

SHREWSBURY PUBLIC LIBRARY
Town of Shrewsbury, Massachusetts

Deliverables # 10 & 11

CMR 607(02)
&
Building Program Statement



Prepared by Godfrey's Associates, Inc.
Richard L. "Dick" Waters, Principal Consultant

June 18, 2010

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SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

Deliverables # 10 & 11 – CMR 607(2)

New Building Program Statement

Prepared by Godfrey's Associates, Ind., Richard L. "Dick" Waters, Principal Consultant

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SHREWSBURY PUBLIC LIBRARY
Town of Shrewsbury, Massachusetts

Deliverable # 10

CMR 607(02)

Prepared by Godfrey's Associates, Inc.
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June 18, 2010

Section 10
CMR 607(02)

The regulations for 605 CMR: BOARD OF LIBRARY COMMISSIONERS, 605 CMR 6.00: LIBRARY IMPROVEMENT PROGRAM - PUBLIC LIBRARY CONSTRUCTION states the following in Section 6.07, the Application Procedures, specifically paragraph (2):

6.07: Application Procedures

(2) The Library shall file a completed Letter of Intent form on or before the due date announced in the Program Notice. Late forms will be automatically returned. For all General Projects (New Construction, Addition/Renovation, Renovation, and Joint Public Library projects), with the Letter of Intent form the applicant shall file the following:

(a) A completed library building program using a 20-year horizon, which has previously been submitted and accepted by the agency. This program shall have been prepared by the Library independently of and in advance of the appointment of the architect who will prepare the schematic design. It shall include:

1. A current community analysis including demography, location, governmental organization and community structure.
2. An institutional analysis including history of the library, philosophy of library service, staffing, library collections, finances and a brief history of the previous and current planning efforts for improvements to the physical plant.

3. A section on facility space requirements including a description of space needs by program area and relationships between the areas, and addressing the requirements and implications of new technologies and new information formats.
 4. A summary of facility space requirements in tabular form.
1. **A current community analysis including demography, location, governmental organization, and community structure.**

DEMOGRAPHY

Population - The Central Massachusetts Regional Planning Commission (CMRPC) has projected the population for all communities in the Commission's area. Projections have been made through 2030 in five-year increments, starting with the U.S. Census data for 2000.

For the Town of Shrewsbury the CMRPC projects:

2000 - 31,640
2010 - 34,400
2020 - 39,800
2030 - 41,300

Percentage changes for the 30-year period:

2000 - 2030 - 30.53%
2000 - 2020 - 25.79%
2000 - 2010 - 8.72%
2010 - 2020 - 15.70%
2020 - 2030 - 3.76%
2010 - 2030 - 20.06%

For the CMRPC Region:

2000 – 518,480
 2010 – 559,600
 2020 – 595,000
 2030 – 628,000

Percentage changes for the 30-year period:

2000 – 2030 – 21.12%
 2000 – 2020 – 14.76%
 2000 – 2010 – 7.93%
 2010 – 2020 – 6.33%
 2020 – 2030 – 5.55%
 2010 – 2030 – 12.22%

There will be, according to the Planning Commission, significant growth in the Town's population as well as the region as a whole. Over the next 20 years the Town of Shrewsbury will gain population at a considerably faster rate than the region as a whole. See the attachments to this deliverable for additional information.

Demographics - The CMRPC developed, based upon the 2000 Census, demographics for each community in the region, the entire region, Worcester County, and the State.

CMRPC Demographic Snapshot

Area	Median Age	Average Household Size (persons)	Percent Owned Homes	Median Household Income
Shrewsbury	37.6	2.54	73.1	\$64,237
Worcester	36.1	2.54	62.4	\$47,949

Primary Metropolitan Statistical Area

Worcester County	36.3	2.56	64.1	\$47,874
State	36.5	2.51	61.7	\$54,502

Additional demographic information informs:

Population by Age – 13.9 percent ages 0 – 9
 9.5 percent ages 10 – 17¹
 6.8 percent ages 65 – 74
 6.0 percent age 75 +
 63.8 percent ages 18 – 64

Household - Type Families (Married Couples) / 85.2 percent
 Families (Couples w/children) / 50.9 percent
 Male household (no wife) / 4.0 percent
 Male (no wife w/children) / 56.5 percent²
 Female household (no husband) / 10.8 percent
 Female (no husband w/children) / 58.1 percent³
 Male Non-family / 43.8 percent
 Female Non-family / 56.1 percent

Ethnicity - 88.7 percent White
 1.8 percent Black
 7.3 percent Asian
 2.1 percent Other/Multiple Races
 2.8 percent Hispanic Origin⁴

¹ There is a breakdown for ages 10 – 14 and 15 – 24. Assuming an equal distribution for each of the 10 years in the 15 – 24 bracket, there are 3.3 percent ages 15 – 17. That, coupled with the 6.2 percent for ages 10 – 14 provides the 10-17 total of 9.5 percent.

² Percent of Male Households with no wife and with children living at home.

³ Percent of Female Households with no husband and with children living at home.

Educational - Attainment Level	No high school diploma / 5.5 percent
	High school graduate / 20.0 percent
	College, no degree / 16.0 percent
	Associate's degree / 7.5 percent
	Bachelor's degree / 28.8 percent
Graduate/Professional degree / 22.3 percent	
Labor Force -	Employed / 63.9 percent
	Unemployed / 4.6 percent
	In Armed Forces / 0.1 percent
	Not in labor force / 31.3 percent
Home Ownership -	Own / 72.2 percent
	Rent / 20.2 percent
	Vacant / 7.6 percent
Vehicles Available -	None – 4.5 percent
	One – 30.4 percent
	Two – 48.3 percent
	Three or more – 16.8 percent

Library Considerations - The three strongest demographic predictors of library usage have consistently been:

- Educational attainment levels
- Households with children living at home
- Home ownership.

In each of these demographic measurements the conclusion to be drawn is that the Town of Shrewsbury Public Library has been – and will continue to be – used a great deal by residents of the community.

⁴ The US Census Bureau no longer reports Hispanic as a specific ethnic grouping. A person of Hispanic Origin might consider him/herself White, or Black, or Other, etc.

The importance of the availability of vehicles bears, of course, on how a person/family can/cannot get to the public library. This becomes increasingly important in a community with limited public transportation and only one public library facility.

LOCATION

The Town of Shrewsbury is located in Worcester County. Highway 9 and I-190 and I-290 access it. Interstate I-495 and I-90 (Massachusetts Turnpike) are to the east and south respectively.

The Shrewsbury Public Library is located in the center of Shrewsbury at the junction of Route 140 and Main Street. Shrewsbury abuts Boylston, Northborough, Westborough, Grafton, and Worcester. Lake Quinsigamond forms the principal border between Worcester and Shrewsbury. The Town of Shrewsbury is situated approximately halfway between Boston (40 miles to the east) and Springfield (45 miles to the west). In some respects it is a suburban community, but in other respects it is a central city of its own.

The Library is located directly across the street from the Common. Retail, office building, and churches constitute its immediate neighbors.

GOVERNMENTAL ORGANIZATION

A publicly elected Mayor and five-member Board of Selectmen govern the Town of Shrewsbury. A Town Manager is responsible for the day-to-day operations of the Town.

An elected nine-member Board of Library Trustees is responsible for the hiring, etc. of the Library Director, long range planning and budget and policy development. Board officers include a President, Vice-president, Secretary, and Treasurer.

The Library also enjoys the support of a very active Friends of the Library organization as well as an active Library Foundation. Library Trustees are represented on both of these organizations.

COMMUNITY STRUCTURE

Shrewsbury is a well-educated community (51.1% have a college or graduate degree, and another 23.5% have an associate degree or some college), whose residents make extensive use of their library for current best sellers and the latest, most topical non-fiction materials, including pertinent consumer information.

The family structure is quite strong. Over 85 percent of the households are married couples, and just fewer than 50 percent have children living at home. The community is heavily white, or Caucasian (88.7%). Nearly 13 percent of the population is age 65 and older. Of those age 25 and above, not quite 64 percent are employed.

Home ownership is strong – 77.2 percent of the residential structures are owner homes. And, 65.1 percent of the households have two or more vehicles.

The downtown area, where the Library is located, is a healthy mix of retail (restaurants and small shops), one to three story office buildings, churches, some residential, and the Common.

- 2. An institutional analysis including history of the library, philosophy of library service, staffing, library collections, finances and a brief history of the previous and current planning efforts for improvements to the physical plant.**

HISTORY

The Shrewsbury Public Library was organized in 1872. The first library was located in the Town House. It moved to its current location in 1895 and was housed in the Bond House, which was purchased to

serve as the public library. The current building was built and opened in 1903, on proceeds from the estate of Jubal Howe.

In 1923, a one story annex to house the Children's Room, was built in memory of General Artemus Ward. That was followed by a second addition, also two-levels, completed and occupied in 1979.

The Library became a member of the Central Massachusetts Regional Library System (CMRLS) in 1969.

PHILOSOPHY OF SERVICE

The primary role of the Shrewsbury Public Library is as a popular materials library. As such, the Library provides a diverse collection of materials, in several formats (printed book, audio-book, videocassettes, CD, DVD, etc.), and a variety of services, including an ever-increasing interlibrary loan service. The largest group of library users is adults 18-65 years old. Next come students 5-17 years old. Picture books have the highest circulation, followed by videocassettes and DVDs.

The secondary role is to serve as an independent learning center, as well as to support students of all ages in formal educational settings, including distance learning and exam proctoring. In this capacity, the Library has a good non-fiction and reference collection. The reference collection also supplements the school media collections and assists students in meeting their formal educational needs. The Shrewsbury Public Library recognizes the rapid advance of computer technology, and tries to keep abreast of new formats, databases, and other online resources. The library's own collection and services are supplemented by those of other member libraries of C/W MARS (the computerized consortium of public and academic libraries in central and western Massachusetts).

As a member both of C/W MARS and CMRLS Shrewsbury Public provides access for its users to the broader resources of the region,

the state, and beyond. The Shrewsbury Public Library Board of Trustees and staff support the concepts of free access to information and of reciprocal borrowing between and among libraries to meet user needs.

STAFFING

The Shrewsbury Public Library employs 12 full-time and 19 part-time employees. A full-time post works a 37.50-hour week, except for the Custodian who works a 40.00-hour week. Part-time staff work between 4.00 and 19.00 hours per week. The full-time equivalent for the part-time staff is 5.85 FTE.

In addition, the library employs five library pages that work a collective 26.5 hours per week, or 0.706 FTE.

Of the full-time staff, four are classified as professional (MLS degree). There is one part-time professional staffer.

The current Library Director has been in her post for five years. The current Assistant Library Director has been in his post for seventeen years.

The direct reports for the Library Director are five; Assistant Director, Senior Account Clerk, and heads of Children's, Technical, and Circulation services.

The Assistant Library Director is also the head of Adult Services with three direct reports – Reference Librarian, Young Adult Librarian, and Electronics Librarian.

LIBRARY COLLECTIONS

The Shrewsbury Public Library collection totals 146,181 items. By age grouping:

- Adult = 90,494

- Young Adult = 7,726
- Children's = 47,959

In terms of media (non-book materials):

- Adult = 11,947
- Young Adult = 1,094
- Children's = 3,480

Within the media collections there are several hundred "legacy" items; videocassettes, books-on-tape, and audiocassettes. These collections have been "closed" and over a period of time will no longer be part of the Library's collection.

With a total of 146,181 items the per capita collection now registers 4.2 items per capita when computed on the basis of a 2010 population estimate of 34,400.

The Building Program calls for:

Adult books = 88,945
Young Adult books = 7,200
Children's books = 52,600
Adult media = 10,100
Young Adult media = 1,000
Children's media = 4,000

On the basis of a projected 2030 population of 41,300, there will be just less than 4.0 collection items per capita.

LIBRARY FINANCES

Income – for FY2010, the library income consists of \$1,077,655 in municipal funds, approximately \$190,000 in trust and endowment income, \$10,000 in monetary gifts, \$30,000 in sponsorships and grants, and \$40,000 in Library State Aid. The Shrewsbury Library

Foundation, a separate non-profit agency, and the Friends of the Library organization, provide additional resources.

Outgo - The FY2010 Town Meeting approved operating budget for the Shrewsbury Public Library was \$1,077,655. The amount reflects a decrease of \$77,365 from the FY09 budget.

Of the total, the breakdown by major expenditure category is:

- Salaries = \$771,515, or 71.6 percent
- Services/Contractual = \$122,062, or 11.3 percent
- Supplies & Materials = \$178,778, or 16.6 percent
- Other & Equipment = \$5,300, or 0.5 percent

Of the \$178,778 for Supplies & Materials the lion's share of that is for library Materials at \$140,000, or just under 13 percent of the total.

Accounting for the decline, by expenditure category:

- Salaries = decrease of \$65,784, or 7.8 percent
- Services/Contractual = decrease \$5,209, or 4.1 percent
- Supplies & Materials = decrease \$9,972, or 5.3 percent
- Other & Equipment = increase of \$3,500, or 21.7 percent.

Library materials expenditures declined \$10,207, or 6.7 percent.

BRIEF HISTORY OF PREVIOUS AND CURRENT PLANNING EFFORTS

Previous - In early 2004, the Town of Shrewsbury contracted with a New York consultant to produce a building program statement (BPS). The BPS was completed and accepted in October, 2004.

The Library was a recipient of a provisional grant of close to \$4 million in the previous construction grant round. Since August of 2008, when the state bonds for the library construction program were approved,

library officials began lobbying town officials to place the project before voters. Even with the unprecedented economic recession, the Trustee had succeeded in gaining selectman approval for placing the project before town meeting. The date was set for September 2009. Just a week later, the MLBC announced the new and more generous grant program. After intense discussion and compromise between the two boards, they jointly decided to forego the earlier grant and prepare to apply under the new program.

They have used this changed timeline as an opportunity to:

1. Update project costs
2. Integrate new technologies- and the new ways people are reading and using libraries--into the building design
3. Adjust to the harsher fiscal realities, to design a building that can be built and run as efficiently as possible
4. To integrate LEED elements (for better energy efficiencies, improved user comfort and other grant possibilities)
5. To extend the fundraising campaign for a more successful result.

Current - Now, some six years later, the Town has again engaged the services of a library consultant to review the 2004 BPS and prepare a new building program. A Rhode Island firm was engaged to prepare the new program.

The review of the 2004 BPS was to prepare three different reviews; conservative, moderate, and enhanced.

The work plan, as executed, consisted of the following:

- Review of background data - staffing, organization chart, usage data, budgets, etc.
- Focus groups and interviews with library staff
- Focus groups with community members
- General community meetings
- Meetings with the Library Board of Trustees

SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

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- Meeting with the Friends of the Library and the Library Foundation
- Online community survey
- In-person community survey
- Discussions with the Library Director
- Preparation of a draft building program
- Review of program draft
- Finalization of the building program.

3. A section on facility space requirements including a description of space needs by program area and relationships between the areas, and addressing the requirements and implications of new technologies and new information formats.

The full Building Program Statement as detailed in Section 11, The Assignable Spaces, address:

- Space requirements for each program area
- Spatial relationships between each program area
- Requirements and implications of new technologies
- Requirements and implication of new information.

4. A summary of facility space requirements in tabular form.

Table 7 of Section 11 is a tabular summary of the space requirements for the Shrewsbury Public Library as reflected in the Building Program Statement.

SHREWSBURY PUBLIC LIBRARY
Town of Shrewsbury, Massachusetts

Deliverable # 11

BUILDING PROGRAM STATEMENT

Prepared by Godfrey's Associates, Inc.
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June 18, 2010

Section 1
**THE CONTEMPORARY
PUBLIC LIBRARY BUILDING**

A building, in its simplest form, is a series of spaces, some defined by enclosure, and some defined only by use. The success of the whole is dependent upon a gathering of these spaces, maintaining their principles, relationships, and most importantly, their aesthetic concerns. These are principles that give the building individualism and special meaning. A public library building has the potential to be one of the most significant civic structures in the community.

TYPICAL SERVICES AND FUNCTIONS

A quality library facility must provide a harmonious balance of public service areas and the necessary support spaces. A library that expects to serve its residents deep into the 21st century must also provide a healthy array of information technologies and public meeting spaces to go along with books and other forms of media. Therefore, there must be considerable adaptability within the design to permit adjustment for new services, furnishings, and equipment over time.

The following is a sampling of typical public library uses and functions that take place in many public library buildings. Many of these will take place in the new Shrewsbury Public Library of the Town of Shrewsbury, Massachusetts.

- A high school debate team preparing for the state tournament
- Users of all ages at the state-of-the-art PCs “surfing the net” and accessing a variety of resources via the Internet
- A staff member of a community non-profit organization at a study carrel researching a strategy for a grant application to a national foundation
- A couple returning materials to the Circulation Services Desk and browsing for new materials in the Popular Materials area
- A librarian requesting materials via an on-line, interlibrary loan database
- Two high school students using both print-on-paper materials and electronically accessible databases for a class project on Massachusetts history
- An English-As-A-Second Language class making a group visit to tour the Library
- Library staff and volunteers re-shelving materials
- A group of pre-kindergarten children experiencing the excitement of learning while enjoying picture book time in the Program Room
- Middle school students surveying the poetry of Robert Frost in the Young Adult Services area.
- A young parent reading a new magazine while his/her child is seeking a photograph of Stonehenge on a Library PC.

LIBRARIES REQUIRE SMART BUILDINGS

The public library building of today and tomorrow, regardless of size, must accommodate the traditional collections and functions long associated with library service while reflecting the technical flexibility and requirements of smart buildings. Libraries must address the dramatic changes in information technologies, especially library information technologies and the digitization of text. As technology has become more sophisticated, so have society at-large, and the public library user in particular.

While more information can be stored in less space, a higher level of demand for a wider range of materials and the furniture and equipment needed to realize the full potential of information technology has offset this condensation of information, as far as library space needs are concerned. For example, Library staff will often be asked if space and a network, wireless or not, is available for connecting a library user's laptop computer.

STRIKING A BALANCE

The proposed Shrewsbury Pubic Library should provide a harmonious balance of public service areas and the necessary support spaces. The modern, contemporary public library building of today is a true community center, regularly visited day in and day out by more people than any other place in the community.

The spaces within the facility for the customers should be varied and inviting. The furnishings and equipment should be arranged so as to balance the needs of the customer for access in relation to the Library's operational needs for controlling that access.

Section 2
EXTERIOR CONSIDERATIONS

Without question one of the major reasons for success of a public use facility in the vast majority of locations is the availability of adequate parking for the users of the facility. Although urban libraries may be able to be quite successful – with success measured by the number of persons using the building – without much, if any, public parking, the libraries located in non-urban environments have found that the absence of adequate parking can be a significant barrier to achieving the level of usage desired.

PUBLIC LIBRARY PARKING GUIDELINES

Adequate off-street parking, accessible and convenient to the entrance of the library building, is a principal factor in user satisfaction. Godfrey's Associates, Inc. strongly believes that adequate parking is a major factor in choosing a site for a public library and in how the building is placed on the site.

Adequate parking must be available, convenient, and safe if library policy-makers expect their new public library of facility to be utilized to its maximum potential.

Parking Determination Factors - There are different ways to determine the number of spaces required. A review of the different factors include:

Ratio of Square Footage to Parking -- Parking requirements for public use and commercial facilities are often expressed as a ratio of the square footage of the building. For example;

- One parking space for every 300 square feet (SF) of building space or
- One square foot of parking (not parking spaces) for one square foot of building space.

Ratio of Parking to Seating -- Another factor, or guideline, relates parking needs to seating requirements. Assuming a vehicle typically carries two people, the ratio of one parking space for every two reader seats within the library building has some rationale. This number must be supplemented by added parking for the meeting rooms in the building. The latter are often covered by local ordinance (even if library buildings are not covered). This type of guideline should include library seating for adults only, children not being automobile drivers.

Parking for Staff -- Parking for staff may also be regulated by local ordinance. Failure to provide adequate staff parking may become a source of staff frustration and discontent. Staff parking should be provided in sufficient quantity for staff that consistently drives to work.

Parking for Volunteers -- Parking for volunteers should also be considered. Local ordinances for staff may include volunteers. If not, volunteers should be included as part of staff on a full-time

equivalent (FTE) basis for the purposes of calculating total parking needs.

SHREWSBURY PUBIC LIBRARY PARKING REQUIREMENTS

As library planning consultants, Godfrey's Associates, Inc. has assisted many library facilities throughout the United States. To provide adequate parking for library users we recommend the following formula:

- One parking space for every 200 building gross square feet (BGSF) is necessary for buildings up to 20,000 SF
- One space for every 300 BGSF for buildings between 20,000 - 30,000 BGSF
- One space for every 350 BGSF for buildings between 30,000 - 50,000.

For the Shrewsbury Pubic Library we recommend that parking be designed and built for the projected 20-year space needs of the facility, or 54,259 BGSF. At one space for every 350 BGSF this produces a need for 155 spaces. These spaces would include public parking, handicap parking per local ordinance, as well as parking for the staff and volunteers.

Consideration should be given to:

- Provision of at least one electric car docking station
- Provision of spaces for very small vehicles, e.g. Smart Cars.

LAND REQUIREMENTS FOR PARKING

Although many jurisdictions do not have public library parking requirements in their local codes, they often do have requirements for the amount of space per vehicle. The amount of land area required to meet the requirement for the Shrewsbury Public Library building of 54,259 BGSF would be 54,259 BGSF (155 spaces x 350 SF per space = 54,250 SF) -- or about 1.25 acres.

PARKING COSTS, ESTIMATED

- Surface parking - \$3,500 - \$5,000 per space depending upon the lighting, landscaping, curbs, striping, surface (asphalt or concrete), etc.
- Parking garage - \$15,000 - \$20,000 per space depending upon footprint, ramps, vertical transportation, etc.
- Underground parking - \$30,000 - \$40,000 per space depending upon number of spaces, depth, air quality, etc.

SIGNAGE

Provide signage that clearly directs drivers to entrance and exit and turning points.

SHARED PARKING

The site for the Shrewsbury Library facility may allow for the possibility to share parking with adjacent buildings. For instance, a public library's greatest need for parking is typically:

- Early morning when many senior citizens use the building and/or story hours are held

- Noon "hour" when many persons visit during their lunch break
- After school until about 5:30 - 6:00 p.m.
- Mid-evening from 7:30 - 8:30 p.m.

