office Renovation Building project. Many of these plans were created with the building's facility manager to help communicate such impacts to building occupants.

Figure 3: Example of a tenant impact plan redirecting pedestrian traffic on the Office Renovation Building project

With the variety of tenant impact situations that have come into consideration throughout the duration of the Office Renovation Building it is evident that working within an occupied building has been a challenge for the Gilbane-Grunley project team. Fortunately, the team has had incredible foresight in regards to issues that are of great concern to the owner and the building's occupants. In working to satisfy the needs of building occupants, having great communication between all stakeholders is key to helping to minimize any impact on the project's schedule.

Complicated Abatement Issues

Having been constructed in the mid 1920s, the Office Renovation Building has asbestos containing materials present throughout its structure and finishes. A significant part of the project's schedule and cost involve the abatement and removal of all asbestos containing materials within the building. Once tenants have relocated from the project's current phase, the abatement process has been generally straightforward with adequate planning. However, difficulties have risen where the construction phase meets the adjacent occupied spaces within the building. The successful construction of the project's phase line was a major challenge for the project team.

The most difficult segment of the construction line takes place in the ceiling plenum of the building's 7th floor transitioning into the 8th floor mechanical penthouse. This is because the ceiling space is open between the construction and occupied sides of the building. In order to construct the partition wall to separate the two zones, asbestos containing materials must be disturbed. Several coordination meetings were held to assure the building's owner and facilities manager that the abatement would not have any harmful effects on the occupied rooms. Because the rooms' tenants were unable to relocate during the

construction of the separating wall, all related work took place from late Friday and over the course of two weekends. The series of steps taken to successfully complete the separating wall were as follows:

1. Place negative air machines in 7th & 8th floor work area
2. Install fall control walkways on 8th floor
3. Establish a film barrier between the occupied and unoccupied work areas
4. Seal all 7th floor HVAC ducts in the work area
5. Construct containments in rooms/areas on the 7th floor where asbestos will be disturbed
6. Additional film barrier walls may be constructed in the attic to allow for more efficient use of negative air machines on the 7th floor during ceiling removal
7. Removal of asbestos along a track where the barrier walls will be constructed
8. 7th floor ceiling/spray on abatement removal of ceiling
9. Install demising walls

The abatement process took place over the two weekends scheduled, one weekend for each side of the building. Fortunately, the plan was successfully implemented with no impact to the rooms' tenants. The activity proved to be a challenge because of the tenant not being able to relocate during construction. Had the facility not been occupied, the completion of the demising walls would have been very straightforward. Because asbestos is a sensitive issue with building occupants associated with the project, GGJV wanted the activity to be completed as smoothly as possible. Figure 4 illustrates the step by step approach presented to the building's owner and facilities manager.

