Jones Physical Science Center
South Tower Lab Renovation

Feasibility Study

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project overview & description

OVERVIEW AND PROJECT DESCRIPTION

The Jones Physical Science Center is located at 745 South Main Street on the campus of the University of South Carolina. The building layout is composed of a seven-story tower with penthouse and basement. There is a north and south wing of the building with central service and circulation connector. The first floor and basement footprint extend beyond the perimeter of the tower. The gross floor area of the building is 192,487 square feet. The building is steel framed with precast concrete cladding. The building is connected to the Earth and Water Sciences Building

Priorities

The intent of the project is to provide additional life science teaching labs to the biology department. Each lab shall meet the requirement of 50 sq. ft. per student. Combined with the lab prep space allocation shall be a minimum of 70 sq. ft. per student as required by the South Carolina Commission on Higher Education Facilities; Facilities Space Standards and Definitions. The team has required a minimum of 4 labs be provided on each floor. A prep room is to be shared by a maximum of 2 labs. Student staging and collaboration space has also been placed at high priority. Lastly additional classroom and office space is required for the department as the student population increases.

Secondary priorities include creating demonstration space visible from public spaces. The new lab spaces should be competitive with other institutions to attract quality students and faculty. Many students will be transitioning from high schools with state of the art lab space. These labs should meet or exceed the expectations of prospective students.

BASIS OF ANALYSIS

The committee and team began this process with the review of the existing space in the south tower of the Jones PSC building. The reviewed space included the basement to the third floor, the fourth-floor mechanical space and the roof. The team was tasked with determining the best use of the provided space and how systems could be modified to allow for continuous use of the fifth through seventh floors while the basement through fourth floors are renovated. Finally, the team was directed to provide options for renovation of the building in phases as well as a whole.

The project will be budgeted and analyzed in several different ways dependent on the available funding. The first budgeted option will include abatement and the shelling of the basement project area through third floors. The second option will include the abatement as described above, the shelling of floors one through three and the installation of the new classroom area in the basement. The third option will include the abatement as described above, the shelling of the basement and floors two and three and the installation of the labs and support spaces on the first floor. The fourth option will include the abatement as described above and the shelling of the basement and first floor. This option includes the installation of the labs and supports spaces on either the second or the third floor, since they are very similar in programming. The last option will include the abatement as described above and renovation of all floors including the basement, first, second and third floors.

The initial phase of the project involves building a new research lab off site for the laser research lab in the basement of Jones PSC. The initial phase will also require the relocation of the anthropology storage on the fourth floor and the relocation of the Women's Studies office space on the first floor. Once the laser research lab, anthropology and women's studies have been relocated the abatement project can begin. The abatement project will demolish all construction in the basement project area through third floor currently contaminated with asbestos excluding HVAC, plumbing and electrical infrastructure serving spaces on the upper floors to be continuously occupied.

Funding limitations may require that only a portion of the new labs be upfitted to the shelled space. The owner can determine which floors will be renovated based on hierarchy of space and budget constraints. This study will break out the cost of renovation of each floor independently as well as describe the savings of renovating all levels at once. There is significant savings when renovating the building at one time in terms of escalation of costs to extend the schedule, the effort to maintain building systems in occupied spaces, redundancy of building system, general conditions for multiple contracts, etc.

SUMMARY

The committee and design team concurs the project area should be abated of asbestos containing materials at the onset. Abated floors should then be prepped for upfit as described in the individual sections of this study or should be shelled for future upfit. The shelled spaces would need to be provided with minimum life safety equipment, fire sprinkler systems, general lighting, exit lights, appropriate signage, etc.

The study has also determined that it is indeed possible to renovate the basement through fourth floors while the remaining floors are continuously occupied. It has also been determined that the best use of the space is to provide four labs per floor on floors one through three. Each floor should provide queuing and collaboration space for the students. Each floor should have at least one classroom and office space. The renovation should provide ANSI 117.1 compliant toilet rooms on each floor. The basement renovation should provide a mix of labs, collaboration space and classrooms. Mechanical systems should be modified to address the older outside air unit in the basement. All floors should be fed from mechanical units located on the fourth floor except the basement. The basement will be conditioned by units in the basement.

The University will determine what portion of the renovation is to occur based on funding, hierarchy of space and best use of the available resources. Ultimately the planned upfits will determine which floors are shelled.

Tab 2

abatement

PROJECT DESCRIPTION

The proposed Project is a renovation of the lower four floors (basement, 1, 2 and 3), of the South Tower of Jones Physical Science Center (PSC) located on S. Main Street in Columbia, SC. At the time of the study, the scope of the renovations was undefined. Concepts were discussed on how to best manage, design and sequence the Project, while minimizing disturbances to the ongoing academic and research activities occurring in the building, and protecting the building occupants from exposure to hazardous materials. Initial discussions were formed around concepts of partial abatement, with renovations to only a portion of the Project study area, to a "full gut" abatement with demolition of the interior portions of the Project area entirely.

DISCUSSIONS

Discussions were focused on the following:

- Planning the Project in the safest manor possible while protecting the building occupants and workers from exposure to hazardous materials;
- Developing and designing the Project while minimizing disruption to the building's ongoing operations;
- Planning the proposed renovations under the constraints of a limited budget;
- Completing the renovations while leaving areas in the direct vicinity in operation and/or occupied during the Project;
- The risks posed from hazardous materials; and
- Dr. Berg's basement research lab located directly in the proposed Project area.

A primary area of concern in the initial discussions, was a mutual concern from USC Health and Safety and USC HAZMAT over the risks and the extensive measures that would be necessary in order to leave Dr. Berg's lab in operation during the Project. The concerns were based on an understanding of the many challenges that have been imposed on past projects that have occurred in PSC, and the various issues with the known hazardous materials in the building. It was evident during the discussions that it would not be feasible to configure the Project while avoiding a significant impact to Dr. Bergs lab, and the potential contamination to his equipment. It was decided at the end of the initial discussions that his space would have to be vacated prior to the start of Project to effectively plan and design the renovations.

Therefore, F&ME's role in this study was to look at hazardous materials (asbestos, lead, lighting) and the potential impacts they will impose on the Project and developing a budget estimate for the abatement portion of the Project. The study was based on a full interior abatement of all ACM in the Project area, demolition down to structural elements, complete removal of existing architectural, mechanical, electric and plumbing (MEP) systems.

PREVIOUS RENOVATIONS AND CHALLENGES/ DR. BERG'S RESEARCH LAB

F&ME's has assisted with multiple projects in PSC over the years. This included performing various investigations and studies associated with ACM, preparing abatement design plans and specifications, assisting with project management, and providing abatement air monitoring during the abatement operations for the various projects that have occurred. In recent years and more specific to the Project area, F&ME has assisted with five (5) projects that were either near or directly in the Project area, and/ or the project was initiated in response to an issue that occurred with hazardous materials and had a direct impact to the Project area. Some of these projects in PSC have occurred over USC's winter and summer breaks when the occupancy was minimal as compared to the normal school year. However, the sizes and duration of some of the various projects required portions the renovations to occur during the normal school year when the building was occupied and in operation. During these renovations, protocols and specific procedures were established, that were over and above the regulatory requirements, to monitor the occupied areas of the building through air sampling, and to protect the occupants. The contamination above the suspended ceilings in PSC has posed many challenges during field investigations that were needed during design development phases of projects and has created logistical challenges for USC Facilities and Maintenance staff in maintaining the MEP systems in the building.

The protocols and procedures established on the earlier projects that F&ME worked on, were initiated in response to other past issue that have occurred, and the challenges posed during earlier renovations to the building. During the renovations to floors 4 through 6 in the south wing of PSC in 2008, it was decided to establish air and vibration monitoring protocols that would occur during both the abatement activities as well as during the construction that followed once the abatement activities were complete. F&ME provided air monitoring and project management during both the abatement and construction activities for this project. In addition, F&ME assisted with conducting vibration monitoring on the underside of structural steel supporting the 4th floor of the building. The decision to monitor the vibrations in the building during the abatement and construction was made in response to an issue that occurred in the building during an even earlier renovation project. A large piece of equipment was being removed during this project and the contractor dropped the equipment down to the floor deck. This resulted in a release of contamination found above the suspended ceilings, and contamination of the underlying floor directly below where the equipment was dropped.

The project manual for the 2008 project included specific instructions to the contractor regarding activities that would create vibrations in the building during construction and placed specific requirements on the contractor to utilize means and methods that minimize vibrations to the building. The requirements placed on the contractor that were included in the project documents were discussed during both the pre-bid meeting during solicitation, and during the pre-construction meeting with the selected contractor prior to the start of the abatement and renovation activities. These requirements and subsequent vibration monitoring were implemented to avoid another fiber release episode like the one that occurred in the building when the large equipment was dropped to the floor deck.

During the 2008 project, with the implementation of the procedures to control the vibrations in the building, and the discussions with the contractor, the protocols established were proven unsuccessful in preventing another issue from occurring in the building. During the project the vibration monitoring and analytical results from samples collected after a vibration event occurred during construction, confirmed the construction activities going on in the building caused enough vibrations to release the contamination from above the suspended ceilings on floors below the construction, and resulted in contamination the three floors directly below the construction. Subsequently, once the issue was resolved, it resulted in a sizable change order to the project. This knowledge and history of the issues and challenges that have occurred in the building during previous projects, the desire to avoid these risks and potential issues, and a concern for safety of the building occupants, has led F&ME to recommend that the Project area be vacated, to included Dr. Berg's research lab and all associated equipment be removed prior to the start of the Project.

KNOWN ACM AND ONGOING ISSUES

Over the history of PSC, many investigations have been performed in connection with the various renovation that have occurred over the years. In addition, the University's ongoing operations and maintenance activities have provided detailed information regarding the issues that have occurred with ACM previously identified in PSC. This information regarding the known ACM, the condition of these materials along with the contamination documented above the existing suspended ceilings, has required the University to implement protocols to manage these materials in place by limiting access to contaminated areas, and to protect the building occupants from exposure.