Of course, there are also great demands on parking when on weekends, and when there is a popular program(s) planned for the multi-purpose meeting room.

These times sometimes conflict with the needs of other buildings, especially in the afternoon and weekends. Therefore, shared parking -- while feasible -- should not be viewed as an answer to more than 15 to 20 percent of the library's total needs.

BICYCLE PARKING

Provide a clearly identified and secure area for bicycle parking. Give consideration to "racks" designed by Spensko Design (see photo for an example).



LIBRARY MATERIALS RETURN AND PICK-UP SERVICE

Of all of the resources that every man, woman, and child has the one that is most valuable – at least arguably so, is time. Every second of time that goes by can never be regained.

If one accepts this premise, the consultant believes that it behooves the Library to do everything that it reasonably can do to assist the Library's customers to make the very best use of their time. Two ways that this can be accomplished is by providing:

- A library materials return service whereby a person driving a vehicle can return a book or CD or DVD, etc. without having to get out of his/her vehicle, and
- A library materials pick-up service that does the same thing for a person wishing to borrow an item from the Library.

The key to the success of these two “time savers” lies in their placement within the building and the layout of the circulation pattern of the Library’s parking.

These two services are described in detail in The Assignable Spaces section (Section 10) of this Building Program.

LANDSCAPING

Provisions should be made for organic landscaping that does not require excessive maintenance and watering. Consideration should be given to plants near the windows of the building that can also serve as a deterrent to someone who may wish to attempt to enter the building via the windows (whether they are operable or not).

The landscaping for the parking area should be designed to offset the heat gain that a sea of concrete or asphalt can cause – which can be as much as 10 – 15 degrees F.

EXTERIOR SIGNAGE

An attractive and sturdy sign, placed perpendicular to the building (depending upon building placement on the site) should clearly identify the building by name. It should also provide for the following:

- Hours of operation clearly and boldly stated
- Whether or not the Library is “Open” or “Closed” as persons approach the building
- Brief information about any special events scheduled that day and/or the next special event.

The appearance of the signage should be consistent with the building’s architecture. It should also be able to be operated from within the building via a technological system.

OUTDOOR SEATING

Provide for bench seating near the Entrance to the building. The benches should not be easy to move.

Section 3
INTERIOR CONSIDERATIONS

This, and the following six (6) sections of the building program for the proposed Shrewsbury Public Library, delineates a direction for the many interior design decisions required in a library project. The sections are intended to provide all parties with several general considerations the library consultant, Godfrey's Associates, Inc., believes are important for a library facility that strives to be functional and cost efficient to operate.

These considerations apply to both the design process and the construction documentation process. They are intended to stimulate discussion and narrow potential options by advancing proven solutions utilized in other libraries.

The considerations are, as stated, intended to be guidelines, not mandates. They are presented here based upon the experience of the consultant. Their purpose is to assist with the overall quality, maintainability, and functionality of the building. The Architects are, of course, encouraged to propose alternatives he believes will result in an even better facility.

In order to focus the efforts of the Architects and engineers the subsequent considerations are presented in the following order:

- Section 4 - Mechanical Systems Considerations
- Section 5 - Electrical Systems Considerations
- Section 6 - Plumbing Design Considerations
- Section 7 - Building Technology Considerations
- Section 8 - Lighting Systems Considerations
- Section 9 - Security Considerations.

Each of the major building systems supporting the Shrewsbury Public Library are described in an effort to begin to define the scope of construction in as much detail as possible. These discussions are intended as guidelines for the designer. They include planning and design issues that affect both construction and operational costs.

GLASS TREATMENT

Consider reducing summer solar heat gain by shading glass exposures with canopies, louvers, solar glass screens, etc. Shaded glass admits only one-quarter of the radiant heat admitted by un-shaded glass exposed to sunlight. Double-glazed, shaded, heat-absorbing glass reduces heat gain by about 85 percent. Reflective glass reduces heat gain by about one-third. Consideration should also be given to low-e glass, recognizing that it does restrict daytime views into the building's interior.

CONTROL WITH MINIMUM STAFF

The building and furnishing layouts must be planned so visual control of public areas is accomplished with minimum number of staff. Give special attention to visual control of entrances, exits, and entrances to public rest rooms.

SIGNAGE AND GRAPHICS

Graphic design, in terms of a signage system for both the interior and exterior and architectural design should be conceived and planned in concert to announce the library's resources and services. Signage should orient and guide people to all areas within the building. The designers should standardize the typeface for all signage. Signage must also comply with ADA guidelines for size, contrast, etc. In many cases, an alternative may be representational signage that uses pictures or symbols to convey an idea instead of, or in addition to, written words.

The Architects should consider signage that divides the information conveyed into three basic categories:

- Direction information to guide and direct people along routes to their destinations
- Identification information to label destinations so people recognize them when they have arrived
- Instruction information to inform people about rules, restrictions, special conditions, and procedures.

The signage should be designed and installed so trained staff can make changes with ease over the life and purpose of the building. Electronic ink signage should be considered.

ACOUSTICAL TREATMENT

Noise is a special concern in the Library. People of all ages will be using the various collections, seeking information, attending programs, visiting exhibits, and checking-out and returning library materials. Some customers will use the building for hours at a time while others will spend a brief amount of time in the facility.

Some of the needs of customers include acoustical considerations. These can often be addressed by locating functions that require concentration away from high-traffic or noisy areas.

A comprehensive program of acoustical design should conform to ASTM E1374 – 06 Standard Guide for Open Office Acoustics.

Ceiling systems are the primary means of absorbing unwanted sounds, followed closely by the type of lighting used. Ceiling-mounted fixtures with large flat lenses can bounce noise from one place to another.

Measuring Acoustical Properties - It is commonly known the fundamental unit of measurement of sound is the decibel (dB). There are also three criteria commonly used for the measurement of noise or sound transmission in architecture. These are:

- Noise Reduction Criteria (NRC)
- Sound Transmission Class (STC)
- Noise Criterion (NC).

Each has its particular purpose in specifying acoustical properties. In order to limit confusion, the consultant offers the following clarification, without an exhaustive discussion of the physics of sound, or the properties of sound transmission.

Noise Reduction Coefficient - The NRC is a rating given to acoustical materials, for the purposes of comparing sound absorption of different commercial products. It is the most useful measurement of noise absorption. In exact terms, the NRC of a given building material is a measurement of the percentage of sound that is absorbed, and not reflected, by that material,

averaged for the four most common audio frequencies, and expressed as a multiple of 0.05. As an example, a material with a NRC of 0.45 absorbs 45 percent of the sound that is incident upon its surface. Therefore, NRC ratings may range from 0.00, or totally reflective, to 1.00 or totally absorbent.

Sound Transmission Class - This rating is substantially more complex than the NRC, and was devised to measure the sound transmission qualities of wall, ceiling, and floor construction assemblies utilizing a collection of materials. Simply stated, the STC of wall assembly measures the average number of decibels lost (absorbed and/or reflected) when sound is transmitted from one side of the wall to the other. Therefore, the higher the STC rating of a partition, the better the noise control. An STC rating of 50 dB, roughly equivalent to the rating of a six-inch thick concrete wall, is considered very good. An STC rating of 65 dB or higher is considered excellent. A rating of 70 dB would provide complete privacy, while a rating of 20 to 25 dB would provide little, if any, privacy. As would be expected, a higher STC rating usually equates to a more costly construction assembly.

Requirements for recommended STC ratings in libraries are provided in Table 1.

Table 1

STC Rating

<i>space</i>	<i>rating</i>
Most Functions	STC 35
Office Areas	STC 40
Mechanical Equipment Rooms	STC 50

Noise Criterion - This criterion measures the acceptable levels of background noise for a given activity. These numerical ratings are

basically the sound level, in decibels, at the frequencies most audible to the average human ear. Through industry standards, NC ratings have been established for various activities. As an example, a NC of 10 dB is virtually inaudible. A NC range of 20 to 25 dB is suggested for sleeping in suburban or rural areas. The suggested range for background noise in libraries is 30 to 35 dB.

Background noise is often referred to as masking, or "white," noise. This low-level sound is desirable, if it is constant in nature and free of informational content, serving to mask other low level noises or sudden peaks in sound levels in a given space. For a space to have good acoustical qualities, it is generally considered to require some combination of acoustically absorbent construction and a level of background noise.

Background noise can be naturally generated from activities in the space, or it can be mechanically produced, as by an air conditioning system.

ACOUSTICAL TREATMENT

The following design goals, as expressed (please see Table 2) in relation to mechanical system generated noises, should be used for the occupied spaces.

Table 2

Noise Coefficient Design Goals

<i>space</i>	<i>design goal</i>
Offices Areas	NC-35
Stack Areas	NC-35
Toilets	NC-45
Break Area	NC-40

DOORS

All interior doors between staff workspaces and public spaces, as well as all doors within staff workspaces, should have vision panels. All interior doors should have doorstops and closure mechanisms.

ELECTRIC CLOCKS

Consider digital clocks that provide the time in hours and seconds, as well as giving the reader the day of the month, the month, and the year.

Clock faces should be large enough to enable those standing 15 to 20 feet from the wall-mounted clock to be able to easily see the clock face.

Confer with Library staff regarding the placement of the clocks in both public and non-public spaces.

FLOOR COVERING

The flexibility required of the floor plan for the Shrewsbury Public Library carries over to the floor finishes as well. The consultant strongly recommends carpet tile as the dominant floor covering where carpet is called for, e.g. offices, public spaces, and workrooms. Consider the acoustical performance, wearing performance, color fastness, texture, fire resistance, non-allergenic qualities, and anti-static qualities of carpet tile. Consider specifying carpet tile with the following characteristics:

- Warranty - Minimum 15-year by manufacturer

- Carpet fibers - DuPont yarns such as Lumena and Legacy manufactured with DuraTech stain protection applied to the yarn
- Backing and construction - Multi-level tufted loop pile tufted into the primary backing of polypropylene with a composite backing system of fiberglass and high-grade composite resin/thermoplastic composite, constructed in a poured coating process
- Number of backing layers - One (1) layer of fiberglass sandwiched between two (2) layers of high-grade composite resin such as poly-vinyl chloride (PVC)
- Finished face weight - 26 ounces per square yard
- Total thickness - 0.315 inches
- Rows - 10 per inch
- Tufts - 100 per square inch
- Average Density - 8,914
- Density Factor - 231,771
- Dimensional Stability - AACHEN test rating not to exceed 0.02 percent dimensional distortion
- Seaming - Chemically welded seams utilizing manufacturer approved and warranted materials
- Antimicrobial application - Incorporate an antimicrobial registered by the Environmental Protection Agency (EPA) which shall have broad-spectrum efficacy, low water solubility, and low human toxicity, and be active for the life of the carpet. The antimicrobial should pass AATCC Test Method 100-1988, and should be incorporated into the composite backing
- Stain protection - Manufacturer's application in addition to DuPont yarn-applied protection
- Flammability: ASTM-E-648 Radiant Panel test rating of Class I, equal to or exceeding 0.45

- Smoke density - NFPA-258-T or ASTM-E-662 test rating equal to or less than 450
- Static electricity - AATCC-165 test rating equal to or less than 3.0 kV at 70° Fahrenheit and 20 percent relative humidity.

Carpeted areas require less time for cleaning and maintenance than hard surface or vinyl flooring, which require waxing, stripping, and buffing.

Consider using hard flooring surface for the entrance lobby. Provide non-slip surfaces for all non-carpeted areas. Acoustics will need to be considered in these areas.

WALL FINISHES

All wall finishes should be high quality, durable, washable paint. Also consider using heavy-duty wainscoting or other hard surface, with corner guards, for the areas of the building with high traffic of bulk materials. The Architects and interior designer for the building are referred to the following publication:

- *Standard Design Criteria*, United States Postal Service, Facilities Department, latest edition.

The offices, workrooms, and Staff Room should have a tackable surface for mounting materials without damage to the wall.

Special consideration should be given to graffiti abatement.

BOOKSTACK SHELVING

The Shrewsbury Public Library will be a place for books and non-

book materials. The space needed to house the print and non-print collections will most likely consume about 30 to 40 percent of the net assignable square footage (NASF). Therefore, the planning of bookstack areas is critical to the successful functioning of the facility.

For all of the bookstacks housing print-on-paper items, e.g. books, a book support should accompany each shelf.

All bookstacks in the public spaces should have end, or face, panels with flush-mounted label holders at each end of double-face ranges. All wall-mounted shelving shall have steel backs (in order to protect the walls and reduce the amount of re-painting of the walls). Selected end panels should be slatwall style to facilitate the merchandising of materials. Also, some of the panels will house stand-up for use PAC (public access catalog) stations. The Assignable Spaces section will provide additional details for the location of the slatwall end panels as well as the PAC stations.

The assignable space section of this building program assumes the clear aisle space within the public accessible bookstack ranges will be a minimum of 42". The consultant recommends, however, 48" clear aisle for a user-friendlier library. The cross and end aisle space will be 48". These measurements will allow for easy access by people with disabilities.

All shelving must be designed and installed to meet the requirements of the seismic code of the Town of Shrewsbury area.

Steel Bookstack Shelving - Bracket or cantilevered steel shelving is the most widely used and universally satisfactory type of shelving for all types of libraries. It is the least expensive, most flexible, and most efficient shelving available in terms of having

the largest capacity and lightest weight. Choices exist in sizes, heights, finishes, and appearances such as closed-base, open-base, accessible-base for electrical and data outlets, T-base, and in accessories, including inserts to hold many types of material.

The shelving consists of slotted steel uprights or posts bolted or welded together and attached to top stretchers and bases to form a frame. Shelves, fitted with end brackets, are hooked into the slots in the uprights. Steel shelving with bolted frames requires sway braces, with turnbuckles for adjustment, in every fourth or fifth section to provide longitudinal stability. Welded frames, while usually more expensive, do not have a problem with longitudinal stability. The standard shelf length is 36". Most library building modules are designed for this length.

Heights vary from counter height at 42 to 48", medium height at 60 to 66", intermediate height at 72 to 78", to tall at 84 to 90". The most commonly used heights are:

- 45 or 48" with a base and two adjustable shelves per single face section (two base shelves and four adjustable shelves for a double-face section)
- 60 to 66" with a base shelf (two base shelves) and four (or eight) adjustable shelves
- 72"H with a base shelf (again, two base shelves) and four or five (eight or 10) adjustable shelves
- 84"H high with a base shelf (two base shelves) and five or six (10 or 12) adjustable shelves.

The tallest shelves, at 84 to 90"H, usually require stabilizing cross bars from one double-faced section to the next, or from a single-faced section to the wall. The intermediate 66"H or 72"H is the best height for a library that wants to be the truly user-friendly to

the largest number of customers.

Nominal shelf depths are generally 8, 10, or 12", while the actual depths are one inch less. The "missing inch" is in the back of the shelf between the uprights. Shelf tops or canopies are normally installed on the counter height shelving. Backstops are recommended on all shelving to prevent books from falling between the uprights.

MERCHANDISING DECOR

Portions of the public service areas such as new materials displays, exhibit spaces, and electronic media areas should be designed to incorporate some of the merchandising and display features and furnishings of a high-design, retail outlet or bookstore. Shelving for books and other library materials, pamphlet holders, display and announcement boards, exhibit case areas, and public service counters and desks should attract customers and encourage browsing. The furniture and equipment selected for this area of the library must be compatible with the furniture and bookstacks used throughout the building.

REST ROOMS

There **must** be good, clear visibility to entrances and exits of all public rest rooms to facilitate staff monitoring of people entering and leaving the rest rooms at all times. Provide acoustical treatment and adequate ventilation for all rest rooms.

Public rest rooms should include:

- Adult rooms per local code requirements
- Children's rooms with appropriate-sized elements

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- Family assist room.

For space and cost saving a unisex rest room should be considered for the Children's rest room.

There should also be one pair of Staff rest rooms, preferably located close to the Staff Room.

Surfaces should be of easily cleaned, graffiti resistant material. Toilet fixtures and accessories should be "hands free," stainless steel, vandal-resistant, and include:

- Wall-mounted water closets and self-flushing urinals, both controlled by automatic sensors (consider waterless urinals in lower traffic rest rooms)
- Ceiling and wall mounted partitions with tamper-proof fasteners
- Vandal-proof partition doors with coat hooks
- A sloped floor with adequate drainage
- Vandal-proof mirrors
- Washbasins with automatic shut-off faucets set in enclosed cabinets for stability
- A ledge approximately 5"H and 8"D placed below the mirror and between the washbasin and the mirror for people to place books, etc.
- Foam or liquid soap dispensers (consider *AutoLoad*) located adjacent to washbasins so excess soap is discharged into the basin
- Changing tables, or suitable counter areas away from the lavatories, with disposable diaper receptacles
- Electric hand dryers
- Soap dispensers, electric hand dryers, and paper towel dispensers positioned for the physically challenged.

All rest room fixtures must comply with the Federal Energy Policy Act of 1992. Assure accessibility for use by people with disabilities, as outlined by applicable building codes, and the Americans with Disabilities Act of 1992.

Consideration should be given to a space design that is similar to airport terminals. That is, no doors. This would *not* apply to the rest rooms in the Children's Services area of the building, or the Family Assist rest room.

See Section 4, Mechanical System Considerations for additional information regarding rest rooms.

CUSTODIAL FACILITIES

Provide on each floor a janitorial closet, to store maintenance and cleaning supplies and equipment. These closets should include plumbing with a utility floor drain and a mop sink. Provide adequate venting and exhaust of cleaning solution fumes, mops, and cloths. Consider a 48 SF room with nine to 12 linear feet of 24"D, 90"H, open storage shelving. Provide concrete or tile flooring. Provide adequate space for storage, taking into account clearance per code requirements for sensitive utilities and equipment.

SMOKING

There will be a "no smoking" policy within the Library.

However, it is understood that there are/may be both customers and staff that wish to smoke. Therefore, an accommodation(s) outside the building need to be provided. There are two

challenges facing the Architects. First, to provide a place(s) for customers and staff to smoke that does not present a visual or breathing barrier to the public and staff entering the building. Second, strive to provide for a separation of the staff who wish/need to smoke from the public who wish/need to smoke.

BUILDING MAINTENANCE

Ease of maintenance should be one of the primary design criteria. General planning considerations include the following:

- Design external and internal window sills, ledges, and all other horizontal surfaces to minimize potential of catching dust
- Attempt to eliminate corridors that have projections into them, and fountains in corridors should be avoided wherever possible
- Where possible, mount toilet fixtures, drinking fountains, and other items on walls rather than on the floor
- Where possible, provide round corners that do not present hazardous sharp edges
- Avoid the use of ornamental brass or bronze hardware or trim that require excessive labor for cleaning and polishing. If possible, utilize stainless steel or brushed aluminum
- Utilize rubber or vinyl covered baseboards, rather than wooden baseboards, to provide a scuff-free surface and rounded joints which are easily cleaned and wear well
- Provide adequate sources of both hot and cold water for custodial use
- Locate light fixtures for easy lamp replacement whenever possible
- Optimize the use of vision glass in doors to limit unsightly smudges

- Use paints that are durable and washable, or use other washable materials such as vinyl wall covering
- Use glazed or ceramic tile for fixture walls of the rest rooms.

PREVENTIVE MAINTENANCE

Requirements – Make certain that all design engineers, contractors, and/or sub-contractors **three** copies of a preventive maintenance manual that provides a timetable for detailed maintenance for all mechanical and electrical equipment. These manuals should provide names, addresses, telephone numbers, and e-mail addresses of suppliers, parts manuals, etc. These maintenance manuals should also include timetables for care and cleaning of all building furniture, fixtures, and equipment surfaces.

Photograph all installations of wiring, plumbing, etc. that will be covered by flooring, or walls for expediting future repairs and changes. **Require three** sets of as-built drawings for all custom items and for the building wherever actual construction varies from the construction bid documents.

Finishes for Floor, Ceiling, and Wall Surfaces - Where feasible, provide stock, off-the-shelf and in-the-catalog products and finishes of the supplier or manufacturer. To facilitate patching and repairs, these stock items should include floor covering, wall covering, ceiling tiles, paints, stains, upholstery, fabrics, and plastic laminates.

Added or Attic Stock - The Architects should attempt to use products and hardware that are standard and available locally, particularly for fuses, circuit breakers, sprinkler heads, and other hardware. For products sensitive to dye lots, manufacturing runs,

etc. such as paint, floor coverings, ceiling tiles, and other finishes, the design team shall consult with the library's maintenance staff on quantities of added stock to be provided by these suppliers.

The Architects should require in the construction documents that certain suppliers provide the owner with an added stock of their product for maintenance or repair. It is important to retain a stock of these materials from the same dye lot, manufacturing runs, etc., to insure proper matching.

Table 3 provides the items and suggested amounts that should be acquired and stored for use as needed.

**Table 3
Added or Attic Stock Inventory**

<i>item</i>	<i>quantity</i>
Wall Covering	3 percent
Ceiling Tile	3 percent
Carpet	5 percent
Vinyl Composition Tile	3 percent
Ceramic Tile	5 percent
Fuses	1 for each installed
Breakers	5 percent of branch circuits
Paint	2 percent to 10 percent
Water Treatment	1-year supply
Air Filters	2 complete changes
Smoke or Heat Detectors	1 of each type
Fire Protection Sprinkler Heads	3 percent

VERTICAL TRANSPORTATION

The building's vertical transportation system should include:

- Two public elevators and one service elevator if the building is multi-level
- Enclosed fire stairs as required by code if the building is multi-level
- One open stair that connects the levels if the building is multi-level.

The two public elevators, for the public and staff alike, should be 3000-pound capacity. The service elevator should be somewhat larger, perhaps with a 5000-pound capacity.

The open stair should have treads and handrails that are code compliant. The riser height should be five inches (5") for ease of movement.

SECTION 4
MECHANICAL SYSTEMS
CONSIDERATIONS

The design of the mechanical systems for the building should comply with the local building code and the State of Massachusetts energy codes, and all other applicable codes, rules, regulations, and executive orders in effect.

