

# Oil City Library Building Investigation & Study



Prepared for the  
Oil City Library Commission  
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## Author Statement

In January of 2009, the Oil City Library Commission contracted with StruXures, LLC to prepare a feasibility study for the Oil City Library located at 2 Central Avenue in Oil City, Pennsylvania. The study includes:

- Schematic design plans for the redistribution of existing spaces and the use of the unfinished basement space and attic areas.
- ADA accessibility compliance and required corrections,
- A comprehensive review of the existing HVAC and Electrical systems and recommended upgrades.
- An assessment of the existing building envelope and structure and any recommended repairs.
- Recommended energy efficiency upgrades to reduce energy costs and increase building sustainability.
- A budget estimate and a prioritized renovation/repair schedule is also part of document.
- A Hazardous Building Material Survey and Report

The architectural elements of the study were documented and composed by a licensed architect. The electrical review was completed by a licensed electrical engineer and the mechanical systems reviewed by a licensed mechanical engineer.

## Acknowledgements

This project was financed in part by a Pennsylvania Heritage Area Program Grant from the Pa. Department of Conservation and Natural Resources, Bureau of Recreation and Conservation, via the Oil Region Alliance of Business, Industry, and Tourism. Additional funding was provided by the Oil City Library Commission.

Input from the library director and his helpful staff is incorporated into the report and the schematic design drawings.

Special thanks to Albert Kamper and his work on the Building Program Statement.

## Preface

Over the past several years, it has become increasingly apparent to the Library Commission and Library staff that the current library is simply running out of space. Clearly, there is not sufficient space to adequately house and display the wide variety of materials that the library current owns, such as books, periodicals, DVDs, CDs, VHSs and other format. Also, there is additional need for space for computers, quiet study, and casual reading.

To properly address the concern of lack of space or better use of space, libraries need to take a two-prong approach to the problem. The Library Commission and staff needed to work closely with an architect and a library consultant.

I was hired as a public library building consultant in July 2008 to work with the Library Commission and staff to study the most efficient use of library space within the building. The library is essentially land-locked and therefore cannot be physical expanded. Fortunately, there is unutilized space within the building: the unfinished space under the 1978 addition and the old “auditorium” space on the second floor of the original building.

I prepared a document in August 2008 identifying the problems with the current space and how the use of the additional space in the lower level and the second floor could alleviate these problems. A more comprehensive Building Program Statement for the various functions of the library and their size and location within the building was prepared in January 2009 (contained in Appendix D of this Study).

Late in 2008, the library hired StruXures Architect/Construction firm to do an in-depth analysis of the physical condition of the building. It is critical to determine the exact physical condition of a building before attempting to renovate the interior or relocate functions within the building. As a building consultant, I was able to provide the architect with a narrative description of the library functions and their needed space and provide input on the interior design of the building. The architect, the library consultant, and the library became a team to evaluate the building and plan for its future.

What follows is essentially a two-part document. The first is the possible use of new and current space to make this library function in an efficient manner and the second is the analysis of the condition of the building and what needs to be replaced or renovated. By expanding into either the basement or the attic, the current library space can be reconfigured and expanded to make it more warm and welcoming to the patron. It would also improve the staff working conditions and make the entire operation more efficient.

This process will assist the library in fulfilling its mission statement which is “to fulfill informational and recreational needs, assist in personal growth and development, and promote the area’s heritage” (Building Program Statement, Appendix D, page 3). The library will truly become a 21<sup>st</sup> Century, state-of-the-art facility for the residents.

Al Kamper, Pittsburgh, PA  
September 2, 2009

## Introduction

The **2009 Oil City Library Building Investigation & Study** is an analytical tool to guide the Oil City Library in a future renovation plan of the library building. Author Kevin Aitken, Registered Architect and Project Architect for the **Study**, methodically evaluated the library building for current building code and accessibility (i.e. handicapped) compliance, for current interior space design with schematics, for proposed interior space design modifications with schematics, for the effectiveness of mechanical and electrical systems of the library building (completed by a licensed electrical engineer and a licensed mechanical engineer), and for a structural survey of the library building's exterior structure. From this evaluation, future building renovation cost estimates are given and a phased-in plan to accomplish the renovations is given.\*

The **Study** is organized into two major sections, followed by appendices. The breakdown of the organization is as follows:

-The first section analyzes the current interior library space and lays out a new interior space design, recapturing unutilized and underutilized library space, and reconfiguring currently used library space more effectively.

-The second section analyzes the exterior building structure and mechanical and electrical systems of the library building, providing recommended improvements. The improvements recommended include new windows, new public entrances for handicapped accessibility, new heating, ventilating, and air conditioning systems, and upgraded electrical and lighting systems. Many of these improvements will substantially increase the energy efficiency and sustainability of the library building.

-Appendix A contains schematic drawings of the existing library space.

-Appendix B contains schematic drawings for the interior renovation of library space.

-Appendix C contains an Asbestos and Lead Survey Report of the library building.

-Appendix D contains the Oil City Library Building Program Statement, January of 2009 (Updated, February 9, 2009), by Albert F. Kamper, Library Building Consultant. The Building Program Statement assesses the interior design of the Oil City Library as related to the Library's mission, services, and current interior space allocation, for which changes are recommended. It was used by Mr. Aitken as input for the redesign of interior library space contained in this **Building Investigation & Study**.

The following table highlights the key areas of the building evaluation analysis.

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\* The library building consists of a 1904 Carnegie Library and a 1978 new wing addition. A building renovation has not been done since 1978 and one is severely needed. In January of 2009, The Oil City Library Commission contracted with Struxures, LLC to prepare a building renovation plan for the library building.

