

Academic Office Building Annex Improvement Project

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1.0 Introduction

“Recognizing the various needs of the client to provide solutions for the future, while preserving the past.” To accomplish this mission statement, Superior Research & Engineering embarked on a semester-long project to develop a concept plan of the Academic Office Building Annex based on the needs and wants of the client, the MTU Social Science Department. To accomplish this concept plan, a scope of work developed, based off of recommendations by Senior Design Advisor, Bill Leder. This report is a conclusive document covering the entire scope of work.

2.0 Study Context

The Academic Office Building Annex was originally constructed in 1936/1937. Designed by Wilfrid Polkinghorne, who was at the time an assistant professor in the combined Civil and Mining Engineering Department, the building appears to have been funded by one of the New Deal programs. The building was intended to be a storage annex for the university library, which was housed in what is today the Academic Office Building. Interestingly, around the same time the Annex was constructed, the university received a Works Progress Administration (WPA) grant to improve the library catalogue system. Whether this influenced the building of the Annex seems unlikely, but remains unknown. To facilitate movement between the Academic Office Building (AOB) and the stacks on the second floor of the Annex (where government documents were stored), a skybridge connected the two buildings. Plans indicate that the second floor was devoted entirely to document storage, as no offices or interior walls appear. Meanwhile, the first floor was similarly open in design, and apparently housed the pipe shop. Finally, a rifle range with dirt floor and backstop were housed in the basement. This rifle range, apparently for use by the Reserve Officers’ Training Corps (ROTC) program, also boasted the only restroom in the original building configuration.

Interestingly, Polkinghorne may have taken inspiration for this particular design element from a nearby source. The Engineering Building (long since torn down), which was located east of the library and Annex, also featured fluted columns and concrete finials. Whether Polkinghorne copied this particular feature into his designs for the Annex remains unknown, but is entirely possible.

By 1959 the building had changed considerably. While the book storage on the second floor and the rifle range in the basement remained basically unchanged, the open first floor was partitioned into several smaller rooms. Maintenance and facilities tasks seem to have been limited to a garage at the west end of the building, where the current archaeology lab is today. Meanwhile, the rest of the floor was divided into offices for the Army and Air Force ROTC programs. Both the Army and Air Force also had individual storerooms on the floor. Interestingly, the garage space was isolated from the rest of the first floor, with no doors connecting it to the Army/Air Force offices.

After 1959 the history of the building becomes somewhat confused. Although no specific dates appear, several changes occurred in the building between 1959 and the late 1980s. At some point, the documents stored on the second floor were placed in the newly-constructed J.R. Van Pelt Library, ostensibly to make way for the Houghton County Health Department. The Army and Air Force ROTC offices may also have moved to their current location in the original campus gym/clubhouse at this point. By 1977, the former garage held the university paint shop. However, in that year the paint shop was removed from the building for bureaucratic or political reasons, and the fledgling archaeology program was allowed to use the space as a lab. Sometime around 1985 the skybridge connecting the Annex and the Academic Office Building was removed. In a somewhat bizarre twist, researchers uncovered or were told at least six different reasons for the removal of the skybridge. These stories (involving everything from the need to allow high-rise firefighting equipment to reach the then newly-constructed R.L. Smith Mechanical Engineering-Engineering Mechanics building, to a structurally unsound bridge structure) all seem equally plausible, but it generally appears that the bridge was removed at the request of the Health Department, citing needs for increased security and privacy. By removing the bridge, the Health Department limited access to its space to a single door on the east side of the Annex. The rifle range in the basement also existed into the 1980s, but was perhaps removed when a new target facility was constructed in the Student Development Complex. The basement was refinished by pouring a simple concrete slab on the floor.

At the same time, the Social Science Department slowly acquired more space on the first floor. By slightly altering the Army/Air Force configuration and adding a restroom, the first floor was transformed into the layout visible today. The Social Science/Industrial Archaeology programs remained cramped into the first floor through the 1990s and the turn of the century. Concurrently, most of the Health Department moved out of the building, leaving only the Michigan Water Quality testing laboratory on the second floor. Finally, in 2004/2005, the entire building was turned over to the Industrial Archaeology program. The Water Quality lab moved to the new Advanced Technology Development Complex, freeing up space for students in the new doctoral program in Industrial Heritage and Preservation as well as the Society for Industrial Archaeology (SIA) offices. Later, the library, have long since moved out of the Academic Office Building, returned some journals and documents to remote storage in the basement as construction upgraded the new library facilities in 2003-2005. These journals were finally retrieved in late 2005, providing a large space for artifact storage and conservation.

3.0 Analysis Methodology

As the single Social Science representative on the Superior Research & Engineering Team, Craig Wilson spent the better part of the work period involved in various sorts of research to help the team better understand the nature of their project, the renovation of the Academic Office Building Annex. While the rest of the team focused on the engineering and technical aspects of the project, Wilson carried out formal archival research to discover the history of the Annex and acted as a liaison between client (the Social Science Department) and consultant (Superior Research & Engineering). As part of this research and cooperation with the client, numerous interviews with Social Science faculty and staff were carried out to gather their input on the project. The results of these interviews were then used in preliminary planning as outlined below. What follows is a basic outline of the research methodology used in and the research results produced from the more socially-oriented portions of the overall project.

3.1 Interviews

On the first crucial steps in the planned redesign of the Annex was to ascertain the wants and needs of the primary users of the building, the Social Science Department. As such, a number of interviews were conducted with various faculty and staff members to determine what they wanted to see in the “new and improved” space. Each interview followed the same basic format, with four general questions designed to spark conversation between interviewer and subject about various aspects of the building. The four questions were as follows: 1.) What would you *like* to be improved in the building? 2.) What improvements do you *need* to successfully carry out your job in the Annex? 3.) What characteristics of the building (design elements, general feeling, etc.) should be saved? 4.) Do you have any ideas about renaming the building or about possible funding sources?

Of those interviewed, three were faculty, three were staff members, and four were students. Dr. Patrick Martin (professor of archaeology) founded the Industrial Archaeology program (which is housed in the Annex) at MTU and remains its director. As such, he is involved in some way in most activities which take place in the building. Dr. Susan Martin (associate professor of archaeology) is the archaeological lab director and oversees artifact conservation. Dr. Tim Scarlett (assistant professor of archaeology) regularly uses the lab space as a base for experimental archaeology and teaches the lab science courses. Don Durfee runs the Society for Industrial Archaeology office, where the Society journal, *IA: The Journal of the Society for Industrial Archaeology*, is based and published. Mike Deegan is the research associate, responsible for artifact conservation and any contract work with outside clients the department is involved in. Paul White assists him in the same capacity. Bode Morin and Cameron Hartnell are the first students in the new doctoral program in Industrial Heritage and Preservation. Finally, Vanessa McLean and Nichole Drenning are students in the Industrial Archaeology masters program. Although Dr. Bruce Seely (professor of history and chair of the Social Science Department) was not formally interviewed, he provided numerous thoughts and ideas about how to better use the space as well.

Upon completion of these interviews, the results were compiled first into a basic spreadsheet. Using this spreadsheet, a color-coded chart (attached) was created to visually demonstrate the wants and needs of the interview group as a whole. This chart was an important tool in deciding which changes and design elements would be included in Superior Research & Engineering's preliminary plans for the redesigned Annex space. These charts can be found in Appendix A.

3.2 Design Meeting

Using the chart as a jumping-off point, the consultants produced a number of preliminary designs for the Annex, each based upon personal interpretations of the interview results by individual team members. Approximately four different designs each were produced for the basement, first, and second floors of the Annex. Again seeking the input of the client, a meeting was arranged with several of the original interview subjects to ascertain which of the preliminary designs best suited their needs for the redesigned Annex.