HVAC DESIGN GUIDELINES

This document is a narrative describing the basis for HVAC Design for mechanical systems for a Library of 30,000 square feet (SF) to 50,000 SF. This information should be used to develop a sustainable, integrated mechanical, HVAC, and controls system that is economical to maintain and operate. Buildings to be LEED Silver or better certified when the certification cost does not exceed 5 percent of the construction cost. Designs shall comply with current local mechanical codes, City amendments, ASHRAE 62 and ASHRAE 90.1 latest editions for minimum energy performance requirements and installations.

HVAC Design Guidelines for this size of facility are divided into two design approaches based on facility size:

- Design Approach "A": Facility size near 30,000 SF
- Design Approach "B": Facility size near 50,000 SF.

The main difference between the two approaches is implementation of both chilled and heating water hydronic systems as the facility size increases from 30,000 SF to 50,000 SF. Sizes in between these square-foot ranges should be a combination of the two approaches depending on actual facility layout, orientation, and glazing areas.

ENERGY CODE

The various design alternatives are based on the following building characteristics and design criteria, governed by the Energy Code, and should be verified and quantified during the design phases to reflect the actual systems chosen for the building:

- Roof overall U-value of 0.04
- Perimeter wall overall U-value of 0.08
- Perimeter glass shading coefficient of 0.40
- Perimeter glass U-value of 0.50.

DESIGN APPROACH "A" FACILITY 30,000 SF

Packaged DX/Gas-fired Air Handling Unit - The facility should incorporate high efficiency, direct expansion (DX) packaged rooftop air handling units with natural gas-fired heat exchangers with the majority of units configured as variable air volume units. Each rooftop variable air volume

(VAV) air-handling unit should be provided with outside air airflow measuring station, MERV 7 pre-filter and MERV 11 final filters, DX cooling coil, gas-fired heat exchanger, and variable frequency driven supply fan motor. The DX refrigeration system should incorporate multiple compressors with variable capacity control compressors or stepped compressors, hot gas reheat or additional means to provide reheat and gas-fired heat exchanger with full modulating gas valve.

Rooftop air handling units should utilize non-CFC-based refrigerants such as R-410A, R-134A, or R-407C. The same refrigerant should be utilized throughout the entire facility. Associated with each VAV air-handling unit (AHU) should be terminal units with electric 460-volt reheat. The terminal units should be sized based on the zone type and size of the zone served and should have the VAV valve, air flow monitoring station, electric reheat coil, and a digital control interface that will communicate with the building control system. The main heat exchanger located at the air-handling unit shall primarily operate as a pre-heat coil. The use of centralized humidifiers should be determined in conjunction with exact requirements of materials use and storage within each facility.

Special Systems - Dedicated cooling only systems should be provided for Information Technology (IT) rooms and for Electrical rooms which house electrical panels and transformers. Mechanical cooling systems for these rooms should be direct expansion, high efficiency split systems utilizing R-410A or R-134A refrigerant.

Air Distribution – Ductwork and Diffusers - Ductwork construction for HVAC systems should consist of low and medium pressure class ductwork. Supply and return air ducts shall be fully ducted systems. All ductwork should be constructed of galvanized sheet metal in accordance with SMACNA standards. Internal duct liner should be installed at a minimum distance downstream from each AHU and downstream from each VAV terminal unit for sound attenuation purposes. Remaining ductwork should be provided with external wrapped insulation. Duct liner should be provided with factory-applied coating to help guard against the incursion of dust or dirt into the substrate minimizing the potential for biological growth.

Diffusers should be ceiling or sidewall type suitable for variable air volume application. Aluminum material for air devices should be utilized for rest rooms, janitor closets, and other potential wet/damp areas.

Natural Gas – Piping - Piping materials for natural gas piping should be black steel piping with welded fittings for pipe sizes 3" and larger and screwed for piping sizes less than 3".

Control Systems - Controls for the HVAC systems should be a direct digital control (DDC) type with a computer-based interface located in the facilities office with Internet interface capabilities. The DDC system should control all aspects for the heating and cooling systems; and, where applicable, provide system alarm output for the fire alarm. DX refrigeration systems should incorporate temperature reset capabilities to maximize energy savings. Controls should also include static pressure optimization for variable

volume airflow applications. Demand control ventilation using carbon dioxide (CO₂) sensors should be incorporated within the occupied spaces as a means to adjust outside air requirements for the facility and reduce operating expenses. Humidity sensors should be utilized in various rooms to insure control and monitoring of humidity levels.

For public spaces, room temperature sensors should be utilized in lieu of adjustable sensors. Private office areas could be provided with adjustable room temperature sensors with fixed maximum operating range to insure no user implemented extreme temperature set points.

Commissioning, Testing, Adjusting, and Balancing (TAB) Systems - The entire HVAC system should be provided with a commissioning and TAB effort. An independent contractor not directly associated with any other trade on the project should provide this effort. This includes air and hydronic systems as well as plumbing systems.

Exhaust Air Systems - Separate exhaust air systems should be required for the following spaces:

- Toilet exhaust fans
- Exhaust fans for kitchen area
- Miscellaneous general exhaust fans to serve electrical rooms, storage rooms, and similar areas
- Potentially, a smoke evacuation system.

DESIGN APPROACH B FACILITY 50,000 SF

Chilled Water System - The facility should incorporate hydronic cooling and heating mechanical systems. The cooling system should be comprised of air-cooled chillers pad mounted outdoors, chilled water pumps, and airside air handling units. Two air cooled chillers, each sized for about 60 percent of the facility load, in parallel will provide some means of redundancy for the system and allow chiller maintenance without having to completely shut down the entire system. Air cooled chillers, rated for high efficiency, should utilize non-CFC-based refrigerant such as R-410A, R-134A, or R-407C. The same refrigerant should be utilized throughout the entire facility. The chilled water system should be a primary-secondary configuration. This configuration requires a constant volume pump dedicated to each chiller and a variable flow pump dedicated to the facility side of the system. The constant volume chiller loop will "connect" to the variable flow facility loop via a "common leg" of piping. The design chilled water temperature differential for the facility side of the system should be a minimum of 14 degrees. Pumps should be frame mounted end suction type with premium efficiency motors that, where applicable, and rated for use with variable frequency drives. The pumps should be mounted on inertia bases that have spring supports.

Two-way control valves should be located at each remote coil location allowing variable flow to each piece of equipment.

Heating Water System - The heating system should be comprised of gas-fired Low NOx condensing type boilers

and a variable flow heating water pump. The heating water system should be a variable primary configuration with two-way control valve installation at all remote coils. Minimum flow conditions for the pumps should be reviewed to determine sufficient by-pass provided at system minimum flow conditions. Pumps should be frame mounted end suction type with premium efficiency motors that, where applicable, are rated for use with variable frequency drives. The pumps will be mounted on inertia bases that have spring supports.

Chemical Treatment - The chilled water and heating water systems will require a chemical treatment system to maintain water quality, this system will be an inline shot feeder type. Additionally, chemical treatment storage tanks should be provided.

Mechanical Rooms - A central mechanical room should house the main chilled and heating water equipment including pumps, boilers, and any required hydronic accessories and chemical treatment. Major equipment should be located on concrete housekeeping pads. The room should be adequate size to allow sufficient clearance for maintenance and removal of equipment for future replacement. Overhead door(s) or over-sized man door(s) should be provided to the room. Direct access from the mechanical room to the exterior of the facility would be beneficial. Main electrical switchgears, transformers, and panels should not be located in the Mechanical room, but rather in a dedicated electrical room. Additional mechanical rooms should be provided to house the remaining airside equipment.

Airside Equipment - Indoor air-handling systems should be comprised of variable air volume (VAV) air handling units with variable air volume terminal units with a combination of electrical and heating water reheats. Emphasis for VAV terminal units serving exterior zones should be provided with heating water while some interior zones provided with electric heating depending on actual location of terminal unit. VAV terminal units should be sized based on the zone type and size of the zone served and will have the VAV valve, airflow monitoring station, reheat coil as required, and a digital control interface that will communicate with the building control system. Each air-handling unit (AHU) should be provided with filter section, heating water pre-heat coil as required, chilled water coil, and fan section. Double wall AHU design should be incorporated. Sufficient distance should be provided between components within each AHU to allow access for cleaning. Filter section should contain pre-filter (MERV 7) and a final filter (MERV 11). An airflow measuring station should be installed within the outside air path of the air handling unit in order to maintain minimum outside air flow rates throughout the entire operating range of the air handling unit. Chilled water coil face velocities should be a maximum of 500 feet per minute and a maximum coil row depth of 8 rows. Adequate clearance should be provided around each side of the AHU's and include clearance for coil removal. The use of centralized humidifiers should be determined in conjunction with exact requirements of materials use and storage within each facility.

Exhaust air systems should be provided for all rest rooms, break rooms, and janitor closets.

Special Systems - Dedicated cooling only systems should be provided for information technology (IT) rooms and for electrical rooms that house electrical panels and transformers. Mechanical cooling systems for these rooms should be direct expansion, high efficiency split systems utilizing R-410A or R-134A refrigerant.

Air Distribution / Ductwork and Diffusers - Ductwork construction for HVAC systems should consist of low and medium pressure class ductwork. All ductwork should be constructed of galvanized sheet metal in accordance with SMACNA standards. Supply and return air duct systems shall be fully ducted. Internal duct liner should be installed at a minimum distance downstream from each AHU and downstream from each VAV terminal unit for sound attenuation purposes. Remaining ductwork should be provided with external wrapped insulation. Duct liner should be provided with factory-applied coating to help guard against the incursion of dust or dirt into the substrate minimizing the potential for biological growth.

Diffusers should be ceiling or sidewall type suitable for variable air volume application. Aluminum material for air devices should be utilized for rest rooms, janitor closets, and other potential wet/damp areas.

Water Distribution / Piping - Piping materials for the chilled and heating water systems should be welded black steel for pipes above 3" and threaded black steel or copper for pipes under 3".

Control Systems - Controls for the HVAC systems will be a direct digital control (DDC) type with a computer-based interface located in the facilities office with Internet interface capabilities. The DDC system should control all aspects for the heating and cooling systems; and, where applicable, provide system alarm output for the fire alarm. Chilled and heating water control systems should incorporate temperature reset capabilities such as heating water set point based on outside air temperature to maximize energy savings. Controls should also include static pressure optimization for variable volume airflow applications. Demand control ventilation using carbon dioxide (CO₂) sensors should be incorporated within the occupied spaces as a means to adjust outside air requirements for the facility and reduce operating expenses. Humidity sensors should be utilized in various rooms to insure control and monitoring of high humidity levels.

For public spaces, room temperature sensors should be utilized in lieu of adjustable sensors. Private office areas could be provided with adjustable room temperature sensors with fixed maximum operating range to insure no user implemented extreme temperature set points.

Exhaust Air Systems - Separate exhaust air systems should be required for the same spaces as for the Design Approach A 30,000 SF building.

SECTION 5
ELECTRICAL DESIGN
CONSIDERATIONS

Electrical system design should take into account energy efficiency, safety, and ease of operation and comply with applicable building codes and the current version of the National Electrical Code (NEC), the Life Safety Code (NFPA 101) and the Fire Alarm Code (NFPA 72), including amendments by the City of Fort Worth and requirements by the Authority Having Jurisdiction (AHJ). As mentioned before, buildings should be designed to achieve LEED Silver or better certification when budget allows. Each system should be designed with energy efficiency in mind. Lighting controls should be automatic and other systems should be intuitive enough for non-trained personnel to use. Library buildings are usually not staffed with technically trained personnel. Electrical equipment presents risks of arc flash, especially if non-trained personnel remove covers. To minimize risk, the first layer of protection at distribution panels should be with fuses. Although fuses do not eliminate the risk of arc flash, they react considerably faster and let less energy pass through under fault conditions than circuit breakers do. Circuit

breakers should be used on the second layer of protection at circuit panelboards.

Power Distribution - Service should be 120/208V or 480/277V, 3-phase, 4-wire or 480/277V. Do not provide single-phase systems. Single-phase A/C systems require more maintenance than three-phase systems and are only suitable for smaller loads, such as IT rooms. Provide underground service if possible for aesthetic purposes. Provide at least 30% of spare capacity at main board, 20% spare circuits for lighting loads and 40% spare circuits for receptacle loads. This is required for future flexibility of receptacle load allocation. Segregate A/C, lighting and receptacle loads into different panels and provide means for future metering if pursuing LEED certification. Provide isolated ground bus for computer loads at the receptacle panel. The isolated ground shall be connected directly to the grounding bus at the service entrance panel (120/208V systems) or to the grounding connection at the transformer (480/277V systems with step-down transformers). Provide dedicated, lockable rooms for electrical equipment with enough space for future expansion and to add future alternative energy source equipment (PV panel controls, inverters, etc.).

Emergency Power - Emergency power is needed for egress purposes only. The use of an emergency generator may be suitable for a facility this size. The designer should consider a providing a generator instead of batter-backed lighting fixtures. The decision should be made on a case-by-case basis.

Receptacle distribution - Receptacles in offices and support areas should take into account loads to be served and computer loads should be served with isolated-ground circuits. Using an under floor distribution system for receptacles and data ports is recommended. Such systems provide flexibility to change the public area layout as library needs change.

Lighting - Provide lighting in office and support areas using 2x4 troffers with high-efficiency lamps and ballasts. Use multiple levels in larger areas and provide occupancy sensors for automatic switching. Provide direct/indirect lighting fixtures for public areas. Follow current IESNA recommended practices for reading use in public areas and adjust lighting levels according to users' age levels. Provide automatic daylight controls for lighting close to windows or under skylights. See Section 9, Lighting Considerations, for additional details regarding library lighting.

Egress Lighting - Provide egress lighting provisions for public, office and support areas. Provide egress lighting with 90-minute battery backup. Lighting fixtures may be integrated into the general lighting or provided separately. Extend egress lighting to egress doors or to safe point if indicated on egress plans.

IT Infrastructure - Follow the latest edition of BICSI's Telecommunications Distribution Methods Manual (TDMM), the current edition of the National Electrical Code (NEC) and applicable codes and ANSI/TIA standards.

Provide separate, dedicated, lockable rooms for IT and other low-voltage equipment. Provide space in these rooms for fire alarm, security, public address, cable and other low voltage systems. Provide dedicated, isolated-ground receptacles for all equipment in this room. Internet, cable, telephone and other services should terminate in one of these rooms. The quantity of IT rooms will depend on the building's area and shape. Follow TDMM's recommendations for number of rooms and maximum distance for horizontal runs.

Provide data ports in office as support areas according to TDMM recommendations. Avoid whenever possible, using MUTOA's or point concentrators. Provide wireless access points in public and office and support areas according to TDMM recommendations. See Section 7, Building Technology Considerations, for additional details regarding IT and IT Infrastructure.

Other Low-Voltage Systems - Provide a complete and monitored fire alarm system fully compliant with NFPA 72 for the facility. Provide a complete and monitored security alarm system. Provide a public address (PA) system for all office, public and support areas. The system shall be operable from the front desk and reach all areas in the library. The phone system may be integrated to the PA system. Use of the speakerphones as a PA system is not recommended.

Section 6

PLUMBING DESIGN CONSIDERATIONS

These considerations for plumbing design apply to library buildings of all sizes.

PLUMBING FIXTURES

Plumbing fixtures anticipated for the public and private rest rooms should include a combination of barrier free and standard wall mounted flush valve type vitreous china water closets, counter mounted oval and wall mounted vitreous china lavatories with wrist blade type faucets, wall mounted flush valve type vitreous china urinals, and stainless steel self-rimming counter sinks in the break rooms. Floor drains should be provided in all rest rooms. Janitor's closet should include a floor mounted 24"x24" molded stone mop sink basin and a medium duty floor drain with a cast iron grate. Electric water coolers should be ADA accessible bi-level water coolers capable of providing an approximate 9.6 gallons per hour of refrigerated and filtered cold water. An option to ADA lever

type handles and flush valve operators is automatic flush meter systems. Depending on LEED implementation, additional water reducing methods of low consumption water closets and urinals should be employed.

DOMESTIC WATER SYSTEM

The domestic water system should extend from the City or Town utility water main and water meter to a Mechanical Room within the building. A City or Town approved reduced pressure backflow preventer device should be installed at the location where the domestic water enters the building. No domestic water piping or equipment should be located in same room as Electrical equipment. A dedicated room shall be provided for Electrical equipment. Exterior water hose connections should be at locations acceptable with a minimum spacing not to exceed 75 feet. The domestic water (potable water) should extend to all plumbing fixtures.

The domestic hot water system should include a centrally located gas-fired, low NOx domestic water heater with lined storage tank within the Mechanical Room. The heated domestic water should pass through a thermostatic type water-tempering valve to provide tempered water as required per the City and Codes. The domestic hot water distribution system should include a hot water recirculation system to minimize the amount of time the plumbing fixture user will have to wait for domestic hot water. The domestic hot water recirculation system should include an in-line pump with calibrated balancing valves to adjust water flow through the system when domestic hot water is not being used.

All domestic water piping within the facility should be copper and insulated with fiberglass pipe insulation.

SANITARY WASTE AND VENT SYSTEM

Sanitary waste piping should extend from plumbing fixtures located throughout the facility to connections with the City utility sanitary sewer systems. Sanitary waste piping located under the ground floor level and above floor should be standard weight cast iron piping with drainage waste and vent fittings. Cast iron will be used above floor for compliance with smoke development and fire spread rating requirements in plenum spaces designated for use as a return air plenum and for reduced noise from use of the piping systems. All sanitary vent piping penetrating the roof should be insulated with fiberglass insulation from the roof penetration to within 10 feet of the roof penetration to avoid possible condensation.

STORM WATER SYSTEM

Storm water roof drainage systems should be internally collected from cast iron dome type roof drains at flat roof areas that will be exposed to standard roof conditions. Additional overflow roof drains (when required) should be piped independently of the primary roof drainage system and should discharge at grade in a visible location with an exterior downspout nozzle. Roof and overflow drainage piping above floor should be standard weight cast iron piping with drainage waste and vent fittings. Cast iron should be used above floor for compliance with smoke and fire development rating requirements in plenum spaces

designated for use as a return air plenum and for reduced noise from use of the piping systems. All roof drainage piping should be insulated with fiberglass type pipe insulation with a vapor barrier.

HVAC CONDENSATE SYSTEM

Condensate drain piping from air handling units should extend to points of indirect discharge into the sanitary sewer systems. Condensate p-traps should be provided at each air-handling unit to reduce losses in air pressure through drain connections at the cooling coils and to accommodate gravity drainage from each air-handling unit. Condensate drain piping should be copper with pipe insulation and a vapor barrier.

NATURAL GAS PIPING

Natural gas distribution systems should extend into the mechanical room from a natural gas meter provided and installed by the local natural gas utility company. Each gas fired appliance or equipment should be provided with a gas shutoff valve and minimum of 6" dirt leg (sediment trap) prior to connection to the appliance or equipment.

Section 7

BUILDING TECHNOLOGY CONSIDERATIONS

The Shrewsbury Public Library should strive to utilize a full range of technologies to enhance public service, streamline internal functions, and to provide library administration with information for accountability and management purposes. The primary systems for a library include:

- Resource management systems, including the Library's Integrated Library System (ILS)
- Public computing
- Staff computing
- Telecommunications systems, including data, Internet, voice, and video systems
- Materials security systems.

LIBRARY TECHNOLOGIES

Integrated Library System - The Integrated Library System, or automation system, is the technological heart of any library. This

is becoming increasingly true as ILS vendors add functions that were traditionally done manually or by a separate application. The inclusion of cash management systems, or point of sale systems, to track and manage payment for fines and fees is a current example. The design of the Library building and information technology (IT) infrastructure should be influenced by both current and future automation system requirements. These may include PACs, Self-Check stations, Information Kiosks, Research stations for the public, and Charging and Discharging (Circulation), Reference, Reporting, Administrative, and Technical Services stations for library staff.

Radio Frequency Identification - The building must accommodate Radio Frequency Identification (RFID) technology at a minimum to enable future implementation. RFID technology is rapidly emerging in libraries – as in commerce – as a means of enhancing material tracking and handling. In the library setting, an RFID tag (consisting of a tiny antenna and a microchip) is placed inside each book or other circulating item instead of a barcode label. Like a barcode, each RFID tag contains a number that identifies the tagged item to the Integrated Library System. Unlike barcodes, which can only be read one at a time by a laser reader which must see each label, several RFID tags can be read simultaneously by placing a stack of books on or near a reader.

In its most basic deployment, RFID technology increases the speed by which staff can check out and in library materials while reducing the risk of repetitive stress injuries which sometimes arise from the staff's need to align each book's barcode with the reader. In more advanced deployments, RFID technology may significantly decrease demands on staff by (a) facilitating self-service check-out and check-in by library customers, and (b) by mechanizing the movement and sorting of returned materials

through the use of RFID-enabled automated material handling systems (AMHS).

At a presentation at the 2005 American Library Association conference, libraries which have taken full advantage of RFID – including self-check and AMHS – reported self-service check-out rates as high as 90% and reductions in staff time spent on checking in and sorting returned materials as high as 600%. Other benefits of RFID library technology may include improved safeguarding of library materials (especially where no existing security system is in place) and rapid, accurate inventory control, i.e. shelf reading and weeding.

Deciding to implement RFID technology as part of a building program presents important cost and design considerations. Both of these considerations are heavily dependent upon the extent to which the library chooses to deploy the technology and upon the choice of RFID vendors. A simple example of how the choice of a vendor may impact library design considerations can be found in the differences between two major vendors' RFID security gates. Two RFID gates from one vendor can be placed 4' apart and are sufficient to provide a total of 8' of security coverage (2' additional on the "outside" of each gate), while another vendor's gates must be no more than 3' apart with no extra coverage area. Moreover, issues regarding interoperability of RFID components from different vendors may mean that the library's choice of one vendor for phase one of an RFID deployment may effectively commit the library to specific vendors for other components and phases of the long-term project, including security systems and AMHS.

When used to manage the charging and discharging of library materials, the RFID system is integrated with the library's ILS.

Specific components that *must* be designed to accommodate RFID include:

- Library services desk charging and discharging stations
- Workspace charging and discharging stations
- Self-check stations
- Technical services tagging or processing stations
- Security or exit gates.