<b>Key Area of Analysis</b>	<b>Findings</b>
<p>Proposed redistribution of existing interior space on the first floor, where currently all library services and functions, except the Heritage Room (i.e. local history) and meeting room are located, and the recapturing of the unfinished basement below the 1978 building addition and of the underutilized second floor areas (storage areas) of the Carnegie Library.</p>	<p>Reallocate the first floor to adult services, expanding space from the current 4,760 square feet to 6,238 square feet. This would include major areas for audiovisual media (DVDs, audio books, etc.) and public access computers. Also reallocate library public circulation desk and the library staff work areas more effectively.</p> <p>Increase space utilization by 11,539 square feet by recapturing the current unused/unfinished basement (7,000 square feet) and by recapturing the underutilized second floor (4,539 square feet).</p> <p>The basement would house Children’s Services, expanding the space used for Children’s Services from the current 2,588 square feet to 4,728 square feet.</p> <p>The basement would house the Heritage Room, moving it from the second floor (1,670 square feet) to the basement (2,272 square feet), providing better access to its collection and providing better climate control for older, sensitive, materials.</p> <p>The current Heritage Room located on the second floor would house the Oil Creek Library District, headquartered at the Oil City Library and serving 14 member public libraries in Clarion, Jefferson, and Venango counties. This would provide the Library District office space and conference space. The current storage areas of the second floor would be restored to the original Carnegie Library appearance, which has fallen largely into disrepair, except for the large stained glass windows, and would serve as community space for exhibitions and meetings.</p>

<b>Key Areas of Analysis</b>	<b>Findings</b>
<p>ADA compliance issues that need correction.</p>	<p>The following are not ADA (i.e. accessible to people with physical disabilities) compliant and are to be corrected: the exterior public entrances to the library building, width of book aisles (i.e. too narrow), the height of shelving (i.e. materials shelved too high), the height of the library circulation desk (i.e. too high), public restrooms, public access computer stations, and the controls to elevator.</p>
<p>Evaluation of the existing heating, ventilating, air conditioning and electrical systems, with recommended upgrades.</p>	<p>The existing heating, ventilating, and air conditioning systems are a combination of several independently operating systems causing energy inefficiencies and promoting growth of mold, bacteria, and air pollutants with internally lined duct work, which will soon be prohibited by code. The proposed correction, which would be costly, but would warrant the costs, is to install integrated new systems for the entire library building, exempting the boiler system that was installed in 2001, that would be energy efficient, would reduce maintenance costs, would comply to the building code, would be sustainable, would have zone controls, would reduce air pollution, would protect Heritage Room materials, and would provide overall comfort for library users and staff.</p> <p>The existing electrical system (i.e. panels and wiring) is in good order. With the renovation of the interior of the Library and upgrading of the heating, ventilating, air conditioning systems, the electrical service will need to be increased in size.</p> <p>As part of the electrical system, the existing lighting system is lacking energy efficiency and is lacking in providing adequate light levels. Lighting would be the highest electrical cost of the Library and the replacement of the lighting system with new solid state electronic ballasts and T8 lamps is recommended for energy efficiency, cost savings, and better lighting.</p>

<b>Key Area of Analysis</b>	<b>Findings</b>
<p>Assessment of the existing exterior building structure and recommended repairs</p>	<p>The overall library building is in good shape and meets current code requirements for allowable height, occupancy, and constructions type. However, there are deficiencies. Structural deficiencies are the leaks in the red clay tile roof of the Carnegie Library causing damage to the second floor ceiling and walls of the unused portion of the second floor. The windows of both the Carnegie Library and the new building addition are poorly constructed by current standards to prevent energy loss. Thermal paned replacement windows are recommended for the majority of the windows and proper weather proofing for the second floor stained glass windows, which is one of the greatest architectural elements of the library building. The Asbestos and Lead Survey Report (Appendix C) finds asbestos in the plaster on the second floor and in some of the floor tiling in the basement. The asbestos in the plaster can be encapsulated during renovation and not requiring remediation; and, the asbestos in the floor tiling is not extensive and requiring a small remediation project. Also there are building codes deficiencies previously mentioned, which are the lack of handicapped accessibility both outside and inside the building and the internally lined ductwork to the heating, ventilating, and air conditioning system.</p>
<p>A budget estimate and a prioritized renovation and repair schedule.</p>	<p>The estimated total cost of the library building renovation would be \$2,034,669.00. It is best to refer to pages 30-32 of the Study to review the budget and renovation repair schedule in detail. The repair and renovation of the library building will equal approximately \$51.63 per square foot, as opposed to the average cost of \$150 - \$175 per square foot for new construction.</p>

## Existing Floor Plan Review and Space Distribution

The current building has several functions. It houses the Library, meeting rooms, the Heritage Room, and the Oil Creek Library District headquarters. The Heritage Room, located on the second floor, contains vast amounts of historical data relevant to the region's significant historical character and is used as a local and national research resource. The Oil Creek Library District is headquartered at the Oil City Library and is charged with enhancing public library service at 14 public libraries that serve 145,000 people in Clarion, Venango and Jefferson counties. In essence the Library is a strong local, regional, and, in some aspects due to its local history holdings, a national resource. The Oil City Library is located within the larger federally approved Oil Region National Heritage Area (Venango County and Eastern Crawford County) and is specifically located in Oil City South Side Historic District (National Register of Historic Places approved district). The existing building currently devotes 18,672 square feet of a possible 30,211 square feet to library operations and building management. Unfinished space, the Heritage Room, and the underutilized second floor constitute the remaining 11,539 square feet. This represents a utilization factor of 61%. The majority of library functions are performed on the first floor with a small amount of program space located within the basement including a large meeting room used for children's programming and public meetings and events. Please refer to Appendix A for the existing floor plan layout.

The basement measures 12,218 square feet. 6,057 square feet contains the following; a meeting room, mechanical spaces, storage, small conference room, a non-accessible toilet, and the children's work room. The remaining 6,161 square feet is an unfinished area under the 1978 addition, see Figure 1. Access to the basement is gained from any of the two interior stairwells, the elevator, and a stairwell leading directly to grade.

The first floor is 12,615 square feet and contains all of the library's collections, circulation desk, and personnel spaces including the work room, the director's office, and staff lounge. The District Library's office, toilets, and circulation desk are also on the first floor. A small mezzanine is also accessible from the ground floor via two small open staircases. Access to the first floor is provided via two main entry points, the Central Avenue stair and the West Front Street ramp. Additionally there is a partially accessible ramp at the rear of the building on Orchard Street.

The second floor houses the Heritage Room and storage space. The second floor is 5,378 square feet. The Heritage Room occupies 1,670 square feet, and underutilized storage and floor access make up the remaining 3,708 square feet, see Figure 2. The second floor can be accessed via the elevator and two stair cases.



Figure 1



Figure 2

## Proposed Renovations & Alterations

The following renovations and space configurations are the product of on-site observations, staff interviews, and a group design consensus. Proposed expansion and relocations of existing spaces will be outlined below with a brief written statement. Please refer to Appendix B Schematic Design Floor Plans for a graphic representation.

### Proposed Basement Renovations:

- The relocation of the Children's Collection and Children's librarian from the first floor into part of the existing unfinished basement space.
- The possible relocation of the Heritage Room into the remaining portion of the existing unfinished space.
- The creation of new multi-user accessible toilet rooms, refinishing of the existing conference room and meeting room, the removal of the existing toilet and expansion of the kitchenette.
- A new dedicated HVAC system would also be part of the basement renovations using high efficiency heating and cooling units.
- New light fixtures that reduce energy usage and create well lit and comfortable spaces are part of the planned renovations as well.