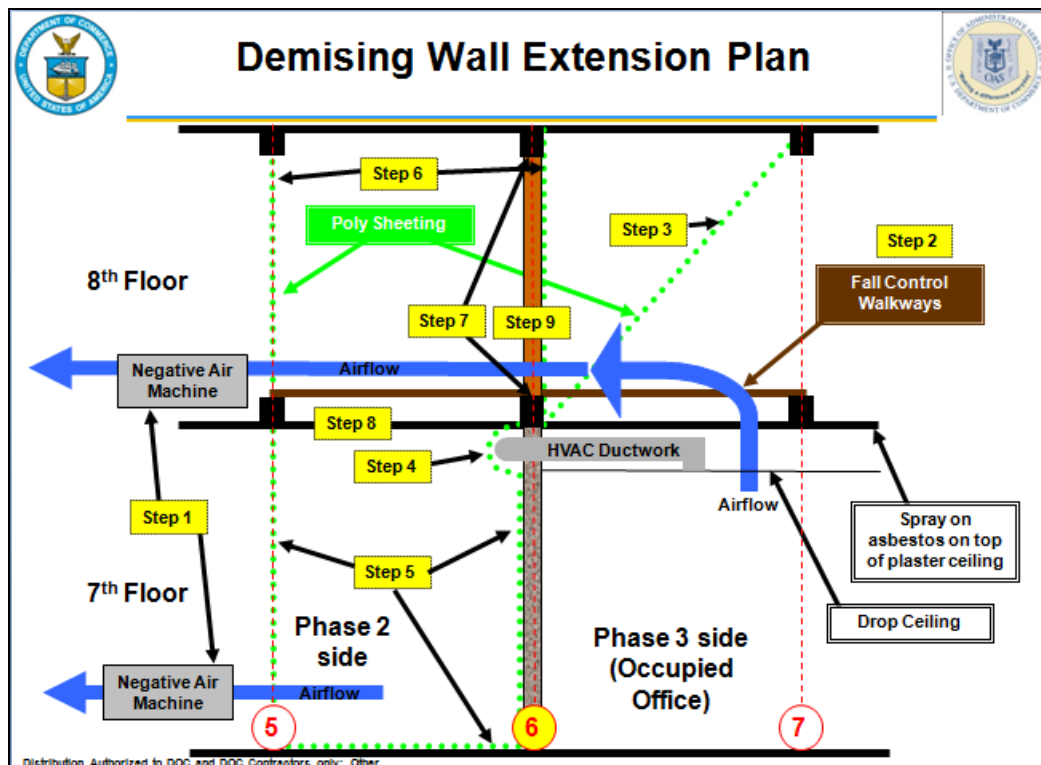


Figure 4: Demising Wall Extension Plan proposed by Gilbane-Grunley to GSA

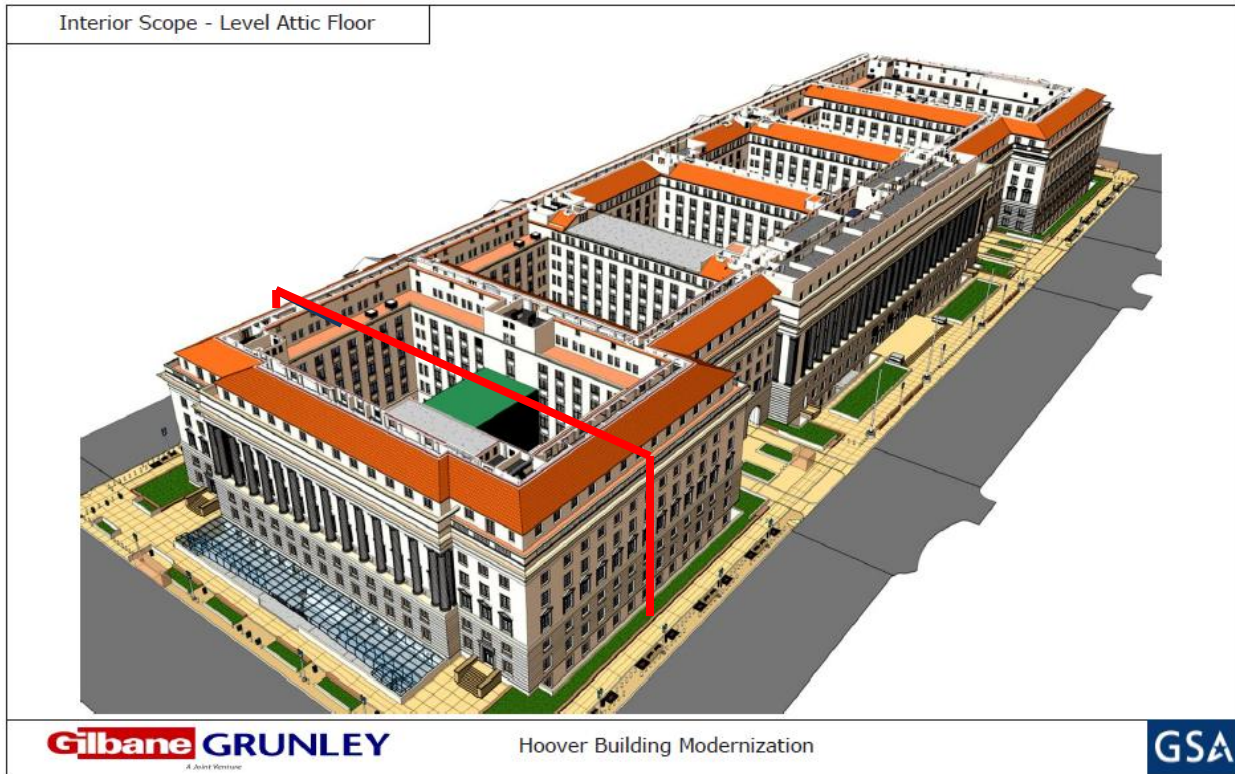


Figure 5: Rendering of the Office Renovation Building, the red line illustrates the phase line between current construction zone (left) and the occupied spaces of the building (right)

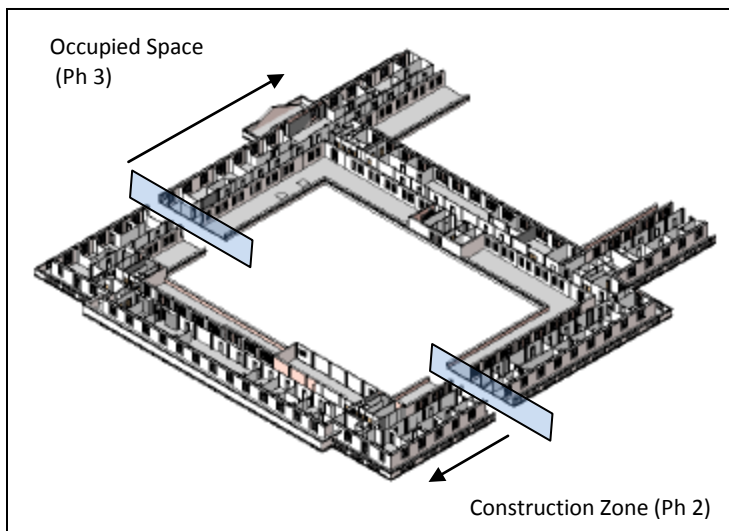


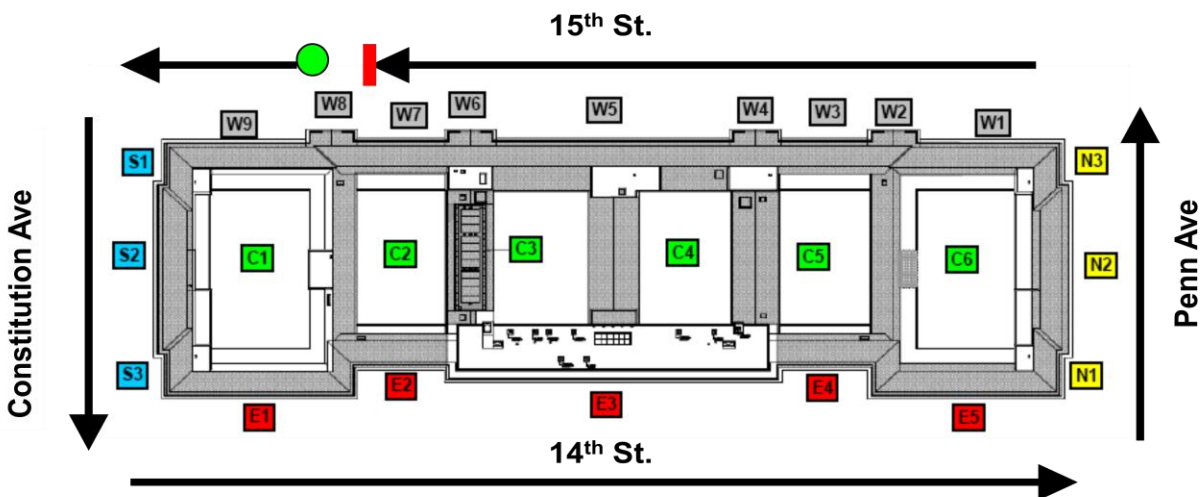
Figure 6: 7th Floor Phase line section (Phases 2 and 3)

The figure on the left is a section illustration of the building's 7th floor phase 2 and phase 3 areas. Phase 2 (on the left) is the current construction area. The spaces adjacent to the construction line (separated by the blue figures) had their respective demising walls constructed over the course of two weekends, one weekend for each side.

Exterior Restoration and Sequencing

A major challenge for the project team on the Office Renovation Building project was how to approach the exterior restoration of the structure. The exterior cleaning of the building's limestone façade is included in the Phase 2 scope of work for this project. The winning contractor's bid for masonry restoration and cleaning totaled just over \$3.6 million and is scheduled to perform cleaning from February 2010 until December 2011 (22 Months). It is evident that the exterior restoration of the historic Office Renovation Building is a considerable scope of work for the project.