For these reasons, it is strongly recommended that a library carefully select an RFID vendor prior to, or early in, the design stage of a building program. Selecting an RFID vendor before the completion of the design drawings should substantially reduce the chance of costly change orders.

High-Speed Public and Staff Internet Access - High-speed Internet access is an integral part of any library. The building technology plan should incorporate a flexible and secure network infrastructure to distribute Internet access to all computers throughout the library building.

Public Computers - All libraries must stay abreast of changes in technology, in the saturation of personal computers, and in the use of remote access to library information resources, in order to assess future changes in library computer use. The planning for public computers may include any or all of the following functionality:

- **PAC** – Public Access Catalogs (PAC) should be strategically located in the primary service areas and throughout the bookstacks. A location at or near the Library Services Desk allows Library staff to efficiently assist or train customers. PACs located in the bookstacks

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may utilize a small footprint computer and be mounted on the shelving end-panels

- **Self-Service Check Stations** – Self-service check, or express service stations, should be provided to allow library customers to check out their own library materials. Self-check stations should be located so that Circulation Services staff may easily provide assistance. An increase in the number of self-check stations should be planned over the life of the facility
- **Printers** – Printers, preferably laser, must be located within easy access of the various groupings of public computers. Network connections must be provided in these locations.

Staff Computers - Planning must also accommodate an expanding number of computers for the staff of the Library.

Desktop (work surface) space should be large enough to accommodate the monitor, speakers, and a variety of peripherals that may include PDA dock, barcode scanner, and personal printer.

Offices should be configured with voice and data jacks, and power outlets on at least two different walls within an office, ideally on each wall as the budget allows. Jack and power outlet placement should take into account the furniture design and placement to avoid having data jacks and power outlets inaccessible behind desk modesty panels, bookcases or credenzas. The Library may also wish to include additional phone jacks for faxing and CATV connections.

FURNITURE FOR LIBRARY TECHNOLOGIES

The furniture selected to house the various pieces of equipment should be able to accommodate a wide variety of CPU designs. Furniture must not be designed for one size of footprint or style of equipment but is flexible to accommodate future equipment designs and combinations. The furniture selected should be adjustable to either a standup or sit down configuration, be ADA compliant, and provide adequate cable management.

Desktop space at the public computers should also provide for placement and use of a personal laptop computer in the Information Commons and Research areas.

PRINT MANAGEMENT SYSTEM

Print Management Systems are designed to manage printing and copying resources and processes. The Library's building design should include space for the following components:

- Print Release Stations
- Add-Value Stations for Payment Accounts and/or Cards

All should be easily accessible and visible to customers who are using the printers.

LAPTOP AND WIRELESS DEVICES NETWORK ACCESS

Areas throughout the library should be provided to accommodate library customers who bring their own laptops to the facility. Furniture may include power and data connections, as well as a security loop that will accommodate a customer-provided laptop security device. A variety of locations should be provided for

customer laptop access, including those designed for individual users and those designed for small groups.

In addition to the wired locations, wireless network access should be provided throughout the building.

Printers, Scanners, Copiers, and Fax Systems -

Printer/scanner stations *must* be located within easy access of the various groupings of public computers. Networked printers are recommended for both staff and groupings of public computers. Local, personal printers should be used minimally for staff use where privacy and efficiency are of concern. The printing and copying area for library customers should be centralized and clearly identified by signage.

Provide a photocopier as indicated in the Building Program. Digital photocopiers are highly recommended. Machines for staff use should be network-ready and be capable of scanning and fax transmission.

INFRASTRUCTURE FOR TECHNOLOGY

Planning and design of electrical and cabling systems should be approached in an integrated fashion with the design for furniture, fixtures, and equipment (FF&E) to assure the proper electrical and network connections are available precisely at the actual point of need. The most efficient location of work areas can be substantially compromised by limited availability of connections for power, data, and telephone circuits.

The Shrewsbury Public Library *must* have power, cabling, etc. that comes into the Library space directly from the "street." This is

very important in order to maintain the operations of the Library's many systems.

All network jacks in public areas must be designed so that unauthorized persons may not connect personal devices to the network or disconnect library devices from the jacks.

To meet these needs, electrical work should conform to the applicable rules and regulations of the National Electrical Code, Life Safety Code, the National Building Code, and applicable NFPA Standards. Network cabling should meet applicable Electronics Industry Association (EIA) and Telecommunications Industry Association (TIA) standards. All electrical and data networks should meet or exceed all applicable state, county, or city codes.

Lighting levels and lighting design in such areas should enhance the ability to see the computer screen without glare.

POWER

In order for the capabilities of technology to be realized there must, of course, be ample power available. The following discussion addresses this need.

Primary and Secondary Electrical Service Distribution -

Normal power should be obtained from the local utility company, in accordance with utility standards. An engine generator set should be specified in accordance with the requirements of applicable local code(s) to provide emergency power to the following:

- Exit lighting

- Corridor egress lighting fixtures
- Lighting in areas of public assembly in accordance with codes
- All wiring closets, the demarcation room, and the computer room
- Life safety equipment.

The telephone system and public address system must also be capable of functioning in a power outage.

Circuits intended for supplying power to computer devices should be "conditioned." Special requirements for providing conditioned and uninterruptible power to servers and to other network devices are included in the Building Program.

Amperage Requirements - A useful rule of thumb for calculating branch circuit requirements for convenient electrical receptacles is an average minimum amperage load of five amps per workstation. Amperage requirements will be higher if extensive high technology equipment is to be used and if task lighting is to be employed. Design should provide for the potential of maximum power consumption.

The exact amperage is difficult to specify because each type and model of equipment differs. More recent models of equipment, for example, often have lower requirements because of improved technology.

To provide a margin of safety, it is generally recommended that no more than 50 percent of each quadruplex outlet should be planned for use.

Some pieces of equipment require dedicated circuits. Photocopy equipment is an example. PCs should also be on independent circuits due to the large amperage load required when the equipment is initially activated. In a shared network system, up to five computers, plus a printer, may be on one circuit. The central servers, however, require independent circuits.

While significant strides have been made in the area of energy efficiency, a typical system consisting of a computer, a monitor, and a laser printer is rated as high as 1,000 watts when the printer is in use. The Environmental Protection Agency's "Energy Star Program" maintains and updates lists of equipment that keep electrical energy use down. In most cases, this involves equipment that "powers down" to a sleep state after a period of non-use. For example, monitors shut down and return to a fully powered state by simply touching a key or the mouse.

Electrical Outlets - In addition to the grid system, a minimum of one wall or column outlet is recommended for every 30 to 50 square feet (SF). Provide outlets in compliance with the applicable building code(s).

Receptacles should be on a one pole, 15-ampere circuit, with a maximum of six 15-ampere receptacles. Receptacles should be on a one pole, 20-ampere circuit, with a maximum of two 20-ampere receptacles. Cleaning and specialty receptacles should be circuited in accordance with program requirements.

Accommodations requiring flexible placement of outlets will include:

- Local-area (LAN) and wide-area networks (WAN)
- Network hardware (servers, hubs, switches, etc.)

- Computers
- Printers and scanners
- Video monitors
- Task lighting
- Photocopying machine
- Telephones and fax equipment
- Wireless access points
- Other devices.

Surge Suppressers and Uninterruptible Power Supplies - Voltage surges, spikes, and sags can create significant problems and can potentially damage equipment and destroy data. Therefore, the facility should provide for protection of devices on the network from these hazards.

Common plug-in surge protectors are designed to provide some protection from spikes and surges. However, the installation of commercial quality surge protection at each power distribution panel is preferable to buying separate surge protectors for each networked device.

Power "sags" refers to low-voltage conditions and actual interruptions of electrical current. Uninterruptible Power Supplies, or UPSs, can be effective in providing some protection from low-voltage hazards. Protection should be considered for all network servers, routers, and mission critical client stations. As a "rule of thumb," a UPS unit should be selected that has a Volt-Amp rating of two times the combined wattage ratings of all of the power supplies that the UPS will support.

Grounding System - In addition to the grounding requirements of the National Electrical Code, the electrical system servicing the project should be grounded by means of individual insulated

equipment ground conductors in the feeders to all switchboards, panel boards, motors, motor control centers, receptacles, etc., in the building. It is intended that the ground conductors be in the same raceway as the current conductors.

Branch Wiring and Feeder Systems - Requirements for power, data, and signal distribution are outlined below. Other than those requirements, when possible, lighting and receptacle branch circuit wiring should be installed in conduit concealed in suspended ceilings and walls in finished areas, and exposed in mechanical spaces and areas without suspended ceilings. In areas without suspended ceilings or raised floors, vertical raceways servicing devices should be concealed in walls whenever possible. Exposed conduit in mechanical rooms, electric rooms, storage areas, and equipment rooms should be rigid steel or plastic specifically designed for conduit.

Feeder wiring in the building should be run in rigid steel conduit with threaded couplings and fittings. Branch circuit and feeder wiring run outside the building, cast into slabs on grade, and below grade should be run in rigid steel conduit with couplings and fittings. Conduit seal fittings and expansion joint fittings should be provided where required.

Conductors serving the fire alarm system and miscellaneous low voltage systems should be run in rigid steel conduit. The minimum conduit size should be 3/4-inch.

General branch circuit and feeder conductors should be copper with heat-resistant thermoplastic (Type THW) or moisture- and heat-resistant thermoplastic (Type THHN) insulation, rated at 600 volt. Insulation should be silicone (SF) when terminating in fixtures. Electric service conductors shall be Type use with

moisture- and heat-resistant rubber (RHW) insulation. Conductors for miscellaneous low voltage systems should be specified in accordance with system requirements.

Distribution System Equipment - Service switchgear should be specified in accordance with utility company standards, and a service switch or switches to accommodate the library building requirements should be provided. A separate service switch for a fire pump should be specified in accordance with applicable codes. Service switches should be of the fused, bolted pressure type. Metering should also be specified in accordance with utility company standards. Switch and fuse-type distribution boards should be specified to provide service to the various panels and miscellaneous loads throughout the building.

Power Wiring Systems - The electrical installation should provide feeders for heating, ventilation, air conditioning, and plumbing equipment.

Motor starters should be grouped in motor control group control panels with combination starters. Each starter should be provided with an H-O-A selector switch, pilot light, control transformer, and two sets of Form C contacts. Motor control centers should be NEMA Class I, Type C.

Separately mounted fused switch combination starters should be provided where service from a motor control center is not practical. Where special equipment, such as alarm systems, communications systems, etc., is provided, special provisions for supply to this equipment should be made.

TELECOMMUNICATION NETWORK

A long-term network infrastructure, based on standards, must be provided.

Cabling Standards - The Electronics Industry Association (EIA) and the Telecommunications Industry Association (TIA) are large industry trade groups that promulgate and update wiring standards on an ongoing basis. The documents cited below contain the detailed architectural, engineering and wire management specifications needed for the Library project.

The Library's voice and data wiring system should be designed at the same time and in an integrated fashion. Increasingly, telephone, computer, and video technologies are merging as all standardize on digital transmission. The following standards apply to the Library's electronic information infrastructure although the Design Architect's telecommunications consultant will want to verify the most recent edition(s), as change is constant in this field:

- ANSI/EIA/TIA-568 Commercial Building Telecommunications Cabling Standard
- ANSI/EIA/TIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/EIA/TIA-570-A Residential and Light Commercial Telecommunication Wiring Standard
- ANSI/EIA/TIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- ANSI/EIA/TIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications
- TSB-67 Testing Standard

- BICSI Telecommunications Distribution Methods Manual
- FCC Docket 88-57 and related rules regarding inside wire and demarcation points
- IEEE 802.3 Specification
- IEEE 802.3af Power Over Ethernet (POE) Specification
- IEEE 100BaseT Specification
- IEEE 1000BaseT-TX Specification
- IEEE 1000BaseT-FX Specification
- IEEE 802.11 Specification for Wireless Transmission.

Cabling Specifications - It is recommended that the cabling used throughout the library building, including the system backbone and connections to workstations from routers and hubs, should be at a minimum 4 pair Category 6 unshielded twisted pair (UTP6). All 4 pairs **must** be terminated to conform to Ethernet standards. UTP6 will support the TCP/IP protocol used for Internet transmissions.

Fiber should be used for the building's network backbone. Fiber may also be used to connect multiple facilities. Especially for facilities in close proximity to each other, the building must provide for the possible future use of fiber.

"Information Outlets" should be located throughout the building. Each modular connector will terminate the UTP cable in an eight-position jack that meets the requirements of EIA/TIA-570 or its successor. The use of modular connector systems that terminate the UTP with a small permanent connector that mate with a RJ-45 connector is recommended.

Patch cables (the cables between the information outlets, or "wall jacks" as they are commonly known, and the networked devices) should be 4 pair Category 6 UTP.

The quality of the electrical system that provides power to computers and other peripheral devices on the Library's local area network is critical. Use of appropriate cabling that is installed correctly to link components on a network together is also crucial. Problems that can result from improper wiring or installation can range from lost or scrambled data caused by electrical interference on data-transmission lines placed too close to electrical wiring to equipment destroyed by a lightning strike.

Capacity for growth should also be available, as should be the possibility of furniture and equipment re-arrangements as customer needs change over the years. This means conditioned electrical outlets and wall-jacks for data lines should be positioned to serve the equipment included both in the initial configuration and in space(s) in the building that may contain similar equipment in the future. No conduit or raceway, power or data, should be more than 40 percent full. Pull lines must be left in every conduit to facilitate future cable pulls.

There is simply no substitute for obtaining expert network design advice and assistance and for retaining a well-qualified, experienced contractor to install the network. While specifications and requirements for different networks do vary somewhat, and while certain types of copper cabling have superior shielding, a number of basic rules apply to virtually all situations where copper cabling is used. For example:

- The network should be designed in such a way that copper data cables cross power lines at right angles; this arrangement minimizes the electrical "noise" on data cables

- Copper network cables should not be run parallel to 120-volt power lines at distances of less than 6" to 8"; the network cables should be kept several feet away from lines carrying higher voltages
- Keep copper data cable as far away as possible from possible sources of electrical "noise" including fluorescent lights, motors, elevator relays, radio transmitters, microwave transmitters, etc.
- Keep "patch" cables as short as possible since they pick up electrical noise"
- All patch cables should be placed in wire management modules.

Because fiber optic cabling is not subject to electrical interference, requirements for maintaining distance from electrical wiring **do not** apply to fiber installations.

Even if a copper network is employed, the Library may wish to take advantage of the fact that electricity does not travel well through glass by using fiber to link nearby buildings on a local area network or to link wiring closets on separate floors. Although there is some extra cost involved in this strategy, it is advisable, particularly if different power transformers feed the areas connected.

Network Backbone - A minimum of four (4) pairs of multi-mode fiber should be run between the Main Distribution Frame (MDF) and each Intermediate Distribution Frame (IDF). An additional four (4) pairs of fiber should run from the MDF to the Computer room.

Power over Ethernet (PoE) - Power over Ethernet is used to eliminate the need to provide an AC power outlet for every

network device. PoE can be used to power VoIP phones, wireless access points, and managed "switch" jacks. Using PoE affects the selection of network equipment and the sizing of the Uninterruptible Power Supply (UPS).

Wireless - A wireless local area network should be considered as an extension or supplement to the library building's wired LAN. Wireless Access Points should be located throughout the facility to provide access for library customer-supplied laptops, staff wireless devices, and wireless IP phones.

Provide for the future use of wireless to connect multiple facilities. Access for conduit and cable from the MDF to the rooftop should be provided. Easy access to the roof for maintenance of these systems must be provided.

CONDUIT AND RACEWAYS

The electronic information infrastructure (wiring) can be divided into three components. They are:

- Vertical Distribution System
- Horizontal Distribution System
- MDF and IDFs (building and floor communication rooms/wiring closets).

In simplified terms, the MDF and IDFs are the switching points for the system. The Vertical Distribution System is the wiring through which information moves from floor to floor; the Horizontal Distribution System is how information flows to network devices on a given floor or level of the building.

Distribution Planning - The library building's cabling systems must be designed in conjunction with the furniture, fixtures, and equipment (FF&E) plan to insure the proper placement of all outlets in relationship to desks, workstations, and service functions, and to allow for future re-arrangement of the building. In light of the need for optimum flexibility, any network distribution system must be flexible as well. The Design Architect and his/her consultants should consider a combination of the concepts described below.

For primary horizontal distribution to concentrations of networked devices planned within the building, utilize flush-mounted floor outlets over a cable tray with three channels, either exposed or concealed in the ceiling plenum below or in a raised floor. For secondary horizontal distribution, use furniture-mounted wire management, systems furnishings, and/or movable partition systems with built-in channels for segregating cabling.

Provision must also be included for wireless data transmission. Wireless access must be available throughout the facility. The necessary data cable and electric service must be incorporated into ceiling or raised floor areas to support wireless transmission points.

Distribution of cabling should conform to EIA/TIA-569 - Commercial Building Standard for Telecommunications Pathways and Spaces. However, local and state codes may also exist that impact design of this system.

An effort to achieve flexibility in the use of space has resulted in open designs that usually greatly reduce the number of permanent walls in modern library buildings. Libraries that employ concrete

slab construction often incorporate floor raceway trenches, laid out in a grid pattern, or other similar technologies, as a method of distributing power and telecommunications cabling. Floor raceway trenches are often used in conjunction with "kneewalls" and de-mountable walls to provide access throughout the building.

The floor raceway is comprised of a steel trench, 2" or more in depth, formed in the concrete floor slab and covered with a flat steel lid, flush with the finished slab, along its entire length. Low profile trenching options exist, as shallow as 3/4" deep.

The raceway should be subdivided into three separate channels, with one each dedicated to power cables, computer data cables, and telecommunications signal cables. This separation is not only required for proper operation, but it is imperative for maximum flexibility and good wire management practices.

No conduit or raceway, power or data, should be more than 40 percent full. Pull lines must be left in every conduit to facilitate future cable pulls.

Because of its depth, the raceway system adds to the thickness of the concrete slab. This characteristic, coupled with the added incremental expense of the trench duct over more commonly used rigid steel conduit, yields a premium in first costs of this system. Prior to the influx of computer technology, this cost premium was usually deemed excessive. However, trends toward information technologies have added new criteria to cable distribution design. Because of its ease of access and the flexibility it provides for change, this system will pay for itself several times over the life of a contemporary library facility.

Plastic pipes are often used as conduit for telecommunications cabling strung in and through walls. This type of conduit often goes either from each wall plate to a backbone conduit or trench or extends all the way back to a wiring closet or communications room.

Surface raceways such as those manufactured by the Panduit Electrical Group can be employed in areas where it is impractical to run cabling inside walls, ceilings and/or floors in existing structures. Panduit and others also offer a series of data cables designed to run under carpeting. While this type of cable can offer a solution in unusual or difficult installation situations, such as those sometimes encountered in retrofitting existing structures for technology, it should only be considered in extreme instances. Wireless network technology provides a far superior method for servicing difficult to reach areas of the existing building.

Library furniture and office systems provide wiring harnesses, channels, and grommets that make cabling and wire-management much easier than has been the case in the past. These features must be considered when selecting all partitions, desks, tables, and carrels.

Ceiling trays and raceways can be employed in many instances; however specific standards and local codes may apply to these installations. Heat resistant plenum-rated cabling or current standard cabling should be used in these instances. The National Electrical Code, which has been adopted by many, if not most jurisdictions, provides specific cabling requirements.

Regardless of the physical distribution system employed, good wire management practices are essential. All cables with the exception of patch cables should be appropriately labeled and

detailed records should be maintained regarding the placement and characteristics of each run. EIA/TIA standard 606 (Administrative Standard for the Telecommunications Infrastructure of Commercial Buildings) describes a method of number and labeling cabling, pathways, and spaces. The 606 standard recommends specifically colored tags for different types of cables (network connections are green, backbone cables are labeled in white, etc.).

In some instances, wireless networking can be a solution to signal distribution in areas that are difficult to reach using more traditional conduit and raceways. However, wireless transmission should be considered an extension of, and supplement to, cabled networks rather than a replacement for them.

COMMUNICATION SYSTEMS

Telephone System - The majority of incoming calls are for general information such as library service hours. The calls that require more time often are the ones that are routed to the Library Services Desk. These calls are related to specific research or library customer transaction records. The complexity of such calls and the priority of in-library service places can result in other callers being placed on hold or even preventing them from reaching the Library at all due to a busy signal. The facility must provide for a signal to carry to a cordless telephone, for use by staff, throughout the facility.

Infrastructure in the telephone room should be able to support advanced communication requirements for a variety of telecommunication services or technologies.

Voice over IP (VoIP) - VoIP telephone systems provide a highly flexible, feature rich, state-of- the-art telephone system. Telephone calls are transmitted over the data network cabling, thereby eliminating the need to run separate lines for telephones. VoIP telephone calls can also be routed over secure Wide Area Network to library branch libraries or other remote locations. VoIP systems support the use of wireless networks, allowing wireless IP phones to be used for mobile communication within the Library's building(s).

Section 8
LIGHTING CONSIDERATIONS

Architecture is concerned with the enclosure of space, including the elements of structure, form, color, brightness, contrast, focal areas, and spatial relationships; all of which require light. Thus lighting *must* be a basic, inseparable factor in the architectural analysis and overall design of the Library building. Through the use of both natural and artificial light, the Architects, interior designer, electrical engineer and lighting designer create visual moods, affect behavior, modify form, provide orientation within the Library, dramatize particular building features, and provide adequate illumination for the specific needs of each library task.

Until recent years, the lighting of libraries was planned by electrical engineers and building designers who generally used a quantitative approach. Major emphasis was given to the use of large or general area quantities of illumination, with too little consideration given to visual comfort, color rendition capabilities of the light source, aesthetics, or energy conservation of the system. Typical layouts consisted of fluorescent luminaires evenly spaced across the ceiling providing equal illumination for the majority of task positions.

Lighting for Library building should emphasize the qualitative approach, in terms of the *quality* of light being provided. It should offer a pleasing visual atmosphere, and operate with energy efficiency, taking into account the increased use of computer monitors for public and staff use, as well as microform reader/printers, resulting in system that allows utilization of this equipment without accompanying eyestrain. By placing light at the point of the task where it is needed, a lesser quantity of light is required, saving energy. By allowing the user to direct the light to the task, visual comfort is enhanced.