The renovation activities that have occurred in the building during various projects over the years, have significantly reduced the quantity of ACM and the associated contamination in the building, which in turn has loosened these restraints posed by them. However, though these past issues in the building have been reduced there are still ongoing issue in PSC associated with the ACM fireproofing. ACM fireproofing is still found enclosed in areas that were inaccessible during the various projects, and the associated contamination from the fireproofing is still present within the interior cavities of original sandwich panel walls found throughout the project area and remains isolated behind enclosures that have been installed in various areas throughout the building. The following is a list of ACMs that remains in the building along with a general description of the locations where they remain:

- **Spray Applied Fireproofing** – The original spray applied fireproofing has been abated from large areas of the building during previous renovation projects. In addition to removing the bulk ACM fireproofing from the structural steel, contamination found above the suspended ceilings has also been reduced in the building. Except for areas where abatement was impracticable, and the fireproofing and contamination was enclosed in cavities through the installation of hard barriers constructed over openings, and/ or sealed in areas with non-combustible spray foam, a large amount fireproofing has been abated in the Project area. However, no remediation activities have occurred in Dr. Bergs research area. The ACM fireproofing and all the original MEP systems remain in place and untouched in Dr. Berg's area of the building, and therefore the contamination above the suspended ceilings is still present. The primary areas where ACM fireproofing and associated contamination remains in the Project area are as follows:

    1. Plaster column surrounds – Fireproofing is enclosed behind plaster column surrounds. The tops of the plaster have been cut clean and the opening has been sealed off with non-combustible spray foam.

    2. Masonry block walls – ACM fireproofing debris and contamination is found in the interior cells of non-load bearing block walls that extend and terminate just above the suspended ceilings. The tops of block cells were left open after the buildings original construction and over the history of the building have become contaminated. These masonry walls throughout the Project area have been capped off with drywall and sealed with non-combustible spray foam.

    3. Sandwich panel walls – The interior cavities of original sandwich panel walls have been deemed contaminated from fireproofing debris. Openings found in the tops of these walls have been sealed with non-combustible spray foam.

    4. Chases – Areas within the main mechanical chases that were not accessible by conventional means during previous renovation activities were sealed off with hard drywall barriers constructed around perimeter of the chases and sealed with non-combustible spray foam. These barriers were constructed from the top of the existing chase panel walls up to the deck above.

    5. Barrier walls – Fireproofing was found in various areas within the Project areas that was inaccessible during previous abatement projects. It was enclosed behind drywall barrier walls and non-combustible spray foam was used to seal the barriers at the edges.

    6. Structural Steel – Original fireproofing was inaccessible during the abatement activities that occurred in the Project area on the backside of structural steel beams located around the exterior perimeter walls. The cavity was filled with fiberglass and non-combustible spray foam.

- 12'x 12" Floor Tile and associated Mastic – The majority of floor tiles and mastics found in PSC have previously been tested and determined to be ACM. Some localized renovations have occurred within the Project area that included the removal and replacement of these ACM tiles and mastics. However, the majority of the tiles still remain on floors 1, 2, 3 and also remain under some walls and cabinetry that were left in place during renovations in areas of the basement. During the design development stage of the Project, prior to the start of any renovation activities, investigations should be performed that include sampling of the new floor tile to reduce the scope of the abatement. For the purposes of this study all floor tiles have been assumed positive and included in the budget estimate.

- Lightweight Concrete Infill - Top and Bottom of Main Mechanical Chases – In the south wing of PSC a lightweight mortar infill was utilized to seal off the top and bottom of each of the main mechanical chases. This infill consisted of a metal lathe and mortar bed that during previous investigations in the building, was determined to have an imbedded layer of asbestos insulation sandwiched in between the mortar. This material is located in the chases on all floors within the Project area. This material will have to be removed as an abatement task by the abatement contractor during the Project.

- Transite Ductwork/ Fume Hoods – Existing fume hoods in the study area have transite panels inside them that will need to be addressed in the design documents. In addition, all of the original exhaust ductwork in the building was constructed with Transite, which is an ACM. Originally the main exhaust risers fed down from the roof through the main mechanical chases on all floors down to the basement. The exhaust ductwork branches out of the chases and extends over all of the fume hoods and lab counters throughout the Project area. The exhaust ductwork was removed during previous renovation projects from the seventh floor down to the fourth floor but remains intact throughout the project area. The Transite ductwork will need to be removed as a component of the Project and will need to be addressed in the abatement design.

- Lab Counter Tops – During previous renovation activities in the building, some of the original lab counter tops in the building have transite sinks and backsplashes. In addition, during demolition activities it was determined that the mastic used to adhere the counter tops to the fixed cabinetry was an ACM as well. As a component of this project, the lab counter tops in the Project area will need to be addressed as an abatement task and addressed during design development.

- Raised Computer Flooring – A raised computer floor is located in the areas included in Dr. Berg's research areas where a full investigation has not been completed. These floors have been known to have an ACM mastic under the legs, that requires the flooring system to be removed as an abatement task. Analytical testing may either confirm the material positive or negative. For the purposes of this study the mastic is assumed positive and is included in the budget estimate.

- Barrier Wall Removal – During previous renovation activities in the building areas were encountered where access to fireproofing and associated overspray could not occur. In addition, some barrier walls were necessary during renovation and installed to isolate these areas from the abatement at that time. As a component of this project, the barrier walls in the Project area will need to be addressed as an abatement task and addressed during design development.

- Black Mastic on Fiberglass and Cellular Foam Glass Pipe Insulation – Black mastic was found during previous investigations and determined to be an ACM. This ACM will need to be abated and will need to be addressed in the abatement design.

ACM INVESTIGATION OF THE PROJECT AREA

It is anticipated that prior to the development of the abatement design, that an investigation will need to be completed along with a report will need to be completed for the Project area. During this investigation, al newly installed materials in areas where renovations have occurred will need to be sampled. Analytical results will dictate how these materials will need to be handled during the Project. The investigation will also need to include Dr. Berg's research area, which has never been thoroughly investigated. The investigation report will need to be prepared and provided to the abatement contractor for issuance to the SCDHEC when applying for an abatement permit.

ACM ABATEMENT DESIGN APPROACH

As noted, the abatement of a large amount of the original ACM fireproofing within the Project area has been abated and replaced with new non-ACM fireproofing. Also, during the abatement of the fireproofing in these areas, the suspended ceilings were removed, and the contamination found above them was addressed. Once the abatement activities were complete on these projects, the put back renovations included the installation of all new non-ACM suspended ceiling systems. The abatement design should be developed that considers these non-ACM materials and should addresses them according. One issue with addressing this, is the tracking associated with the newer suspended ceilings in these areas. The perimeter ceiling grid tracking is attached to contaminated sandwich panel partitions and will need to remain attached and removed along with the partitions as an abatement task.

The abatement design should consider and be developed to address the new non-ACM suspended ceilings and the newly applied fireproofing. Methods should also be developed to protect the newer fireproofing from being exposed and/ or contaminated during the abatement activities and leave it in place. This will allow the costs to be avoided for respraying the structural steel in these areas. For the purposes of this study, the removal of the suspended ceilings has been included as a task performed by the abatement contractor after full containment has been established, but before any disturbance to ACM. These costs have been included in the budget estimate for the abatement.

The large main fresh air supply ducts that run down the middle of each of the main corridors in the Project area were also cleaned during the previous abatement activities that occurred within the project area. During the design development it should be anticipated that this ductwork can be removed as a general demolition task and will not require abatement. However, due to its size, location and proximity to known ACM in the building, the removal of this ductwork may impact or disturb the ACM in the Project area. Therefore, the removal of the ductwork will need to be removed by the abatement contractor after full containment has been established, but before any disturbance to ACM. These costs have been included in the budget estimate for the abatement.

It is assumed that floors 1, 2 and 3 in the Project area will need to be placed under full containment. This will allow a more aggressive approach in accessing the ACM found in closed chases and cavities, allowing the remaining ACM in the areas included in the Project to be removed.

- **Basement approach:**

  A large amount of abatement has been completed in the basement area in the south wing of the building. It is assumed that the entire basement may not need to be placed under full containment and the abatement may only been in specific regions. However, several materials were inaccessible and left in place and these materials will be impacted by the renovations.

  The main mechanical chases were opened up during abatement activities in the basement in order to access and remove the majority of ACM materials in them. No abatement activities have occurred in Dr. Berg's research area. During the previous abatement activities, this space was isolated from the abatement by the installation of barrier walls around the perimeter of the space. In addition, several other areas were found during the abatement activities that were inaccessible (open cells of block walls, closed chases and wall cavities). These areas were capped off with either a layer of drywall and sealed at the seams with non-combustible spray foam or the openings were sealed with non-combustible spray foam. All these areas where ACM has been sealed off and enclosed behind barrier walls will need to be addressed in the abatement design.

  Another item that will need to be addressed in the basement will be the light weight infill located at the base of the main mechanical chase on the first floor. Due to its location, the light weight infill used to seal off the bottom of the chase, was left in place during the abatement activities. Once the abatement activities were complete and prior to clearance sampling, the underside of the light weight infill was coated with a spray applied encapsulant. The light weight infill will need to be removed during the abatement activities and therefore, will need to be addressed in the abatement design.

Approach First, Second and Third Floors:

A large amount of abatement was completed on floors 1, 2 and 3 in the south wing of the building during the 2009 renovations of floors 4 thru 6. New fireproofing and new suspended ceilings were installed at that time. However, ACM is still located throughout these areas of the building in various forms and some ACM has been encapsulated and/ or enclosed behind barrier walls and/ or sealed in various cavities with non-combustible spray foam. In addition, the main mechanical chases on all three floors have never been abated and they were sealed off during the abatement activities with barrier walls.