Relocating the Children's Collection to the basement has the following benefits:

- Expansion of the Children's collection allowing the first floor expansion of the Adult Collection
- It allows for the centralization and expansion of the Children's Collection required spaces including storage, work room, and Children's Librarian.
- It allows for greater Children's space programming flexibility in terms of audio/visual displays and group gatherings.
- The installation of a dedicated children's toilet enhances user comfort and reduces usage of adult fixtures.

Additionally the Children's Area will expand from the current 2,588 square feet to nearly double that amount of 4,278 square feet. The installation of radiant floor heat will provide a comfortable surface for children to use as seating and expand large group gathering without requiring additional seating.

The moving of the Heritage Room from the Second Floor to the Basement is probably one of the more drastic plan recommendations. With these concerns in mind we support the relocation of the Heritage Room for the following reasons:

- The current location of the Heritage Room isolates the second floor and limits the ability of the Library to access essentially the entire 5,378 square feet of the second floor.
- The sensitive nature and storage requirements of the documents in the collection lends itself to being placed in the basement where new HVAC equipment is being installed and can be designed to accommodate unique temperature and humidity requirements.

The construction of an expanded toilet rooms allows for the increase of fixture count and the compliance with accessibility standards while not using prime space on the first floor. The toilets are easily accessed from the upper levels via the adjacent stairwell and elevator. They are also closer to the Basement meeting room which is used for special functions and activities that create a greater need for restroom usage. The introduction of new finishes into the existing Meeting and Conference Room will enhance the user experience and make the spaces more desirable for special functions and create additional rental revenue.

Of course with the expansion of services to multiple levels new concerns and issues will arise. This is particularly true for staffing allocation. The question of vertical ingress and egress also becomes an issue. The addition of a new exit stair will allow for greater emergency egress, and the construction of light wells will enhance day lighting and allow for the introduction of natural light into the Basement.

See Sheet A1.1 and A1.1a for details.

### **Proposed First Floor & Exterior:**

- The removal and replacement of the existing check-in counter, a rearrangement of the current staff and office spaces.
- The creating of single-user accessible toilets, and the expansion of the Adult Collection into the existing Children's Collection area.
- HVAC and lighting upgrades would also be part of the first floor renovations.
- The replacement of the existing windows and exterior doors to more energy efficient units is also recommended.
- Recommended exterior renovations include the replacement of the current West Front Street ramp and the Central Avenue stairwell.

In conjunction with the relocation of the Children's Collection to the Basement the following First Floor opportunities become available:

- The expansion of the Adult Collection from the current 4,760 square feet to 6,238 square feet.
- The expansion of the computer and technology areas.
- The creation of a mezzanine reading area and likely a greater usage of that mezzanine.
- The incorporation of a dedicated quiet room and enhanced user functions such as copying and document distribution.
- A possible expansion of the Young Adult area if deemed necessary.
- The redistribution of book shelving to allow greater volume spacing and aisle spacing complying with accessibility requirements.

The renovations to the offices, work room, and circulation desk will provide the following improvements:

- More efficient work flow and enhanced user comfort.
- An increase in worker productivity utilizing better ergonomics and space relationships.
- A unified design aesthetic and modernization of office equipment and furnishings.

- A proper Director's Office providing the appropriate space for the Director's duties and title, and allowing for meetings with vendors and staff.
- A training room will be added that will allow for staff training in a proper learning environment including teleconference and online curriculums.
- The new circulation desk will enhance the exchange of materials with patrons, provide more space for shelving activities, and allow for accessible transactions.

The replacement of the exterior entries will increase the ability of library patrons to access the building, and will more fully integrate the building into the surrounding community. The replacement of the existing windows will reduce heating and cooling costs, offer better protection for the book collections, and create a more desirable interior environment.

The proposed alterations to the First Floor which appear overwhelming in scale are actually limited in scope in terms of construction and budget. Many of the spaces are remaining as they are currently delineated, with others simply changing names. Limiting unnecessary and poorly designed spaces is a major component of this study. New light fixtures specifically designed for a library space will decrease energy consumption and enhance the user environment decreasing eyestrain and glare.

See Sheet A1.2 for details.

#### **Proposed Second Floor & Roof (Carnegie Building):**

- The relocation of the Library District operations to the second floor and the use of the existing storage space for public use highlight the proposed changes for this level.
- HVAC, lighting, and the restoration and integration of the existing spectacular stained glass windows would be another component of the renovations.

As part of the planned renovations to the Second Floor a major component is the relocation of the Heritage Room and movement and expansion of the District Services Office. Please review the following list of benefits:

- Expanded office space for the District Services Office from the current 173 square feet to 620 square feet including a full size conference room for Oil City Library Commission meetings.
- The integration of audio/visual technologies for use by the District Library and Library personnel into the new conference room.
- The ability to access and expand into an additional 4,000 square feet that is currently underutilized as storage space.
- The reopening of a spectacular architectural treasure in the form of the vaulted second floor including expansive wood moldings, stunning stained glass windows, and an available stage.

The replacement of the roof is a prerequisite for any planned building renovations and should be a high priority item.

See Sheet A1.3 for details.

**Conclusion:**

All of the preceding recommendations are a result of the design process including; user input, response to current building codes, and professional experience to design user friendly spaces and work flows. They are not however fixed and represent only one possible design solution, not the “only” solution. They do however represent a highly cost effective way to increase available space with a minimum of capital expenditures. The following list represents the major objectives and design goals represented within the document as a whole:

- The recapturing of currently unused portions of the building by expanding into the Basement and Second Floor.
- Compliance with current building codes including mechanical, electrical, and accessibility codes.
- The creation of a more efficient building envelope and superior indoor environment by replacing the roof, windows, and mechanical equipment.
- Granting greater user access and safety by replacing the existing exterior entries.
- The extension and enhancement of Library services by increasing the efficiency of spacial relationships and allowing for future technology integration.

The implementation of these items will not only provide the Library with the ability to construct the attached proposed plans, but also the flexibility to create design alternatives and react to future physical needs.

**Closing:**

The preceding sections reviewed the existing floor plans and introduced proposed modifications. The last major building renovation and reconfiguration of interior spaces was completed in 1978. Since that time library functions, technology, and library users have evolved. The following sections review and analyze existing building systems for code compliance, efficiency, user comfort, and long term use. Correcting the deficiencies noted not only supports and makes possible many of the proposed floor plan changes, but in many cases is mandatory for building code compliance and the health and safety of all buildings users.