Meeting in a casual group setting, Dr. Pat Martin, Dr. Susan Martin, Dr. Tim Scarlett, and Don Durfee examined the various plans and offered their opinions as to which overall design and which individual design elements were the most welcome. After reviewing and discussing multiple possible plans for each of the three floors in the Annex with the consultant team, the client representatives proposed their own ideal plan

3.3 Technical Research

The main source of technical documents for the Annex came from MTU Facilities Management. Many sources were investigated; however, Facilities Management was the only source which gave any substantial information or drawings. Ed Maki, of MTU Facilities Management, was the only source of usable documents obtained during this project. The age and use of the building led to the lack of documentation over the years. Another lead investigated through the early half of the semester was William Verette of Gundlach-Champion. Several professors suggested calling him to find out if Gundlach-Champion may have had the drawings in storage because recently the Academic Office Building blue prints were donated to the archives in the library. Unfortunately, after several calls, it was concluded that no such plans existed because the AOB plans came from Mr. Gundlach's personal files. Another source of documents for the Annex was Tom Adams of Northern Awning and Window Company, the contractor working on the roof during the beginning of the fall 2006 semester. After several chance meetings, a spare set of plans was obtained from him for the Annex rooftop, before and after renovation views. Later, drawings of tunnels on Michigan Tech's campus were donated to assist in the design of a stairwell for the Annex.

4.0 Engineering Criteria and Assumptions

While working on this concept design many assumptions were made for different sections of the project. Main assumptions deal with the elevator, soils, and existing building structure.

The existing structure possesses enough reinforcement to provide adequate tensile strength to remain tension-controlled. Unknowns include the following questions. What type of reinforcement was used in the original construction of the building? Is there concrete block in the walls, and what makes up the bulk of the wall? The floor load is distributed to the walls and directed into the foundation of the building. Is the cracking that began on the second floor ribs of the floor in the Industrial Archeology Lab of concern?

Though the dimensions of the actual elevator shaft are dependent upon the size, type and brand of elevator, whether or not the internal shaft can be built will depend on multiple assumptions. If the basement floor allows for a pit to be built several feet down below the basement to allow for some mechanics and the elevator to come to the ground level evenly. This is assuming the soils below the slab in the basement are capable of supporting the whole elevator shaft including extra weight from each of the floor.

In regards to the stairwell, a soil profile must be determined through soil borings. This type of sub-surface exploration will not give a complete view of the soil. However, it will give enough information to determine the size of the foundation with which the structure will be built upon. Whether or not the external stairwell can be secured or built into the existing building can only be determined by an engineering firm. Another assumption made includes the ability to cut into the foundation and each level of the building on the west side to provide a space for a door to the stairwell.

Assumptions for the bridge include the existence of pedestals in the walls of both building. These pedestals are shown in the drawings of the original bridge. This can not be investigated due to the cladding found on both buildings' exteriors at the former bridge connections. If the pedestals aren't in the walls, bridge supports must be added to hold the bridge up separately. This also will have to be designed by an engineering firm.

Many of these assumptions have been made because a new addition or renovation would be affected. All major assumptions have been stated to further develop the concept design for the building.

5.0 Architectural Components

Currently, there are several historic design elements which can be considered integral to the overall historic character of the Academic Office Building Annex. On the exterior of the building, the fluted brick pilasters and concrete finials hearken back to the Art Deco and Streamlined Moderne schools of design in vogue when the Annex was constructed in the 1930s. A key feature of Art Deco design was a feeling of plainness and severity, brightened by small touches of decoration. On the Annex building, fluted brick pilasters and concrete finials could have provided such decoration. Meanwhile inside, most of the valuable historic elements are found on the second floor. A high ceiling is supported by three oak pillars, adding a decorative yet studious flair to the wide central hallway. Oak trim and furniture, most notably a series of three large map cases, lines the walls. The exterior walls are covered with light tan ceramic tile, further identifying the space as a historic laboratory. Finally, green and scarlet floor tiles present a balanced, academic color palette to the entire floor. These elements represent the identifying architectural components.

6.0 Verification of As-Built Drawings

Elevation and profile views of the Annex have been created from a compilation of the surveying work done by Superior Research & Engineering as well as the as-built drawings obtained from Ed Maki at Facilities Management. The drawings that existed at Facilities Management were old, and had been altered with very little reference as to dates of changes. Superior Research & Engineering made the decision to insure the project continue with an accurate portrayal of the building's dimensions.

The surveying which was done by Superior Research & Engineering was very important and vital to almost all of the aspects of the Annex Improvement Project. Times to conduct the actual surveying and measuring were selected to not interfere with the students and staff of the department. Selecting these times meant that the quality of the measurements was greater. Also, any interference or danger posed by traffic, parked vehicles, and other people was reduced. Equipment for surveying and guidance was supplied by Rob Fritz of the Civil and Environmental Engineering Department. The benchmark in front of the Michigan Tech Library was used to determine all of the elevations of the Annex after leveling over to the building. Surveying was performed in two parts. One of those parts was during class. In which a known elevation of a manhole near the south east corner of the Annex was found. This manhole was the turning point to which all other elevations were determined from. The second portion was finding elevations of the Annex building itself and objects surrounding it. The second was completed the following Saturday.

Interior measurements of the Annex were performed at several times, both in and outside of class. These measurements were each time verified for correctness. The greatest attempts were made to make all measurements in a quiet and orderly manner. Tape measures and measuring tapes were supplied mostly by the Social Science Department itself.

The best attempts were made to make measurements as accurately and consistently as possible. When a discrepancy was noted during the process of entering the data into the computer drawing, the measurement was either corrected using good judgment or measured again. These drawings can be found in Appendix C.

The surveying done by Superior Research & Engineering will not only fulfill objectives set forth by the Social Science Department, but will also serve as a valuable asset to the Department. The department will find the data compiled into accurate drawings of the building and surrounding landscape helpful in future work towards improvements. With accurate drawings Facilities Management will be able to more quickly respond to the any request for enhancements and/or maintenance to the Annex. These drawings can be attached to any initial memo sent to Facilities to begin any project in the future. Including the title page of the drawings (Appendix T) would be appropriate as an introduction.

7.0 Climate Control Recommendations

The basement of the Annex building, which the Department currently uses for archival purposes, will need to be climate controlled. This shall be attained by a separate HVAC system to observe temperature and humidity.

The Michigan Tech Archives was recently relocated and renovated as with the rest of the library. This renovation also made changes to the HVAC systems within their archival storage. To properly update these systems, a consultant was hired to recommend changes to be made. It can be assumed that the recommendations which were made can be mirrored in the basement of the Annex. This report is the main reference for the following recommendations.

Constant or nearly constant temperature and humidity is important. Temperature below 70 degrees F and relative humidity of less than 50% are commonly recommended. The relative humidity is of particular concern for archived materials; this should not be lower than 30% or fluctuate. The basement storage should also have a work area for observation and analysis of the materials. This will allow the stored items to not experience a huge fluctuation in temperature due to a change in environment. Observations of the temperature and humidity should be done year round. Fluctuations should not occur within a 24 hour period.

Human comfort is not taken into consideration when creating storage facilities. The climate of the entire basement should be controlled. Desks and a work area are recommended in the area immediately adjacent to the stacks. The work area ensures that as archived materials are being examined, a drastic change in temperature does not occur that could possibly cause moisture buildup. A smaller and even more controlled environment will be constructed within the basement as well. The department can use this to house different artifacts that are more important or very different from the rest of the collection.