It is assumed that all three (3) of these floors will be placed under full containment entirely. This will allow of the abatement activities and the removal of the remaining ACM to be completed while under full containment. It is anticipated that once these floors are placed under containment, that that non-abatement tasks will need to be performed prior to the start of any activities that disturb ACM. This will include the removal of newly installed suspended ceilings and associated grid, and the removal of the original metal fresh air supply ducts that run nearly the full length of the main corridors on each of these floors. Once these materials are removed the contractor shall be instructed to establish means and methods that protect the new fireproofing that was installed during the 2009 renovations from contamination during the abatement activities. The concepts that will be necessary to leave the new fireproofing in place may require a variance from the SCDHEC. These concepts will need to be address during design development and included in the abatement design plans and specifications.

Approach Fourth Floor:

The majority of ACM has been abated from the fourth floor. Only two (2) materials remain on this floor. The light weight infill at the base of the main mechanical chases and Transite exhaust duct risers that feed up from the floors below. These are the only materials on the fourth floor that require abatement.

- Light Weight Infill – This material is found at the base of the floor of the chases on the fourth floor and will require special consideration when developing a plan to remove it. Establishing containment and the removal of this material will be an awkward task since access from both the top and bottom is only gained through accessing the main mechanical chases. However, the lightweight infill was not designed to be structural floor system that bear loads nor were they designed to be stood on. Currently the anticipated approach will be to develop a design that minimizes disturbances on the newly renovated fourth floor. A method should be developed that allows for the material to be removed from the third floor. This will minimize the impact to the fourth floor. The approach will need to consider worker protection when accessing the chases on the fourth floor when establishing containment from the third floor the removal of the lightweight infill has been included as an abatement task in the attached budget estimate.

- Transite Exhaust Ductwork – Original Transite exhaust ductwork has been removed down to the base of the fourth-floor chases. It remains intact in all areas below the fourth floor and terminates in the fourth-floor chase. This material is to be removed as a component of the project. To remove this material completely it will need to be accessed in the fourth-floor chases. The design should include removal of the Transite and should also consider the safety issues as previously noted and discussed associated with the lightweight infill.

LEAD-BASED PAINT COATED MATERIALS

Historic data regarding lead-based paint (LBP) coated materials in the buildings would indicate that LBP will have a minimal impact to the Project. Only limited items have been identified in the building, and most of the items found in the building would easily be managed during abatement and demolition activities by the utilization of intact removal methods. The types of materials would either be taken to local facilities for recycling and/ or disposed of intact along with other general construction, demolition, and abatement debris. No evidence or materials have been identified that would warrant actual LBP abatement activities. However, due to the contamination above the suspended ceilings, no surveys have been completed relative to the structural steel in the building. During the design development phase of the project if renovations will require alterations, removal or attachments to the existing structural steel, testing should be performed to determine if it is coated with LBP, so that the contractor on the Project can be provided that information. For the purposes of the study, we have included costs in the budget estimate for the LBP survey and have allocated a lump sum to cover some of the costs to the contractor in handle LBP coated materials.

ORIGINAL LIGHTING SYSTEMS

Most of the original lighting systems have been removed during past renovation projects and have been replaced with current "green" non-hazardous materials. However, no abatement activities have occurred in Dr. Berg's research lab in the basement. The original lighting systems are in place in this area. Due to the number of light fixtures and associated florescent bulbs in this areas of the building and the fact that these systems are contaminated by the ACM fireproofing, the best approach would be to have all of the bulbs in this area of the building removed from the light fixtures and decontaminated at the start of the abatement without breakage and have the contractor turn them over to USC HAZMAT for disposal. At that time the lighting ballasts will need to be reviewed and ballasts not designated with the "no PCB's" label will be collected and turned over to USC HAZMAT for disposal. We believe this will have a minimal impact to the Project and contingencies built into the budget estimate should easily cover those costs.

Tab 3

architecture

ABATEMENT + SHELL SPACE

Portions of the basement through third floors are currently contaminated with asbestos. Previous abatement projects included removing the asbestos contaminated fire proofing from the steel columns and beams. A portion of the basement which was inaccessible in the earlier abatement project is still contaminated with asbestos containing fireproofing. Additional asbestos contaminated material is contained with wall cavities and dispersed throughout the project area.

The first step in the renovation of the basement through third floors of the building is the abatement of all contaminated materials. This effort will require the demolition of all construction within the project area including fireproofing, walls, doors and finishes. All mechanical, electrical, and plumbing systems except risers serving the upper floors will also be demolished.

Limitations in funding may require all floors be shelled for future upfit. The shell spaces will be provided with code required life safety, fire sprinkler and emergency lighting system.

Refer to the abatement and individual engineering disciplines sections of the study for additional detailed information.

BASEMENT RENOVATION

The basement currently houses the mechanical infrastructure for portions of the basement, the first, second and third floor. The main electrical room, sprinkler riser and a portion of the plumbing infrastructure is also housed in the basement. There are also classrooms, research lab space, offices and other administrative space in the basement.

6,915 square feet of the south tower basement will be gutted to make way for new classrooms and lab spaces. The plan is to include one, thirty seat classroom, one, forty seat classroom, two, basic, twenty four seat labs and collaboration space. A new mechanical room will also be built as part of this renovation to provide HVAC for the renovated area while existing systems continue to operate during construction. Refer to mechanical narrative for additional detailed information on phasing and system description.

The finishes shall be upgraded resilient flooring, suspended acoustical ceilings, rubber/ vinyl base, painted walls and stained wood doors. All larger classrooms shall be provided acoustical panels. All walls shall be high STC wall construction to limit the passage of sound. All platforms and classroom tiers will be built from light gauge construction and finished as described above.

BASEMENT PROGRAM

ROOM ELEMENT	# OF ROOMS	NET SQ. FT. PER ROOM	TOTAL (SQ. FT.)	
Basement				
24 Seat Lab	1	1,300	1,300	
40 Seat Classroom	1	950	950	
30 Seat Classroom	1	400	400	
Men's Toilet	1	189	189	
Women's Toilet	1	180	180	
Collaboration Space	1	628	628	
24 Seat Lab	1	1,245	1,245	
Mechanical Room	1	335	335	
Subtotal			5,227	
Circulation (30%)			1,568	
TOTAL			**6,795**	**Sq. Ft.**

FIRST FLOOR RENOVATION

The existing first floor of the south tower currently houses an office suite for women's studies, chemistry labs, prep rooms, classrooms and other miscellaneous office spaces. This space will also be shelled because of the asbestos abatement demolition.

The new south tower upfit will be a show piece for the biology department of the College of Arts and Sciences. 13,053 square feet of the south tower will be renovated. The main circulation route into the south tower will provide access to a new collaboration soft seating space with views to the exterior from new floor to ceiling curtainwall windows. There will also be storefront viewing windows into two demonstration labs, one from the main entrance lobby at center of the two towers and another viewed from the main circulation/ collaboration space. There will also be a demonstration prep room with views from the main lobby tower connector. The balance of the programmatic space includes 2 additional labs, 2 additional prep rooms, a vending area, office suite, women's and men's accessible toilets and 24 seat classroom.

Due to the high-profile nature of this area upgraded finished throughout. The ceilings will be a mixture of suspended acoustical and painted gypsum board. There will also be areas where there is no ceiling and HVAC systems are exposed. Glazed aluminum window systems will allow views into several of the lab and prep room spaces.

To allow natural light to filter into the interior circulation space a portion of the precast concrete cladding will be removed. The precast panel cladding will be replaced with a new curtain wall system.

FIRST FLOOR PROGRAM

ROOM ELEMENT	# OF ROOMS	NET SQ. FT. PER ROOM	TOTAL (SQ. FT.)	
First Floor				
24 Seat Biology Lab	2	1,207	2,414	
24 Seat Demonstration Biology Lab 1	1	1,240	1,240	
24 Seat Demonstration Biology Lab 2	1	1,385	1,385	
Biology Lab Demonstration Prep Room	1	392	392	
Biology Lab Shared Prep Room	1	477	477	
Biology Lab Prep Room	1	390	390	
Men's Toilet	1	193	193	
Women's Toilet	1	237	237	
Collaboration Space	1	1,648	1,648	
36 Seat Classroom	1	1,134	1,134	
Open Office	1	148	148	
Private Office	1	150	150	
Vending	1	148	148	
Subtotal			9,956	
Circulation (20%)			1,991	
TOTAL			**13,527**	**Sq. Ft.**

SECOND FLOOR OR THIRD FLOOR RENOVATION

The upfit would include the installation of four new instructional biology labs, two new prep rooms, an office suite, new ANSI A117.1 toilets and collaborative space. Just as the other floors, HVAC systems would be housed on the fourth floor and distributed down to the floor via vertical chases in the original vertical chases. The exhaust system will be handled in the same vertical chases and tied to the existing building exhaust system. The fire sprinkler and fire alarm system will be modified to accommodate the spatial arrangement. Electrical systems would be fed from the existing busway. Plumbing systems would be tied to the existing active building water and waste risers. Refer plumbing, mechanical, electrical, fire protection and abatement narratives for details on the newly installed systems.

The finishes will be similar to the other floors. The walls will be painted gypsum board on light gauge metal framing. The labs floors will be painted epoxy. The contractor will be required to repair existing concrete floors in preparation of new floor finish. The ceilings will be suspended grid with acoustical ceiling tiles. The office space shall be carpet floor tiles, painted walls and suspended grid with acoustical ceiling tile. The toilet rooms shall be ceramic tile walls and floors and suspended grid with acoustical ceiling tile. All effort shall be made to preserve the existing terrazzo flooring in corridors.

The instructional lab casework will match the casework installed in the labs of the other floors. The finish shall be stained wood. The countertops shall be black chemical resistant epoxy. Each student bench shall be similarly equipped with compressed air and natural gas connections and electrical connectivity. Each lab would have similar A/V and IT needs and are outlined in the A/V/ IT section of this study. The instructor's bench will be equipped with a shut off valve for the natural gas supplying the student benches. There will be natural gas and compressed air connections. There shall be an eye wash station at one of the sinks in the room as well as an eyewash/ shower combination unit.