## Handicap Accessibility Analysis and Compliance Recommendations

The Americans with Disabilities Act (ADA) of 1990 defines the scoping and technical requirements for accessibility to buildings and facilities by individuals with disabilities. This law requires that buildings be accessible to individuals with disabilities. The State of Pennsylvania enforces compliance with this federal law in regards to buildings through the Uniform Construction Code and the current accessibility standard ANSI 117.1 2003. This code separates a structure's accessibility into the following parts:

- Handicap accessible entrances
- Handicap accessible routes
- Handicap accessible features and facilities

The current building fails to meet many of the current handicap accessibility requirements. The current building was built at a time when accessibility codes were in their infancy and compliance was only minimal. An outline of the problems and proposed solutions are listed below.

### **Handicap Accessible Routes:**

Handicap accessible routes are defined as the path taken to a building from a site arrival point such as a parking space or exterior drop off point, and the access between spaces within the building. Currently there are two handicap accessible spaces located near the building. There is an area on Central Avenue that acts as passenger unloading zone, but it is not designated as such and lacks a handicap accessible curb ramp from the street to the sidewalk. The only handicap accessible curb cut is located at the corner of Central Avenue and West Front Street.

A building space has multiple levels of handicap accessibility. The current building complies with some of the requirements for handicap accessible routes but many of the items contained within those routes fail to meet current ADA code standards. An elevator connects all three levels, but lacks the correct accessible controls and signage. The restrooms on both levels, including public and staff, do not comply with the required door clearances, fixture heights and locations, and faucet controls. Additionally the basement level restroom has a single step.

### **Proposed Solutions:**

A review of the existing parking layout in conjunction with the city should be performed and a new parking layout created. This layout should include a delineated passenger drop off zone, handicap spaces located adjacent to the handicap accessible public entrance and the appropriate signage. The location of appropriate curb ramps and curb cuts should also be developed.

Corrective action to correct interior accessible route issues include:

- The modernization of the elevator cab and controls.
- The renovation of bathrooms to meet current ANSI 117.1 standards.

### **Handicap Accessible Entrances:**

All public buildings are required to provide a public entrance that is handicap accessible. Currently the building does not have a public entrance that meets the code standards. The Library's floor is not level with the exterior at the two public entrances. The ramp located on West Front Street is 50% steeper than what is allowed by the code. The Central Avenue stair entry also fails to meet the code for accessible stairs including the ability to prevent the collection of water on flat surfaces and improper hand and guardrail configurations. The doors at both entrances fail to meet the minimum code required clear width of 32".

#### **Proposed Solutions:**

A new ramp should be constructed at the West Front Street entrance that meets the handicap accessibility requirements including proper slope, handrail and guardrail needs, and 36" wide entry doors. The Central Avenue Stair should be replaced with a safe accessible stair that sheds water properly and provides the proper handrails.

### **Handicap Accessible Features and Facilities:**

All of the items within a building are controlled by accessible building code requirements. Those guidelines govern everything from the height of shelving and the width of doors to the type of interior signage delineating room names. Many of the library features do not comply with current accessibility codes including the size and shape of the restrooms, the width of the book stacks aisles, and the height of the circulation. Additionally the user computer stations, signage, and the shape of the door hardware do not comply.

#### **Proposed Solutions:**

A complete redesign and replacement of the existing toilet rooms is required to bring them up to current standards. Accessible computer stations can be created to allow for handicap users. The elevator can be modernized to include the required accessible components. Door hardware can be easily replaced, and outlet and switch plates lowered to appropriate heights.

The check-in counter is required to have work surfaces mounted between 28" and 34" high. Currently the height ranges between 36" and 42". A new counter should replace the existing to meet current standards for patrons and staff alike. Stack aisles are required to be 36" wide minimum and have a turning space at the end of aisles measuring 60".

### **Conclusion:**

Handicap accessibility is a primary component of any building, but especially public buildings such as libraries. The current building fails to meet most of the current handicap accessibility requirements. Addressing and correcting all items will promote the inclusion of the entire population served by the library and ensure continued long term usage of the existing structure.

## Existing HVAC System Analysis and Recommendations

### Existing HVAC:

The existing HVAC system is comprised of several disparate components that operate independently of each other instead as a whole building comfort solution. These systems on a whole are inefficient, costly to operate, and lack proper temperature and humidity control. They also in many cases fail to meet current building codes including required fresh air exchanges and proper duct construction.

### Basement:

- Hot Water Boiler System
- Horizontal Unit Ventilator and Ductwork
- Ceiling mounted Fan Coil Units

The existing boiler system provides hot water to the heating system located throughout the building. The existing boiler and pumps are in excellent condition. The existing boiler system is approximately seven (7) years old and does not achieve the high efficiency ratings of current equipment. The existing boiler system can remain in-place and be used as part of new integrated heating and cooling system.

The current meeting room and conference room are cooled using a type of air conditioner called a Horizontal Unit Ventilator. The cooled air is distributed throughout the space employing internally lined ductwork. The existing unit is another low efficiency piece of equipment and replacement would decrease energy consumption and maintenance costs. The internally lined ductwork promotes the growth of mold, bacteria, and indoor air pollutants. The use of this type of ductwork will soon be prohibited by the building code. It should be replaced with new externally lined ductwork.

The basement storage area is heated with Ceiling Mounted Fan Coil Units. They lack the ability to properly condition the space or control humidity levels as required to maintain the collections stored in this area.

Corridors throughout the entire library are without any form of heating, cooling, or fresh air exchange as required by the current building code.

### First Floor:

- Hot Water Boiler System
- Roof Top Units
- Thru wall HVAC units

Radiant heat convectors located in the Carnegie Library section of the building are supplied via the Hot Water Boiler System. Two Roof Top Units (RTU), RTU-A and RTU-B, supply conditioned air to the current Stack Areas, the Work Room, and Check-in Counter via internally lined ductwork. RTU-A supplies cooling only, while RTU-B supplies both heating and cooling. The Director's Office, District Services Office, Staff Lounge, and A/V Workroom have separate AC systems. Toilet Rooms have exhaust systems only.

## **Second Floor:**

- Hot Water Boiler System
- Floor Mounted AC System and Ductwork

The majority of the second floor currently lacks heating and cooling capabilities which creates two major issues. The inability to use the space for library functions and increased heating and cooling loads for the first floor due to heat loss and gain from the second floor. The Heritage Room is supplied with heat from the Hot Water Boiler system and cooling from the Floor Mounted AC System located within the second floor storage area.