The GGJV project team first approached this overwhelming task by scheduled activities far in advance to notify impacted tenants and to better coordinate for the safety of surrounding pedestrian traffic flow. Working with the awarded subcontractor and facilities manager, the project team established a well coordinate flow of work with specific dates to help maintain the series of activities on schedule. Figure seven illustrates the abbreviated flow of the building's exterior restoration starting at section W8.



Following the exterior work, courtyard restorations will begin in June of 2011 starting in courtyard 1 (C1)

Though the project team successfully created an efficient and predictable schedule for the masonry restoration, it was difficult to find a definitive way to effectively clean the masonry. The project specifications define a variety of cleaning chemicals for the contractor to use in regards to ferrous metal staining but none resulted in satisfactory outcomes to the owner. After numerous mock ups of various chemical applications, product samples had to be sent to a third party consultant to help find an acceptable applicable. After weeks of trials, it was finally agreed that the restoration contractor were to use two applications of HydroClean HT throughout the cleaning process. This undiluted hydro silica application is to be applied with 6900 kPa of pressure at a 15 degree angle from 3 meters away. This material was chosen because the consultant saw that the ferrous metal staining on the limestone was a result of years of runoff from copper and lead based gutters that helped induce a chemical reaction that

was physically 'burning' into the limestone. The selected application is to strip the limestone of this ongoing reaction while helping to clean the façade as much as possible.

Though the project team was able to eventually move forward with the exterior cleaning and restoration, the number of required mock-ups set the project behind schedule. To help compensate for time lost, the cleaning contract must have cleaning crews working late shifts from 7pm-5am and on weekends. The contractor was not able to increase crew size during the day because no cleaning is to take place during regular working hours when the building is occupied.



Figure 8: Mock-Up Photos from HydroClean HT Application

Schedule Acceleration Scenarios

The Office Renovation Building project involves the coordination and planning of many varying and concurring activities. In an effort to accurately depict the critical path of this renovation project, the schedule has been summarized in three different categories of work. These activities have been classified as interior renovation work, erection of the building's electrical equipment enclosure, and exterior restoration. A summary of each of these activities and their general critical path schedules are illustrated in figures 9, 11, and 12.

Interior Renovation

A majority of the project's scope includes the demolition and renovation of the building's interior spaces. The project team has followed the critical path schedule shown in figure 9 while utilizing a top-down approach starting with abatement at the building's 8th and 7th floors. As a result of owner directed changes during the abatement and demolition stages of the renovation, the Gilbane-Grunley project team has been forced to implement schedule acceleration techniques to assure that project progression would stay on track.



Figure 9: Floor by floor critical path schedule for interior renovation work

A major delay the project team encountered during the abatement and renovation stage was in regards to the IT/LAN communication systems within the construction area. In order for the building's data systems to remain online throughout construction, the construction zone required that temporary and mobile IT/LAN closets be created. These mobile closets would allow demolition work to proceed while keeping the building's IT and LAN systems online. Unfortunately, this scope of work was not included in the original contract and GGJV could not proceed until an agreement was made. It was evident that abatement and demolition work could not proceed until temporary closets were created. Eventually, the owner and GSA representatives contracted Grunley Construction to be responsible for the creation of temporary/mobile IT/LAN closets. The project schedule was heavily affected as a direct result of this delay.

Having not been awarded a schedule extension following this delay, the Gilbane-Grunley project team accelerated the abatement and demolition work to get back on track. Originally, abatement crews were only permitted to proceed with work at night and during non-working hours, but as a result of this delay, the GGJV employed day shift abatement and increased task crew sizes. The manpower for abatement during the average night shift ranged from 25-35 workers; the abatement contractor was also able to add approximately 50 workers daily to the day shift in an effort to make up for lost time. The GGJV team also brought demolition crews to work at night to help with getting back on schedule. As a result, the project team was able to get past the IT/LAN closet setback and is currently on track with the original project schedule.

Construction of Electrical Equipment Enclosure (EEE)

A major task within the project involves the construction of a new electrical equipment enclosure. This 20,000 SF two story facility is to be erected within one of the building's interior courtyards and will be constructed above an existing level of the office building. The electrical equipment enclosure (EEE) will house a variety of transformers, switchgear, and emergency generators to ensure the building remains operable at all times. Figure 10 shows the location of the EEE in the center of courtyard 1 of the structure.

In an effort to minimize schedule risk, the GGJV team has slightly altered their initial steel erection plan. Instead of picking the structural steel directly off of delivery trucks in the staging area (see Tech 2 submission for more detail), the project team will utilize rollers to bring steel pieces from outside the building into the courtyard. This will require less dependency on the delivery time of trucks while being able to provide a shakedown area the structure's steel erection. This plan has been newly implemented; site photos of the process will be included in the report as soon as they become available. Please reference **Appendix B: Site Utilization Plan- Steel Delivery** for a detailed plan of the process.



Figure 10: The EEE will extend to the building's 5th floor while offering two stories of space for various electrical equipment

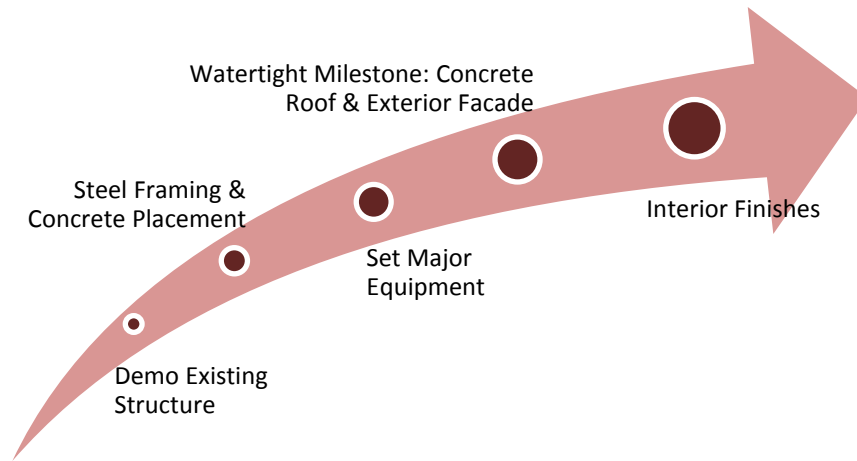


Figure 11: Critical Path Schedule for EEE construction

Exterior Restoration and Site work

Though the approval of an acceptable method for cleaning the building’s exterior façade was a difficult task as described in the *Constructability Challenges* section, the project team has seen minimal delays in the project schedule. This is largely because the exteriors schedule follows a different critical path schedule than the other activities associated with the project. An overview of the critical path for exterior tasks can be seen in figure 12. The site utilities, masonry restoration, and exterior site work activities are schedule to take place throughout the duration of the project. They are independent of other schedule activities with the exception of the completion of the building’s site utilities. The exterior ductbank that will bring additional power into the structure must be completed before the equipment within the EEE is activated.