The prep room shall be similar to the instructional lab with stain wood finish and chemical resistant epoxy tops. There will be one fume hood in the prep room tied to the building exhaust system. The finishes will match those in the instruction lab. There would propane and compressed air provided in the fume hood as wells as at one location in the prep room.

The collaborative space shall provide space for students to que while labs are in progress. There would be adequate wireless capacity for use by students in this space. This space would also provide group gathering and study areas as well as opportunity for student/ faculty interaction. Small informal seating arrangements that are easily modified would be the goal.

The office suite shall include one large private office. The attached open office area shall provide space for a minimum of 3 modular furniture seats and associated IT and electrical connections.

The classroom will be furnished with the standard university tablet arm chairs. The room will include standard A/V and IT connections and equipment. There shall be a lectern which houses all A/V equipment. Refer to the A/V/ IT section of this study for additional detail.

SECOND FLOOR PROGRAM

ROOM ELEMENT	# OF ROOMS	NET SQ. FT. PER ROOM	TOTAL (SQ. FT.)	
Second Floor				
24 Seat Biology Lab	4	1,329	5,316	
Biology Lab Prep Room	2	392	784	
Men's Toilet	1	206	206	
Women's Toilet	1	252	252	
Collaboration Space	1	1,075	1,075	
Office	1	192	193	
Open Office	1	298	299	
Subtotal			8,125	
Circulation (30%)			2,438	
TOTAL			**10,563**	**Sq. Ft.**

Third Floor Renovation

THIRD FLOOR PROGRAM				
ROOM ELEMENT	**# OF ROOMS**	**NET SQ. FT. PER ROOM**	**TOTAL (SQ. FT.)**	
Third Floor				
24 Seat Biology Lab	4	1,329	5,316	
Biology Lab Prep Room	2	392	784	
Men's Toilet	1	206	206	
Women's Toilet	1	252	262	
Collaboration Space	1	1,075	1,075	
28 Seat Classroom	1	480	481	
Subtotal	1		8,124	
Circulation (30%)			2,437	
TOTAL			**10,561**	**Sq. Ft.**

BASEMENT THRU THIRD FLOOR RENOVATION

The above sections describe how each floor could be upfitted individually. This is the least efficient method of constructing this project. The most cost effective and efficient method to construct this project is to have the abatement and construction be performed under one contract. This would allow the contractor to schedule abatement and renovation activities concurrently. As floors are decontaminated renovation activities could begin immediately. The project duration would be significantly decreased. There would be significant savings due to reduction in general conditions, redundancy in building systems, project cost escalation, economy of scale, etc.

Tab 4

fire protection

OVERVIEW AND PROJECT DESCRIPTION

The Jones Physical Science Building currently has a firepump that supplies the North and South Tower fire service hose station standpipes. These standpipes also supply the fire sprinkler systems in the North and South Tower, respectively. Our area of interest is the South Tower Basement, First Floor, Second Floor, and Third Floor. In the hallways of each floor here are existing Fire Sprinkler main lines, with tees installed at each of the existing adjacent doorways to facilitate fire sprinkler installation into the spaces adjacent to the hallways. The existing firepump/standpipes/hallway mains are adequate to supply the renovation sprinkler heads layout.

Fire Sprinkler rough-in piping is to be installed before fireproofing of the steel.

This wet system hydraulic design criteria is 2016 Edition of NFPA 13 Light Haz (0.1gpm/1500sf) and Ord 1 Haz (0.15 gpm/1500 sf).

All fire sprinkler piping should be black steel ASTM A795 or ASTM A53, sched 40 with threaded fittings for pipe dia less than 2", and sched 10 with welded or listed roll grooved fittings for pipe 2" dia and greater. All piping should have an interior coating resistive to MIC.

Seismic bracing and restraint is required for all systems.

All new piping less than 2" diameter must be Sched 40 steel with threaded fittings. Piping 2" or greater diameter must be sched 10 steel with listed grooved fittings.

The main corridors main lines are to be left intact.

ABATEMENT + SHELL SPACE

The south tower basement has areas on the floor that have been previously fire sprinklered as well as areas that have yet to be sprinklered. For the areas that are currently fire sprinklered the existing heads must be removed up to their connection to the branch lines, with the main and branch main lines left intact, and branch lines removed where they no longer are useful in supplying the new heads layout.

Abatement: Basement – 3rd Floor

The abatement of floors 1-3 will be identical for each floor. The south tower first floor has areas on the floor that have been previously fire sprinklered as well as areas that have yet to be sprinklered. For the areas that are currently fire sprinklered the existing heads must be removed up to their connection to the branch lines, with the main and branch main lines left intact, and branch lines removed where they are no longer are useful in supplying the new heads layout.

Shell Space (Basement, 1st thru 3rd Floor)

The renovation of the basement, 1st thru 3rd floor as it pertains to a shell space must consist of providing upright heads throughout all the shell space.

BASEMENT RENOVATION

The south tower basement will have renovated spaces as well as shell space. See the basement architectural plans for exact renovation locations.

Finished spaces must be provided with new pendant type fire sprinkler heads. Also new branch lines and drops must be provided where necessary to accommodate the new and relocated sprinkler heads.

Unfinished spaces must be provided with new upright sprinklers. New branch lines must be provided where necessary to accommodate the new and relocated sprinkler heads.

1ST FLOOR RENOVATION

The south tower 1st Floor has areas on the floor that have been previously fire sprinklered (main corridor and Womens Studies area) as well as areas that have yet to be sprinklered.

Finished spaces must be provided with new pendant type fire sprinkler heads. Also new branch lines and drops must be provided where necessary to accommodate the new and relocated sprinkler heads.

Unfinished spaces must be provided with new upright sprinklers. New branch lines must be provided where necessary to accommodate the new and relocated sprinkler heads.

2ND OR 3RD FLOOR RENOVATION

The only areas on these floor that are previously fire sprinklered are the main corridors.

The entire south tower second/third floor will be renovated. See the proposed architectural second/third floor lab layout for exact Lab, prep room, faculty, toilet, and classroom locations.

Finished spaces must be provided with new pendant type fire sprinkler heads. Also new branch lines and drops must be provided where necessary to accommodate the new and relocated sprinkler heads.

Unfinished spaces must be provided with new upright sprinklers. New branch lines must be provided where necessary to accommodate the new and relocated sprinkler heads.

BASEMENT THRU THIRD FLOOR RENOVATION

Refer to previous sections for required renovations to each floor. There will be significant savings if all renovation activities occur as one project. Doing so would eliminate the need for future shut downs and other building disruptions as floors are renovated. There is tremendous savings with the economy of scale in renovating the building in one project. There would be no need to provide accommodations for future expansion of systems for future renovations. All of these measures add up to significant cost to the project that could be spent on equipment or other project needs.

Tab 5

plumbing

OVERVIEW AND PROJECT DESCRIPTION

- Project is a proposed full abatement of floors: first, second and third of Jones PSC south tower.
- Project would include the renovation of the second or third floor to proposed flexible lab spaces. Reference architectural schematic plans for more information.
- Project would include option for the renovation of the first floor to proposed lab, restroom, office and public space. Reference architectural schematic plans for more information.
- Project would include the abatement of Dr. Berg's lab space in the basement. Domestic piping system summary: Domestic cold water enters the building in basement mechanical room. The building domestic cold-water riser is routed in a plumbing chase between the mechanical room and corridor located near the southwest corner of the existing basement mechanical room. Each subsequent floor has a tie-in to this riser and a tee. The north line supplies north tower and the other line supplies the south tower with a typical loop.
- Domestic hot water to the south tower is supplied by existing domestic water heater(s) and recirculation pumps in the eighth-floor penthouse mechanical room. The domestic hot watermand hot water recirculation risers for the south tower are in the same plumbing chase as the domestic cold-water riser.
- Chemical resistant Duriron sanitary and cast iron storm piping risers are routed in various plumbing chases lining the corridor.

ABATEMENT + SHELL SPACE

- Proposed project will include the full abatement of the basement, first, second and third floors – south tower. This will include spaces above ceiling and below floor for each floor. Exception: areas above Dr. Berg's basement lab.
- All existing ACM supply piping insulation surrounding domestic cold water, domestic hot water and domestic hot water return piping will abated/ demolished. Plumbing chases, sandwich panel walls, plaster column walls, masonry block walls, barrier walls.
- Piping insulation will be replaced with new jacketed fiber glass insulation with taped and sealed joints.
- Existing isolation valves located within previously ACM locations shall be replaced with full port ¼ turn lever handle ball valves.
- New full port ¼ turn lever handle ball valves will be required at some locations to aid maintenance staff.
- Demolish and replace sections of existing supply piping, sanitary piping and/or storm piping may be required based on discovered conditions.

ABATEMENT OF DR. BERG'S LAB

- Proposed project will include the full abatement of the Dr. Berg's lab – south tower basement. This will include spaces above ceiling and within the existing pipe chases.
- All existing ACM supply piping insulation surrounding domestic cold water, domestic hot water and domestic hot water return piping will abated/ demolished. Plumbing chases, sandwich panel walls, plaster column walls, masonry block walls, barrier walls.

- Piping insulation will be replaced with new jacketed fiber glass insulation with taped and sealed joints.
- Existing isolation valves located within previously ACM locations shall be replaced with full port ¼ turn lever handle ball valves.
- New full port ¼ turn lever handle ball valves will be required at some locations to aid maintenance staff.

BASEMENT RENOVATION

- Proposed project will include the demolition and renovation of the basement to classroom spaces based on architectural schematic design. All work shall be post abatement. This option would require access to above ceiling and below floor of either floor that is renovated.
- This will require renovation and replacement of domestic water piping and new isolation valves.
- Existing chemical resistant waste risers located in the hallway plumbing chases will need to be relocated as necessary.
- Some trenching will be required as necessary for demolition and renovation of existing waste riser and below slab connection points.