## **Proposed HVAC:**

Replacement of the existing HVAC equipment is an expensive proposal. Therefore serious consideration went into following recommendations. The new addition of the spaces as defined in Appendix B in the basement and the second floor add significant loads and are not accounted for in the current system design. The new systems proposed will provide the following benefits:

- Energy efficiency and reduced heating and cooling costs
- Reduced maintenance costs
- Code compliance
- Sustainability
- Proper Humidity Control
- Zone Control
- Reduced Indoor Air Pollution
- An overall more comfortable space for users and the one-of-a-kind and rare books contained within the Library

## **Proposed Basement:**

### **Children's Area / Heritage Room**

- Heating: Radiant Floor Heat
- Cooling: Air to Air Exchange System with Fresh Air Introduction and Humidity Control

Radiant Hot Water Heat located in the floor slab will provide excellent warming characteristics for the entire space. It will also create a comfortable surface for sitting and playing. The Air to Air system is highly efficient and will provide the required fresh air exchanges as dictated by the International Mechanical Code. Proper humidity control will ensure the integrity of the items located in the basement including the valuable Heritage Room collection.

### **Large Meeting Room / Kitchenette / Storage / Corridors**

- New High Efficiency Forced Air System
- New Externally Insulated Ductwork and Diffusers

Replacement of the existing separate system with a high efficiency system will reduce operating costs and provide even distribution of heating and cooling throughout the different spaces. The new ductwork will reduce airborne contaminants and allergens.

### **Small Conference Room**

- Air Handler
- VRFZ System

The VRFZ stands for Variable Refrigerant Flow Zoning. A VRFZ system reacts to changing heating and cooling loads by varying the speed of the refrigerant and inverter technology. The benefits of the system include:

- zoned individual controls
- low noise levels
- design flexibility
- simultaneous heating and cooling
- ductless distribution
- reduced energy consumption

### **Proposed First Floor:**

#### **Adult Area “A” / Training**

- High Efficiency Roof Top Units (RTU)
- New Externally Insulated Ductwork and Diffusers

The new RTU will reduce operating and maintenance costs. The replacement of the ductwork will reduce airborne contaminants and allergens. Evidence of the existing ductwork’s ability to promote indoor air pollution can be seen as the black smudging found at the current diffusers. New diffusers will provide better air distribution and ceiling aesthetics.

#### **Adult Area “B” / Quiet Room / Circulation Desk**

- New VRFZ System

A new VRFZ system will utilize the existing Hot Water Supply System. Distribution units will be placed where the current radiant heat units are located. The new system will be ductless.

#### **Work Room / Director’s Office / Staff Lounge / Microfiche / A/V Work Room**

- Part of New VRFZ System
- Packaged Air Handling Units

Part of the VRFZ system will provide heating and cooling. New High Efficiency Air Handling Units will provide the necessary fresh air requirements for the various spaces.

### **Proposed Second Floor:**

#### **Flex Space / Gallery**

- Packaged Air Handling Units
- New Externally Insulated Ductwork and Diffusers

New High Efficiency Air Handling Units will provide the necessary fresh air, heating and cooling.

### **Conference / District Office**

- Ducted VRFZ System with Zone Controls

### **All Floors:**

All new toilet rooms will be provided with exhaust fans and supplemental heat as required.

### **Conclusion:**

A costly renovation to the Library's HVAC system was completed in 2001. The inclusion of a revised and renovated HVAC system is necessitated in part by the expansion into currently inadequately or unconditioned spaces, and as a result of the existing system being inefficient and costly to operate. The above recommendations represent the ideal and most expensive solution. The new system design will incorporate multiple technologies including: the existing Hot Water Boiler System, High Efficiency Roof Top Units, Ducted VRFZ's, and Air Handlers. All of these items will be combined to create a whole building heating and cooling solution. These systems will increase user comfort, building sustainability, and reduce energy consumption.

# Existing Electrical System Analysis and Recommendations

## Existing Service:

The existing Main Panel electrical service is original to the building's 1978 addition. It is in good working condition. The Sub Panels connected to the Main Panel are in good condition, some are new.

Those components include:

- 600 amp 208 volt 3 phase 4 wire main electrical service
- A 15 KW natural gas generator
- Sub panels throughout the building

Proposed Changes:

The main service will need to be increased in size to accommodate the new HVAC equipment.

The sub panels are operable and do not require any work. A new sub panel will be required for the new basement children's area.

The generator is in poor shape and needs to be removed and replaced with battery emergency ballast in the required light fixtures used for egress.

## Existing Lighting:

The current light levels are below standards and the fixture styles are out of date. In the upstairs there are original 1900 combination gas electric fixtures from the original construction.

Those components include:

- Fluorescent fixtures with T8 lamps.
- Incandescent Exit lights.
- Gas electric wall sconces

## Proposed Changes:

Replace the existing lay-in type fixtures with new pendant mounted direct/indirect fluorescent fixtures.

Replace the existing lay-in fixtures in the office areas, with lower ceilings, with new basket type fixtures.

The new fixtures for the upstairs Auditorium area can be chosen at a later date.

The new exterior stairs and handicap ramps will have LED fixtures that will last 100,000 hours with very little power usage.

The existing gas/electric fixtures located in the current second floor storage space are antiques that deserve to be restored, we suggest sending the light fixtures out for renovation to a like new, safe condition and then reinstalled in their original location.

Verify all emergency and exit lights are working and are sufficient for today's standards.

**Existing Fire Alarm:**

The existing fire alarm system is newer. There are smoke detectors, pull stations and horn/strobe units. The existing elevator is not set up for automatic fire recall and needs to be updated.

**Proposed Changes:**

The system will need strobe units for the new bathrooms and to have the existing smoke detectors relocated into the new ceiling. Additional devices will need to be added to the basement area and duct detectors for the new HVAC units. Also additional fire devices will be required to coincide with the elevator recall.

**Miscellaneous items:**

Additional electrical work will be required for the HVAC renovations. This includes wiring necessary for the installation of the new boilers and air handling units.

Additional electrical work will be required for new children's area such as tamper proof outlets.