Planning is very important for effectively creating a space such as the one the department desires. Prior to construction proper planning will ensure a smooth transition. Temporary storage facilities will need to be in place. Careful monitoring of the stored items is important at all times for security and the possibility that deterioration may speed up during the transition. Following construction, the archived materials should be cleaned of all construction dust that has accumulated over the project. This dust should also be cleaned out of all HVAC ducts and equipment.

Consulting an engineer specializing in climate control is a valid option that should be explored by the department in the future. Also, exploring funding sources for updating and creating facilities to store artifacts should be considered. For example, the Mainwaring Wing of the University of Pennsylvania Museum found support from foundations, corporations, and individuals. Grant programs can be another source of funding for sites such as the Annex. The National Endowment for the Humanities is an organization which provides preservation and access grants to assist in properly preserving historically important materials.

8.0 Building Code Compliance

A large part of this project involved researching building code and determining what features of the Annex must be altered in order to meet current building code and the Americans With Disabilities Act. The bodies of code used in this project were the International Building Code (IBC), the International Existing Building Code (IEBC), International Fire Code (IFC), Americans With Disabilities Act (ADA), and the MTU Facilities Department's Construction Standards for Architects, Engineers, and Planners (MTU CSAEP). The IBC is a collection of regulations that regard safe construction; it includes dimensions of all means of egress, defines and regulates hazardous materials, electrical systems, and HVAC and air circulation systems. IFC is an addition to IBC that strictly deals with fire safety, suppression, and alarms. The IEBC is another addition to IBC that deals with the renovation and alteration of existing buildings. ADA is an act of Congress that requires special accommodations to ensure accessible design for all people with disabilities. MTU CSAEP is a document from the Michigan Tech facilities department that dictated the building requirements of all buildings on the Michigan Tech campus.

8.1 Construction Type

According to IBC public colleges and universities are classified as business; therefore, the Annex is Type B construction.

According to IEBC this project is a level 3 alteration (IEBC 305)

8.2 Bathrooms

All bathrooms must meet ADA code requirements. There must be at least one bathroom for each gender; however, unisex bathrooms are acceptable for a building of this size. Bathrooms must be located in accessible areas of the building and have adequate clearance inside for wheelchairs (ADA 4.16.2). Figure 8.1 shows an example of adequate clear space within a bathroom.

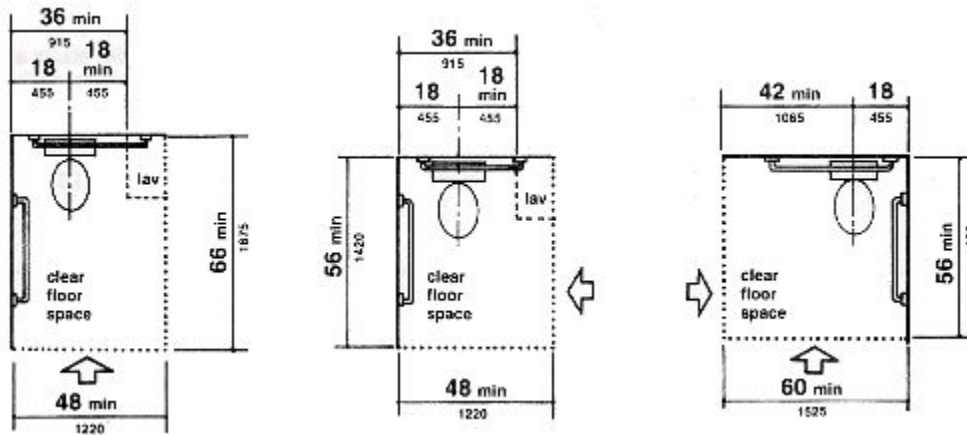


Figure 8.1: Clear Floor Space for Bathroom (ADA figure 28)

Grab bars and handicap accessible sinks must be installed in all bathrooms (ADA 4.16.4). Figure 8.2 shows the required location of grab bars in a bathroom.

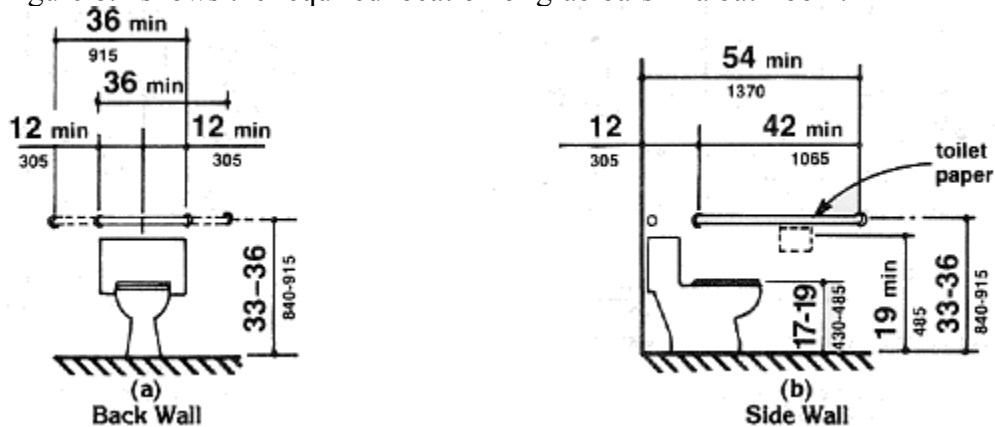


Figure 8.2: Grab Bars in Bathroom (ADA figure 29)

8.3 Stairs

In order for stairs to meet ADA section 4.9 accessibility requirements they must have uniform riser heights and have a minimum distance of 11 inches from riser end to riser end (ADA 4.9.2). The slope of the stairs can be no greater than sixty degrees from the horizontal (ADA 4.9.3). The current stairway to the second floor does not meet these requirements. According to section 4.1.6 ADA and 506.1 IEBC no modifications are required because such modifications would be technically infeasible since it would require cutting into and removing some load bearing structural elements. The current

second floor stairs will need to be altered as much as is feasible and marked with bright colored warning tape on any step that does not meet these requirements. Figure 8.3 shows details of stair design according to ADA. All new stair construction must meet these requirements.

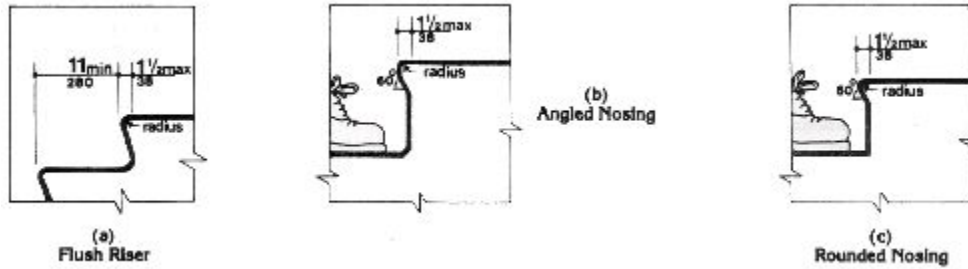


Figure 8.3: ADA Stair Design (ADA figure 18)

Handrails are also a requirement of any stair construction. Handrails are to be continuous along the length of the stairs and extend 12 inches past the last stair. Figure 8.4 shows details of handrail construction according to ADA.

Stair head clearance will be at least 80" (IBC 1009.2) in all new stairwell construction.