FIRST FLOOR RENOVATION

- Proposed project will include the demolition and renovation of the first floor to proposed lab and lab prep spaces based on architectural schematic design. All work shall be post abatement. This option would require access to above ceiling and below floor of either floor that is renovated.
- Renovation will include new plumbing fixtures:
  - Group Toilets - Waterclosets, lavatories, floor drains, hose bibbs. ADA where necessary.
  - Labs - lab faucets, deck-mounted gas and compressed air outlets, emergency eye and shower fixtures, mixing valves and floor drains.
  - Prep Rooms – lab faucets, deck-mounted gas and compressed air outlets, emergency eye and shower fixtures, mixing valves, floor drains, fume hood connections, dishwasher connections.
- Renovation will include new and revised piping:
  - Domestic CW, HW & HWR piping shall include new tie-ins to existing risers with isolation valves and expansion tees. New supply and return loops will be provided around perimeter of the floor to maximize efficiency and minimize piping material. Isolation valves and balancing valves to be provided where necessary. Distribution shall be above ceiling to most fixtures. Piping shall be type L copper pipe with sweated fittings and joints. Pipe sizes shall be based on proposed plumbing fixture load.
  - Compressed air piping shall be type K copper piping with sweated fittings. Compressed air piping shall connect to existing riser located in existing risers. Pipe sizes shall be based on proposed lab equipment consumption load. Existing air compressor located in eighth floor mechanical room shall be evaluated to meet proposed and existing load requirements.

- Chemical resistant waste piping shall connect to existing waste risers located in corridor piping chases. Piping material will be selected to coordinate with the most stringent chemical resistant requirements used in the proposed lab and prep spaces. This piping will route below the floor of renovated space. Pipe sizes shall be based on proposed plumbing fixture load. This will include piping specialties such as p-traps and hub drains. New separate pipe chases will be required below floor if the space below cannot be abated.

- Chemical waste vent piping shall be provided and connect to existing vent risers located in existing corridor pipe chases. This piping shall be selected to match the most stringent chemical resistant requirements used in proposed lab spaces. Piping shall be routed above ceiling.

SECOND OR THIRD FLOOR RENOVATION

- Proposed project will include the demolition and renovation of the second and third floors to proposed flexible lab and lab prep spaces based on architectural schematic design. All work shall be post abatement. This option would require access to above ceiling and below floor of either floor that is renovated.

- Renovation will include new plumbing fixtures:

  - Labs - lab faucets located at perimeter casework, emergency eye and shower fixtures, mixing valves and floor drains.

  - Prep Rooms – lab faucets, deck-mounted gas and compressed air outlets, emergency eye and shower fixtures, mixing valves, floor drains, fume hood connections, dishwasher connections.

- Renovation will include new and revised piping:

  - Domestic CW, HW & HWR piping shall include new tie-ins to existing risers with isolation valves and expansion tees. New supply and return loops will be provided around perimeter of the floor to maximize efficiency and minimize piping material. Isolation valves and balancing valves to be provided where necessary. Distribution shall be above ceiling to most fixtures. Piping shall be type L copper pipe with sweated fittings and joints. Pipe sizes shall be based on proposed plumbing fixture load.

  - Compressed air piping shall be type K copper piping with sweated fittings. Compressed air piping shall connect to existing riser located in existing risers. Pipe sizes shall be based on proposed lab equipment consumption load. Existing air compressor located in eighth floor mechanical room shall be evaluated to meet proposed and existing load requirements.

  - Chemical resistant waste piping shall connect to existing waste risers located in corridor piping chases. Piping material will be selected to coordinate with the most stringent chemical resistant requirements used in the proposed lab and prep spaces. This piping will route below the floor of renovated space. Pipe sizes shall be based on proposed plumbing fixture load. This will include piping specialties such as p-traps and hub drains.

  - Chemical waste vent piping shall be provided and connect to existing vent risers located in existing corridor pipe chases. This piping shall be selected to match the most stringent chemical resistant requirements used in proposed lab spaces. Piping shall be routed above ceiling.

Tab 6

mechanical

OVERVIEW AND PROJECT DESCRIPTION

Mechanical system summary: Heating and cooling for each space is provided by four pipe fan coil units or 100% ventilation air from the air handler located in the basement. The ventilation air (outside air) is provided by an existing air handler located in the basement mechanical room. This air handler provides ventilation air for the basement, first floor, second floor, and third floor. Ventilation air is either supplied directly to the space or delivered into the back of the space fan coil units. The ventilation duct is routed up through mechanical chases and out to each floor. The current mechanical systems don't have adequate capacity for the type spaces proposed in this study.

Exhaust system summary: The building has a central exhaust system located on the roof. This exhaust system was installed in 2006. The exhaust system appears to have adequate capacity for the spaces proposed in this study.

ABATEMENT + SHELL SPACE

- The ventilation unit (located in the basement) and ductwork connected to unit shall remain in operation during abatement of the south tower. This unit provides ventilation air for the whole basement, the south tower 1st floor, 2nd floor, and the 3rd floor.
- Steam risers shall remain in operation during abatement of the south tower. Remove steam mains on each floor back to riser and cap.
- Hot and chilled waters risers and mains shall remain in operation during abatement of the south tower.
- Fan coil units, air handlers, and associated supply duct, return ducts, piping, and controls in unabated areas shall be demolished. Remove hot and chilled water piping back to mains and cap.
- Remove all transite exhaust duct and risers serving the basement, 1st floor, 2nd floor, and 3rd floor of the south tower.

Shell Space (Basement, 1st thru 3rd Floor)

The renovation of the basement, 1st thru 3rd floor as it pertains to a shell space shall consist of providing minimal heating to maintain space temperature above freezing.

BASEMENT RENOVATION

- Demolish ventilation, supply, return, and exhaust ducts serving proposed spaces in the basement.
- Demolish existing ventilation unit serving basement, portion of 1st floor, portion 2nd floor, and portion 3rd floor.
- Add a new 15000 CFM ventilation air handler to provide ventilation air for the entire basement, the south tower 1st, 2nd, and 3rd floors.
- Add a new VAV air handler in a new mechanical room serve proposed spaces. New VAV air handler shall be 10,000 CFM, with supply fan, variable frequency drive, chilled water coil, steam preheat coil, mixing box, and MERV 8 prefilters. Controls for new air handler shall be by Johnson Controls and integrate into the building management system.
- Each zone shall be served with VAV box with hot water reheat. The proposed spaces in the basement will require 8-10 zones.

- Building chilled water will be extended from the existing basement mechanical room to the new air handler located in the 4th floor mechanical room.
- Building hot water will be extended from the basement mechanical room to the new air handler and vav boxes.

FIRST FLOOR RENOVATION

- Demolish ventilation ducts serving proposed spaces on the first floor. Spaces served by the existing ventilation system, outside the proposed renovation area, shall remain in operation.
- Add a new VAV air handler in the 4th floor mechanical room and route supply and return ducts (in the existing chases) down to the first floor. New VAV air handler shall be 25,000 CFM, with supply fan, variable frequency drive, chilled water coil, humidifier, steam preheat coil, mixing box, MERV 8 prefilters, and MERV 13 final filters. Controls for new air handler shall be by Johnson Controls and integrate into the building management system.
- Building chilled water will be extended from the existing basement mechanical room to the new air handlers in the 4th floor mechanical room. New 6" chilled water risers will be routed in existing chases up to 4th floor mechanical room. New chilled water risers are required for any option defined in the mechanical scope summary unless only one floor is renovated. The existing 6" chilled water piping in the 4th floor mechanical room has enough capacity for one new air handler installed in the 4th floor mechanical room.
- Steam for air handlers shall be provided from the existing steam line located in the 4th floor mechanical room.
- Main exhaust riser (for the first floor) shall be routed in the existing duct chase. Riser shall extend from the first floor up to the central exhaust system on the roof. All lab exhaust duct shall be welded 316 stainless steel.
- Each Lab shall have (1) 28x14 Phoenix Controls Traccel Supply valve with a duct mounted hot water reheat coil (4.0 GPM). A total of (4) supply valves are required for the proposed number of labs on the first floor. A 28x12 Phoenix Controls Traccel Exhaust valve shall be provided in each space and shall control and track with the supply valve in each lab space. A total of (4) exhaust valves are required for the proposed number of labs on the first floor.
- Each Prep Room shall have (1) 8" Phoenix Controls Traccel Supply valve with a duct mounted hot water reheat coil (2.0 GPM). A total of (3) supply valves are required for the proposed number of prep rooms on the first floor. A 8" Phoenix Controls Traccel Exhaust valve shall be provided in each space and shall control and track with the supply valve in each prep room. A total of (3) exhaust valves are required for the proposed number of labs on the first floor. Each prep room shall have (1) 8" Phoenix controls constant volume exhaust valve for the fume hood. The valve shall have a corrosion resistant baked on phenolic coating. A total of (3) constant volume exhaust valves are required for the proposed number of prep rooms on the first floor.
- Each ancillary zone shall be served with a VAV box with a hot water reheat coil. The proposed ancillary spaces on the first floor will have 4-5 zones.
- Building hot water will be extended from the existing hot water risers located in the chases and serve the hot water coils located on the first floor.
- Add a new 15000 CFM ventilation air handler to provide ventilation air for the entire basement, the south tower 1st, 2nd, and 3rd floors.