**Budget Costs Analysis:**

• Electrical Service Upgrades	\$20,000.00
• Fire Alarm	\$15,000.00
• Lighting	\$175,000.00
• <u>Miscellaneous</u>	<u>\$30,000.00</u>
• Total	\$240,000.00

**Conclusion:**

The reconfiguration and the utilization of previously unused portions of the building require that upgrades be made to the electrical service. This is due to new light fixtures and new HVAC equipment being added to the current electrical loads. Creating an environment with proper light levels using efficient fixtures will enhance user comfort and decrease operating costs significantly. According to the Department of Energy electricity constitutes 66% of a building's energy consumption. Of that lighting constitutes 44% of electricity usage in the average building. Lighting usage in a library is likely a higher percentage. Providing the required light levels for reading is energy intensive. Replacing the existing fixtures with the recommended new fixtures will increase light levels to the required values and reduce electricity consumption.

## Existing Building Code Analysis

Currently building construction in Pennsylvania is regulated by the Department of Labor and Industry which employs the use of the International Building Code (IBC) to define construction standards and regulations. The codes are broken into sections which cover the major building systems including Mechanical, Plumbing, Electrical, and Accessibility. Existing buildings have a code which addresses them directly and allows for concessions in meeting the current more stringent regulations.

The existing building consists of two stories and a basement. The building's pertinent information is listed in the table below. The building was previously approved by Labor and Industry, approval #MA-91457.

<b>BUILDING CODE INFORMATION</b>	
<b>CONSTRUCTION TYPE</b>	IIB (Non Combustible Construction)
<b>OCCUPANCY GROUP</b>	A-3 (Assembly – Library)
<b>HEIGHT (STORIES)</b>	
Allowable (excluding basement)	Two (2)
Existing	Two (2)
<b>FLOOR AREA</b>	
Basement Floor Area	12,218 Square Feet (Including unfinished)
Existing First Floor Area	12,615 Square Feet
Existing Second Floor Area	5,378 Square Feet

### **Conclusion:**

Overall the building meets current code requirements for allowable height, occupancy group, and construction type. Accessibility and energy performance account for the greatest code deficiencies.

## Existing Site Analysis & Recommendations

The existing site covers an area of approximately .45 acres. The majority of the site is relatively flat or gently sloped. Located on the site are the library building and entry walkways. Currently there are six (6) site entry points. Drainage is accomplished via grading to off-site catch basins. Currently the site drains adequately but there have been occurrences of poor drainage which have been mitigated by efforts from the City.

Site & Zoning Characteristics	
Area	+/- .45 Acres (19,788 Square Feet)
Impervious Lot Coverage (Building Footprint and walk ways)	+/-69% (13,660 Square Feet)
Front Yard Setback	18' Minimum (Varies)

### Conclusion:

The primary site entry points are located on Central Avenue via stairs (Figure 3) and West Front Street via ramp (Figure 4). The West Front Street entrance ramp fails to meet current accessibility requirements and the Central Avenue stair is in poor condition and poses safety hazards for library patrons. The remediation of these items will create better site and building access.



Figure 3



Figure 4

## Existing Building Envelope and Structural Analysis

The existing building is composed of an original Carnegie Library Building and one major addition. The original library building was constructed in 1904. This part of the building consists of a basement and two above grade stories measuring approximately 15,933 square feet. The building is constructed of masonry walls, a steel structural frame, and a pitched roof structure covered with clay tile and slate. In 1959 a major building renovation was completed including exterior and interior modifications to the original Carnegie Building.

In 1978 a large addition to the Carnegie Building was constructed. The new construction was comprised of a two level addition, a reconfigured check-out counter, a book lift, and an elevator connecting all levels. The addition totaled approximately 13,642 square feet. Currently the library is utilizing only 7,642 square feet of the available space. The remaining 6,000 square feet is occupied by an unfinished basement area. The 1978 addition was constructed using masonry walls, a steel structural frame, and a flat roof composed of metal decking covered with minimal insulation and a waterproof membrane.

### Exterior Wall Construction & Fenestration:

The existing structure contains two types of exterior wall construction and two types of fenestration which coincide with the year of construction.

- Brick & Stone Veneer w/Concrete Backup – 1904 Carnegie Library Building
- Non Insulated Wood Windows – 1904 Carnegie Library Building
- Brick Veneer w/CMU Backup – 1978 Library Addition
- Insulated Glazing and Aluminum Frame Windows - 1978 Library Addition

The 1904 Carnegie Library Building walls are constructed of brick and stone veneers anchored to concrete. The interior face is finished with a plaster coating. The walls are not insulated.

The 1978 Library Addition walls are constructed as illustrated in Figure 5.

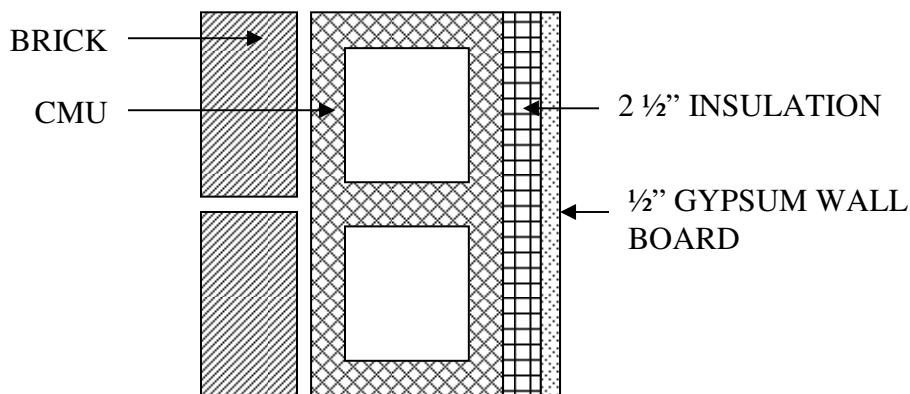


Figure 5

Overall the exterior walls of the entire library building are sound and in excellent condition. Caulking at expansion and control joints should be replaced to limit air, insect, and contaminant infiltration. Because there is a basement located below grade water infiltration is a concern. When the 1978 addition was constructed the new walls were damproofed on the exterior side and a foundation drain installed, see Figure 6. During the 1978 construction the 1904 basement walls were coated with a damproofing material on the interior exposed faces. There is no record of foundation drains for that part of the building. Likely they were constructed but have since been abandoned. Water infiltration into the basement seems to be minimal and can be addressed by installing new damproofing on the basement walls and adding dehumidification to the HVAC system.