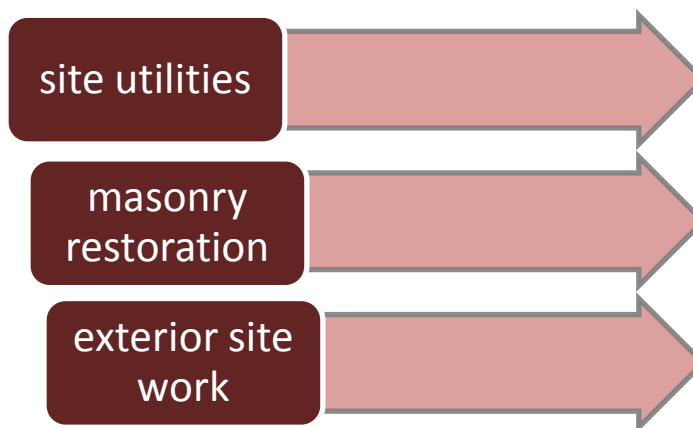


Figure 12: Critical Path activities for exterior work

Weather delays and unforeseen conditions have been the only impacts on exterior work to date. Fortunately, the GGJV team has planned for such delays and is prepared to allow contractors to work on weekends to help compensate for any interruptions. Such delays have included the disruption of facility security cameras and various findings during excavation during the installation of the building's electrical ductbank. Many of these delays have been relatively simple for the project team to surpass; this is largely due to the communication between the building's facilities manager and security personnel. To minimize risk in project scheduling, the project team has been able to construct temporary security cameras for the facility that will not get in the way of any exterior excavation. Though exterior work is still on-going at the Office Renovation Building Project, the GGJV project team is prepared for any project delays by allowing work to proceed on the weekends and at night if necessary.

Value Engineering Topics

Following interviews and conversations with the general contractor's three project managers associated with the project, no value engineering has taken place to date. In the opinion of the project team, the nature of the federal project and its historic references will result in minimal value engineering topics to take place during the current phase of construction. However, it may be possible that such topics may arise when the project is well within its finished stages. With approximately 11 months remaining in the project schedule, value engineering topics are sure to be considered.

It can be assumed that many value engineering topics were considered during the design phase of this project. However, the general contractor had minimal impact on the design and the associated project manager's had minimal knowledge of any applicable examples

The only value engineering topics that may be considered to date are the exclusions from the phase's original scope of work. Initially, the project's current phase of construction was to include the addition and construction of a new national aquarium and the renovation of the building's main entrance. The project team had estimated that the total cost of these activities were to total approximately \$4.3 million. However, prior to Gilbane-Grunley's bid submission, the owner had requested that all bidders exclude the costs for these projects. The owner had selected to have the architect refine and redesign these areas of the buildings. This scope of work is most likely to be included in the 4th phase of the Office Renovation Building project.

Problem Identification

Through the in-depth analysis and research of the project's constructability challenges associated with this report, several problematic issues have been identified that may be hindering the progress of the Office Renovation Building Project. Additionally, having the opportunity to intern on this project presents the opportunity to express what areas are in need of improvement. The following issues may possibly be pursued in upcoming research topics.

BIM Utilization

The Gilbane-Grunley team proclaims to be utilizing building information modeling to help construct a more efficient project. Unfortunately, GGJV has only been using Autodesk Navisworks® to coordinate MEP drawings for the new system. Also, the project team has created a 3D Revit model of the building, but uses it only to provide the owner with a visualization of the construction process.

After learning about the opportunities that exist within the utilization of BIM applications, it seems that the Gilbane-Grunley team is not effectively using their resources. Opportunities for improvement and how the project team can work to benefit more from their efforts will be discussed in the *Technical Analysis Methods*.

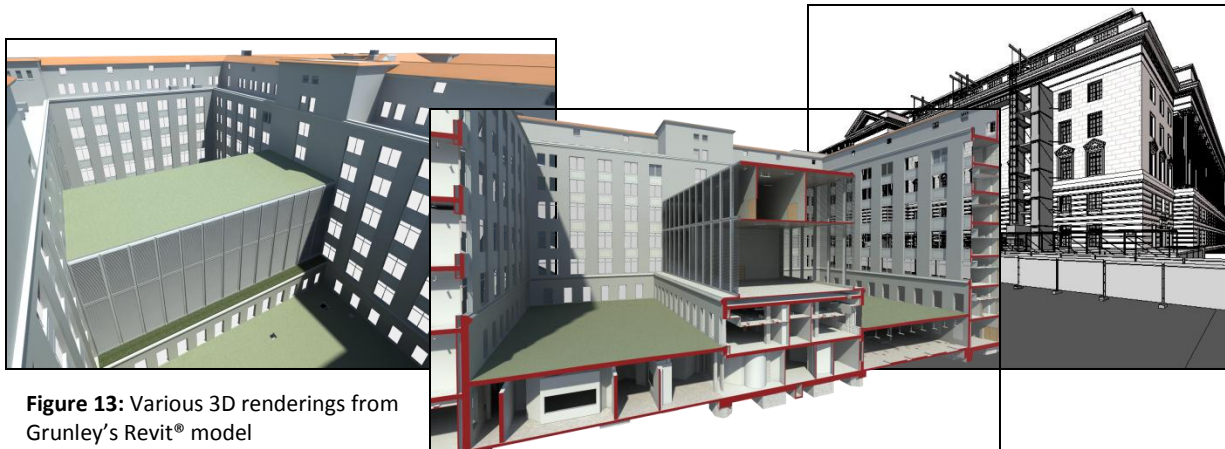


Figure 13: Various 3D renderings from Grunley's Revit® model

Joint Venture Team Communication

It has been difficult for the project team to build trusting relationships between each other. Staff members from Gilbane Building Company and Grunley Construction are very experienced professionals that have developed their own particular ways of completing tasks. Staff members have expressed that it is sometimes difficult to mesh mythologies between the two organizations. When the project team has not been able to communicate successfully between each other it is often at the expense of the project. Fortunately, each organization has realized this issue and has tried to make adjustments to help the project team work together more effectively. Through open discussion staff gatherings and consultant meetings, the project team is trying to overcome this issue.