SECOND OR THIRD FLOOR RENOVATION

- Demolish ventilation duct serving proposed floor. Spaces served by the existing ventilation system, outside the proposed renovation area, shall remain in operation.
- Add a new VAV air handler in the 4th floor mechanical room and route supply and return ducts in the existing chases down to the second or third floor. New VAV air handler shall be 20,000 CFM, with supply fan, variable frequency drive, chilled water coil, humidifier, steam preheat coil, mixing box, MERV 8 prefilters, and MERV 13 final filters. Controls for new air handler shall be by Johnson Controls and integrate into the building management system.
- Building chilled water will be extended from the existing basement mechanical room to the new air handlers in the 4th floor mechanical room. New 6" chilled water risers will be routed in existing chases up to 4th floor mechanical room. New chilled water risers are required for any option defined in the mechanical scope summary unless only one floor is renovated. The existing 6" chilled water piping in the 4th floor mechanical room has enough capacity for one new air handler installed in the 4th floor mechanical room.
- Steam for air handlers shall be provided from the existing steam line located in the 4th floor mechanical room.
- Main exhaust riser (for each floor) shall be routed in the existing duct chases. Risers shall extend from the 6th floor to the second or third floor and connect to the central exhaust system. All lab exhaust duct shall be welded 316 stainless steel.
- Each Lab shall have (1) 28x14 Phoenix Controls Traccel Supply valve with a duct mounted hot water reheat coil (4.0 GPM). A total of (4) supply valves are required for the proposed number of labs on the first floor. A 28x12 Phoenix Controls Traccel Exhaust valve shall be provided in each space and shall track with the supply valve in each lab space through controls. A total of (4) exhaust valves are required for the proposed number of labs on the first floor.
- Each Prep Room shall have (1) 8" Phoenix Controls Traccel Supply valve with a duct mounted hot water reheat coil (2.0 GPM). A total of (2) supply valves are required for the proposed number of prep rooms on the first floor. An 8" Phoenix Controls Traccel Exhaust valve shall be provided in each space and shall track with the supply valve in each prep room through controls. A total of (2) exhaust valves are required for the proposed number of labs on the first floor. Each prep room shall have (1) 8" Phoenix controls constant volume exhaust valve for the fume hood. The valve shall have a corrosion resistant baked on phenolic coating. A total of (2) constant volume exhaust valves are required for the proposed number of prep rooms on the first floor.
- Each ancillary zone shall be served with a VAV box with a hot water reheat coil. The proposed ancillary spaces on the first floor will have 3 zones.
- Building hot water will be extended from the existing hot water risers located in the chases and serve the hot water coils located on the first floor.
- Add a new 15000 CFM ventilation air handler to provide ventilation air for the entire basement, the south tower 1st, 2nd, and 3rd floors.

BASEMENT THRU THIRD FLOOR RENOVATION

Refer to previous sections for required renovations to each floor. There will be significant savings if all renovation activities occur as one project. Doing so would eliminate the need for future shut downs and other building disruptions as floors are renovated. There is tremendous savings with the economy of scale in renovating the building in one project. There would be no need to provide accommodations for future expansion of systems for future renovations. All of these measures add up to significant cost to the project that could be spent on equipment or other project needs.

Tab 7

electrical

OVERVIEW AND PROJECT DESCRIPTION

The Jones Physical Science Building currently has a 4000 amp 277/480v service that feeds a Main Switchboard that has (4) sections located in the basement Mechanical/Electrical Room that consists of a Primary 277/480v Section with a 500KVA step down Transformer Section feeding a Secondary 120/208v Section. The final section of the Main Switchboard is a 277/480v Motor Control Center.

The current Motor Control Center section of the Main Switchboard is original to the building. Currently it serves HVAC chilled water pumps, domestic water pumps, an air compressor, an air handler, and a condensate pump among other ancillary equipment. I would recommend replacing the final section of the Main Switchboard with a 600 amp 277/480v panelboard and refeed all HVAC equipment from the existing Motor Control Center.

The primary and secondary sections of the main service gear was updated with GE MicroVersa Trip Power Circuit Breakers back in 2004/2009. There isn't a need to replace or upgrade the current breakers however I would recommend that a GE technician come on campus to service all the breakers in the switchboard by way of cleaning, inspecting, and testing.

The current electrical service to the facility is adequate to accommodate all lab renovations on the first through the third floors. The existing distribution system on the primary and secondary sections of the main switchboard would only need to be disturbed to cycle breakers on and off during the renovation/abatement of the south tower through the 3rd floor. All interaction with electrical main service gear should always be coordinated with USC electrical personnel.

ABATEMENT + SHELL SPACE

The south tower basement has areas on the floor that have been previously abated as well as areas that have yet to be abated. For abated/unabated areas/locations the below listed electrical devices shall be disconnected, removed, and disposed of along with their associated conduit and wire back to the appropriate source panelboards. These electrical devices consist of the following:

1. Lighting – 2x2/2x4 fixtures, wall/surface mtd. fixtures, switches, exits, occupancy sensors, etc.
2. Power – floor/wall/ceiling receptacles, plug-in strip wiremold, disconnect switches, clocks, etc.
3. Communications – data/telephone outlets, ceiling speakers, etc.
4. Fire Alarm – smoke detectors, pull stations, strobe/horns, etc.
5. Misc. electrical items – Conduit, junction boxes, etc.

The current basement electrical distribution consists of an 800 amp plug-in bus duct that is currently located in the chase walls of the basement corridor and runs from the basement to the 3rd floor. The 800 amp bus duct is fed from the Secondary 120/208v Section of the Main Switchboard. An 400 amp 120/208v distribution panel is fed from the bus duct and is located in the chase wall of the basement corridor as well. The 800 amp bus duct and 400 amp distribution panel shall remain as-is and not be demolished in the abatement. The 400 amp distribution panel feeds (3) 225 amp 120/208v panelboards all located in the chase walls of the basement corridor. All (3) 225 amp panelboards and all associated feeders/circuits shall be disconnected, removed, and disposed of during abatement. Also located in the chase walls of the basement corridor is an 400 amp 277/480v panelboard with feed thru lugs that is fed from the Primary 277/480v Section of the Main Switchboard. This panel shall also remain as-is and not be demolished in the abatement.

The current basement electrical distribution also consists a 400 amp and a 225 amp 120/208v panelboard currently fed from the Secondary 120/208v Section of the Main Switchboard and located in Dr. Berg's lab space. Both panelboards and their associated feeders/circuits shall be disconnected, removed, and disposed of during abatement.

Also during the basement abatement there are number of existing circuits from south tower panelboards feeding electrical equipment in the north tower. These circuits will need to be traced/re-routed to north tower panelboards during abatement.

The last part of the current basement electrical distribution is a 225 amp 120/208v suspended plug-in bus duct that is currently fed from the Secondary 120/208v Section of the Main Switchboard and located in the Machine Shop area. The bus duct and its associated feeders/circuits shall be disconnected, removed, and disposed of during abatement.

The abatement of floors 1-3 will be identical for each floor. The entire floor will be abated and the below listed electrical devices shall be disconnected, removed, and disposed of along with their associated conduit and wire back to the appropriate source panelboards. These electrical devices consist of the following:

1. Lighting – 2x2/2x4 fixtures, wall/surface mtd. fixtures, switches, exits, occupancy sensors, etc.
2. Power – floor/wall/ceiling receptacles, plug-in strip wiremold, disconnect switches, clocks, etc.
3. Communications – data/telephone outlets, ceiling speakers, etc.
4. Fire Alarm – smoke detectors, pull stations, strobe/horns, etc.
5. Misc. electrical items – Conduit, junction boxes, etc.

The current electrical distribution on each floor consists of an 800 amp plug-in bus duct that is currently located in the chase walls of the corridor and starts from the basement to the 3rd floor. An 400 amp 120/208v distribution panel is fed from the bus duct and is located in the chase wall of the corridor as well. The 800 amp bus duct and 400 amp distribution panel shall remain as-is and not be demolished in the abatement. The 400 amp distribution panel feeds (4) 225 amp 120/208v panelboards all located in the chase walls of the corridor. All (4) 225 amp panelboards and all associated feeders/circuits shall be disconnected, removed, and disposed of during abatement. Also located in the chase walls of the basement corridor is an 400 amp 277/480v panelboard with feed thru lugs. This panel shall also remain as-is and not be demolished in the abatement.

Also during the abatement of each floor there are number of existing circuits from south tower panelboards feeding electrical equipment in the north tower. These circuits will need to be traced/re-routed to north tower panelboards during abatement.

The renovation of the basement, 1st thru 3rd floor as it pertains to a shell space shall consist of providing minimal strip light lighting, exits, a couple of convenience outlets, and the appropriate number of fire alarm strobe and pull stations depending on the space.

BASEMENT RENOVATION

The renovation of the south tower basement will consist of removing/upgrading the 400 amp 120/208v distribution panel and the 400 amp 277/480v panelboard from abatement. The following are approved electrical panelboard manufacturers; G.E., Squared D, and Cutler Hammer/Eaton per USC electrical personnel.

The south tower basement will have renovated spaces as well as shell space. See the basement architectural plans for exact renovation locations. All lighting for the entire south tower basement shall be circuited to the new 400 amp 277/480v 42 circuit panelboard with feed thru lugs. All lighting in all spaces shall comply with the International Energy Code (IEC). The new lighting fixtures shall be a mixture of L.E.D. direct/indirect pendant, ceiling, and wall mounted fixtures, L.E.D. recessed six/eight inch down lights, and recessed L.E.D. 2x4 fixtures. The lighting system shall have manual and automated control by way of SPST/occupancy light switches and ceiling mounted occupancy sensors. Emergency and night lighting shall be accomplished by using battery packs for egress lighting and exit signs in the student/faculty spaces. In the egress corridor areas emergency lighting shall be accomplished by circuiting to the existing emergency lighting panelboard.

In order to serve the renovated spaces (3) new recessed 225 amp 120/208v panelboards shall be added in strategic/practical locations in order to provide power to the Mechanical, Plumbing, and other equipment that will be at 208v, 1-phase/3-phase loads. The (3) new panelboards shall be fed from the new 400 amp 120/208v distribution panelboard. All Panels shall be dead front type with copper bus and bolt-on style circuit breakers.

The existing Air Handler serving the basement is currently fed from the existing Motor Control Center section of the Main Switchboard. The existing feeder and associated wiring would be disconnected and removed in renovation. A new Air Handler will be installed by the mechanical contractor & located in the basement electrical room. The new unit would be fed from the existing 277/480v Motor Control Center.

In addition, (2) new chilled water pumps will be installed by the mechanical contractor & located in the basement electrical room. The new pumps would be fed from the existing 277/480v Motor Control Center.