LIGHTING SPECIFICATIONS AND THE PROTECTION OF COLLECTIONS

Certain portions of the energy spectrum degrade paper, bookbinding materials, and other library media, reducing their service lives. Ultraviolet (UV), infrared, and visible light all cause degradation of outer surfaces with the most damage created by the Ultraviolet (UV) portion of the spectrum. Therefore, each source of light damage needs to be addressed and controlled. Damage is directly proportional to exposure (i.e., intensity (measured in foot-candles x time). As such, greater exposure to UV will lead to greater damage. To the extent possible,

Library customers and staff should be located in areas with natural light and the collections of Library materials should be housed in areas with electric light. Where daylight is introduced into the storage or display environment, great care must be taken to offer architectural details whereby no solar penetration or direct sun hits any part of the collections. Diffuse daylight contributions, in and of themselves, are not a detriment to collections, only direct sun exposure is a detriment. Visible light levels recommended for

preservation storage and display usually are much below the 30 – 50 foot candles recommended for task lighting for reading.

Natural light, of course, almost always exceeds the recommended light levels of task lighting. Since less light is better for material protection, light levels for the book stacks housing the collections should be set to the minimum acceptable levels to enable book titles and call numbers to be read without great difficulty. In general, this equates to 10 foot-candles average measured 30" above floor.

Lighting types and configurations that can reduce the maximum light levels will result in reduced deterioration of the collections. Natural and fluorescent light contains ultraviolet (UV) rays. UV rays are damaging to library materials. Collections of a non-special nature housed in areas of the building with natural light should have the book stack ranges of shelving set perpendicular to and away from windows whenever possible to avoid direct sunlight on the spines/covers of books.

Electric lighting should be equipped with staff-operated local switches or motion detection so that the lights can be activated as needed. This is most desirable rather than electric lights remaining on continuously, or for extended periods, when lighting is not needed for the staff or the customers.

Fluorescent lighting should be equipped with UV shields to eliminate much of the UV light. Windows should be tinted with a UV filtering layer. These steps will substantially reduce operational expenses for rebinding and repair of otherwise exposed collection materials. Limiting the intensity of UV light as a portion of total light exposure to a maximum of 75 microwatts/lumen is recommended. Infrared radiation damage is

most noticeable when light sources are close enough to the collections to heat them. This results in local damage. This situation can be witnessed in older, over-crowded book stacks with collections housed on the shelves near the incandescent book stack lighting.

A more common situation in newer libraries occurs in display areas that use hot, high intensity, halogen lighting. The lighting can heat up objects even if the lighting is placed some distance from the objects. When lighting is mounted in display or other cases it will raise the temperature of the case environment.

Most collections of materials receive more exposure to light when on display than at any other time during their service lives. Display lighting that is left on during all open hours cumulates very high levels of exposure and light damage. In an effort to limit damage, the visible light levels most often recommended for display of paper-based materials are 5 - 15 foot candles. This is a level often lower than surrounding ambient lighting. This level is often too low to attract visitors to the exhibit. Therefore, exhibits should be housed in a separate space with low levels of ambient lighting.¹

LIGHTING SOURCES

Natural Light, or Daylighting - Natural light (daylighting) can provide important psychological benefit to Library customers as well as supplement lighting needs during daytime hours, providing

¹ An alternative is to raise exhibit lighting levels at least to ambient lighting levels, making sure the lights are turned off when they not needed, and limiting the length of time that materials are on display.

that glare control, human factors, and integration of building systems are properly addressed. Daylight apertures typically serve two distinct purposes:

- Allowing views to the exterior
- Providing functional ambient light for the interior.

These two seemingly linked design considerations, however, may potentially conflict. For example, view windows typically occur low in the wall at eye height, while functional daylight apertures distribute light most evenly when they are placed up high. It is important to evaluate the building's daylighting potential early in the design process; keeping in mind that glare from both direct sunlight and diffuse skylights should be controlled to the same degree as from luminaries.

Electric Light Sources - Potential electric light sources used in library interiors today are:

- Halogen
- Fluorescent/Compact fluorescent
- Ceramic Metal Halide
- LED (Light Emitting Diode).

Each has qualities that match the specific requirements of a particular area or situation. Therefore, no single type of system can be recommended exclusively. The primary consideration in selecting a particular lighting system is to provide light for the library customer to complete a specific visual task without distraction, such as minimizing the glare and brightness of lighting fixtures. In addition, the lighting system should complement the architectural and interior design of the Library while also being highly energy efficient. These sources (as applied in various light

fixture types) vary in terms of:

- Maintenance and replacement
- Types of lamps and ballasts required
- Rated life of various bulbs
- Heat, UV and glare factors
- Color of the light produced (which affects color and richness of materials and customers)
- Effect on the eyes – directional (creates depth, texture and shadows) or diffuse (provides uniform light, no shadows, flat)
- Required warm-up time
- Efficiency
- Dimming.

The primary features of each source are compared in the Lamp Characteristics table (Table 4 on the following page), followed by a detailed analysis of each source's advantages and disadvantages.

Halogen Lighting - Line voltage halogen lamps are relatively inexpensive, easy to install, and do not require ballasts. They are easy to control through the use of ready-manufactured dimmer systems. A wide variety of halogen lighting fixtures and lamp types are available for special uses. Halogen lights have a tungsten filament, or one "point" from which the light is produced, as opposed to the linear light of fluorescent tubes. This, coupled with the fact that halogen lamps have the best color rendition, makes them particularly effective for tasks requiring exceptional optical control and discernment of precise color and detail, such as displays, accent lighting, and art exhibits.

Relative to other lamps sources discussed in this document, halogen lamps are inefficient to operate and therefore relatively expensive to maintain, given their shorter life. The rated life of many halogen lamps is between 2,000 - 3,000 hours. Halogen lamps also produce considerable heat, which can adversely affect the operation of air conditioning systems. Low-voltage halogen lighting systems are similar to line voltage halogen, however require a transformer to convert from building power to low voltage 12V power.

Low-voltage halogen lighting systems are recommended for highlighting special areas such as exhibits, art work, new book displays, etc. Track lighting for such areas could provide flexibility for highlighting changing displays.

Consider the newest technology, halogen IR (Infrared) lamps for both line and low voltage halogen sources. Halogen IR lamps use an infrared coating, which significantly increases efficiency.

Fluorescent/Compact Fluorescent Lighting - Given its energy efficiency, long life, and the variety of luminaire designs providing numerous forms of diffused light, ranging from direct to indirect as needed; fluorescent lighting is recommended as the best general lighting system. Historically, the most commonly used light source in libraries, fluorescent lamps produce about three to four times the light per watt, and can last six to ten times longer than incandescent lamps. In contrast to the point-of-source bulbs,

**Table 4
Lamp Characteristics**

Source	Life	CCT 1	CRI 2
Halogen	2000–3,000 hrs	3000°K	100
Halogen IR	3,000–6,000 hrs	3000°K	100
Fluorescent Compact	20,000–46,000 hrs	3000–6500°K	78-86
Fluorescent Ceramic	10,000–12,000 hrs	2700-4100°K	82
Metal Halide	6,000–24,000 hrs	3000-4200°K	80-96
LED	50,000 hrs	2400-8000°K	70-90

Notes:

1. CCT (Correlated Color Temperature) is a measure of the visual “warmth” or “coolness” of the light from a lamp. The higher the value (in degrees Kelvin), the whiter or “cooler” the light appears.
2. CRI (Color Rendering Index) is an indication of the ability of the lamp to render object colors in a normal, natural way. The higher the number (on a scale of 0 to 100), the better the color appearance.

a fluorescent lamp emanates light along the entire length of its tube and diffuses light more effectively.

Compact fluorescent lamps have virtually replaced the use of standard incandescent lamps in commercial buildings and made deep in-roads into the residential marketplace as well. Thin, one-inch diameter fluorescent (T8) tubes are now prominent in the marketplace, producing more light with less energy consumption than their one and one-half inch (T12) predecessors, which are nearly obsolete. Newer 5/8-inch diameter (T5 and T5HO) tubes are also becoming readily available, however, will probably never completely replace the T8’s, and due to T8’s lower cost and similar or better efficiencies.

In comparison studies, T5HO (HO = High Output) have proven to be slightly less efficient than their T8 counterpart, when the whole "system wattage" is considered (i.e. lamp plus ballast). The new T8 lamp/ballast combinations currently coming onto the market, however, promise to reduce overall input wattage without sacrificing initial lumens. Fluorescent lamp life is affected by the amount of times it is turned on and off and its starting method.

Available starting methods for ballasts include instant-start and programmed-rapid start. With the increased use of occupancy sensors that turn the lamps on and off more often, programmed-rapid start ballasts are recommended over instant-start for longer lamp life expectancies.

Like incandescent lamps, fluorescent lighting can be controlled via ready-manufactured dimmer systems. Both full-range (100%-5%) and step (100% and 50%) dimming ballasts are available, with selection dependent on budget and the importance of smooth, non-perceivable dimming over energy savings.

The color of fluorescent lamps should be tri-phosphor type, minimum 80 CRI, and within the color temperature range of 3000°K to 4100°K (3500°K preferred). Regardless of the color temperature chosen, a mock-up of the selected lamps, along with the library's interior finishes and adjacent light sources used should be done in order to ensure color compatibility. Fluorescent ballasts should be electronic, high power factor, high-efficiency type with less than 10 percent THD (total harmonic distortion), to prevent interference with the book detection system.

Ceramic Metal Halide Lighting – The only HID (high intensity discharge) source that should be considered for use in library

interiors is ceramic metal halide, primarily because of its (comparatively) superior color rendition (unlike color in other HID sources that can vary from a bright yellow in the sodium-vapor HID's to a blue-violet in some mercury-vapor HID's). Ceramic metal halide lamps are typically more energy efficient and have longer life spans than halogen sources.

Ceramic metal halide lighting is suggested particularly for use in high ceilings to provide both direct and indirect lighting. It should rarely be used in a library as a visible source, as it provides light from only one point rather than diffusing the light, as do fluorescents. Although ceramic metal halide lamps can be successfully utilized for general lighting, they have several limitations such as higher glare potential due to their intensity, required warm-up and re-strike time.

Limited dimming capability for high-wattage metal halide lamps is now available, but the controls require sophisticated systems, compared to the ready-manufactured systems available for halogen and fluorescent lighting. Like other HID sources, ceramic metal halides are sensitive to variations in electrical current and may go off if the variation is too great. HID's require warm-up time before reaching full output. After being turned off or knocked off by a power variation, HID's require time to cool down before lighting up again, potentially posing a safety problem in some instances if no other lighting is available. This also limits ceramic metal halide lighting for emergency lighting purposes; it is possible but usually at a high cost.

Ceramic metal halide ballasts should be electronic, high power factor, energy saving type.

LED Lighting - Consideration should be given to LED lighting for possible use with displays, signage, and others elements of the building that might be highlighted by this type of lighting. LEDs for interior environments continue to make great strides, and recently issued standards will improve reliability and consistency of products over the coming years. White LEDs have had difficulty in the past due to high color temperature (bluish) and poor color rendering ability (low CRI).

Recent improvements have made some LEDs more appropriate for interior applications, including the availability of warmer (2400°K-4000°K) color temperatures and improved 80+ CRI.

Currently, LEDs are suitable for low ambient general lighting, such as hallways and rest rooms. They are also appropriate for task lighting, signage and decorative cove lighting. Costs remain high for LED technology and therefore life-cycle costs may need to be used to justify initial costs. Careful evaluation and attention should be taken before incorporating LED light fixtures as there is currently much misinformation and misunderstanding of this new technology.

Most LEDs are dimmable, depending on the driver (power supply) used with the fixture. Dimmer manufacturers are finessing the development of compatible dimmers, as early dimming had issues with flickering and the light cutting-out at around the 20% range or higher. The designer will require careful coordination when dimming is desired.

ILLUMINATION MEASUREMENTS

While the most commonly known measurement of illumination levels is the foot candle (fc), it is only a two-dimensional unit and

needs to be viewed in relation to other terms. The lumen is the fundamental unit for measuring light energy. In physical terms, a lumen is defined as the amount of energy radiating from one square foot of surface area of an imaginary sphere, two feet in diameter, surrounding the light source. In essence, the lumen measures light at the source.

A foot candle is a measurement of luminous energy at a surface upon that it falls and is defined as one lumen of light energy incident upon one square foot of surface area. Hence, a foot candle measures the density of light. Light is a radiant form of energy; the further it travels, the more area it covers the less density it has. The foot candle measures only ambient lighting levels on a surface and does not take into consideration factors such as glare, shadowing, contrasts, or other factors that affect task visibility or the ability to see. The recommended light levels (Table 5, next page) are the accepted standard, to be used as a guideline along with input from library staff.

LIGHTING EFFICACY

The efficacy of a light source is determined by the quantity of light per unit of energy that it takes to produce that light. Lighting efficacy is measured in lumens per watt, or the number of lumens produced by one watt of electricity. Artificial light sources now on the market vary in efficacy from seven to over 120 lumens per watt. Incandescent light sources have the lowest efficacy while linear fluorescent and ceramic metal halide has the highest efficacy. In general, higher efficacy lamps are viewed as the most energy efficient sources.

**Table 5
Recommended Illumination Levels ***

<i>Area or Task</i>	<i>Horizontal Illuminance</i>	<i>Vertical Vertical</i>
Active Bookstacks	10-30 fc	30 fc 30" above floor
Inactive Bookstacks	10-30 fc	5 fc 30" above floor)
Reader seating	30 – 50 fc	
Carrels & Study Desks ¹	30 fc	
Community Room ^{2 6}	5-50 fc	20-30 fc
Seminar / Classrooms ^{2 6}	30-50 fc	20-30 fc
Computer Room	20-30 fc	3 fc
Word Processing	20-30 fc	3 fc
Microform Area ³	30 fc	-
Audiovisual Area	30 fc	-
Audio Listening Area	30 fc	-
Local History/Documents	50 fc	5 fc
Circulation Desk	30 fc	-
Administration/Offices ³	30 fc	5 fc
Cataloguing	30 fc	-
Card Files (paper)	30 fc	5 fc
Conference Rooms ^{2 6}	30-50 fc	20-30 fc
Staff Room ⁴	10 fc	3 fc
Corridors	10 fc	5 fc
Rest Rooms	10 fc	5 fc
Storage	10 fc	-

Notes:

1. Carrels with shelves cause shadows and require task lighting. Consider an under-shelf light, which would need to be detailed into the furniture piece.
2. Consider local dimming control system and/or switching similar types of fixtures together, in order to achieve multiple lighting levels and scenes.

3. Machines should have hoods/screens treated to reduce reflections.
4. Consider a different lighting environment/technique for the Staff Room in order to provide a break from the work environment.
5. Individual rooms should be provided with (4) four 20-amp specification grade receptacles. Light switches should be specification grade, toggle type, rated 20 amperes, 120/277 volts. Wiring devices, in addition to those referenced above should be provided in all specialty areas and as otherwise required by library standards.
6. Vertical illumination recommendations are for marker boards or other instructional wall surfaces. In designing the lighting the lighting designer must calculate the quantity of illumination for each particular space and its various functions. Visibility, for example, which affects the ease of performing a visual task, is dependent upon contrast and background luminance. More specifically, the designer must take into consideration all factors in the immediate lighting environment that affect the ability to see or task visibility, such as glare, reflection, absorption, shadowing, and contrast, and evaluate the quality as well as the quantity of illumination.

* The recommended levels are based on the 9th edition of the *IESNA Lighting Handbook*.

ELECTRICAL SYSTEM REQUIREMENTS

Typically, fluorescent lighting is circuited to a single-pole, 20 ampere, 120 (or 277) volt circuit, maximum 1920 (or 4432) volt-amperes in accordance with National Electrical Code requirements, or a maximum of ten fixtures in accordance with library requirements. Multi-level switching should be specified in accordance with library staff requirements.

Lighting panel boards should be of the thermal-magnetic, bolt-on, circuit breaker type. Panels shall be sized to accommodate lighting loads, with the A.I.C. rating determined based on available fault calculations of the entire electrical system. All panel boards should be provided with main molded case switches or circuit breaker (or may be main-lug type if designed within the requirements of the local electrical code).

Emergency lighting throughout the library facility (both interior and exterior), to safely guide users and staff to exits during power failures, should be coordinated with the project's electrical engineer and local building and electrical codes.

CONTROLS

Lighting controls shall meet local energy code requirements. This may require local switches, bi-level switching and automatic shut-off of building lighting after the building closes. These are minimum requirements only and in many instances, the usage of the space may dictate a higher level of control such as dimming or daylighting controls. Lighting in all reading areas, etc. should have their own on/off switches for lights, in addition to centralized override switches located in the main administration area.

If daylighting can be used to replace some of the electric lighting during substantial periods of the day, lighting in those areas should be dimmed or switched off via daylighting sensors.

CODES

Prior to designing the lighting system the designer should consult local authorities having jurisdiction regarding the various codes and standards this project must adhere to. In addition, contact with the owner should be made to determine whether or not the building will pursue LEEDTM certification, and the lighting related credits that are being targeted.

LIBRARY LIGHTING CHECKLIST

1. Is the Library located in an area where seismic bracing of light

fixtures is required?

2. Is the configuration of book stacks/furniture likely to change? If so, will the lighting design accommodate the level of flexibility the Library staff requires?
3. Has the number of lamp types been minimized?
4. Discuss lighting control strategy (dimming, switching, control locations, etc.) with the design team and the library staff.
5. Has every effort been made to specify sources/fixtures in locations that can be easily maintained by the library staff?

For additional information on library lighting consult Table 6.

**Table 6
Other Lighting Sources for Reference**

<i>Organization</i>	<i>Website</i>
IESNA Illumination Engineering Society of North America	www.iesna.org
IALD - International Association of Lighting Designers	www.iald.org
CIE - International Commission on Illumination, United States National Committee	www.cie-usnc.org
CEC - California Energy Commission (Title 24)	www.energy.ca.gov/title24
ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.	www.ashrae.org
LEED – Leadership in Energy & Environmental Design	www.usgbc.org/LEED/LEED_main
IDA - International Dark-Sky Association	www.darksky.org
ALA - American Library Association	www.ala.org
GE Lighting	www.gelighting.com
Philips Lighting Company	www.lighting.philips.com/nam
Osram <i>Sylvania</i>	www.sylvania.com
Venture Lighting International	www.venturelighting.com

SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

Section 9
SECURITY CONSIDERATIONS

The security of people, the library collections, and equipment is a very important consideration in the library buildings now being planned. It is simply an unfortunate fact of life that every reasonable precaution must now be taken to ensure the safety of library customers, staff, materials, and equipment from theft, vandalism, and other potential acts of violence.

The design of the building should incorporate fire and smoke detection and prevention systems, per applicable codes. Provide an intrusion security system to detect unauthorized entry when the building is closed, as it will house extremely valuable collections of books and documents, works of art, considerable electronic equipment, office machines, and vending machines. Provide for smoke and heat detectors to detect a fire at its inception and provide a local warning. Locate the system out of reach of children. Equip all emergency exits with a time released audible alarm.

Provide dead bolts for all exterior doors. Provide removable core locks for all doors. Provide tamper resistant electrical receptacles

in areas accessible to children that are compliant with NEC Article 517-18c (also referred to as ASTM 517-18c).

THEFT AND VANDALISM PROTECTION

Effective management of access to and egress from the various collections storage and reading areas is essential for the provision of good service and the protection of the varied collections. Unobstructed sight lines that allow staff observation of customer behavior are a good deterrent to theft and vandalism, as well as beneficial for staff and customer safety. The design and layout of service desks need to consider points of entry and exit from the Library.

FIRE PROTECTION DESIGN GUIDELINES

The building should be protected with a pre-action fire standpipe suppression system capable of suppressing potential fire spread throughout the facility. A minimum of 6" fire service main should be extended from the city utility water main to a dedicated Fire Sprinkler Riser Room within the building. Fire department connections and hose stream demand factors should be in accordance with NFPA 13 and city requirements. The fire sprinkler distribution system should be designed and hydraulically calculated by the Fire Sprinkler Contractor based on flow and pressure available at the facility and the distribution system routing determined by the Fire Sprinkler Contractor. All fire sprinkler piping downstream of the wet type valve shall be black steel, with iron fittings, and shall be a minimum of Schedule 10 for the sprinkler mains and Schedule 40 for all branch lines. Library return / drop off

area should be provided with dedicated clean-agent fire suppression system.

Fire Detection And Alarm System - A zoned, individually coded fire alarm system, with separate and distinct codes for smoke detection and sprinkler water flow should be investigated. The system should include, but not be limited to, the following:

- Fire alarm control panel
- Remote annunciator panel
- Manual fire alarm stations
- Area smoke detectors
- Duct smoke detectors
- Heat detectors
- Sprinkler water flow switch alarm
- Alarm bells
- Visual alarm lights
- Central station alarm, supervisory and trouble connection control
- Air handling systems shutdown control
- Elevator recall control
- Electromagnetic door holders and release control
- Sprinkler valve tamper switch supervision
- Emergency generator supervision
- Fire pump supervision
- Manual code switch
- Battery backup.

Signal termination panels for this system should be provided in the nearest Atlantic City Fire Department station.

Fire Standpipe and Fire Pump System - Fire standpipe risers and associated drain risers should be located in stairwells.

Consider providing a 2 1/2" valve with residual pressure of 65 pounds per square inch (psi) at the topmost outlet. A complete floor control assembly should be provided at each floor for the sprinkler system. An electric automatic fire pump, jockey pump, and associated controllers and transfer switch designed to deliver the necessary gallons per minute (gpm) should also be provided. Confer with the Town of Shrewsbury Fire Marshall for specific requirements.

A separate water service to the fire pump should be provided. This water service should be connected to the existing municipal main with an approved back-flow prevention device. A fire pump test header and required fire department connections should also be provided.

BUILDING SECURITY SYSTEMS

Theft Detection System - A Theft Detection System will be used to control the loss of the Library collections. Theft Detection Systems utilize some form of reader or gate at all public exit points of the building. The Library's entranceways should be designed to attractively incorporate these devices. Utilize building materials that do not interfere with their proper operation and locate the detection devices within proper distances from other systems that may impede proper operation.