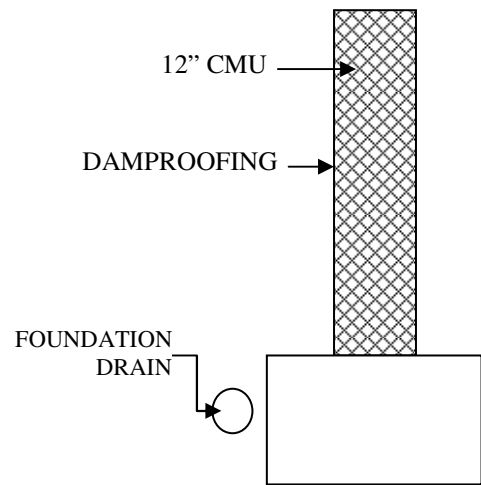


Figure 6

The existing windows in the Carnegie Library building are constructed using wood frames and single pane plate glass. Many of the windows have been fitted with storm windows in filled with plate glass or Plexiglas. One of the Carnegie Library building's greatest architectural elements is the large windows including multiple stained glass windows located on the second floor, see Figure 7. These elements have been largely marginalized because of the addition of poorly planned energy conservation means and methods. The 1978 windows are constructed using an aluminum frame in-filled with 1" insulated glazing. The windows are sound but lack today's high performance energy capabilities.



Figure 7

Window efficiency is measured using several factors primarily U-Value and Solar Heat Gain Coefficient (SHGC). Higher numbers represent poorer performance. The current glazing has a U-Value of approximately .55, this translates to an R-Value of 1.8(1/.55) and an SHGC of .7 and therefore allows 70% of the direct solar radiation to pass through the window. Current glazing systems feature U-Values of .30 equaling an R-Value of 3.33 (1/.30) and an SHGC of .22 allowing only 22% of direct solar radiation to pass through the window. The current windows also lack any kind of low emissivity coating. Low-E coatings can reduce temperature gain on the interior of the building by 4 to 5 degrees. These figures represent significant improvements and lower heating costs. Replacement of the existing windows and proper opening weatherproofing would help reduce heating and cooling costs, improve user comfort, and expose the building's impressive millwork which has been covered over with ineffective storm windows.

### **Roof:**

The roof is divided into two major areas. One covers the original Carnegie Building and consists of clay tile and slate. This part of the roof is in poor condition and several temporary fixes have been attempted, see Figure 8. Currently leaks into the Carnegie Building second floor space are causing damage to ceiling and wall finishes. Complete roof integrity is required before renovations can take place on the ground and upper floors.

The second roof area covers the 1978 addition and consists of flat rubber roof and small sloped roof protected by slate. Both of these roof surfaces are in good condition, see Figure 9.



**Figure 8**



**Figure 9**

### **Interior Wall Construction:**

There are three types of interior walls.

- Painted plaster over wood studs
- Painted gypsum wallboard over wood studs
- Painted exposed CMU (Concrete Masonry Unit)

The interior partitions have been well maintained except for the second floor storage area of the original Carnegie Library Building; a large portion of the 2<sup>nd</sup> floor has been used for storage since 1979. In this location the walls and plaster ceilings have deteriorated drastically due to non-use and water infiltration from leaks in roof, see Figure 10.



**Figure 10**

### **Doors & Interior Windows:**

- **Exterior Doors**
- **Interior Doors**
- **Interior Windows**

Exterior doors are either hollow metal or aluminum and insulated glass and are in good condition. Caulking at all exterior doors should be replaced to limit infiltration and ex-filtration and reduce energy loss. The Interior doors are constructed of solid core wood and are in excellent condition having been well maintained by the library maintenance staff. Door

hardware is in good condition but fails to meet current accessibility codes. The small amount of interior glazing (glass) is in good condition and need not be modified.

#### **Interior Finishes:**

- **Wall Finishes**
- **Floor Finishes**
- **Ceiling Finishes**

The primary wall finish is a shade of white paint, see Figure 11. The custodial staff does an admirable job of keeping the walls clean and blemish free. Specifying a higher wear resistant paint could reduce scheduled paintings and maintenance. The introduction of a more vibrant color scheme would improve building aesthetics and user comfort.

Floor finishes include carpet, wood laminate, and vinyl composition tile (VCT). The carpet is in good condition and could be reused if necessary. Additionally some areas contain tiles with asbestos content and should be remediated as required. Please see the attached toxic materials report for location and extent.

Acoustic ceiling tile comprises the majority of the ceiling finishes. Lack of filtration and duct dirt has colored many of the tiles particularly near supply vents. HVAC upgrades would necessitate the demolition of much of the current ceilings and could allow for ceiling tile upgrades for better acoustics and aesthetics. Areas that have hard ceilings are adequate except where water damage has occurred and repairs need to be affected.



**Figure 11**



**Figure 12**

#### **Stairs and Elevators:**

There are three interior staircases, one passenger elevator, and a book lift. The stairs are in good condition. Replacement of the existing riser and tread coverings would enhance safety and reduce maintenance. The existing elevator is operational and in use, but does not meet current code requirements for safety and handicap accessibility, including a return to floor option during power loss and emergency operations. The existing book lift is operational and is used to transport books between the basement, first floor, and mezzanine levels.

#### **Furnishings:**

The library has a multitude of furniture styles especially in the office areas, see Figure 12. Systems furniture should replace the collection of non functional and uncomfortable office equipment to increase productivity and reduce space requirements. Shelving comprises the greatest percentage of furniture items. The current shelving is adequate but in many cases fails to meet accessibility standards due to shelf heights exceeding a maximum of 48". A variety of

computer desks are also in use throughout the library. A phased furniture plan should be implemented to replace worn out and mismatched pieces. The original library featured solid wood furniture that was designed as part of the building creating a unified aesthetic. A return to a cohesive furniture and interior design strategy will help to enhance user experience and library aesthetics and efficiency.

**Conclusion:**

The Oil City Library is a community and architectural treasure. The building on a whole is in excellent condition. This is the result of quality construction and constant maintenance. The current structure is at a minimum thirty-one years old with a significant portion of the building being more than 100 years old. As such there are items that have come to the end of service life such as the roof or have been made obsolete by technology such as the windows. The spaces that have been kept in constant service have worn well and been properly maintained. Areas like the second floor which has seen little use and maintenance require extensive rehabilitation. The unfinished space located in the basement affords the Library an opportunity to expand without constructing a new addition.

## Technology and Audio/Visual Recommendations

Libraries serve as places of learning and knowledge dissemination. Traditionally that knowledge has come from the books and publications housed within the building. The availability of e-content, library subscription databases, and the digitization of print books available online has created alternative outlets for securing information once thought to be strictly the domain of libraries. Technology within the frame of the bricks and mortar of a traditional library offer opportunities to reach a much broader audience than web content alone. It allows access to multiple sources of information not found by simply surfing the web. It also provides the library the ability to provide an enhanced array of media including audio, video and web content. More importantly libraries offer the services of human interaction unavailable to the lone individual.