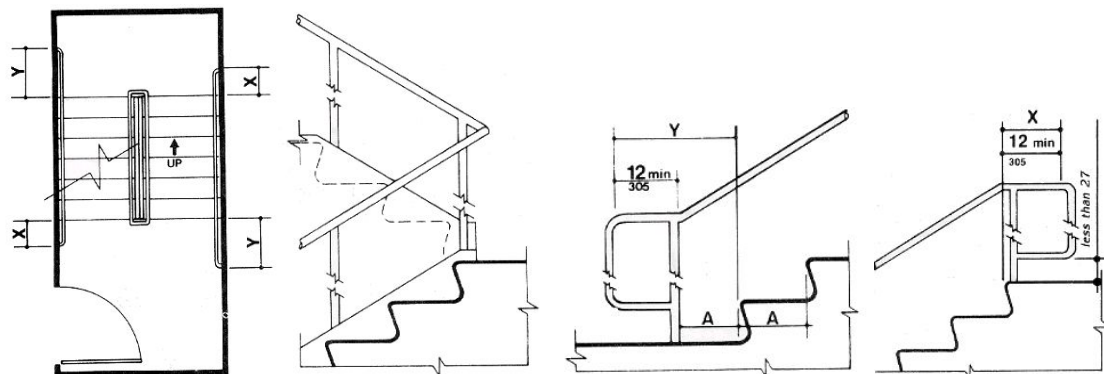


Figure 8.4: ADA Handrail Design (ADA figure 19)

8.4 Doors and Entrances

All doorways shall have a width of 32 inches and open at least 90 degrees as seen in Figure 8.5. Doors must have a maximum opening force of 5 pounds (ADA 4.13). Door knobs need to be replaced with handles or push panels (ADA 4.13.9).

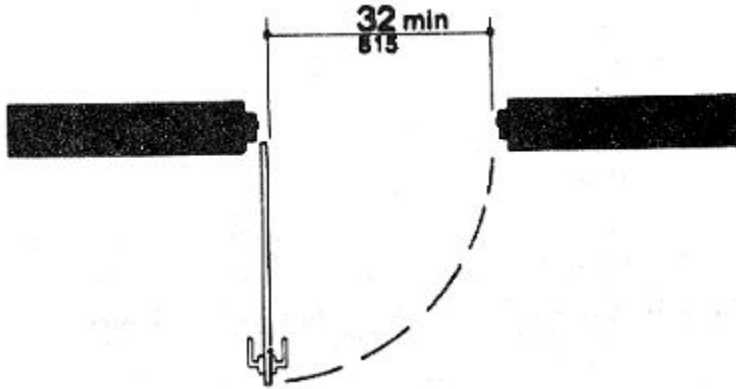


Figure 8.5: Minimum Door Size (ADA figure 24b)

The designated main entrance to the building must be handicap accessible and have an automatic door opening device installed (ADA 4.3.2)

8.5 Means of Egress

48 inches minimum stair width (IBC 1007.3) is required for all new stairwell construction.

A Minimum width of 32 inches is required for all doors, and a 90 degree minimum swing angle from doorway (IBC 1008) for all new and old doors.

All corridors will have a minimum width of 44 inches in accordance with IBC 1016.2.

No dead end corridors can exist with a length greater than 20 feet (IBC 1016.2).

2 Exit doorways are required for the first and second floors (IBC 605.4.1). The second stairwell being added to the outside of the building will satisfy this requirement.

8.6 Fire Protection System

IBC and IFC do not require fire suppression or alarm system for type B construction (IBC 903.2.2). It is, however, recommended that such systems be updated and added for safety. The MTU CSAEP requires all fire alarm and suppression systems to be wired into the central system. IFC requires that there be at least two exits from every floor of the building that is used for purposes other than storage.

8.7 Hazardous Materials

Older buildings often have some hazardous material in their structure. These were used in their construction, but would no longer be permitted by current construction and building safety standards. The most common hazardous material is asbestos in pipe insulation or floor tile and mastic. Materials with less than one percent asbestos are not considered hazardous. It is not required that these materials be removed before renovation or alteration.

The Michigan Tech Facilities department has on file an asbestos building survey report from Nova Consulting Group, Inc. This report, dated October 2004, is the most recent asbestos report for the Annex.

The report states that the red and black floor tile and mastic on the second floor contain asbestos in quantities of less than one percent. It would not be required that these materials be removed before renovations or alterations take place. 42 square feet of floor tile and the mastic in the second floor women's restroom contains asbestos and would have to be removed prior to renovations in this area. The aircell pipe insulation and fitting insulation also contains asbestos and must be removed if these pipes are to be altered or exposed in any way. There are 285 linear feet of pipe insulation, and 3 fittings that contain asbestos and require removal.

9.0 Accessibility and Security

Access to the Academic Office Building Annex is unlike any building access on campus. Presently the AOB Annex is the only instructional building on campus which does not have card access entry. The AOB Annex has access through four doors, of which two doors lead to the first floor, one to the basement, and one to the second floor. Each floor in the building is locked, with access by means of a different key for each floor. Only the first floor has access by means of wheel chair and one cannot move within the building from one floor to another. The three main concerns of the building are access, accessibility, and security.

Each floor has its own problems with accessibility; two floors are only accessible by means of stairs and one has tight spaces which individuals must maneuver around. The second floor can be accessed by means of the east side door. This door was added sometime around the time in which the bridge was torn down, allowing only one entrance to the second floor. The first floor entrances are the two entrances on the right of the south face. The set of double doors furthest to the right open into the Archeology lab, a space is cramped due to large tables holding artifacts and equipment on all walls. The other entrance is in the center of the south face and is an extra wide door which opens into a conference room. This entrance is the most accessible to anyone. The basement requires entrance from the door furthest east on the South face. After entering this door, there is a caged room for internet wires and a set of stairs leading to a locked door in the basement. One of the doors in this building is presently handicap accessible, the center door on the south face. Recommendations for accessibility will be explained later with the inclusion of an elevator, and elevated bridge.

Access to each floor is by means of different keys for the building, one for each floor's doors. Most staff and students have keys to get into the first and second floors, however few personnel have access to the basement. It is unknown how many keys are issued or allowed to be issued for use of this building but it is a hard system to keep track of who has a key.

Security on each floor is another concern of the AOB Annex personnel. Though locks are on the doors, it is not hard to find students who kindly let you in the building. The only room secured on the first floor was the artifact storage and curation room. This room formerly held all artifacts until recently when these items were moved into the basement. The rest of the building, including graduate student labs, library and laboratory are open at all times. During the day, the door to the second floor is left unlocked to all offices. No offices on the second floor have locks due to missing doors and panes of glass from the windows in the interior walls.



Figure 9.1: Handle with Swipe

The recommendation for the AOB Annex is to install card access to each of the three of the four entrances and one on the inside of basement for faculty and graduate level students only. Card Access in the building can be achieved by two systems. One system is independent card swipes on each door. This option, shown in figure 9.1 would include a new handle to replace the existing door knob with minimal work. This system will fit most doors, however some doors may not have room for this system and a new door would have to be purchased. This handle has an electronic card swipe which would retract the cylinder in the door, allowing the door to be pulled or pushed open. This option would be updated by a small handheld computer to install access to individual doors. Michigan Tech presently has several doors with similar access and a hand held computer to install new access. The cost per door would be \$500 dollars. This cost would cover the electronics, hardware and any uncertainties which may arise while installing the system.

The second option is a centralized system as seen in figure 9.2, is connected by means of wire to a central computer which updates access regularly. This would allow updates to occur without having EECN staff come to the building to update each door manually. This option includes wall mounted swipe units which connect to the campus wide system located in the EERC basement. The units control access through the door jam by opening the door jam to allow the door to swing. This unit costs \$1500 per machine if chosen. New or modified door jams would have to be installed to allow this type of door access to work.