Floor receptacles for power outlets shall be included in the project in stadium like classroom seating only. All other classrooms will have general convenience outlets. The smaller classrooms shall have ceiling mounted powered retractable projector screen with a ceiling mounted projector mounted from the ceiling. Receptacles in corridors shall be spaced 25 feet on center. Unoccupied spaces shall have one receptacle per room.

All underground/underslab raceways shall be PVC. All locations where underground PVC circuits penetrate the floor slab shall be done with rigid galvanized steel 90 degree bends. All overhead feeder circuits shall be installed in EMT raceway. All wire and cable shall be copper. Conductors for power and lighting branch circuits shall not be smaller than #12 AWG. All conductors #10 AWG and smaller shall be solid with THHN or THWN insulation. Equipment grounding conductor shall be provided along with phase conductors in all conduits.

In the renovated spaces new fire alarm devices that match the existing system shall be provided. These devices include but aren't limited to smoke detectors, HVAC duct detectors for all units greater than 2000 cfm, pull stations, horn/strobe units, and strobe only units. The existing building fire alarm system shall be inspected and verified prior to the addition of new fire alarm devices to the existing system.

Voice and data outlets will have backboxes and conduit to the ceiling plenum. All other wiring shall be by the Owner's voice and data communications provider. All audio/video/tv/data cable for all classrooms shall be coordinated with USC IT Department.

1ST FLOOR RENOVATION

The renovation of the south tower first floor will consist of removing/upgrading the 400 amp 120/208v distribution panel and the 400 amp 277/480v panelboard from abatement. The following are approved electrical panelboard manufacturers; G.E., Squared D, and Cutler Hammer/Eaton per USC electrical personnel.

The entire south tower first floor will be renovated. See the proposed architectural first floor lab layout for exact Lab, prep room, faculty, toilet, and classroom locations. All lighting for the south tower first floor faculty, toilet, corridor, student, and classroom spaces shall be circuited to the new 400 amp 277/480v 42 circuit panelboard with feed thru lugs. All lighting in all spaces shall comply with the International Energy Code (IEC). The new lighting fixtures shall be a mixture of L.E.D. direct/indirect pendant, ceiling, and wall mounted fixtures, L.E.D. recessed six/eight inch down lights, and recessed L.E.D. 2x4 fixtures. The lighting system shall have manual and automated control by way of SPST/occupancy light switches and ceiling mounted occupancy sensors. Emergency and night lighting shall be accomplished by using battery packs for egress lighting and exit signs in the student/faculty spaces. In the egress corridor areas emergency lighting shall be accomplished by circuiting to the existing emergency lighting panelboard.

In order to serve the lab spaces effectively there shall be (4) new dedicated recessed 100 amp 120/208v 42 circuit panelboards, one for each lab space. The panelboards shall be added in strategic/practical locations in order to provide power to all the lab related Mechanical, Plumbing, and other equipment that will be at 208v, 1-phase/3-phase. All lighting for each lab space shall be fed from the lab space dedicated panel. The (4) new panelboards shall be fed from the new 400 amp 120/208v distribution panelboard. All Panels shall be dead front type with copper bus and bolt-on style circuit breakers.

Two additional recessed 225 amp 120/208v 42circuit panelboards shall be added to provide power to the classroom, faculty, toilet, and group study areas.

A new Air Handler will be installed by the mechanical contractor & located in the 4th floor mechanical room. The new Air Handler would be fed from existing 277/480v Panel "4HDP" located in an electrical room on the 4th floor along with associated electrical devices.

All labs shall have power/data floor boxes included in the project for all lab lecterns. All student lab benches shall have GFI receptacles. All other classrooms, toilets, and faculty areas will have general convenience outlets. All labs shall have recessed A/V boxes for wall mounted TV's. Receptacles in corridors shall be spaced 25 feet on center. Unoccupied spaces shall have one receptacle per room.

Coordinate with owner for designated outlets in lab/prep rooms that shall be on emergency power. Emergency 120/208v panelboards are located in 4th floor electrical rooms.

All underground/under slab raceways shall be PVC. All locations where underground PVC circuits penetrate the floor slab shall be done with rigid galvanized steel 90 degree bends. All overhead feeder circuits shall be installed in EMT raceway. All wire and cable shall be copper. Conductors for power and lighting branch circuits shall not be smaller than #12 AWG. All conductors #10 AWG and smaller shall be solid with THHN or THWN insulation. Equipment grounding conductor shall be provided along with phase conductors in all conduits.

In the renovated spaces new fire alarm devices that match the existing system shall be provided. These devices include but aren't limited to smoke detectors, HVAC duct detectors for all units greater than 2000 cfm, pull stations, horn/strobe units, and strobe only units. The existing building fire alarm system shall be inspected and verified prior to the addition of new fire alarm devices to the existing system.

Voice and data outlets will have backboxes and conduit to the ceiling plenum. All other wiring shall be by the Owner's voice and data communications provider. All audio/video/tv/data cable for all classrooms shall be coordinated with USC IT Department.

2ND OR 3RD FLOOR RENOVATION

The renovation of the south tower second/third floor will consist of removing/upgrading the 400 amp 120/208v distribution panel and the 400 amp 277/480v panelboard from abatement. The following are approved electrical panelboard manufacturers; G.E., Squared D, and Cutler Hammer/Eaton per USC electrical personnel.

The entire south tower second/third floor will be renovated. See the proposed architectural second/third floor lab layout for exact Lab, prep room, faculty, and classroom locations. All lighting for the south tower second/third floor faculty, corridor, student, and classroom spaces shall be circuited to the new 400 amp 277/480v 42 circuit panelboard with feed thru lugs. All lighting in all spaces shall comply with the International Energy Code (IEC). The new lighting fixtures shall be a mixture of L.E.D. direct/indirect pendant, ceiling, and wall mounted fixtures, L.E.D. recessed six/eight inch down lights, and recessed L.E.D. 2x4 fixtures. The lighting system shall have manual and automated control by way of SPST/occupancy light switches and ceiling mounted occupancy sensors. Emergency and night lighting shall be accomplished by using battery packs for egress lighting and exit signs in the student/faculty spaces. In the egress corridor areas emergency lighting shall be accomplished by circuiting to the existing emergency lighting panelboard.

In order to serve the lab spaces effectively there shall be (4) new dedicated recessed 100 amp 120/208v 42 circuit panelboards, one for each lab space. The panelboards shall be added in strategic/practical locations in order to provide power to all the lab related Mechanical, Plumbing, and other equipment that will be at 208v, 1-phase/3-phase. All lighting for each lab space shall be fed from the lab space dedicated panel. The (4) new panelboards shall be fed from the new 400 amp 120/208v distribution panelboard. All Panels shall be dead front type with copper bus and bolt-on style circuit breakers.

Two additional recessed 225 amp 120/208v 42circuit panelboards shall be added to provide power to the classroom, faculty, toilet, and group study areas.

A new Air Handler will be installed by the mechanical contractor & located in the 4th floor mechanical room. The new Air Handler would be fed from existing 277/480v Panel "4HDP" located in an electrical room on the 4th floor along with associated electrical devices.

All labs shall have power/data floor boxes included in the project for all lab lecterns. There are no receptacles in the lab benches. All labs shall have non-metallic raceway plug mold with GFI receptacles wall mounted above counter-tops near lab sinks. All other classrooms, prep rooms, and faculty/office, and group study areas will have general convenience outlets. All labs shall have recessed A/V boxes for wall mounted TV's. Receptacles in corridors shall be spaced 25 feet on center.

Coordinate with owner for designated outlets in lab/prep rooms that shall be on emergency power. Emergency 120/208v panelboards are located in 4th floor electrical rooms.

All underground/under slab raceways shall be PVC. All locations where underground PVC circuits penetrate the floor slab shall be done with rigid galvanized steel 90 degree bends. All overhead feeder circuits shall be installed in EMT raceway. All wire and cable shall be copper. Conductors for power and lighting branch circuits shall not be smaller than #12 AWG. All conductors #10 AWG and smaller shall be solid with THHN or THWN insulation. Equipment grounding conductor shall be provided along with phase conductors in all conduits.

In the renovated spaces new fire alarm devices that match the existing system shall be provided. These devices include but aren't limited to smoke detectors, HVAC duct detectors for all units greater than 2000 cfm, pull stations, horn/strobe units, and strobe only units. The existing building fire alarm system shall be inspected and verified prior to the addition of new fire alarm devices to the existing system.

Voice and data outlets will have backboxes and conduit to the ceiling plenum. All other wiring shall be by the Owner's voice and data communications provider. All audio/video/tv/data cable for all classrooms shall be coordinated with USC IT Department.

BASEMENT THRU THIRD FLOOR RENOVATION

Refer to previous sections for required renovations to each floor. There will be significant savings if all renovation activities occur as one project. Doing so would eliminate the need for future shut downs and other building disruptions as floors are renovated. There is tremendous savings with the economy of scale in renovating the building in one project. There would be no need to provide accommodations for future expansion of systems for future renovations. All of these measures add up to significant cost to the project that could be spent on equipment or other project needs.

Tab 8

owner supplied information

OWNER SUPPLIED INFORMATION

Information Technology

The University IT department in consultation with faculty and staff committee members has made recommendations for IT requirement for the project. Those requirements are generally described below:

Labs, Classrooms, Collaboration Spaces, and Offices

- Cat6 wall outlets
- Cat6 for A/V systems
- Cat6 for wireless service
- Cat6 cabling
- Wireless Equipment
- Network Switches
- Phones
- Installation and Labor

Audio Visual

The University A/V department has determined the following A/V needs in consultation with faculty and staff committee members. Additionally the budgeting of both the labs and classrooms will be based on the Provost's standard level of AV technology. Each of the collaboration spaces will also have digital message boards, TVs and other technology.