Figure 14: GGJV logo for the Office Renovation Building Project

LEED Tracking and Contractor Expectations

The Office Renovation Building project is presently scheduled to attain LEED Silver certification. The GGJV team has found it difficult to translate the requirements for material data and tracking to a variety of subcontractors. This has mostly been a result of responsible parties being uneducated in regards to what information is necessary to help earn particular LEED credits. This issue has prolonged the LEED submittal process and has created more work than necessary for the project team. Opportunities to help resolve this problem will be discussed in the *Technical Analysis Methods* section of this report.



Figure 15: USGBC Logo

In addition to the issues described above, several other potential problems have been identified for the Office Renovation Building project. Though most of these issues and their associated activities have not yet taken place, they are worth noting and should be considered by the project team.

- Public safety of tourists, pedestrians, and commuters
- Setting major electrical equipment prior to the completion of the building's EEE
- Unforeseen disturbances with building security and federal disruptions/delays
- Minimizing nuisances and distractions that may disturb occupied areas of the building
- Coordinating construction activities to the satisfaction of the building's facilities manager
- Owner/Architect decision to have project achieve LEED Platinum status in opposition to the originally proposed LEED Silver certification.

Technical Analysis Methods

BIM Execution and Planning

As stated in the *Problem Identification* section of this report, the GGJV is not taking full advantage of its building information modeling efforts. Having already constructed an in-depth 3D Revit® Model of the Office Renovation Building, there are many opportunities for the project team to deliver a final product of superior quality with greater efficiency. An interest has been taken in this topic in order to help the Gilbane-Grunly team secure contracts to perform the later phases of the Office Renovation Building project; GGJV is currently only contracted for phases 2 and 3 of the renovation.

The efforts of the research that will be done related to this topic will heavily reference the BIM *Uses* described in Penn State's *BIM Project Execution Planning Guide V2.0*. The guide will help the project team create a planning guide specific to the Office Renovation Building project. A variety of *uses* will be analyzed to see which can most efficiently benefit the efforts of the project. Further research will be particularly direct toward the *uses* of Cost Estimation, Design Reviews, Sustainability Evaluation, Site Utilization Planning and Asset Management.

This topic will be most useful to the project team and building owner. This analysis will include the feedback and input from both parties in regards to what *uses* will best benefit the interests of the renovation.

Improving Sustainable Practices

The Office Renovation Building project is currently listed to achieve LEED® Silver status when the 8th and final phase is completed. This certification will be earned under LEED® Version 2.1 for New Construction and Major Renovations. Though the architect has proposed the renovation project aim to earn Gold status, recent discussions have motivated the owner to invest in achieving Platinum certification. This is difficult because phase 1 of the renovation of the building is already completed and phase 2 is well underway. For the building to achieve its desired status, each phase of construction must achieve the same status or must have other building sections compensate for missed percentages.

The research on this topic will work to see what credits are still attainable for the project to achieve LEED® Platinum recognition. An in depth analysis will be done to establish what percentages and material specifications will be needed to compensate for work that has already been completed. A majority of the research will involve the Sustainable Sites and Energy & Atmosphere categories of the LEED® scorecard. Studies will be done in regards to how photovoltaic technologies can help the building earn points under EA credit 2 for on-site renewable energy. Feasibility studies will also be done to investigate the opportunity to earn credits for storm water design and heat island reduction. The initial scorecard for the project's current phase can be seen in **Appendix C: LEED® Scorecard**.

Transition Planning and Management for Phased Construction

Working within an occupied facility is difficult for both the owner and project manager. Moving building employees out of the construction area before phase 2 began was a difficult and prolonged task for the facilities manager and project team. It was difficult to track how many employees were being moved and what spaces were available for them to move to. It would prove worth-while to research and develop a plan to help minimize this task.

This research topic relates to the previously suggested BIM execution; it would involve the 3D Model to work as a reference plan for people and resources. Adding furniture detail and families in the current 3D Model would make it feasible to better track the location of building resources. Integrating the Model with facility management applications like IBM's Maximo or ARCHIBUS Enterprise™ would make it easy for the building to manage its people and resources. Having such an application prepared prior to the transition between phases and moving employees would save considerable amounts of time and effort. For the project team to provide such a service to the owner, GGJV would have a greater opportunity of securing more work while building a more efficient product.

Schedule Acceleration for the Electrical Equipment Enclosure

The erection of the Electrical Equipment Enclosure is the only new construction being done on the Office Renovation Building project. The 20,000 SF facility presents opportunities for improvement. Research will be done on this topic to present how the design and project team could have presented a more cost effective structure. The current design for this facility involves three levels cast in place elevated floor slabs to be poured included the roof. The previously submitted technical assignment goes into greater detail in regards to the scope of work being performed on the building's EEE. Due to the small nature of this project, the start up and close out costs associated with cast in place concrete are assumed to be excessive.

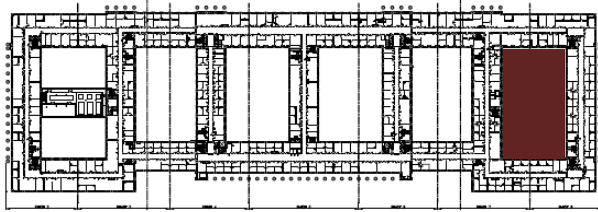
Barring further investigation and research in the cost of particular structural designs, this topic will cover the cost alternatives of presenting precast concrete floor panels for the structure. Research will be done in regards to what neighboring facilities can deliver the material and at what cost in comparison to the existing design. It is assumed that the delivery and placement of the precast panels will both accelerate the schedule and lower the project cost. Also, investigations will be done with the help of other peers and advisors to analyze if such an approach is feasible with the structure's design. This topic will also include how the site utilization plan will be affected if any changes are to be put into effect.