Figure 9.2: Centralized System

10.0 Funding

In restoring and renovating historic structures such as the Academic Office Building Annex, several possible funding sources are available. However, due to the somewhat unique use history of the Annex, many of those funding possibilities unfortunately do not apply to changes within the building.

One of the most common methods of obtaining funding for a historic building alteration is to have the structure listed on the National Register of Historic Places. Although addition to the Register alone does not provide any funding, listed structures are eligible for tax breaks and grant monies to aid with renovation efforts. However, eligibility is determined by a rigid set of guidelines which outline construction methods and building materials which are used to maintain historic character and integrity. In essence, the building must retain many features of its historic character, and any new features added during construction must be easily discernable as such through the use of differing building materials. Unfortunately, the historic character of the Annex seems to have been lost long before the renovation efforts by Superior Research & Engineering began. As noted above, both the interior and exterior of the building have changed multiple times over the structure's 70 year history. In short, the building has changed so dramatically that little of the original, 1936 character is present, thus making an argument for historic importance somewhat tenuous.

Another possible funding source is the Society for Industrial Archaeology (SIA), which maintains a journal office on the second floor of the Annex. The SIA is dedicated to the study and preservation of historic industrial sites around the world, and publishes a quarterly journal, *IA: The Journal for the Society of Industrial Archaeology*. The SIA currently has approximately 2,000 members worldwide. Unfortunately, although the SIA is relatively well established in the academic world, it is not an especially wealthy organization, and could thus spare little in the way of funding for a renovation of the Annex. However, there remains the possibility that wealthy individual donors within the Society could be persuaded to donate a portion of the renovation and construction costs. Further research and networking with such individuals, as well as a solid cost estimate, are needed before any attempt should be made to solicit donations

11.0 Written scope of work

There are many changes that are being made to the Annex building. The layout is being changed; this means many walls are being removed and others constructed. All doors are being replaced if not removed entirely. There is also some major work to be done associated with the major renovation projects such as the exterior stairwell and elevator.

11.1 Basement

From the basement 21 square feet of the outside concrete wall on the west wall will be removed to create an opening for a door into the exterior stairwell. A little over 29 square

feet of wall is to be removed. A total of 3,710 square feet of drywall and framing will be added to the basement. The entire perimeter of the basement will be laid over with drywall, and a separate room will be created for greater climate control, storage closet, elevator mechanical room, and the newly relocated vault. Five doors will be added to the basement. One leading into each of the four mentioned new rooms as well as a door into the exterior stairwell. As seen in the drawing on R1 of Appendix R.

11.2 First Floor

An elevator will be added to in the space formerly occupied by the vault. This will require approximately 40 square feet of floor area to be removed. The remaining area of the vault will be converted into storage space; a door will be added leading into the lab. The current graduate student offices will be converted into a combination classroom and conference room. The south and east wall of the small room in the former artifact storage area will be removed; both of these walls are 10.5 feet long. The remaining 10.5 feet of wall on the west side of the main area of the former storage area will also be removed. The partition within the existing stairwell will be removed. The wall on the north of the new vestibule will be extended to the new classroom. The new room that this creates will be used for graduate student offices. Two doors will be added into the existing stairwell: one from the vestibule and one from the new graduate student area to improve circulation throughout the building. As seen in the drawing on R2 of Appendix R.

11.3 Second Floor

The addition of the elevator will require a section of floor to be cut out to make room for the elevator structure. The walls creating the offices on the south side of the main corridor will be removed and replaced in altered locations to create space for the additional workspace, library, and storage. The walls that form the three center offices on the north side of the main corridor will remain, but new drywall will be installed. A new wall will extend from this existing wall until even with the existing mechanical room in the northwest corner. This will create space for the kitchen. The small protruding wall in this area will be removed. The office in the northeast corner will be expanded to include one of the existing bathrooms; all extraneous walls will be removed to create one large office to locate the SIA office. New doors will be added into each new office or room. A table and chairs, as well as the map cases, will occupy the open space in the southeast of the building. As seen in the drawing on R3 of Appendix R.

The existing stairwell leading to the second floor will be refaced as much as possible. The treads will be resurfaced and the handrail replaced.

11.4 Exterior Stairwell

A new structure will be added to the west face of the Annex. This will house a new stairwell. The stairs will reach all three floors of the building with an exit at ground level. This structure will require its own footings. Windows will have to be removed on the west side of the second floor. Doorways will be cut into the exterior wall for access to the stairwell in

each floor to provide access to all floors of the building. This structure will require excavation of the land on the west face of the Annex to make room for both the stairwell itself and the footings and foundation. The structure will be a reinforced concrete skeleton with a brick façade. This structure will be of similar design to the Annex structure of reinforced load bearing walls, however larger windows will be provided to supply as much natural light as possible. As seen in the drawings of Appendix E.

11.5 Elevator

The elevator will be added to the east side of the room on the first floor which formerly housed the vault. Space will be cut out of the floor structure on the first and second floors to make room for the elevator shaft. In the basement a section of the floor will have to be removed and the ground underneath excavated to place footings for the elevator shaft and mechanical equipment. A separate room will be created in the basement directly west of the elevator shaft for the elevator mechanical room that will house all the elevator controls and equipment.

11.6 Skybridge

If the bridge were to be created, an opening would have to be cut into the exterior walls of both the Annex and Academic Office Building. It will be placed in the same location as the original walkway. For the bridge to be self supporting the original pedestals must still be in place within the walls of both the Annex and the AOB. Due to the difference in elevation between the AOB and the Annex a set of stairs will have to be added in the Annex to bring the walkway to floor level with the Annex. To increase handicap accessibility a small chairlift will also be installed at the end of the walkway on the second floor of the Annex. Both of these features will be located on the east side of the south wall of the building in the open area containing a table for workspace. As seen in the drawing on V2 of Appendix V.

12.0 Quantitative scope of work

Table 1: Summary of Changes for Basement

Part/ Section of change	Description
Elevator	1. Elevator: <ul style="list-style-type: none"> a) A hydraulic elevator will be built in the original vault b) 7.75ft of the space of original vault will be used to house a hydraulic elevator. c) A portion of the original vault space will be used as storage space accessible from the lab
Wall	1. Walls that will be added <ul style="list-style-type: none"> d) Climate Control Room <ul style="list-style-type: none"> i. A 4" thick masonry wall was build around the climate control room with the area of 20ft x 14ft. e) Equipment Storage <ul style="list-style-type: none"> i. A 4" thick masonry wall was built around storage area with the area of 7'-1" x 4'-8". f) New Vault <ul style="list-style-type: none"> i. A 4: thick masonry wall was built around the vault with area of 7'-1" x 6'

	<ul style="list-style-type: none"> g) Elevator <ul style="list-style-type: none"> i. A 1ft thick concrete wall was built around the elevator at elevator
Door	<ul style="list-style-type: none"> 1. Doors that will be added: <ul style="list-style-type: none"> h) Climate Control Room <ul style="list-style-type: none"> i. A door will be added at the northeast side of climate control room. i) Equipment Storage <ul style="list-style-type: none"> i. A door will be added at the northeast side of equipment storage room j) Vault <ul style="list-style-type: none"> i. A door will be added at the east side of the vault. d) A door will be added in the west exterior wall
Side Stair	<ul style="list-style-type: none"> 1. A staircase will be built at northwest exterior wall
Stack	<ul style="list-style-type: none"> 1. The entire stacks in the basement will be removed. 2. Stacks will be relocated at section 1, 2, 5, and 9
Paint	<ul style="list-style-type: none"> 1. The entire wall of these sections will be painted <ul style="list-style-type: none"> a) The entire outer wall of the basement b) Section climate control room (580sq ft) c) Section equipment storage (240 sq ft) d) Section elevator (260 sq ft)
Ceiling	<ul style="list-style-type: none"> 1. A suspended ceiling will be added to the entire basement
Fire Safety	<ul style="list-style-type: none"> 1. One Fire Alarm will be installed in the center of the basement 2. Two smoke detectors will be added on the second floor, on east and west walls
Climate Control	<ul style="list-style-type: none"> 1. A climate control unit will be added to the sectioned off climate control room
Floor Tile	<ul style="list-style-type: none"> 1. Vinyl Composite Floor Tile will be installed for the entire basement including the exterior stairwell (1214 sq ft)