Labs and classroom A/V requirements:

- Lectern/credenza – classrooms would get a lectern and labs would get a credenza
- Projector/screen
- Crestron control system to control input selection and on/off controls
- Document cameras
- Laptop and desktop inputs
- Blu-ray player
- Sound system
- Integration labor

Jones Physical Science Center
South Tower Lab Renovation
Feasibility Study

Tab 8

budget

BUDGET

BIOLOGICAL LAB RENOVATIONS - ABATEMENT & SHELLS ONLY Feasibility Study Estimate	
Asbestos Abatement / Demolition (basement through third floors)	$488,272
Life Safety / Shell Space @ remaining Floors (basement through third floors)	$886,000
4th Floor Renovation	$50,000
Construction Sub-Total:	**$1,424272**
A/E and Commissioning fees (8%)	$113,943
Abatement Consultant fees, Investigation and Sampling	$110,040
Third Party Testing and Inspections	$30,000
USC Facilities Assistance	$10,000
Builders Risk Insurance	$1,400
Market Escalation (2 years @ 10%):	$168,966
Contingency (Design, Construction and Estimating - 15%)	$278,794
Total Costs:	**$2,137,415**

Biological Lab Renovations - Basement Level Only
Estimate Summary

- Abatement of the project area on the basement through third Floor
- Provide shell space on basement through third floor project area
- Provide minimal code required life safety, fire protection, HVAC and lighting for shell space

BIOLOGICAL LAB RENOVATIONS - BASEMENT LEVEL ONLY

Feasibility Study Estimate

Asbestos Abatement / Demolition (basement through third floors)			$488,272
Life Safety / Shell Space @ remaining Floors (first through third floors)			$501,000
Basement Renovations Construction Costs:			$1,219,900
Plumbing	$170,950		
Mechanical	$384,350		
Electrical	$239,880		
Fire Protection	$39,675		
4th Floor Renovation			$50,000
		Construction Subtotal :	**$2,259,172**
A/E and Commissioning fees (8%)			$180,735
Abatement Consultant fees, Investigation and Sampling			$110,040
Furniture, Fixtures and Equipment			$168,900
Signage			$1,400
IT			$47,896
Audio/ Video Equipment			$266,500
Third Party Testing and Inspections			$30,000
USC Facilities Assistance			$10,000
Builders Risk Insurance			$1,400
Market Escalation (2 years @ 10%):			$307,605
Contingency (Design, Construction and Estimating - 25%)			$845,913
		Total Costs:	**$4,229,561**

Biological Lab Renovations – Basement Level Only
Estimate Summary

- Abatement of the project area on the basement through third Floor
- New Classroom, collaboration space and ANSI A117.1 compliant toilet rooms in the basement
- All associated plumbing, mechanical, fire protection and electrical work

BIOLOGICAL LAB RENOVATIONS - 1ST FLOOR ONLY

Feasibility Study Estimate

Asbestos Abatement / Demolition (basement through third floors)			$488,272
Life Safety / Shell Space @ remaining Floors (Basement, second and third floors)			$407,700
First Floor Renovations Construction Costs:			$3,721,700
	Plumbing	$533,005	
	Mechanical	$821,630	
	Electrical	$453,874	
	Fire Protection	$75,440	
4th Floor Renovation			$50,000
		Construction Subtotal :	**$4,667,672**
	A/E and Commissioning fees (8%)		$373,414
	Abatement Consultant fees, Investigation and Sampling		$110,040
	Furniture		$136,300
	Lab Equipment (microscopes, refrigerators, balances, etc.)		$250,000
	Signage		$2,200
	IT		$42,953
	Audio/ Video Equipment		$182,500
	Third Party Testing and Inspections		$30,000
	USC Facilities Assistance		$10,000
	Builders Risk Insurance		$1,400
	Market Escalation (2 years @ 10%):		$580,648
	Contingency (Design, Construction and Estimating - 25%)		$1,596,782
		Total Costs:	**$7,983,909**

Biological Lab Renovations – First Floor Only
Estimate Summary

- Abatement of the project area on the basement through third Floor
- 4 new biology labs and support spaces, collaboration space, office space and ANSI A117.1 compliant toilet rooms on the first floor
- All associated plumbing, mechanical, fire protection and electrical work

BIOLOGICAL LAB RENOVATIONS - 2ND FLOOR ONLY

Feasibility Study Estimate

Asbestos Abatement / Demolition (basement through third floors)			$488,272
Life Safety / Shell Space @ remaining Floors (basement, first and third floors)			$452,400
Second Floor Renovations Construction Costs:			$3,066,500
	Plumbing	$506,220	
	Mechanical	$712,110	
	Electrical	$378,028	
	Fire Protection	$58,305	
4th Floor Renovation			$50,000
		Construction Subtotal :	**$4,057,172**
	A/E and Commissioning fees (8%)		$324,574
	Abatement Consultant fees, Investigation and Sampling		$110,040
	Furniture		$58,600
	Lab Equipment (microscopes, refrigerators, balances, etc.)		$250,000
	Signage		$2,100
	IT		$27,467
	Audio/ Video Equipment		$146,500
	Third Party Testing and Inspections		$30,000
	USC Facilities Assistance		$10,000
	Builders Risk Insurance		$1,400
	Market Escalation (2 years @ 10%):		$501,785
	Contingency (Design, Construction and Estimating - 25%)		$1,379,910
		Total Costs:	**$6,899,548**

Biological Lab Renovations – Second Floor Only
Estimate Summary

- Abatement of the project area on the basement through third Floor
- 4 new biology labs and support spaces, collaboration space, office space and ANSI A117.1 compliant toilet rooms on the second floor
- All associated plumbing, mechanical, fire protection and electrical work

BIOLOGICAL LAB RENOVATIONS - 3RD FLOOR ONLY

Feasibility Study Estimate

Asbestos Abatement / Demolition (basement through third floors)			$488,272
Life Safety / Shell Space @ remaining Floors (basement through second floors)			$452,400
Third Floor Renovations Construction Costs:			$3,051,700
Plumbing	$506,220		
Mechanical	$712,110		
Electrical	$378,028		
Fire Protection	$58,305		
4th Floor Renovation			$50,000
		Construction Subtotal :	**$4,042,372**
A/E and Commissioning fees (8%)			$323,390
Abatement Consultant fees, Investigation and Sampling			$110,040
Furniture			$74,600
Lab Equipment (microscopes, refrigerators, balances, etc.)			$250,000
Signage			$1,600
IT			$28,228
Audio/ Video Equipment			$182,500
Third Party Testing and Inspections			$30,000
USC Facilities Assistance			$10,000
Builders Risk Insurance			$1,400
Market Escalation (2 years @ 10%):			$505,413
Contingency (Design, Construction and Estimating - 25%)			$1,389,886
		Total Costs:	**$6,949,429**

Biological Lab Renovations – Third Floor Only
Estimate Summary

- Abatement of the project area on the basement through third Floor
- 4 new biology labs and support spaces, collaboration space, office space and ANSI A117.1 compliant toilet rooms on the third floors
- All associated plumbing, mechanical, fire protection and electrical work

BIOLOGICAL LAB RENOVATIONS - 1ST AND 2ND FLOORS ONLY

Feasibility Study Estimate

Asbestos Abatement / Demolition (basement through third floors)			$488,272
Life Safety / Shell Space @ remaining Floors (basement and third floors)			$202,400
First and Second Floors Renovation Construction Costs:			$6,538,200
	Plumbing	$1,039,225	
	Mechanical	$1,433,740	
	Electrical	$831,902	
	Fire Protection	$133,745	
4th Floor Renovation			$50,000
		Construction Subtotal :	**$7,278,872**
	A/E and Commissioning fees (8%)		$582,310
	Abatement Consultant fees, Investigation and Sampling		$110,040
	Furniture		$194,900
	Lab Equipment (microscopes, refrigerators, balances, etc.)		$500,000
	Signage		$4,300
	IT		$70,420
	Audio/ Video Equipment		$329,000
	Third Party Testing and Inspections		$60,000
	USC Facilities Assistance		$20,000
	Builders Risk Insurance		$2,800
	Market Escalation (2 years @ 10%):		$915,264
	Contingency (Design, Construction and Estimating - 25%)		$2,516,977
		Total Costs:	**$12,584,883**

Biological Lab Renovations – First and Second Floors Only
Estimate Summary

- Abatement of the project area on the basement through third Floor
- New Classroom lab, collaboration space and ANSI A117.1 compliant toilet rooms in the basement
- 8 new biology labs and support spaces, collaboration space, office space and ANSI A117.1 compliant toilet rooms on the first and second floors
- All associated plumbing, mechanical, fire protection and electrical work

BIOLOGICAL LAB RENOVATIONS - ALL FLOORS COMBINED

Feasibility Study Estimate

Asbestos Abatement / Demolition (basement through third floors)			$488,272
All Floors Renovations Construction Costs:			$9,920,335
Plumbing	$1,319,232		
Mechanical	$1,604,591		
Electrical	$1,065,422		
Fire Protection	$221,297		
4th Floor Renovation			$50,000
		Construction Subtotal :	**$10,458,607**
A/E and Commissioning fees (8%)			$836,690
Abatement Consultant fees, Investigation and Sampling			$110,040
Furniture			$438,400
Lab Equipment (microscopes, refrigerators, balances, etc.)			$750,000
Signage			$7,300
IT			$146,544
Audio/ Video Equipment			$778,000
Third Party Testing and Inspections			$120,000
USC Facilities Assistance			$25,000
Builders Risk Insurance			$3,800
Market Escalation (2 years @ 10%):			$1,367,439
Contingency (Design, Construction and Estimating - 25%)			$3,760,456
		Total Costs:	**$18,802,276**

Biological Lab Renovations – All Floor Combined
Estimate Summary

- Abatement of the project area on the basement through third Floor
- New Classroom, collaboration space and ANSI A117.1 compliant toilet rooms in the basement
- 12 new biology labs and support spaces, collaboration space, office space and ANSI A117.1 compliant toilet rooms on the first, second and third floors
- All associated plumbing, mechanical, fire protection and electrical work