Miscellaneous Possibilities

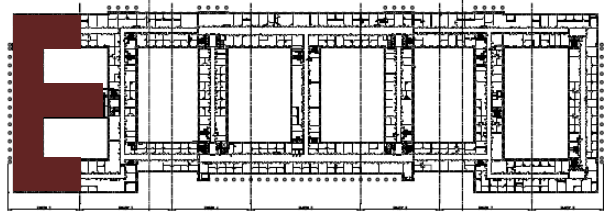
As per the assignment requirements, this report presents four topics for further research. However, it is important to note that additional potential topics are being considered, they are currently being investigated for their feasibility and project impact. Such topics include the application of a short interval production schedule (SIPS) on the finishes schedule of the renovation project.

[APPENDIX A]
PHASE SEQUENCING

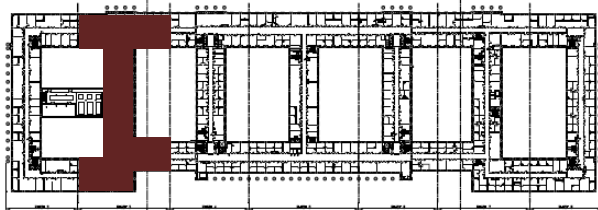
The images below illustrate the phase sequencing of construction. Phase 1 consisted of an office space for building occupants to relocate to when their building sections are under construction.



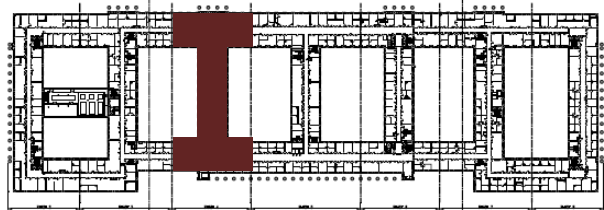
Phase 1: Construction of new temporary office space in courtyard 6 to house relocated occupants



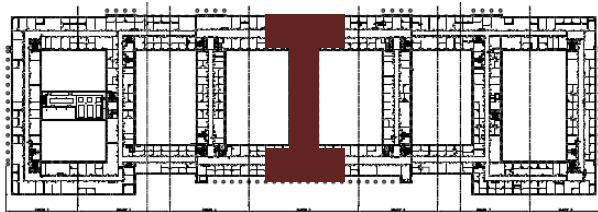
Phase 2: New MEP Infrastructure including chiller plant and new Electrical Equipment Enclosure in courtyard 1. Complete façade restoration and office renovations on 7 floors



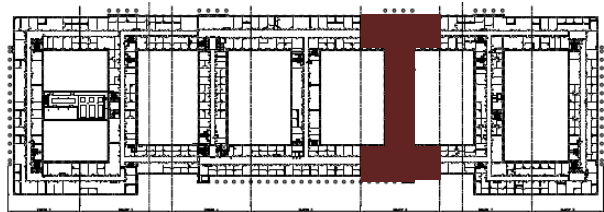
Phase 3: System replacement on all floors and repaving of courtyard 2



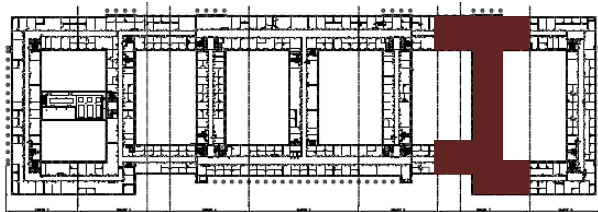
Phase 4: System replacement on all floors



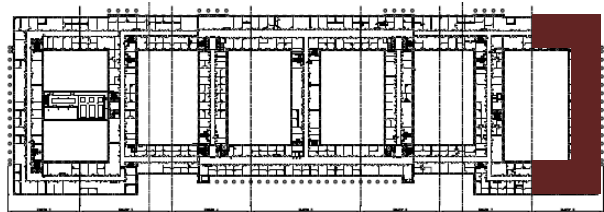
Phase 5: System replacement on all floors including auditorium, main entrance lobby, and mass transit tunnel



Phase 6: System replacement on all floors and courtyard 5 loading dock part 1



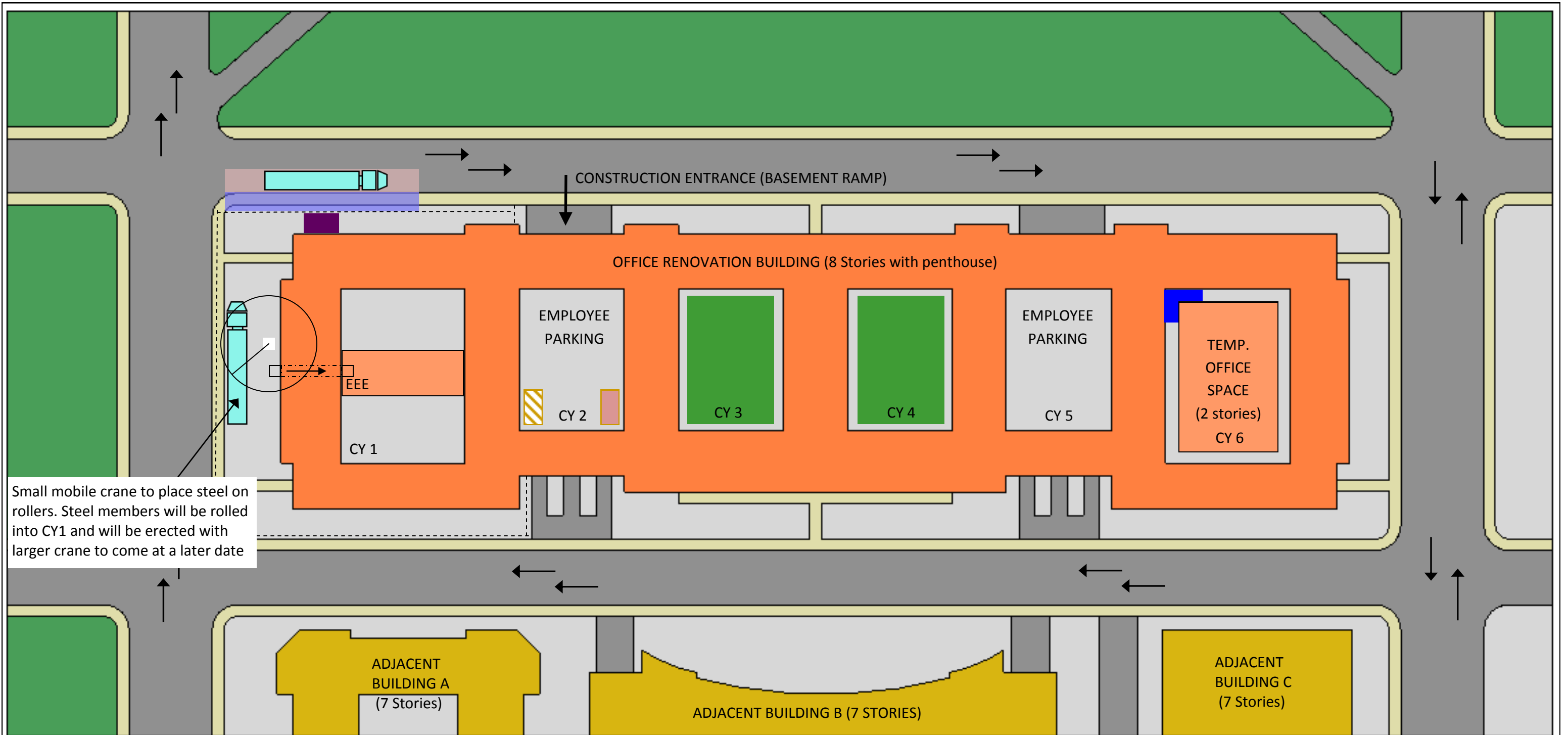
Phase 7: System replacement on all floors and courtyard 5 loading dock part 2