Technology for this project can be divided into two major categories.

- Building Technology
- Library Technology

### **Building Technology:**

This category refers to systems primarily accessed and operated by the staff and include:

- Phone System Internal/External
- Staff Computers
- Staff Training
- Building Access Controls

Currently the library is devoid of most forms of current technology related to increasing the efficiency of normal everyday operations. Digital technologies including voicemail, card access, conference call equipment, and digital video projection should be incorporated into the building.

### **Library Technology:**

Technology should be employed as a tool to enhance current library services and to allow for the implementation of future services. The development of an overall Technology Plan should be implemented and should include:

- Introduction/Overview
- Vision Statement
- Executive Summary
- Background and Current State of Technology
- Technology Goals and Objectives

Because of the broad scope that a technology plan encompasses we are highlighting it as a discussion point in the whole of the study and will not include it in cost or time estimates. Any technology plan should be incorporated into the building as a part of the infrastructure and not

simply an additional layer. Technology should act as an enhancement to the traditional aspects of a library and not simply a replacement.

## Schedule of Work

Renovations to the existing structure and continuous operation of the building during construction are critical elements for the success of the project. The Library, Architect, and Contractor must have a plan for the phasing and timing of construction approved in advance to insure proper work flow and building operations. Proper safety measures must be put in place to protect patrons before and during construction.

<b>BUILDING CONSTRUCTION PHASING</b>	
PHASE 1 - Exterior	EXTERIOR RENOVATIONS INCLUDING WINDOW REPLACEMENT, ROOF REPLACEMENT, AND CAULKING AND SEALING. STAIR AND RAMP REPLACEMENT.
PHASE 2 - Basement	RENOVATIONS TO THE BASEMENT.
PHASE 3 – Second Floor	RENOVATIONS TO THE SECOND FLOOR.
PHASE 4 - First Floor	RENOVATIONS TO THE FIRST FLOOR.

### **Conclusion:**

A phased approach would allow the Library to implement renovations on a floor by floor basis and on an available funding basis. It would also minimize service disruptions and potential negative interaction between library patrons, staff and construction activities. The negative to this approach is that the construction schedule is lengthened and is generally more costly than completing the project all at once.

## Cost Estimate

The capitol cost for a construction project includes the expenses related to the establishment of the facility and are comprised of multiple components including:

- Planning and feasibility studies
- Architectural and engineering design fees
- Construction, including materials, equipment and labor
- Field supervision of construction, overhead, and profit
- Construction financing
- Insurance and taxes during construction
- Equipment and furnishings not included in construction
- Inspection and testing costs

Also included in our construction budget there is an allowance for contingencies or unexpected costs occurring during construction.

We based our cost estimate on historical cost data for this project type, unit costs for items defined in the schematic plans, and our own experience with local commercial construction. These items are time sensitive and costs usually increase on a yearly basis from 5% to 15%.

<b>BUILDING CONSTRUCTION ESTIMATE</b>	
Phase 1 - Exterior	\$495,834.00
Phase 2 - Basement	\$484,286.00
Phase 3 - Second Floor	\$247,135.00
Phase 4 - First Floor	\$332,414.00
<b>SUB TOTAL</b>	<b>\$1,559,669</b>
Fees	\$125,000
Equipment & Furnishings	\$350,000
<b>TOTAL</b>	<b>\$2,034,669.00</b>

The numbers above are estimated and will vary based on the project's final design and scope. All of the bulleted factors are included in the above estimated values. A 5% contingency is also included. The cost of Equipment & Furnishings can vary greatly and is not generally considered part of the construction costs but are still part of the total project costs and have been included for budget purposes. The fees are based on percentage (8%) of the total construction costs excluding Equipment & Furnishings.

The following bulleted items highlight significant construction items and their respective costs.

**Phase 1:** The estimated budget for Phase 1 (Exterior) includes the following line items:

- Window Replacement: \$298,273.00
- Roof Replacement: \$48,500.00
- Stair and Ramp Replacement: \$125,450.00
- 5% Contingency: \$23,611.00

**Phase 2:** The estimated budget for Phase 2 (Basement) includes the following line items:

- Interior Renovations: \$229,062.00
- New Toilet Rooms: \$41,268.00
- Construction of Exit Stair: \$6,100.00
- HVAC: \$106,950.00
- Electrical: \$80,000.00
- 5% Contingency: \$20,906.00

**Phase 3:** The estimated budget for Phase 3 (Second Floor) includes the following line items:

- Interior Renovations: \$73,897.00
- HVAC: \$92,050.00
- Electrical: \$65,000.00
- New Toilet Rooms: \$5,500.00
- 5% Contingency: \$10,688.00

**Phase 4:** The estimated budget for Phase 4 (First Floor) includes the following line items:

- Interior Renovations: \$169,974.00
- New Toilet Rooms: \$15,090.00
- HVAC: \$38,000.00
- Electrical: \$95,500.00
- 5% Contingency: \$14,350.00

**Conclusion:**

The above estimate equals an approximate cost of \$51.63 per square foot ( $\$1,559,669 \div 30,211$  square feet) excluding equipment and furnishings. This compares to the average cost of \$150-\$175 per square foot for new construction. This represents an excellent value and provides for the Library's continued use by current and future generations of library patrons.

## Glossary

**ACCESSIBLE** - A site, building, facility or portion thereof that complies with chapter 11 of the International Building Code.

**ACCESSIBLE ROUTE** - A continuous, unobstructed path that complies with chapter 11 of the International Building Code.

**CMU** – Concrete Masonry Unit. A large rectangular block made from cast concrete in a defined modular size.

**GRADEPLANE**: A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

**PUBLIC ENTRANCE** - An entrance that is not a service entrance or a restricted entrance.

**PUBLIC-USE AREAS** - Interior or exterior rooms or spaces that are made available to the general public.

**RESTRICTED ENTRANCE** - An entrance that is made available for common use on a controlled basis, but not public use, and that is not a service entrance.

**RTU** – Roof Top Unit. A large piece of HVAC equipment located on the roof.

**SOLAR HEAT GAIN COEFFICIENT (SHGC)** - A measure of a window's ability to reduce heat gain during direct radiation exposure.

**U-VALUE** - A measure of a window's ability to reduce heat loss during indirect radiation exposure.