Confer with Library staff on specifics of the system. The design should provide for the installation of a system to detect and deter the unauthorized removal of library materials from the building. Theft Detection Systems are an integrated component of RFID installations. As noted in the RFID discussion design requirements for Theft Detection Systems vary significantly from vendor to vendor. Before the design of the entrance and exit areas are

finalized, extensive discussions with the vendor and the Library staff *must* be held.

The system should also provide a means for counting foot traffic coming in and out of the building.

Emergency and Standby Power Equipment - Emergency systems provide power and illumination essential for safety to life and property where such systems are legally required. Most states and cities require emergency power for exit lighting and egress lighting in places of assembly, plus power for equipment necessary for safety such as elevators, fire alarm systems, and fire pumps.

Emergency Systems - The choice of arrangement and the size and type of equipment depends in large measure on the requirements of local codes, which determine the loads to be fed from the emergency system. The Architects should note that, although the consultant is using the term emergency, the concepts involved are equally applicable to standby systems, remembering the NEC requires emergency and standby systems to be kept entirely separate.

In general, when emergency power is discussed, it is assumed to be replacing normal power. The assumption underlying governmental codes and ordinances is that power must be supplied to selected loads within the building because of a utility power outage. Cognizance *is not* taken of situations where normal power has not failed and the outage is localized because of an equipment failure. That aspect of design, reliability, is left to the designer. Some of the arrangements that will be discussed below differentiate between the nature of outages, that is, a utility or general outage versus an equipment or local outage.

The emergency system includes all devices, wiring, raceways, and other electrical equipment, including the emergency source that is intended to supply electric power to the selected loads. These loads normally include:

- Egress lighting, in corridors, exits, and lobby lights
- Signal equipment, such as public address and fire alarm that must remain functional during an emergency.

The recognized arrangements are discussed below.

Where emergency loads are light, a storage battery is used, to be connected automatically upon a power outage. Alternating current lighting can accept direct current emergency power if equipped with a local inverter. The emergency equipment is entirely separate from the normal equipment and is normally de-energized. This arrangement is used in small facilities requiring egress lighting only, where it is found that supplying a completely separate emergency system is the preferred economic or engineering choice. Large battery installations are used where uninterrupted power is required, as is generally the case in computer installations where no power interruption, however short, can be tolerated. These systems are highly technical.

Where emergency loads are larger than can be supplied economically by batteries, and where the eight to 15 second start-up times is tolerable, a generator set is employed. The prime mover may be gasoline, diesel, steam, or gas. It should be pointed out that a combination of sources could be used in a single building. For instance, a generator can supply bulk power loads and a battery installation selected lighting loads, provided that the design carefully avoids any possibility of contact between

the two systems. The system can be arranged with a single transfer switch that senses normal power loss or it can use multiple switches, each one will sense power loss at its downstream location. The latter system provides greater power reliability, provided the design is such that the emergency power uses an independent power path to the transfer switches. Otherwise, a faulty piece of equipment that will interrupt normal power downstream will also prevent emergency power from reaching that point.

Many codes permit the use of two separate electric services in lieu of a normal service plus an emergency source, provided the two sources are independent, that is, come from different utility transformers or feeders, enter the building at different points and preferably from different directions, and use separate service drops or laterals. The point is, of course, the type of reliability desired can only be obtained by minimizing the possibility of a single event interrupting both services. The usual arrangement is for one service to be normal and the other standby. A much less frequent case utilizes both feeders as normal, each carrying part of the normal load and each acting as a standby for the other.

Emergency system wiring must be kept entirely independent of all other wiring and equipment and should not occupy the same enclosure or conduit as normal system wiring, except in dual fed units such as transfer switches.

Where individual battery units are installed in a space to provide emergency lighting, they should be permanently wired and not plug connected. Also, the panel device feeding these outlets should be capable of being locked, or, so arranged as to be accessible to authorized personnel only.

Section 10
CMR 607(02)

The regulations for 605 CMR: BOARD OF LIBRARY COMMISSIONERS, 605 CMR 6.00: LIBRARY IMPROVEMENT PROGRAM - PUBLIC LIBRARY CONSTRUCTION states the following in Section 6.07, the Application Procedures, specifically paragraph (2):

6.07: Application Procedures

(2) The Library shall file a completed Letter of Intent form on or before the due date announced in the Program Notice. Late forms will be automatically returned. For all General Projects (New Construction, Addition/Renovation, Renovation, and Joint Public Library projects), with the Letter of Intent form the applicant shall file the following:

(a) A completed library building program using a 20-year horizon, which has previously been submitted and accepted by

the agency. This program shall have been prepared by the Library independently of and in advance of the appointment of the architect who will prepare the schematic design. It shall include:

1. A current community analysis including demography, location, governmental organization and community structure.
 2. An institutional analysis including history of the library, philosophy of library service, staffing, library collections, finances and a brief history of the previous and current planning efforts for improvements to the physical plant.
 3. A section on facility space requirements including a description of space needs by program area and relationships between the areas, and addressing the requirements and implications of new technologies and new information formats.
 4. A summary of facility space requirements in tabular form.
-
1. **A current community analysis including demography, location, governmental organization, and community structure.**

DEMOGRAPHY

Population - The Central Massachusetts Regional Planning Commission (CMRPC) has projected the population for all communities in the Commission's area. Projections have been made through 2030 in five-year increments, starting with the U.S. Census data for 2000.

For the Town of Shrewsbury the CMRPC projects:

2000 – 31,640
 2010 – 34,400
 2020 – 39,800
 2030 – 41,300

Percentage changes for the 30-year period:

2000 – 2030 – 30.53%
 2000 – 2020 – 25.79%
 2000 – 2010 – 8.72%
 2010 – 2020 – 15.70%
 2020 – 2030 – 3.76%
 2010 – 2030 – 20.06%

For the CMRPC Region:

2000 – 518,480
 2010 – 559,600
 2020 – 595,000
 2030 – 628,000

Percentage changes for the 30-year period:

2000 – 2030 – 21.12%
 2000 – 2020 – 14.76%
 2000 – 2010 – 7.93%
 2010 – 2020 – 6.33%
 2020 – 2030 – 5.55%
 2010 – 2030 – 12.22%

There will be, according to the Planning Commission, significant growth in the Town's population as well as the region as a whole. Over the next 20 years the Town of Shrewsbury will gain population at a considerably faster rate than the region as a whole. See the attachments to this deliverable for additional information.

Demographics - The CMRPC developed, based upon the 2000 Census, demographics for each community in the region, the entire region, Worcester County, and the State.

CMRPC Demographic Snapshot

<i>Area</i>	<i>Median Age</i>	<i>Average Household Size (persons)</i>	<i>Percent Owned Homes</i>	<i>Median Household Income</i>
Shrewsbury	37.6	2.54	73.1	\$64,237
Worcester	36.1	2.54	62.4	\$47,949

Primary Metropolitan
Statistical Area

Worcester County	36.3	2.56	64.1	\$47,874
State	36.5	2.51	61.7	\$54,502

Additional demographic information informs:

Population by Age –

13.9 percent ages 0 – 9
9.5 percent ages 10 – 17 ²
6.8 percent ages 65 – 74
6.0 percent age 75 +
63.8 percent ages 18 – 64

Household - Type

Families (Married Couples) / 85.2 percent
Families (Couples w/children) / 50.9 percent
Male household (no wife) / 4.0 percent
Male (no wife w/children) / 56.5 percent ³
Female household (no husband) / 10.8 percent
Female (no husband w/children) / 58.1 percent ⁴
Male Non-family / 43.8 percent

² There is a breakdown for ages 10 – 14 and 15 – 24. Assuming an equal distribution for each of the 10 years in the 15 – 24 bracket, there are 3.3 percent ages 15 – 17. That, coupled with the 6.2 percent for ages 10 – 14 provides the 10 -17 total of 9.5 percent.

³ Percent of Male Households with no wife and with children living at home.

⁴ Percent of Female Households with no husband and with children living at home.

Female Non-family / 56.1 percent

Ethnicity -

88.7 percent White
1.8 percent Black
7.3 percent Asian
2.1 percent Other/Multiple Races
2.8 percent Hispanic Origin ⁵

Educational - Attainment Level

No high school diploma / 5.5 percent
High school graduate / 20.0 percent
College, no degree / 16.0 percent
Associate's degree / 7.5 percent
Bachelor's degree / 28.8 percent
Graduate/Professional degree / 22.3 percent

Labor Force -

Employed / 63.9 percent
Unemployed / 4.6 percent
In Armed Forces / 0.1 percent
Not in labor force / 31.3 percent

Home Ownership -

Own / 72.2 percent
Rent / 20.2 percent
Vacant / 7.6 percent

Vehicles Available -

None – 4.5 percent
One – 30.4 percent
Two – 48.3 percent
Three or more – 16.8 percent

⁵ The US Census Bureau no longer reports Hispanic as a specific ethnic grouping. A person of Hispanic Origin might consider him/herself White, or Black, or Other, etc.

Library Considerations - The three strongest demographic predictors of library usage have consistently been:

- Educational attainment levels
- Households with children living at home
- Home ownership.

In each of these demographic measurements the conclusion to be drawn is that the Town of Shrewsbury Public Library has been – and will continue to be – used a great deal by residents of the community.

The importance of the availability of vehicles bears, of course, on how a person/family can/cannot get to the public library. This becomes increasingly important in a community with limited public transportation and only one public library facility.

LOCATION

The Town of Shrewsbury is located in Worcester County. Highway 9 and I-190 and I-290 access it. Interstate I-495 and I-90 (Massachusetts Turnpike) are to the east and south respectively.

The Shrewsbury Public Library is located in the center of Shrewsbury at the junction of

Route 140 and Main Street. Shrewsbury abuts Boylston, Northborough, Westborough, Grafton, and Worcester. Lake Quinsigamond forms the principal border between Worcester and Shrewsbury. The Town of Shrewsbury is situated approximately halfway between Boston (40 miles to the east) and Springfield (45 miles to the west). In some respects it is a suburban community, but in other respects it is a central city of its own.

The Library is located directly across the street from the Common. Retail, office building, and churches constitute its immediate neighbors.

GOVERNMENTAL ORGANIZATION

A publicly elected Mayor and five-member Board of Selectmen govern the Town of Shrewsbury. A Town Manager is responsible for the day-to-day operations of the Town.

An elected nine- member Board of Library Trustees is responsible for the hiring, etc. of the Library Director, long range planning and budget and policy development. Board officers include a President, Vice-president, Secretary, and Treasurer.

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The Library also enjoys the support of a very active Friends of the Library organization as well as an active Library Foundation. Library Trustees are represented on both of these organizations.

COMMUNITY STRUCTURE

Shrewsbury is a well-educated community (51.1% have a college or graduate degree, and another 23.5% have an associate degree or some college), whose residents make extensive use of their library for current best sellers and the latest, most topical non-fiction materials, including pertinent consumer information.

The family structure is quite strong. Over 85 percent of the households are married couples, and just fewer than 50 percent have children living at home. The community is heavily white, or Caucasian (88.7%). Nearly 13 percent of the population is age 65 and older. Of those age 25 and above, not quite 64 percent are employed.

Home ownership is strong – 77.2 percent of the residential structures are owner homes. And, 65.1 percent of the households have two or more vehicles.

The downtown area, where the Library is

located, is a healthy mix of retail (restaurants and small shops), one to three story office buildings, churches, some residential, and the Common.

- 2. An institutional analysis including history of the library, philosophy of library service, staffing, library collections, finances and a brief history of the previous and current planning efforts for improvements to the physical plant.**

HISTORY

The Shrewsbury Public Library was organized in 1872. The first library was located in the Town House. It moved to its current location in 1895 and was housed in the Bond House, which was purchased to serve as the public library. The current building was built and opened in 1903, on proceeds from the estate of Jubal Howe.

In 1923, a one story annex to house the Children's Room, was built in memory of General Artemus Ward. That was followed by a second addition, also two-levels, completed and occupied in 1979.

The Library became a member of the Central Massachusetts Regional Library System (CMRLS) in 1969.

PHILOSOPHY OF SERVICE

The primary role of the Shrewsbury Public Library is as a popular materials library. As such, the Library provides a diverse collection of materials, in several formats (printed book, audio-book, videocassettes, CD, DVD, etc.), and a variety of services, including an ever-increasing interlibrary loan service. The largest group of library users is adults 18-65 years old. Next come students 5-17 years old. Picture books have the highest circulation, followed by videocassettes and DVDs.

The secondary role is to serve as an independent learning center, as well as to support students of all ages in formal educational settings, including distance learning and exam proctoring. In this capacity, the Library has a good non-fiction and reference collection. The reference collection also supplements the school media collections and assists students in meeting their formal educational needs. The Shrewsbury Public Library recognizes the rapid advance of computer technology, and tries to keep abreast of new formats, databases, and other online resources. The library's own collection and services are supplemented by those of other member libraries of C/W MARS (the

computerized consortium of public and academic libraries in central and western Massachusetts).

As a member both of C/W MARS and CMRLS Shrewsbury Public provides access for its users to the broader resources of the region, the state, and beyond. The Shrewsbury Public Library Board of Trustees and staff support the concepts of free access to information and of reciprocal borrowing between and among libraries to meet user needs.

STAFFING

The Shrewsbury Public Library employs 12 full-time and 19 part-time employees. A full-time post works a 37.50-hour week, except for the Custodian who works a 40.00-hour week. Part-time staff work between 4.00 and 19.00 hours per week. The full-time equivalent for the part-time staff is 5.85 FTE.

In addition, the library employs five library pages that work a collective 26.5 hours per week, or 0.706 FTE.

Of the full-time staff, four are classified as professional (MLS degree). There is one part-time professional staffer.

The current Library Director has been in her post for five years. The current Assistant Library Director has been in his post for seventeen years.

The direct reports for the Library Director are five; Assistant Director, Senior Account Clerk, and heads of Children's, Technical, and Circulation services.

The Assistant Library Director is also the head of Adult Services with three direct reports – Reference Librarian, Young Adult Librarian, and Electronics Librarian.

LIBRARY COLLECTIONS

The Shrewsbury Public Library collection totals 146,181 items. By age grouping:

- Adult = 90,494
- Young Adult = 7,726
- Children's = 47,959

In terms of media (non-book materials):

- Adult = 11,947
- Young Adult = 1,094
- Children's = 3,480

Within the media collections there are several hundred "legacy" items; videocassettes, books-on-tape, and

audiocassettes. These collections have been "closed" and over a period of time will no longer be part of the Library's collection.

With a total of 146,181 items the per capita collection now registers 4.2 items per capita when computed on the basis of a 2010 population estimate of 34,400.

The Building Program calls for:

Adult books = 88,945
Young Adult books = 7,200
Children's books = 52,600
Adult media = 10,100
Young Adult media = 1,000
Children's media = 4,000

On the basis of a projected 2030 population of 41,300, there will be just less than 4.0 collection items per capita.

LIBRARY FINANCES

Income – for FY2010, the library income consists of \$1,077,655 in municipal funds, approximately \$190,000 in trust and endowment income, \$10,000 in monetary gifts, \$30,000 in sponsorships and grants, and \$40,000 in Library State Aid. The Shrewsbury Library Foundation, a separate non-profit agency, and the Friends of the

Library organization, provide additional resources.

Outgo - The FY2010 Town Meeting approved operating budget for the Shrewsbury Public Library was \$1,077,655. The amount reflects a decrease of \$77,365 from the FY09 budget.

Of the total, the breakdown by major expenditure category is:

- Salaries = \$771,515, or 71.6 percent
- Services/Contractual = \$122,062, or 11.3 percent
- Supplies & Materials = \$178,778, or 16.6 percent
- Other & Equipment = \$5,300, or 0.5 percent.

Of the \$178,778 for Supplies & Materials the lion's share of that is for library Materials at \$140,000, or just under 13 percent of the total.

Accounting for the decline, by expenditure category:

- Salaries = decrease of \$65,784, or 7.8 percent
- Services/Contractual = decrease \$5,209, or 4.1 percent

- Supplies & Materials = decrease \$9,972, or 5.3 percent
- Other & Equipment = increase of \$3,600, or 211.7 percent.

Library materials expenditures declined \$10,207, or 6.7 percent.

BRIEF HISTORY OF PREVIOUS AND CURRENT PLANNING EFFORTS

Previous – In early 2004, the Town of Shrewsbury contracted with a New York consultant to produce a building program statement (BPS). The BPS was completed and accepted in October, 2004.

The Library was a recipient of a provisional grant of close to \$4 million in the previous construction grant round. Since August of 2008, when the state bonds for the library construction program were approved, library officials began lobbying town officials to place the project before voters. Even with the unprecedented economic recession, the Trustee had succeeded in gaining selectman approval for placing the project before town meeting. The date was set for September 2009. Just a week later, the MLBC announced the new and more generous grant program. After intense discussion and compromise between the two boards, they jointly decided to forego

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the earlier grant and prepare to apply under the new program.

They have used this changed timeline as an opportunity to:

1. Update project costs
2. Integrate new technologies- and the new ways people are reading and using libraries—into the building design
3. Adjust to the harsher fiscal realities, to design a building that can be built and run as efficiently as possible
4. To integrate LEED elements (for better energy efficiencies, improved user comfort and other grant possibilities)
5. To extend the fundraising campaign for a more successful result.

Current – Now, some six years later, the Town has again engaged the services of a library consultant to review the 2004 BPS and prepare a new building program. A Rhode Island firm was engaged to prepare the new program.

The review of the 2004 BPS was to prepare three different reviews; conservative, moderate, and enhanced.

The work plan, as executed, consisted of the following:

- Review of background data – staffing, organization chart, usage data, budgets, etc.
- Focus groups and interviews with library staff
- Focus groups with community members
- General community meetings
- Meetings with the Library Board of Trustees
- Meeting with the Friends of the Library and the Library Foundation
- Online community survey
- In-person community survey
- Discussions with the Library Director
- Preparation of a draft building program
- Review of program draft
- Finalization of the building program.

3. **A section on facility space requirements including a description of space needs by program area and relationships between the areas, and addressing the requirements and implications of new technologies and new information formats.**

The full Building Program Statement as detailed in Section 11, The Assignable Spaces, address:

- Space requirements for each program area
- Spatial relationships between each program area
- Requirements and implications of new technologies
- Requirements and implication of new information.

4. A summary of facility space requirements in tabular form.

Table 7 of Section 11 is a tabular summary of the space requirements for the Shrewsbury Public Library as reflected in the Building Program Statement.

Section 11
THE ASSIGNABLE SPACES

Godfrey's Associates, Inc has developed a set of space planning guidelines based upon our work with hundreds of libraries throughout the United States and abroad. The guidelines are intended to be general in nature, applicable to all libraries. As library consultants, we recognize that each library building is unique, and therefore each item must be carefully analyzed to match specific local needs. However, it has been our experience that these guidelines, when applied, result in adequately sized, user-friendly, and ADA compliant buildings for the various pieces of furniture, equipment, and other needs.

Once a determination is made as to quantities, such as the number of adult reference books to be in the collection, the number of reader tables to be provided, the number of computer workstations to be available, etc. – then a building can then be "sized."

SQUARE FOOTAGE DEFINITIONS

In order to understand the methodology we have followed a common definition of terms used in the course of discussions that

follow is required.

Net Usable Square Footage (NSF) - NSF represents the actual unobstructed floor area or square footage assigned to a primary use for an individual unit, contained within a defined perimeter. In effect, net area is the actual area of bookstacks, offices, computer workstations, support areas, or special function areas *exclusive* of partitions, exterior walls, public and private corridors, columns, pipe chases, stairs, mechanical and electrical space, and all similar, non-usable areas.

Net Assignable Square Footage (NASF) - NASF includes all net areas assigned to a given unit as well as related corridor space for movement, interior partitions, and other areas incidental to the spatial organization or construction. Additionally, internal corridor (circulation) space shared by or connecting units is included in this total area. Net assignable area *excludes* the area required for mechanical and electrical spaces and distribution shafts, stairs, rest rooms, elevators, and other common building elements.

In effect, this is the total area *assigned* to a use and is comparable to the amount of area occupied for a specific tenant as if it were leased from a landlord. This area includes internal partitions, corridors and allowances for columns, chases, etc., which penetrate the space.

Efficiency factors added to the pure net square footage to accommodate these other assignable spaces might range from 10 to 30 percent of the total net area. When analyzing existing facilities, this assignable factor is calculated by dividing the net usable area (NSF) by the total unit net assignable area (NASF) to determine the overall efficiency of the unit. The net-to-net assignable square footage relationship is primarily a factor of the

size, type, configuration, number of individual spaces, and the anticipated width of internal personnel movement and service corridors.

Generally, units comprised of larger individual spaces will require less space for inter- and intra-unit movement. Units comprised of many smaller workstations, especially private offices, require a higher degree of intra- and inter-unit movement and wall space. Experience has shown the efficiency of older facilities is generally less than new construction due to the area required for structure, walls, and formalistic approaches to space planning.

Building Gross Square Footage (BGSF) - BGSF reflects the total area of the building, including all net and net assignable areas as defined above, plus any additional area occupied by rest rooms, vertical movement, janitorial/custodial closets, central mechanical and electrical space, chases, and other spaces related to primary air and power distribution, columns, and exterior walls.

When programming space for new facilities the total building gross area is estimated by applying an overall facility grossing factor to the total programmed net assignable area. Typically, these factors range from 15 to 20 percent in smaller, single-level buildings up to 30 percent in larger, multi-level facilities.

The building program for the Shrewsbury Public Library, Town of Shrewsbury, Massachusetts calls for the total amount of space projected to be 38,466 net assignable square feet (NASF) and 51,288 building gross square feet (BGSF). This assumes a building that is 75 percent efficient.

11.102) compares the NASF of the existing building with the NASF in this Building Program Statement.