Table 2: Summary of changes for first floor:

Part/ Section of change	Description
Elevator	<ul style="list-style-type: none"> 1. Elevator <ul style="list-style-type: none"> k) A hydraulic elevator will be built at the original closet l) 7.75ft of the space of original closet will be use for hydraulic elevator. m) The entrance of original closet will be changed from west side to the west side which locates beside the entrance of dirty lab.
Wall	<ul style="list-style-type: none"> 1. Walls that will remove on the first floor: <ul style="list-style-type: none"> n) Northwest corner of grad. lab <ul style="list-style-type: none"> i. South and east side of wall of office in lab will be removed. o) Grad area <ul style="list-style-type: none"> i. 10.5ft of the wall at the east side of graduate area will be removed. p) Graduate Area <ul style="list-style-type: none"> i. 10.5ft of the wall at the east side of graduate area will be removed. ii. 10ft of the wall at the north side of computer lab will be removed. q) Stairwell <ul style="list-style-type: none"> i. Wall at the south side of stairwell will be removed. 2. Walls that will be added <ul style="list-style-type: none"> r) Graduate Area <ul style="list-style-type: none"> i. A 7" thick masonry wall will be built at the south side of the graduate starting from the end of wall at west side of graduate area

	<p>3. Walls that will be re-constructed</p> <p>s) Closet</p> <p>i. A 1ft thick concrete wall around the elevator at closet will be re-build.</p> <p>4.. The main entrance in stairwell will be fitted with an automatic door opener</p>
Door	<p>1. Doors that will be removed</p> <p>t) northwest corner of lab:</p> <p>i. Door at west side of northwest corner of lab will be removed.</p> <p>u) Vault</p> <p>i. Door at east side of Vault will be removed</p> <p>v) Former storage area</p> <p>i. Door at southeast side of the former storage area will be removed.</p> <p>w) Stairwell</p> <p>i. Door at the northeast side of stairwell will be removed.</p> <p>2. Doors that will be added:</p> <p>x) Lab</p> <p>i. A door connected to exterior stair staircase will be built at west side of Lab</p> <p>y) Closet</p> <p>i. A door will be added at the west side of Closet</p> <p>z) Stairwell</p> <p>i. A door will be added at the northwest side of the stairwell</p> <p>ii. A door will be added at the west side of the stairwell</p>
Side Stair	1. A staircase will be built at west side of the lab
Pipe	1. The entire nonfunctional pipe at lab will be removed.
Ceiling	1. A suspended ceiling will be added to the entire first floor (2586 sq ft) or where deemed necessary by final design.
Restroom	<p>1. The restroom will be upgraded in these ways</p> <p>a) Grab bars added</p> <p>b) New toilet</p> <p>c) Modify sink</p> <p>d) Pipe insulation under sink</p> <p>e) Faucet knobs</p>
Carpet	<p>1. Carpet will be installed in these rooms</p> <p>a) Classroom (860 sq ft)</p> <p>b) Vestibule (350 sq ft)</p> <p>c) Graduate Offices (720 sq ft)</p> <p>d) Computer Lab (600 sq ft)</p>
Floor Tile	<p>1. Vinyl Composite Tile will be installed in These Rooms</p> <p>a) Lab (833.67 sq ft)</p> <p>b) Clean Lab (173.33 sq ft)</p> <p>c) Restroom (44.92 sq ft)</p> <p>d) Storage Closet (74.25 sq ft)</p> <p>e) Existing Stairwell (250 sq ft)</p> <p>f) Exterior Stairwell (250 sq ft)</p>
Drinking Fountain	1. A drinking fountain will be added in the vestibule
Fire Safety	<p>1. Smoke Alarms will be added to these rooms</p> <p>a) Lab</p> <p>b) Clean Lab</p> <p>c) Classroom</p> <p>d) Graduate Offices</p> <p>2. Fire Alarms will be added to these rooms</p> <p>a) Lab</p>

	b) Graduate Office
Lab Equipment	<ol style="list-style-type: none"> 1. Necessary fume hoods will be installed 2. An eyewash station will be installed 3. An emergency shower will be installed 4. A new lab sink will be installed <ol style="list-style-type: none"> a) A solids interceptor will be installed with this sink

Table 3: Summary of changes for second floor:

Part/ Section of change	Description
Elevator	<ol style="list-style-type: none"> 1. Elevator <ol style="list-style-type: none"> a. A hydraulic elevator will be built at the original closet b. 7.75ft of the space of original room will be used for the hydraulic elevator.
Wall	<ol style="list-style-type: none"> 1. Walls that will be removed on second floor <ol style="list-style-type: none"> a) the North wall of section current storage and SIA offices o the south of the main corridor will be removed b) the two wall on the east of the open area outside the existing stairwell nest to the stairwell will be removed c) the 8' 7 3/16" wall extending from the north outer wall in the far west of the main corridor will be removed d) the wall inside the restroom will be removed 2. Walls that will be extended on second floor <ol style="list-style-type: none"> a) the north wall of extra workspace that is 15' 5" from the south outer wall will be extended to the east face of the elevator b) the west wall of current PhD office will be extended to the south outer wall c) The south wall of sections offices on the north side of the Annex will be extended to the east side of the mechanical room d) the walls between the partitioned offices will be extended to completely separate these sections e) the west wall of future SIA will be extended to the north wall of the restroom
Room	<ol style="list-style-type: none"> 1. Rooms that will be removed on the second floor <ol style="list-style-type: none"> a) The current SIA office will be completely removed b) North restroom will be removed to make room for the new SIA office c) The storage area will be removed along with its wall to make room for the elevator and open study area 2. Rooms that will be added on second floor <ol style="list-style-type: none"> a) A new storage room will be added on the north face of the elevator b) the new SIA office will be added in the northeast corner
Door	<ol style="list-style-type: none"> 1. Doors that will be removed from the second floor <ol style="list-style-type: none"> a) All doors will be removed except for the mechanical room, the south restroom and the two existing offices on the north side of the main corridor 2. Doors that will be added to the second floor <ol style="list-style-type: none"> a) A north facing door will be added on the west end of the south wall of the new kitchen area b) A north facing door will be added on the east end of the south wall of section of west office on the north side of the corridor new office space. c) a north facing door will be added on the west end of the south wall of the new SIA office d) a north facing door will be added on the east end of the north wall of the new storage area e) a north facing door will be added on the east end of the north wall of the new library f) a north facing door will be added on the east end of the north wall of the new PhD/additional workspace
Side Stair	<ol style="list-style-type: none"> 1. A staircase will be built at east side of the existing hallway