Phase 8: System replacement on all floors and tourist visitor center upgrades



[APPENDIX B]
SITE UTILIZATION PLANE
STEEL DELIVERY



Small mobile crane to place steel on rollers. Steel members will be rolled into CY1 and will be erected with larger crane to come at a later date

**OFFICE RENOVATION BUILDING
NORTHEAST, UNITED STATES**

BUILDING & STREET NAMES HAVE NOT BEEN LISTED AT THE REQUEST OF THE OWNER

LEGEND:

- CONSTRUCTION FENCE
- VHICULAR TRAFFIC
- GC OFFICE/TRAILER
- SUPERINTENDENT PARKING
- MATERIAL HOIST
- COVERED WALKWAY
- RESERVED LANE FOR DELIVERY
- STEEL DELIVERY TRAILER
- CONCRETE TRUCK & PUMP
- MATERIAL WASTE CONTAINERS (BASEMENT LEVEL)

SITE UTILIZATION PLAN: EEE ERECTION PLAN

PROJECT NUMBER: 001-01	
NOVEMBER 25, 2010	
DRAWN BY: ANTHONY JURJEVIC	
CHECKED BY:	
SCALE: NTS	

[APPENDIX C]
LEED® SCORECARD

HERBERT C HOOVER BUILDING - DEPARTMENT OF COMMERCE - LEED NC 2.1 - NEW CONSTRUCTION, MAJOR RENOVATIONS, MARCH 4, 2010

Credit Feasibility			LEED Category/Credit Description	Submittal Phase	Rating System	Uploaded Online	Critical Path / Next Steps	Responsibility
Yes	Maybe	No				Templ-ate	Supp.-Docrs	
8	5	1	Sustainable Sites					
Y			Prereq 1 Erosion & Sedimentation Control	Construction	2.1	no	no	GGA to coordinate with civil engineer.
1			Credit 1 Site Selection	Design	2.1	yes	n/a	Documentation completed.
1			Credit 2 Development Density & Community Connectivity	Design	2.2	yes	yes	Documentation completed.
		1	Credit 3 Brownfield Redevelopment	Design	n/a	n/a	n/a	Project is not on a Brownfield site.
1			Credit 4.1 Alternative Transportation, Public Transportation Access	Design	2.1	yes	yes	Documentation completed.
1			Credit 4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	Design	2.2	yes	yes	On hold - pending design fitness on basement level. DOC to review bicycle rack locations.
	1		Credit 4.3 Alternative Transportation, Low Emission & Fuel Efficient Vehicles	Design	2.2	yes	yes	Documentation completed. DOC to confirm (9) preferred parking spaces will be provided for Low Emission Vehicles and Zero Emission Vehicles. DOC to review location of dedicated parking spots.
	1		Credit 4.4 Alternative Transportation, Parking Capacity	Design	2.2	yes	yes	Documentation completed. DOC to confirm (9) preferred parking spaces will be provided for Car/Vanpools and to review location of dedicated parking spots
1			Credit 5.1 Site Development, Protect or Restore Habitat	Construction	2.2	yes	yes	Narrative (approach to achieve credit) to be uploaded to complete template.
1			Credit 5.2 Site Development, Maximize Open Space	Design	2.2	yes	yes	Letter to be uploaded to complete documentation.
	1		Credit 6.1 Stormwater Design, Quantity Control	Design	2.1 (2.2)	no	no	Documentation and calculations in progress. Pending cistern design.
	1		Credit 6.2 Stormwater Design, Quality Control	Design	2.1 (2.2)	no	no	Under review.
1			Credit 7.1 Heat Island Reduction, Non-Roof	Construction	2.1	yes	yes	Documentation completed.
	1		Credit 7.2 Heat Island Reduction, Roof	Design	2.2	yes	yes	GGJV to provide terra cotta tile SRI data from manufacturer.
1			Credit 8 Light Pollution Reduction	Design	2.2	no	no	CIRs for historic fixtures. Exterior fixtures are full cut-off and dimmable. GGA to coordinate with lighting consultant Kling.
4	0	1	Water Efficiency					
1			Credit 1.1 Water Efficient Landscaping, Reduce by 50%	Design	2.1 (2.2)	no	no	No irrigation will be used. GGA to submit landscape plan to DOC for review.
1			Credit 1.2 Water Efficient Landscaping, No Potable Use or Irrigation	Design	2.1 (2.2)	no	no	No irrigation will be used. GGA to submit landscape plan to DOC for review.
		1	Credit 2 Innovative Waste Water Technologies	Design	n/a	n/a	n/a	Not feasible for project.
1			Credit 3.1 Water Use Reduction, 20% Reduction	Design	2.2	no	no	Template to be completed.
1			Credit 3.2 Water Use Reduction, 30% Reduction	Design	2.2	no	no	Template to be completed.
9	4	4	Energy & Atmosphere					
Y			Prereq 1 Fundamental Building Systems Commissioning	Construction	2.2	no	no	Cx to provide commissioning plan, report, and template for Phase 1.
Y			Prereq 2 Minimum Energy Performance	Design	2.1	yes	n/a	Documentation complete.
Y			Prereq 3 Fundamental Refrigerant Management	Design	2.2	no	no	Template to be completed.
7		3	Credit 1 Optimize Energy Performance	Design	2.1	yes	yes	Energy model shows 35% savings. Documentation completed.
	3		Credit 2 On-Site Renewable Energy	Design	2.2	n/a	n/a	URS to provide estimated savings (2.5% renewable energy - 1 pt; 7.5% - 2pts; 12.5% - 3pts).
1			Credit 3 Additional Commissioning	Construction	2.2	no	no	Cx to provide commissioning plan, report, and template for Phase 1.
1			Credit 4 Ozone Depletion	Design	2.2	no	no	Template to be completed.