**Table 7
Summary of Net Assignable Spaces**

Space	Space No.	NSF	NASF
PUBLIC SPACES:			
Library Entrance & Lobby	Space 1		775
Library Café & Store	Space 2		820
Library Cafe		575	
Library Store		<u>170</u>	
Circulation Services;	Space 3		673
Circulation Services Counter		432	
Self-Check Stations		<u>120</u>	
Adult Services;	Space 4		13,266
Popular Materials		242	
Reference (including Service Counter, OPACs, and Seating)		1,424	
Computers, Public Use		936	
Fiction and Non-Fiction (including Seating)		6,118	
Media		1,196	
Local History (including Seating)		754	
Periodicals (including Seating)		806	
Group Study Rooms		440	
Tutoring/Research Rooms		<u>144</u>	

Table 7 is a summary of the 18 individual spaces. Table 8 (page

Young Adult Services;	Space 5	1,922	Workroom	<u>597</u>	
Computers, Public Use		336			
Collections (including Seating)		1,061	Young Adult Services Workroom; Space 10	<u>180</u>	216
Recreational Gathering Space		<u>350</u>			
Children's Services	Space 6	7,377	Technical Services;	Space 11	910
Reference (including Service Desk and OPACs)		192	Workroom		559
Computers, Public Use		336	Storage & Supply		<u>200</u>
Easy/Picture/Board Books (including Seating)		1,843	Administrative Services;	Space 12	1,320
Fiction/Non-Fiction/Media (including Seating)		2,640	Reception		70
Parenting (including Seating)		130	Offices		
Homework & Study		460	Account Clerk		154
Program Room		<u>1,105</u>	Director		144
			Assistant Director		110
			Administrative Workroom		<u>622</u>
SUBTOTAL ALL PUBLIC SPACES NASF		24,833	Building Services;	Space 13	766
			Workroom & Office		96
STAFF SPACES:			Storage & Supply Room		<u>600</u>
Circulation Services;	Space 7	1,297	Staff Room	Space 14	<u>446</u> 491
Office		100	Friends of the Library	Space 15	<u>450</u> 495
Workroom		827	Loading, Receiving & Staff Entrance	Space 16	<u>489</u> <u>538</u>
Drive-in/Drive-up Return & Checkout		<u>154</u>			
Adult & Electronic Services Workroom;	Space 8	674	SUBTOTAL ALL STAFF SPACES NASF		7,543
Workroom		362			
Network Server Room		<u>200</u>			
Children's Services;	Space 9	836			
Office		100			

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GATHERING SPACES:

Multi-Purpose Meeting Room (Including Kitchen)	Space 17	<u>2,030</u>	2,640
Computer Lab	Space 18	<u>390</u>	<u>468</u>
SUBTOTAL ALL GATHERING SPACES NASF			<u>3,108</u>
TOTAL ALL NASF OPTION ONE			35,484
UNASSIGNABLE SPACE AT 75% EFFICIENCY¹			<u>11,828</u>
TOTAL BUILDING GROSS SQUARE FEET (BGSF) OPTION ONE			47,312
TOTAL ALL NASF OPTION TWO			35,484
UNASSIGNABLE SPACE AT 80% EFFICIENCY²			<u>8,871</u>
TOTAL BUILDING GROSS SQUARE FEET (BGSF) OPTION TWO			44,355

¹ Assumes the renovation and expansion of the existing building excluding the last addition and possibly the addition prior to the last addition.

² Assumes a totally new building on a new site.

PUBLIC SPACES

Space 1

LIBRARY ENTRANCE LOBBY

775 NASF

The function of this space is to:

- Provide climate controlled foyer for persons to enter the library
- Provide electronic and paper library announcements, public bulletin boards, a building directory, and an ATM machine
- Provide area for displays and exhibits
- Provide bench seating
- Provide for 24/7 service.

A summary of the square footage allocation for the Library Entrance Lobby is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Lobby/Vestibule	1	600	600
Bench seating	1	10	10
Electronic kiosk	1	30	30
Literature rack	3	15	45
24/7 service locker	8	2.5	<u>20</u>
Subtotal NSF			705
Internal walls/circulation @ 10%			<u>70</u>
TOTAL NASF			775

Occupancy

The occupancy of this space will range from six or eight to 10 or 20 (2 seated), depending upon the schedule of activities in the building.

Preliminary Listing of Furniture and Equipment

- 1 Lobby/Vestibule; 600 NSF.
- 1 Benche seating two persons; allow 10 NSF.
- 2 Electronic kiosk, allow 30 NSF.
- 3 Literature racks; allow 45 NSF (15 NSF each).
- 8 Lockers, each 2.5" in size; allow 20 NSF (2.5 NSF each).
(NOTE: Place these lockers in a separate space within the Foyer, accessible from the outside via a separate door that allows entry by one person who, w/a pre-determined pass code, can access one of the lockers to retrieve one or more items of Library materials that has been reserved in advance for persons w/a valid Library borrower's card.)
- 2 Bulletin boards, 3' X 4'; NSF included in circulation allowance above.
- 1 Automatic teller machine (ATM); NSF included in circulation allowance above.

Spatial Relationships

Adjacent to: Library Cafe and Store (Space 2).

Close to: Circulation Services Desk (Space 3).

Environmental and Engineering Needs

Acoustics: This is a high traffic area. Give special consideration to additional acoustical control through the use of hanging baffles or other sound absorbent materials.

Electrical: Provide power outlets in the floor, counters, and/or walls for exhibit possibilities. Provide for a people-counter device mounted at the entrance into the Library proper.

Finishes: Because this is a high traffic area, flooring materials should be selected for their long-term durability characteristics. The flooring *must* be a non-slip type.

Lighting: Daylighting and general ambient lighting for the area, w/adjustable lighting for exhibits.

Finishes: Flooring materials should be selected for their long-term durability.

Security: Provide a surveillance camera for the 24/7 Service Lockers.

Other Comments

Double set electronic bi-parting doors (air lock).

Flat art mounting capabilities.

A building plaque will be needed. It can be placed within the Lobby area, or perhaps best located near the building core by the public elevator(s).

Provide an Automatic Teller Machine (ATM) via a contract w/a local financial institution.

**Space 2
LIBRARY CAFÉ AND STORE
820 NASF**

The function of this space is to provide a small CAFE for food and refreshment service and a space for the Friends of the Library bookstore/gift shop.

A summary of the square footage allocation for the Library Café and Store is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Library Café</u>			
1-Place table	3	10	30
2-Place table	3	20	60
Counter	1	50	50
Lounge chair	5	35	175
Vending	2	25	50
Sales counter	1	30	30
Kitchen	1	80	80
Subtotal NSF			575

Library Store

Display shelving	6	10	60
Display table	2	25	50
Counter	1	50	50
Bench	1	10	10
Subtotal NSF			170

Subtotal All NSF 745

Internal walls /circulation @ 10% 75

TOTAL NASF 820

Occupancy

From three or four to 16 to 20 customers (18 seated), depending upon the activity level in the Library Café and from two or three to five or six (2 seated) in the Library Store.

Preliminary Listing of Furniture and Equipment

Library Cafe

- 3 1-Place tables w/one reader chair for each; allow 30 NSF (10 NSF each).
- 3 2-Place tables w/two reader chairs for each; allow 60 NSF (20 NSF each).
- 1 Counter w/four stools; allow 50 NSF
- 5 Lounge chairs w/one side table between two pairs of chairs; allow 175 NSF (35 NSF each). (NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.)
- 2 Vending machines; allow 50 NSF (25 NSF each).
- 1 Sales counter w/one (1) ergonomic task stool, and electronic cash register; allow 30 NSF.

- 1 Kitchen; allow 80 NSF. (NOTE: This is primarily a place to keep foods and drinks at proper selling temperature. It is anticipated that the vendor will prepare sales items off-site.)

Library Store

- 6 Sections (90 linear feet) of 72"H steel, display-type, wall-mounted, single-face bookstack shelving w/four (4) 10-inch adjustable shelves over one (1) 10-inch tilt-base shelf for the display of 500 items; allow 60 NSF (10 NSF per single-face section).
- 2 Display tables, 48"D, round; allow 50 NSF (25 NSF each).
- 1 Sales counter w/two ergonomic stools, glass front for merchandise display; allow 50 NSF
- 1 Bench seating two persons; allow 10 NSF.

Spatial Relationships

Adjacent to: Library Entrance Lobby (Space 1).

Close to: Circulation Services (Space 3).

Environmental and Engineering Needs

Communications: Provide a wall-mounted telephone near the Sales Counters in both the Library Café and the Library Store.

Data Cabling: Conduit to provide data network cabling to all workstations and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide electrical outlets on all walls.

Finishes: Provide hard surface flooring in the Library Café area.

Lighting: Daylighting and display lighting for the bookstacks and the display tables in the Library Store.

Utilities: Provide for a floor drain in the Library Cafe.

Other Comments

Locate the Library Café in a highly visible area as persons enter the building. Design the Library Cafe space for ease of maintenance.

The furniture and equipment in the Library Café should be highly vandalism resistant.

If the design of the building is to include any seating outside, consider some locating near the Library Cafe.

It is anticipated that a commercial vendor will operate the Library Café and the Friends of the Shrewsbury Public Library will operate the Library Store.

Location, Consideration for a

The space in the building that now houses the YA collections and a reading area might be a consideration for location of the Library Café and Store. Visibility into the space from passers-by is important for the success of both the Café and the Store.

**Space 3
CIRCULATION SERVICES
673 NASF**

The function of this space includes circulation (check-out and –in of library materials) and informational functions. For the different functions the Circulation Services Counter should be designed to:

- Handle checkout and check-in of library materials, receipt of fines for overdue books and lost items, etc.
- Provide for four Self-Check stations
- Provide shelving for 500 holds on the public side of the Counter
- Provide a pay station
- Provide a public address (PA) system.

A summary of the square footage allocation for Circulation Services is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Circulation Services Counter</u>			
Circulation services counter	1	100	100
Queuing space	1	300	300
Pay station	1	20	20
Single-face shelving	4	10	40
Booktruck	4	8	<u>32</u>
Subtotal NSF			432

Self-Check Stations

Self-check station	4	30	<u>120</u>
Subtotal NSF			<u>120</u>
Subtotal All NSF			612
Internal walls and circulation @ 10%			<u>61</u>
TOTAL NASF			673

Occupancy

From one to three staff, depending upon the activity level. Public customers being assisted may range from five or six to a dozen or more at any one time.

Preliminary Listing of Furniture and Equipment

Circulation Services Counter

- 1 Modular-designed, Circulation Counter w/space and outlets for two PCs (flat screen monitors) w/desktop network laser printer and access to the cash management system, two ergonomic task stools, and two cordless telephones. The counter should be a custom design in such a manner that it is friendly to adults, children, and the physically challenged (such as different counter heights, the larger part at standing height, the lesser part at sitting height); allow 100 NSF.
- 1 Queuing space; allow 300 NSF. (NOTES: [1.] Floor space for waiting in line for a staffed station an/or Self-Check station to become open and available. [2.] Consider a means to guide the customers who are in the queue.)

- 1 Pay station, wall mounted; allow 20 NSF. (*NOTE: To allow for purchase of smart cards as well as making changes [to accept \$1, \$5, and \$10 bills].*)
- 4 Sections (60 linear feet) of 72"H single-face steel, wall-mounted bookstack shelving w/four 10-inch adjustable shelves over one 12-inch base shelf (15 linear feet per single-face section) for 500 items on hold; for allow 40 NSF (10 NSF per single-face section). (*NOTES: [1.] Place this shelving adjacent to the Counter on the public side of the Counter. [2.] If double-face shelving is needed due to the absence of nearby wall, then provide two double-face ranges w/two sections per range.*)
- 4 Booktrucks; allow 32 NSF (8 NSF each).
- 1 Large (48") flat screen monitor located above the Circulation Counter; NSF included in circulation allowance above. (*NOTE: This will be used to promote activities in the Library and throughout the Town of Shrewsbury and the Library.*)
- 1 Public address (PA) system; NSF included in circulation allowance above. (*NOTE: The system should extend throughout the building w/specific zones established, e.g. Multi-Purpose Meeting Room would be a zone. The system must such that in can be heard throughout the building if that is required, or only a selected zone{s} if that is required.*)
- 1 Ceiling-mounted projection unit; NSF included in circulation allowance above. (*NOTE: This unit must be positioned so that it projects onto the large flat screen monitor noted above.*)

- 1 Library materials security system; allow (NSF included in circulation allowance above).

Self-Check Stations

- 4 Self-check stations; allow 120 NSF (30 NSF each). (*NOTE: The Library may not install all four (4) stations at the outset but space and wiring, etc. must be provided at the outset.*)

Spatial Relationships

Adjacent to: Circulation Services Workroom (Space 7). (*NOTE: Holds shelving [4 sections] adjacent to Circulation Services Counter.*)

Close to: Entrance Lobby (Space 1).

Environmental and Engineering Needs

Acoustics: This is another high traffic area that warrants consideration of extra acoustical control.

Communications: Provide two cordless telephones at the desk. Provide controls for the building-wide public address system at this location. Provide for TTD/TTY communications. Provide a buzzer that connects the Desk and the Circulation Services Workroom (Space 1.6).

Data Cabling: Conduit to provide data network cabling to all workstations and potential workstations **must** be provided as well as a wire management system.

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Electrical: Provide wiring, power, data network outlets, and cable management system for circulation workstations, pay station, and peripherals including barcode scanners and printers, and the self-check stations. Provide wiring and power for one electronic cash drawer at each station, for the library materials security system, and for the public address (PA) system.

Finishes: Provide additional padding under the carpeting on the staff side of the Counter inasmuch as staff often must stand for several hours at a time while providing service. Consider a different carpet tile pattern on the public side of the Counter inasmuch as this area will wear out and need to be replaced before other areas of the building will need to be re-carpeted. Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Avoid high-heat producing, incandescent lighting.

Security: Provide for electronic cash drawers, making certain that the drawers cannot be reached from the public side of the desk. Provide a panic alarm system.

Temperature: Provide adequate supply and return air to avoid heat build-up as the staff will be in the area much of their normal workday. Consider ceiling fans above the Counter.

Other Comments

For many customers of the Library the Circulation Counter is their primary, and perhaps only, contact on a regular basis w/Library staff. Therefore, it is very important that the Counter be user-friendly, comfortable, and attractive.

Space 4
ADULT SERVICES
13,266 NASF

The function of this space is to provide an area for Library customers primarily interested in adult materials and services. There *must* be continuous shelving for the fiction and non-fiction collections in the same location – but not interfiled.

A summary of the square footage allocation for the Adult Services area is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Popular Materials</u>			
OPAC station (stand-up)	2	16	32
Double-face shelving	10	20	200
Bench seating	1	10	<u>10</u>
Subtotal NSF			242
<u>Reference</u>			
Counter, Service	1	60	60
OPAC station (stand-up)	1	16	16
Photocopy machine	1	48	48
Sorting table	1	36	36
Supply cabinet	1	24	24
Single-face shelving	1	10	10
Double-face shelving	14	20	280
File cabinet	1	20	20
Map case	1	40	40
1-place table	12	35	420

4-place table	3	100	300
Microform reader/printer	1	48	48
Microform cabinet	6	20	<u>120</u>
Subtotal NSF			1,424

Computers, Public Use

Express station (stand-up)	4	24	96
Computer station, 1-place	20	36	720
Computer station, 2-place	2	48	96
Printer/scanner station	1	24	<u>24</u>
Subtotal NSF			936

Fiction and Non-Fiction Collection

OPAC station (stand-up)	3	16	48
Double-face shelving;			
Large print vols.	20	20	400
Fiction vols.	94	20	1,880
Non-fiction vols.	136	20	2,720
Paperback vols.	8	20	160
Bench seating	2	10	20
Lounge seating	6	35	210
1-place table	8	35	280
4-place table	4	100	<u>400</u>
Subtotal NSF			6,118

Media Collection

OPAC station (stand-up)	1	16	16
Bins, Art print	4	25	100
Media housing unit	9	120	<u>1,080</u>
Subtotal NSF			1,196

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Local History

Closed Stacks:

Double-face shelving	8	20	160
Booktruck	2	8	<u>16</u>
Subtotal NSF			176

Research/Study Area:

Single-face shelving	4	10	40
Computer station w/OPAC	1	36	36
Printer/scanner/fax station	1	24	24
Lounge seating	2	35	70
Conference table	1	360	360
Stack chair	4	12	<u>48</u>
Subtotal NSF			396

Subtotal All NSF 754

Periodicals

OPAC station (stand-up)	1	16	16
Double-face shelving	14	20	280
Lounge seating	6	35	210
4-place table	3	100	<u>300</u>
Subtotal NSF			806

Group Study Rooms

6-Place Room

Table, round w/6 chairs	2	120	<u>240</u>
Subtotal NSF			240

4-Place Room

Table, rectangular w/4 chairs	2	100	<u>200</u>
Subtotal NSF			200

Subtotal All NSF 440

Tutoring/Research Study Rooms

Room	3	48	<u>144</u>
Subtotal NSF			144

SUBTOTAL ALL NSF 12,060

Internal Walls & Circulation @ 10% 1,206

SUBTOTL NASF 13,266

Occupancy

From 30 or 40 to 150 to 190 customers (173 seated), depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Popular Materials

2 OPAC (online public access catalog) stations; allow 32 NSF (16 NSF each). (NOTE: Locate on the face panels of two of the face panels of the 10 sections of shelving described below>)

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- 10 Sections (240 linear feet) of 66”H double-face steel bookstack shelving w/6 10-inch adjustable shelves over two 12-inch tilt base shelves (24 linear feet per double-face section) for about 1,440 *volumes/items of new materials*; allow 200 NSF (20 NSF per double-face section). (NOTES: [1.] Consider some of the adjustable shelves being capable of housing books and CDs/DVDs “face out” to improve merchandising of the collections. [2.] Do NOT provide canopy tops; DO provide slatwall face panels on both ends of the range{s}. [3.] These shelving units should be equipped w/ lockdown casters.)
- 1 Bench seating two persons, interspersed among the 10 sections of shelving; 10 NSF.

Reference

- 1 Service Counter w/two stations, each w/a PC and w/one desktop networked laser printer, telephones w/wireless capability, and two ergonomic task stools; allow 60 NSF. (NOTE: The Counter **must** have visual control of entire area.)
- 1 OPAC station; allow 16 NSF. (NOTES: [1.] Locate on the face panel of one range of bookstack shelving. [2.] Staff from the Service Counter should be able to see the PAC station so that help can be provided to customers who may need assistance.)
- 1 Photocopy machine, allow 48 NSF. (NOTE: Place near the Knowledge Counter, in an alcove.)
- 1 Sorting table (3’W X 3”L X 30”H); allow 24 NSF

- 1 Supply cabinet, counter height; allow 24 NSF
- 1 Section (9 linear feet) of 48”H steel, free-standing single-face bookstack shelving w/two 12-inch adjustable shelves over one 12-inch flat base shelf (9 linear feet per single-face section) w/canopy tops for 70 *ready reference vols.*; allow 10 NSF.
- 8 Sections (144 linear feet) of 48”H steel, double-face bookstack shelving w/four adjustable 10-inch shelves two 12-inch flat base shelves (18 linear feet per double-face section) w/canopy tops for 1,200 *reference and business vols.*; allow 240 NSF (20 NSF per double-face section).
- 6 Sections (180 linear feet) of 72”H steel, double-face bookstack shelving w/eight 10-inch adjustable shelves over two 12-inch flat base shelves (30 linear feet per double-face section) for 1,620 *reference and business vols.*; for allow 160 NSF (20 NSF per double-face section). (NOTES: [1.] These six sections and the above eight sections should be positioned side-by-side so the canopy tops of the 48”H ranges can be used as a work surface for customers who remove a book from any of the reference shelving. {2.} On these sections provide five of the face panels a slanted shelf w/1/2”lip that can serve as a place where a customer can place a book and read {short-term reading} without having to either hold the book in his/her hands or take it to a table on or one of the adjacent canopy tops. [3.] The arrangement should be as follows – 48”H range, 72”H range, 48”H range, 72”H range, and 48”H range.)
- 1 Four-drawer, lateral-pull file cabinet; allow 20 NSF.

- 1 Ten-drawer map case; allow 40 NSF. (NOTES: [1.] There will be two five-drawer cases stacked one on top of the other to achieve the 10 drawers. [2.] The 40 NSF allows for a drawer to be fully extended and a person standing in front of the drawer.)
- 12 One-place study reader tables w/one reader chair each; allow 420 NSF (35 NSF each).
- 3 Four-place reader tables (4' X 6') w/four reader chairs each; allow 300 NSF (100 NSF each).
- 1 Microform reader/printer w/ergonomic task chair; allow 48 NSF.
- 6 Eleven-drawer microform cabinets; allow 120 NSF (20 NSF each).

Computers, Public Use

- 4 PC workstations on stand-up tables, Internet connectivity only, Express Stations, e.g. 15-minute time limit; allow 96 NSF (24 NSF each).
- 20 PC workstations w/one ergonomic task chair per station; allow 720 NSF (36 NSF each). (NOTES: [1.] These workstations will have Internet connectivity, word processing and Excel software, and be able to access the online catalog and all electronic databases in the Library's collection. [2.] These stations should be networked to the printer/scanner/fax station described below. [3.] Two of the workstations should have adjustable height capabilities for

the physically challenged.)

- 2 PC workstations w/two ergonomic task chairs and two PCs per stations; allow 96 NSF (48 NSF each). (NOTES: [1.] These workstations will have Internet connectivity, word processing and Excel software, and be able to access the online catalog and all electronic databases in the Library's collection. [2.] These stations should be networked to the printer/station/fax described below.)

- 1 Printer/scanner/fax station, allow 24 NSF. (NOTES: The station should have color printing/scanning/faxing capability.)

Fiction and Non-Fiction Collection

- 3 OPAC stations; allow 48 NSF (16 NSF each). (NOTES: [1.] Locate on the face panels of three different ranges of bookstack shelving. [2.] Position one station at a height for use by the physically challenged.)
- 20 Sections (600 linear feet) of 72"H double-face bookstack shelving w/six adjustable 10-inch shelves over four 12-inch tilt-base shelves (30 linear feet per double-face section) for 6,000 large print vols.; allow 400 NSF (20 NSF per double-face section).
- 94 Sections (2,820 linear feet) of 72"H double-face bookstack shelving w/six adjustable 10-inch shelves over four 12-inch tilt-base shelves (30 linear feet per double-face section) for 28,200 fiction vols.; allow 1,880 NSF (20 NSF per double-face section).