Restroom	<ol style="list-style-type: none"> 1. The restroom will be upgraded with: <ol style="list-style-type: none"> a) Grab bars added b) New toilet c) Modify sink d) Pipe insulation under sink e) Faucet Knobs
Carpeting	<ol style="list-style-type: none"> 1. Carpeting will be installed in these rooms <ol style="list-style-type: none"> a) All offices (466.66sq ft) b) SIA office (280 sq ft) c) PhD/extra workspace (304.48 sq ft) d) Library (221 sq ft)
Floor Tile	<ol style="list-style-type: none"> 1. Vinyl composite floor tile will be installed in these rooms <ol style="list-style-type: none"> a) Main corridor and open workspace b) Kitchen (198.67 sq ft) c) Restroom (80.9 sq ft) d) Storage Closet (65.85 sq ft) e) Mechanical Room (76.5 sq ft) f) Existing Stairwell (52.5 sq ft) g) Exterior Stairwell (250 sq ft)
Fire Safety	<ol style="list-style-type: none"> 1. Smoke detectors will be added to these rooms <ol style="list-style-type: none"> a) Kitchen b) Open Workspace c) Extra PhD/workspace d) SIA office 2. Fire Alarms will be added to these rooms <ol style="list-style-type: none"> a) Open Workspace b) Kitchen
Paint	<ol style="list-style-type: none"> 1. These wall will be painted <ol style="list-style-type: none"> a) In the offices on the north of the main corridor including the SIA office and kitchen <ol style="list-style-type: none"> i. East, west, south walls (1405 sq ft) b) The library <ol style="list-style-type: none"> i. North, west, and east walls (488.3 sq ft) c) Extra PhD/workspace <ol style="list-style-type: none"> i. North and east walls (351.7 sq ft) d) Restroom <ol style="list-style-type: none"> i. All walls e) Main corridor and open workspace <ol style="list-style-type: none"> i. All walls not including exterior walls of building (1322 sq ft) f) Stairwell <ol style="list-style-type: none"> i. All walls of both existing and exterior stairwell for all floors
Kitchen	<ol style="list-style-type: none"> 1. Current kitchen appliances will be transported to new kitchen 2. A new sink will be installed in the kitchen
Windows	<ol style="list-style-type: none"> 1. The windows on the west face will be removed

Table 4: Major Renovations

Exterior Stairwell	<ol style="list-style-type: none"> 1. The soil will be excavated on the west side of the Annex for this structure 2. Footing and foundation will be installed 3. Structure will consist of <ol style="list-style-type: none"> a) Reinforced Concrete structural skeleton b) Brick façade 4. Vinyl composite tile for the entire floor 5. Handrails are to be installed as specified
Elevator	<ol style="list-style-type: none"> 1. Floor space to be cut out from each floor as specified 2. Ground cut out from beneath basement level for elevator mechanics to be completed as specified 3. Elevator mechanical room to be located in basement directly to the west of the elevator
Skybridge	<ol style="list-style-type: none"> 1. Structure to be designed according to specifications 2. Steps leading into Annex directly out of skybridge into the open workspace on the second floor 3. Wheelchair lift installed in second floor Annex next to steps leading out of skybridge

13.0 Cost Estimate

Final Estimate

ADA Compliance	\$5,458.00
Rough Framing	\$19,700.00
Demolition	\$3,700.00
Flooring	\$19,100.00
Ceiling	\$3,300.00
Electrical	\$7,350.00
Painting	\$4,010.00
Doors	\$14,600.00
Plumbing	\$5,250.00
Excavation	\$2,125.00
Climate Control	\$10,000.00
Concrete	\$3,500.00
Kitchen	\$500.00
Bathroom	\$500.00
Interior Elevator	\$190,500.00
Exterior Stairwell	\$113,000.00
Windows	\$2,700.00
Furniture	\$23,000.00
Subtotal	\$428,293.00
10% Contingency	\$42,830.00
Total	\$472,000.00

This final estimate is to give the Social Science department a rough idea of basic costs. This estimate will be refined with further engineering as the project progresses through the design process. This estimate is based on ADA Compliance Price Guide, RSMMeans Remodeling and Repair, RSMMeans Heavy Construction, and NBS (a furniture distributor). Further data can be found to show the price breakdown in Appendix B.

14.0 Recommendations

The recommendations made by Superior Research & Engineering have been stated throughout the report along with the supporting data on each topic. In order to make the information readily available the following is a summarization.

14.1 Code

It is recommended that the entire building be brought up to code for this alteration. The asbestos on the air-cell pipe and fitting insulation as well as the small section of asbestos containing floor tile on the second floor need to be removed before any renovations take place. The existing stairs leading to the second floor do not meet ADA or IBC standards. These stairs should be rehabilitated as much as is feasibly possible. These stairs should also be marked with warning tape to signal they are undersized in both width and length and the risers are not uniform height. The bathrooms need to be altered to meet ADA requirements. Grab bars must be installed. Sinks and toilets need to be altered to meet ADA dimension requirements. All doors must also be brought up to current standards. Doorknobs need to be replaced with handles or push-plates. At least one entrance must be fitted with an automatic door opener. Fire alarm and suppression systems should be upgraded and wired into the university's central control systems.

14.2 Furniture

Presently the furniture in the Academic Office Building Annex is a mix of accumulated furniture over the years. The furniture in the Annex was not obtained in the traditional sense. There are no purchase receipts from the numerous historic pieces which are present. There is an enormous amount of character to some of the furniture in the building, most of which serves a functional purpose. The department has been fortunate to have found some of the furniture in portions of the building that previous occupants have left unoccupied. However, in other cases the furniture was the property of other departments on campus, who were not in need of it any longer. Off campus sources have supplied furniture in the remaining cases. As seen in Appendix S-2

When the Industrial Archeology department took over the second floor, much of the cabinetry was left behind by the Houghton County Water Quality Lab. Presently this cabinetry lines the hallway of the second floor. The countertops of these cabinets have been removed. Therefore these items are not being used, but are marked to be saved. Other larger wooden cabinets with shelves are used to store books in the current library as well as storage areas throughout the building, as seen in Appendix S-1 The cabinets and shelves are practical and appropriate to the functionality and atmosphere of the building. These pieces serve as educational aids as well as adding to the historic style of the building.

In some cases changing out some of the furniture would provide a more work friendly environment for students and faculty. In the new classroom/conference room, 10 matching tables would serve this dual purpose. The tables could be set out to provide a classroom setting for 20 students during school hours and easily rearranged to provide a large conference room in the center of the room. Another recommendation to the conference room is 20 chairs with collapsible bottoms. The purpose of the collapsible bottoms is to provide extra space during times where extra space is valuable. The remaining chairs fold up and are stored on the sides of the room and remaining tables slide out toward the walls, as seen in Appendix S-3. Due to the dirty nature to the labs, the existing tables are sufficient because of their light weight and ability to be moved if large groups work with artifacts. In addition, a fume hood, obtained during the fall semester 2006, would need to be installed on the west wall of the laboratory close to the kiln. This fume hood would be used for hydrogen gas from the electrolysis tank. In the graduate student lab, new desks and chairs are recommended for staff members. In the vestibule a wood bench for individuals to remove and set items on upon entering the AOB Annex. A coat rack for staff and student jackets is to be located in the vestibule during days of cold weather. Though requested by the graduate students, a new couch is simply not within the objectives of the project's allotted budget

If future planning found it necessary to increase the estimate of project costs to over 1 million dollars there would have to be some green elements to the project. More specifically, the building would need to be certified by LEED. In the event that this determination is made, special planning would be necessary on the subject of furniture. The furniture selected for the Annex should not block natural sunlight. Any light fixtures should use light bulbs approved by LEED. The materials that are used in the production of the furniture should not emit any hazardous gases into the building's environment. Being that the Annex is a renovation project it would make sense to take into consideration the addition of certain pieces of furniture to make green additions more attractive: coat racks, tables, benches, bike racks, and etc. Their appropriate locations within surrounding the Annex, would enable users to use more of the sustainable aspects of a building with LEED certification.