	1		Credit 5 Measurement and Verification	Construction	n/a	n/a	n/a	Point forfeited based on clarification of increased level of detail required in monitoring system.
	1		Credit 6 Green Power	Construction	2.1	no	no	Currently purchasing 3%. Re-evaluate intent to pursue at each contract cycle.
9	0	4	Materials & Resources					
Y			Prereq 1 Storage & Collection of Recyclables	Design	2.1	no	no	DOC to determine location of recycling area. GGA to complete template and upload drawings with collection data.
2		1	Credit 1 Building Reuse, Maintain Existing Structure and Shell	Construction	2.2	yes	yes	Documentation completed.
2			Credit 2 Construction Waste Management, Divert 50-75%	Construction	2.2	no	no	GGJV to provide completed phase 1 template back-up
		2	Credit 3 Resource Reuse	Construction	n/a	n/a	n/a	Not feasible for project
2			Credit 4 Recycled Content, 5-10% (post-consumer +1/2 pre-consumer)	Construction	2.1 (2.2)	no	no	GGJV to provide completed phase 1 template back-up.
1			Credit 5.1 Local/Regional Materials, 20% Manufactured Locally	Construction	2.1 (2.2)	no	no	GGJV to provide completed phase 1 template back-up.
1			Credit 5.2 Local/Regional Materials, of 20% in MRc5.1, 50% Harvested Locally	Construction	2.1 (2.2)	no	no	GGJV to provide completed phase 1 template back-up.
	1		Credit 6 Rapidly Renewable Materials	Construction	n/a	n/a	n/a	Not feasible for project.
1			Credit 7 Certified Wood, 50% of all wood products by cost	Construction	2.1 (2.2)	no	no	GGJV to provide completed phase 1 template back-up
11	0	4	Indoor Environmental Quality					
Y			Prereq 1 Minimum IAQ Performance	Design	2.1 (2.2)	no	no	Template to be completed.
Y			Prereq 2 Environmental Tobacco Smoke (ETS) Control	Design	2.2	no	no	GGA to complete template.
1			Credit 1 Carbon Dioxide (CO2) Monitoring	Design	2.1 (2.2)	no	no	Template to be completed.
		1	Credit 2 Increase Ventilation Effectiveness	Design	n/a	n/a	n/a	Discontinuing pursuit due to cost and impact on energy use.
1			Credit 3.1 Construction IAQ Management Plan, During Construction	Construction	2.2	no	no	GGJV to provide completed Phase 1 template and 18 photographs.
1			Credit 3.2 Construction IAQ Management Plan, Before Occupancy	Construction	2.2	no	no	GGJV to provide completed Phase 1 template and documentation.
1			Credit 4.1 Low-Emitting Materials, Adhesives & Sealants	Construction	2.1 (2.2)	no	no	GGJV to provide completed Phase 1 template and budget.
1			Credit 4.2 Low-Emitting Materials, Paints	Construction	2.1 (2.2)	no	no	GGJV to provide completed Phase 1 template and budget.
1			Credit 4.3 Low-Emitting Materials, Carpet	Construction	2.1 (2.2)	no	no	GGJV to provide completed Phase 1 template.
1			Credit 4.4 Low-Emitting Materials, Composite Wood	Construction	2.1 (2.2)	no	no	GGJV to provide completed Phase 1 template.
	1		Credit 5 Indoor Chemical & Pollutant Source Control	Design	n/a	n/a	n/a	MERV13 filters cannot be used. Credit forfeited.
1			Credit 6.1 Controllability of Systems, Lighting	Design	2.2	no	no	DOC to provide information. GGA to complete template.
1			Credit 6.2 Controllability of Systems, Thermal Comfort	Design	2.2	no	no	Every office on the perimeter has a thermostat. Building engineer can control fan speed and temperature for each space. Template to be completed
1			Credit 7.1 Thermal Comfort, Design	Design	2.1 (2.2)	no	no	Template to be completed.
1			Credit 7.2 Thermal Comfort, Verification	Design	2.1 (2.2)	no	no	DOC to confirm administration of Thermal Comfort Survey to all building occupants 6-18 months after occupancy of each phase.
		1	Credit 8.1 Daylight & Views, Daylight 75% of Spaces	Design	n/a	n/a	n/a	Not feasible for project.
		1	Credit 8.2 Daylight & Views, Views for 90% of Spaces	Design	n/a	n/a	n/a	Not feasible for project.
5	0	0	Innovation in Design					
1			Credit 1.1 Green Cleaning, Innovation in Design	-	-	no	no	DOC to provide green cleaning program and product list. GGA to complete template.
1			Credit 1.2 Toxic Material Reduction - Reduced Mercury in Light Bulbs, MR Prereq 2	-	EB	no	no	GGJV to provide light fixture purchases and cutsheets with mercury content. GGA to complete template.
1			Credit 1.3 Furniture Reuse, MRc3.3	Construction	CI	no	no	DOC to confirm intent to pursue. GGA to complete template.
1			Credit 1.4 Low-Emitting Furniture, EQc4.5 Low Emitting Materials	Construction	CI	no	no	DOC to provide furniture spreadsheet, cut sheets, proof of GreenGuard Certification. GGA to complete LEED CI template.
			Backup Exemplary Performance: SSc4.1, Mass Transit	Design	2.1	no	no	Documentation completed.
1			Credit 2 LEED Accredited Professional	Construction	2.1	no	no	LEED Accredited Professional.
46	9	14	Certified (26 to 32pts), Silver (33 to 38pts), Gold (39 to 51pts), Platinum (52 to 69pts)					