14.3 Skybridge

During the time in which the Water Quality Lab was the tenant of the second floor of the Annex building, the original skybridge was removed, due to security reasons. Superior Research & Engineering, upon the request of the department, investigated the reinstallation of this skybridge. The department had suggested that the bridge not be a prefabricated bridge. After a thorough evaluation of the situation the determination was made us to design a bridge. It must be determined if the supports of the previous bridge are still within the walls of the two buildings. If the supports were removed with the first bridge, columns will be necessary. The most effective way to determine the existence of the required columns would be done by inspection of the interior of the wall. In the event that column supports are needed for the bridge a soil report must be done before the footings can be designed for the columns.

The column dimensions and material will be determined with a combination of both the soil strength and the loadings of the actual bridge. The bridge itself must be designed to withstand a live-load due to movement of people and educational materials across the bridge with a starting assumption of 100 lb/ft² which is the standard design live load of office spaces. The dead load is a summation of all the building materials and any mechanical equipment that may be within the bridge. The snow loading of the Houghton area is 80 lbs/ft. The design wind speed within the Houghton area is 90 mph. Taking a conservative approach to design, a 100 mph wind speed will be used to create the design wind loading for this structure.

Due to the complexity of designing such a bridge, Superior Research & Engineering came to the conclusion early on that to attempt such a design would be outside of the scope of work of this project for the allotted time. In the future, after an investigation is performed to evaluate how to support the bridge, the final design work can be completed. The existing problems will be resolved by this in depth continuation of the design phase. The first and foremost is cost comparisons between prefabricated and on site constructed bridges. The cost and ease of installation will most likely drive a decision to select a type of bridge. The type of exterior was not determined through discussions about the bridge with the department. The final design parameter which Superior Research & Engineering left for future engineering is the design for wind on the bridge. The maximum specified wind speed is 90 mph, just a speed however is not sufficient to determine a wind loading. Superior Research & Engineering did not have the resources to test a model bridge within a wind tunnel.

With further engineering the bridge could easily be a reality. If such a bridge was installed there would be many benefits for the Social Sciences Department as well as the users of the Annex. The severe winters would not be as great of a concern if a bridge were reconstructed. The bridge would also connect the two buildings which house members of the same department.

14.4 Exterior Stairwell

Before construction can begin on the exterior stairwell or the elevator soil borings need to be taken so that proper footings can be designed. This is to insure the correct size foundation and determine the manner in which the exterior stairs will be secured to the existing building. The stairs will be a steel frame with steel stair pans for mortar and tile. The Structure housing the stairs will also be red brick to match the existing structure with several large windows to provide more natural light into this area of the building. As seen in the drawing on E1 of Appendix E.

14.5 Climate Control

Climate control and air circulation systems should be upgraded throughout the entire building. Temperature fluctuates greatly in this building as the outside climate changes. Especially for areas for artifact storage temperature and humidity control is very important. Temperature and relative humidity should remain constant in areas where artifacts are being stored. Climate control for these areas should be a very high priority.

15.0 Construction Process

The department, being an entity of Michigan Technological University (a state institution), will use the design/bid/build construction process. The design/bid/build construction process is considered the traditional method of construction and is generally used by state institutions. There are three distinct phases of construction: design, bidding, and build. The owner, which in this case is the Department in conjunction with Michigan Technological University Facilities Management, will have separate contracts with the designer and the construction company. The design will be completed at which time an advertisement for bids will be made. Bids are made by contractors; the awarded contractor is the company which will build the project.

Facilities Management will partner with the Department for the project to renovate the Annex. The Michigan Tech Operating Procedures Manual outlines the policies of the University and its departments. Facilities Management performs maintenance and any alterations of University physical facilities. This policy defines physical facilities as buildings, grounds, and utilities. The project of the renovation must follow the procedures outlined in this policy unless documented approval is obtained. The procedure begins with a memo outlining the project and containing any schematic drawings applicable is sent to Facilities Management manager of planning, engineering, and construction. The adequacy of utilities and life safety is evaluated by Facilities and Occupational Safety and Health Services; the approval by the two is required to proceed. Upon approval a total estimated cost of the work is made if the engineering and planning stages allow. With the cost estimate the department will notify Facilities to proceed, in writing. The plans and specifications prepared by facilities will be reviewed by the department any necessary changes and a new cost estimate are made. The project will then be determined to be bid out or done by MTU personnel. A departmental index number will be evaluated which will provide for funding of the project. When funding is available the job is scheduled with the assistance of Facilities Management.

The project concept and need establishment are the focus of this project. Much work has been done to create preliminary drawings and determine needs of the Annex. Formal need evaluation will be done by the Department and will take place before the request procedure begins. The final conceptual drawings will be completed when the formal need evaluation is finalized.

If the decision is made to award the project to an outside contractor, the Department will publish an advertisement for bid. The project documents will be made available to bidders at a location stated in the advertisement for bids. The advertisement for bids will tell the bidding contractors that the contractor safety requirements set forth by the University are located at <http://www.admin.mtu.edu/acct/dept/pur/contractor/safety.htm>.

Sufficient time must be given to allow contractors to produce a reasonable bid. There will be a time period before the bid opening in which a bidding contractor may withdraw a bid. This time span will be defined by the Department. Some time after the bid opening, the Department, along with Facilities Management, will formally, in writing, award the contract to the winning bidder. The contractor will then receive a notice to proceed which will specify the start and end date of the project.

16.0 Conclusion

The recommendations presented in this report are based on Superior Research & Engineering's interpretation of the client's wants and needs. Recommendations are governed by the International Existing Building Code, International Building Code, and ADA standards, as well as the other documents which govern the aspects of this project. As stated in the report, a professional engineer should be consulted to further Superior Research & Engineering's findings. This project's contents can be immediately put to use as a demonstration of the possible options available to the Department.

Superior Research & Engineering has attempted to follow the Facilities Management published document of Construction Standards for Architects, Engineers, and Planners which outlines physical master plan principles. All of the principles contribute to the improvement of campus character. The Annex renovation project will enhance the Department's work space and campus as a whole. The renovation of the Annex will create more research and instructional facilities of a higher quality within the academic core of campus. By connecting the Academic Office Building to the Annex with a bridge, there will be a protection from severe weather conditions. The basement renovation will increase usability for storage and will be a valuable asset to both the Department and Society of Industrial Archeology. The storage of artifacts is an important part of the graduate program which the Department provides. This storage facility must be kept near the teaching facilities which benefit from it. Annex improvements will upgrade the landscape of the campus and improve appeal of the entry image at the western extremity of campus. Repairing the brick façade of the Annex decreases maintenance cost for the long term and increases the appeal of historic buildings nearby. The Portage Canal view from the Annex as well as the Administration Building will maintain their respective views with Annex enhancements. All new projects on campus must take the Construction Standards and master plan principles into consideration in order to make the University a

more appealing place. The Annex improvements are an efficient way to preserve the past, while creating a better learning environment for the future.

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18.0 Glossary

Annex: Academic Office Building Annex
AOBA: Academic Office Building Annex
AOB: Academic Office Building
MTU: Michigan Technological University
ADA: Americans with Disabilities Act, 1994
IBC: International Building Code
IEBC: International Existing Building Cod
IFC: International Fire Code
MTU CSAEP: MTU Facilities Construction Standards for Architects, Engineers, and Planners
WPA: Works Progress Administration
SIA: Society for Industrial Archeology

EECN: East Engineering Computing Network
HVAC: Heating, Ventilation, and Air Conditioning
ROTC: Reserve Officers' Training Corps
LEED: Leadership in Energy and Environmental Design

19.0 Appendices