- 136 Sections (4,080 linear feet) of 72"H double-face bookstack shelving w/six adjustable 10-inch shelves over four 12-inch tilt-base shelves (30 linear feet per double-face section) for 38,000 *non-fiction vols.*; allow 2,720 NSF (20 NSF per double-face section).
- 8 Sections (240 linear feet) of 72"H double-face bookstack shelving w/six adjustable 10-inch shelves over four 12-inch tilt-base shelves (30 linear feet per double-face section) for 4,000 *paperback vols.*; allow 160 NSF (20 NSF per double-face section).
- 2 Benches, each seating two persons; allow 20 NSF (10 NSF each). (*NOTE: Position these benches near the 20 sections of bookstacks housing the Large Print vols.*)
- 6 Lounge chairs w/one side table w/lamp for each pair of chairs; allow 210 NSF (35 NSF each). (*NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.*)
- 8 One-place reader tables w/one reader chair each; allow 280 NSF (35 NSF each).
- 4 Four-place reader tables (4' X 6") w/four reader chairs each; allow 400 NSF (100 NSF each).

Media Collection

- 1 OPAC station; allow 16 NSF. (*NOTE: Locate on one of the face panels of the nine media housing units.*)
- 4 Bins for 100 *art prints*; allow 100 NSF (25 NSF each). (*NOTE: Confer w/Staff regarding the type of bin preferred.*)

- 9 Media housing units for 10,000 *media items (music CDs, DVDs, Videocassettes, Books-on-Cassette, Books-on-CD, games, and computer software)*.; allow 1,080 NSF (120 NSF per unit).

Local History

Closed Stacks:

- 8 Sections (360 linear feet) of 84"H double-face bookstack shelving w/ten adjustable 10-inch shelves over two 12-inch base shelves (36 linear feet per double-face section) for 2,240 *items*; allow 160 NSF (20 NSF per double-face section).
- 2 Booktrucks; allow 16 NSF (8 NSF each). (*NOTE: The booktrucks and the eight sections of shelving described above must be in a locked, secure, environmentally sound room separate from but adjacent to the Research/Study Area.*)

Research/Study Area:

- 4 Sections (60 linear feet) of 72"H single-face wooden bookstack shelving w/four adjustable 12-inch shelves over one 12-inch base shelf (15 linear feet per single-face section) for 500 *items*; allow 40 NSF (10 NSF per single-face section).
- 1 PC workstation w/ergonomic task chair; allow 36 NSF. (*NOTES: [1.] This workstation will have Internet connectivity, word processing and Excel software, and be*

able to access the online catalog and all electronic databases in the Library's collection. [2.] This station should be networked to the printer/scanner/fax station described below.)

- 1 Printer/scanner/fax station, allow 24 NSF. (NOTE: The station should have color printing/scanning/faxing capability.)
- 2 Lounge chairs w/one side table w/lamp positioned between the two chairs; allow 70 NSF (35 NSF each). (NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.)
- 1 Conference table w/12 conference chairs; allow 360 NSF.
- 4 Stack chairs; allow 48 NSF (12 NSF each). (The stack chairs are to located along one side of the table, against a wall.)

Periodicals

- 1 OPAC station; allow 16 NSF. (NOTE: [1.] Locate on the face panels of one range of periodical shelving.)
- 14 Sections (336 linear feet) of 66"H steel, double-face steel bookstack shelving w/six 10-inch adjustable shelves over two 12-inch base shelves (24 linear feet per double-face section) for 252 current newspapers/periodicals; for allow 280 NSF (20 NSF per double-face section). (NOTES: [1.] Each section shall consist of six hinged and adjustable shelves above six flat and adjustable shelves. [2.] The current issue of a newspaper/periodical shall rest on the

hinged shelf, average of three periodicals per shelf, and the older issues shall reside on the flat shelf beneath the hinged shelf. Each hinged shelf shall have a ½" lip" to keep the items in place. [3] The base shelves will **not** be used to house periodicals/newspapers.)

- 6 Lounge chairs w/one side table w/lamp for each pair of chairs; allow 210 NSF (35 NSF each). (NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.)
- 3 Four-place reader tables (4' X 6') w/four reader chairs each; allow 300 NSF (100 NSF each).

Group Study Rooms

6-Place Room

- 2 Group study rooms w/six reader chairs and one 4' X 6' study table; allow 240 NSF (120 NSF each). (NOTES: [1.] These Group Study Rooms **must** be a glass-enclosed space w/a lockable door. [2.] Library staff at the Reference Service Counter **must** be able to see into the Rooms at all times.)

4-Place Room

- 2 Group study room w/four reader chairs and one 48"D study table; allow 200 NSF (100 NSF per room). (NOTES: [1.] These Group Study Rooms **must** be a glass-enclosed space w/a lockable door. [2.] Library staff at the Reference Service Counter **must** be able to see into the Rooms at all times.)

Tutoring/Research Study Rooms

- 3 Tutoring/research/study rooms w/two reader chairs and a counter 3'D and 30"H; allow 144 NSF (48 NSF each).
(NOTES: [1.] "Build" these rooms w/office systems furniture w/84"H panels. [2.] Provide doors w/vision panels. [3.] Library staff at the Reference Service Counter will assign customers to these rooms per Library policy.)

Spatial Relationships

Away from: Children's Services (Space 6).

Environmental and Engineering Needs

Communications: Provide two telephones at the Reference Service Counter w/wireless capability.

Data Cabling: Conduit and/or wiring tray should be in place to provide connections to the Library's data network at all seated and standing machine stations as well as at tables and carrels not immediately scheduled for housing computers. Provide data network connection to the photocopy machine for eventual use of networked photocopy machines.

Electrical: Provide power to all table, carrel, and machine stations whether or not they are currently identified as machine stations in order to allow for future installation of additional workstations. Provide power for all OPAC and computer stations and the laser printer/scanner/fax stations. Provide docking stations for customers w/laptops. Provide power for the photocopy machine.

Finishes: Areas subject to abuse or along the path of booktruck

movement *must* have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting at all four-place tables and for the table lamps for each of the side tables w/the lounge seating. The extensive use and viewing of the computers will require special attention to minimize glare on the monitors.

Security: Position the bookstacks so there are good sight lines from the Reference Service Counter into the bookstacks. The various computers, printers, and scanners are vulnerable to theft. Provide sufficient security measures to insure theft of these items does not occur. Provide smart-card equipment in addition to coin-operated devices for all equipment for which there will be charges.

Location, Consideration for a

The current Meeting Room might be a location to consider for both Local History and Periodicals. The current Local History space might be were the Closed Stacks component of Local History could be housed. The current Staff Room might be a viable location for one Group Study Room.

**Space 5
YOUNG ADULT SERVICES
1,922 NSF**

The function of this space is to provide:

- A computer and collection area
- A recreational gathering area.

Young Adult Services includes both teens and tweens.

A summary of the square footage allocation for the Young Adult Services area is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Computers, Public use</u>			
Computer station, 1-place	6	36	216
Computer station, 2-place	2	48	96
Printer/scanner station	1	24	<u>24</u>
Subtotal NSF			336
<u>Collections</u>			
OPAC (stand-up)	1	16	16
Fiction/Non-Fiction/Periodicals	20	20	400
Media housing	1	120	120
Lounge chair	4	30	120
4-place table	3	100	300
1-place table	3	35	<u>105</u>
Subtotal NSF			1,061

Recreational Gathering Space

Table, rectangular w/6 chairs	2	120	240
Lounge chair	2	35	70
Gaming equipment unit	1	30	30
Television stand	1	10	<u>10</u>
Subtotal NSF			<u>350</u>

Subtotal All NSF 1,747

Internal Walls & Circulation @ 10% 175

SUBTOTAL NASF 1,922

Occupancy

From 10 or 20 to 40 to 50 customers (49 seated), depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Computers, Public Use

- 6 PC workstations w/one ergonomic task chair per station; allow 216 NSF (36 NSF each). (NOTES: [1.] These workstations will have Internet connectivity, word processing and Excel software, and be able to access the online catalog and all electronic databases in the Library's collection. [2.] These stations should be networked to the printer/scanner/fax station described below. [3.] One of the workstations should have adjustable height capabilities for the physically challenged.)

- 2 PC workstations w/two ergonomic task chairs and two PCs per stations; allow 96 NSF (48 NSF each). (NOTES: [1.] *These workstations will have Internet connectivity, word processing and Excel software, and be able to access the online catalog and all electronic databases in the Library's collection.* [2.] *These stations should be networked to the printer/scanner/fax station described below.*)
- 1 Printer/scanner/fax station, allow 24 NSF. (NOTE: *The station should have color printing/scanning/faxing capability.*)

Collections

- 1 OPAC station; allow 16 NSF. (NOTE: *Locate on the face panel of one of the ranges of bookstack shelving.*)
- 20 Sections (720 linear feet) of 72"H double-face bookstack shelving w/six adjustable 10-inch shelves over four 12-inch tilt-base shelves (30 linear feet per double-face section) for 6,000 *fiction/non-fiction/graphic novel/paperback vols.*; allow 480 NSF (20 NSF per double-face section). (NOTES: [1.] *Each range, no more than **four sections per range**, should have lock-down casters.* [2.] *One side of one section should include hinged, adjustable, periodical shelving w/three hinged and **three flat shelves for nine** periodicals.* [3.] *The hinged shelves will have a ½" lip so that the current issues can rest on the shelf and be supported by the "lip."* *Backfile issues will be placed on the flat shelves below the hinged shelves and will not be seen unless the hinged shelf is raised.* [4.] *The base shelf is **not** used for periodical display.*)

- 1 Media housing units for 1,000 *media items (music CDs, DVDs, Videocassettes, Books-on-Cassette, Books-on-CD, games, and computer software).*; allow 120 NSF. (NOTE: *This unit should have lock-down casters.*)
- 4 Lounge chairs w/one tablet arm per chair; allow 120 NSF (30 NSF each). (NOTES: [1.] *These chairs should have casters on the rear "legs" along w/a handle on the upper outside back of the chair to facilitate easy movement from place to place.* [2.] *Provide stain resistant finishes/fabrics for the lounge chairs.*)
- 3 Four-place reader tables w/four two-position reader chairs each; allow 300 NSF (100 NSF each). (*These tables should have lock down casters.*)
- 3 One-place reader tables w/one two-position reader chair each; allow 105 NSF (35 NSF each).

Recreational Gathering Space

- 2 Tables, rectangular, w/six chairs each; allow 240 NSF (120 NSF each). (NOTE: *One of the tables should be for teens, the other for tweens, w/the tweens table perhaps a bit lower, e.g. 26'/27'H and w/different height/looking chairs than the teens table.*)
- 2 Lounge chairs w/one tablet arm per chair; allow 70 NSF (35 NSF each). (NOTES: [1.] *These chairs should have casters on the rear "legs" along w/a handle on the upper outside back of the chair to facilitate easy movement from place to place.* [2.] *Provide stain resistant finishes/fabrics for the lounge chairs.*)

- 1 Gaming equipment unit; allow 30 NSF. (NOTE: Confer w/Staff regarding the specifics for the unit.)
- 1 Television stand w/lock-down casters; allow 10 NSF.

Spatial Relationships

Away from: Children's Services (Space 6).

Environmental and Engineering Needs

Data Cabling: Conduit and/or wiring tray should be in place to provide connections to the Library's data network at all seated and standing machine stations as well as at tables and carrels not immediately scheduled for housing computers. Provide data network connection to the photocopy machine for eventual use of networked photocopy machines.

Electrical: Provide power to all table, carrel, and machine stations whether or not they are currently identified as machine stations in order to allow for future installation of additional workstations. Provide power for all OPAC and computer stations and the laser printer/scanner/fax station. Provide docking stations for customers w/laptops. Consider parabolic cones for some of the seating in the Recreational Gathering Space.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting at all four-place tables. The extensive use and viewing of the computers will require special

attention to minimize glare on the monitors.

Security: Position the bookstacks so there are good sight lines from the Young Adult Services Workroom (Space 8) into the public Young Adult area. The various computers, printers, and scanners are vulnerable to theft. Provide sufficient security measures to insure theft of these items does not occur. Provide smart-card equipment in addition to coin-operated devices for all equipment for which there will be charges.

Location, Consideration for a

The current "Loft" along w/the current Secretary/Account Clerk space might be a location to consider for Young Adult Services. Additional space will be needed to accommodate all of the public space.

**Space 6
CHILDREN'S SERVICES
7,308 NASF**

The function of this space is to provide an area for Library customers primarily interested in children's materials, programs, and services.

A summary of the square footage allocation for the Children's Services area is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Reference</u>			
Service desk	1	60	60
Single-face shelving (Ready Reference)	2	10	20
Photocopy machine	1	48	48
OPAC station (sit down)	1	30	30
Literature rack	1	15	<u>15</u>
Subtotal NSF			173

Computers, Public Use

Computer station, 1-place	5	30	150
Computer station, 2-place	3	48	144
Printer/scanner/fax station	1	24	<u>24</u>
Subtotal NSF			318

Easy/Picture/Board Books

Double-face shelving	50	20	1,000
4-place table (25"H)	3	80	240
4-place table (27 1/2"H)	2	100	200
Floor cushions	10	5	50
Read aloud chair	2	40	80
Toy bin	2	24	48
Play area	1	200	<u>200</u>
Subtotal NSF			1,818

Fiction/Non-Fiction/Media/Periodicals

OPAC station (sit down)	2	30	60
Double-face shelving, Periodicals	1	20	20
Double-face shelving, Fiction & Non-Fiction	116	20	2,320
Media shelving	2	120	<u>240</u>
Subtotal NSF			2,640

Parenting Collection

Double-face shelving	3	20	60
Lounge chair	2	35	<u>70</u>
Subtotal NSF			130

Homework & Study

4-place table	4	100	400
Lounge chair	2	30	<u>60</u>
Subtotal NSF			460

Program Room

Table, folding (25"H)	4	80	320
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SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

Table, folding (27 ½"H)	2	80	160
Floor area	1	300	300
Stroller parking	1	100	100
Storage closet (& puppet stage)	1	225	<u>225</u>
Subtotal NSF			<u>1,105</u>
Subtotal All NSF			6,644
Internal Walls & Circulation @ 10%			<u>664</u>
SUBTOTAL NASF			7,308

Occupancy

From 20 to 30 to 120 to 140 customers (136 seated [70 at various tables, computer workstations, and Read Aloud seating] and 64 in the Program Room), depending upon the level of activity.

Preliminary Listing of Furniture and Equipment

Reference

- 1 Service Desk w/a PC networked to a desktop laser printer, two ergonomic task chairs, two side chairs, and two telephones w/wireless connectivity; allow 60 NSF. (NOTE: *The Service Desk must have visual control of entire area.*)
- 2 Sections (18 linear feet) of 48"H steel, free-standing single-face bookstack shelving w/two 12-inch adjustable shelves over two 12-inch flat base shelves (9 linear feet per single-face section) w/canopy top for 135 ready reference vols.; allow 30 NSF (10 NSF per single-face section).

- 1 Photocopy machine, allow 48 NSF.
- 1 OPAC station w/one children's size reader chair; allow 30 NSF.
- 1 Literature rack; allow 15 NSF. (NOTE: *Consider wall-mounted racks to reduce furniture items sitting on the floor that have to be moved in order for effective carpet sweeping to take place.*)

Computers, Public Use

- 5 Workstations w/one PC and one reader chair each; allow 150 NSF (30 NSF each). (NOTES: [1.] *Two or three of the workstations should be of a type and size that is comfortable for very young children.* [2.] *One of the workstations should have adjustable height capabilities for the physically challenged.*)
- 3 Workstations w/one PC each and w/two chairs each; allow 144 NSF (48 NSF each).
- 1 Printer/scanner/fax station; allow 24 NSF. (NOTE: *The station should have color printing/scanning/faxing capabilities.*)

Easy/Picture/Board Books

- 50 Sections (900 linear feet) of 48"H double-face steel bookstack shelving w/four 12-inch adjustable shelving bins over two flat base shelves (18 linear feet per double-face section) for 13,500 easy/picture/board books.; allow 1,000 NSF (20 NSF per double-face section).

SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

- 3 Four-place reader tables (36"D and 25"H) w/four reader chairs each; allow 240 NSF (80 NSF each).
- 2 Four-place reader tables (42"D and 27 1/2"H) w/four reader chairs each; allow 200 NSF (100 NSF each).
- 10 Floor cushions; allow 50 NSF (5 NSF each). (NOTE: Include one round table approximately 12-inches in height and 42 to 48-inches in diameter.)
- 2 Read-aloud chairs; allow 80 NSF (40 NSF each). (NOTE: Each chair would be large enough to comfortably allow an adult, or older sibling, caregiver to sit w/one or two children and read aloud to/with them.)
- 2 Toy bins on lockdown casters; allow 48 NSF (24 NSF each). (NOTE: The design consultant **must** confer w/Library Staff regarding the design and shape of these two bins.)
- 1 Play area; allow 200 NSF. (NOTE: The design consultant **must** confer w/Library Staff regarding the design and shape of this item.)

Fiction/Non-Fiction/Media/Periodicals

- 2 OPAC stations w/one reader chair each; allow 60 NSF (30 NSF each).
- 1 Section (24 linear feet) of 60"H double-face steel bookstack shelving w/six 10-inch hinged periodicals shelves and six 10-inch flat shelves over two 12-inch base shelves for 48 periodicals; allow 20 NSF. (NOTES: [1.] The hinged shelves

*will have a 1/2" lip so that the current issues can rest on the shelf and be supported by the "lip." Backfile issues will be placed on the flat shelves below the hinged shelves and will not be seen unless the hinged shelf is raised. [2.] The base shelf is **not** used for periodical display.)*

- 116 Sections (3,480 linear feet) of 60"H double-face steel bookstack shelving w/eight 8-inch adjustable shelves over two 10-inch tilt base shelves (30 linear feet per double-face section) for 35,000 fiction/non-fiction books; for allow 2,320 NSF (20 NSF per double-face section).
- 2 Units of media housing for 4,000 media items (DVDs, CDs, Books-on-CD, Audiocassettes, and Videocassettes); allow 240 NSF (120 NSF per unit).

Parenting Collection

- 3 Sections (90 linear feet) of 60"H double-face steel bookstack shelving w/eight 8-inch adjustable shelves over two 10-inch tilt base shelves (30 linear feet per double-face section) for 720 parenting vols.; for allow 60 NSF (20 NSF per double-face section).
- 2 Lounge chairs w/one side table w/lamp between the two chairs; allow 70 NSF (35 NSF each). (NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.)

Homework & Study

- 4 Four-place reader tables (3'W X 5'"L X 27 1/2"H) w/four reader chairs each; allow 400 NSF (100 NSF each).

- 2 Lounge chairs, each w/tablet arm; allow 60 NSF (30 NSF each). (NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.)

caregivers who may be in the Program Room w/their child(ren).

Program Room

- 4 Tables, 4'W X 4"L X 25"H w/four chairs each; allow 320 NSF (80 NSF each). (NOTE: These tables will fold into the wall, and put in place as needed, much like "Murphy" beds.)
- 2 Tables, 4"w X 4"L X 27 ½"H, w/four chairs each; allow 160 NSF (80 NSF each); allow 160 NSF (80 NSF each). (NOTE: These tables will also fold into the wall, and put in place as needed, much like "Murphy" beds.)
- 1 Floor area; allow 300 NSF. (NOTE: Provide 40 floor cushions.)
- 1 Storage closet; allow 225 NSF. (NOTES: [1.] Two of the four walls should be outfitted w/industrial shelving, 15"D. [2.] Provide a rectangular opening in the wall that opens into the larger space. This opening will serve as the Puppet State for hand puppet shows. [3.] Provide a card access into this closet.)
- 1 Stroller parking area; allow 100 NSF. (NOTE: This area should be **immediately outside** the Program Room.)
- 8 Bins, capable of seating two persons each; NSF included in circulation allowance above. (NOTES: Locate these bins around the perimeter of the room. [2.] Provide cushions on each bin. [3.] The bins will also serve as additional storage for the Program Room as well as providing seating for adult

Spatial Relationships

Away from: Adult Services (Space 4) and Young Adult Services (Space 5).

Close to: Multi-Purpose Meeting Room (Space 18).

Environmental and Engineering Needs

Acoustics: Locate the computer workstations in such a manner that the noise that is created by the machines and the customers using them does not unduly interfere w/the users who are not using computers.

Communications: Provide for telephones w/wireless connectivity at the Children's Reference Service Desk and a wall-mounted telephone in the Program Room w/silent ring capability.

Data Cabling: Conduit and/or wiring tray should be in place to provide connections to the Library's data network at all seated and standing machine stations as well as at tables and carrels not immediately scheduled for housing computers.

Electrical: Provide power to all table, carrel, and machine stations whether or not they are currently identified as machine stations in order to allow for future installation of additional workstations. Provide power for computer workstations, printer/scanner/fax stations, and at the Service Desk. Provide for the photocopy machine.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors. The folding tables in the Program Room should be of a type that also folds into the wall(s) so that when not in use they are not taking up floor space, e.g. tables not unlike "Murphy Beds."

Lighting: The extensive use and viewing of the computers will require special attention to minimize glare on the monitors.

Security: Position the bookstacks so there are good sight lines from the Children's Reference Service Desk into the bookstacks. The various computers, printers, and scanners are vulnerable to theft; provide sufficient security measures to insure theft of these items does not occur. Provide smart-card equipment in addition to coin-operated devices for all equipment for which there will be charges. The consultant will confer w/Staff on which equipment requires these devices.

Other Comments

This is a space for children, persons who are short. Therefore, the space should be sized for the children and not for adults even though there will be lots of adults in the space.

The color palette and décor should be carefully considered. Avoid an overuse of colors that might over-stimulate the children.

Consider an outdoor reading garden and/or program area that would be accessible only from within the Children's Services area and that would not allow a child to wander away from the outdoor area.

STAFF SPACES

Space 7

**CIRCULATION SERVICES OFFICE, WORKROOM, AND DRIVE-UP/IN RETURN & CHECKOUT
1,297 NSF**

The function of this space is to provide a private office for the Head of Circulation Services and workroom space for the Circulation Services staff. In addition, it is to provide an enclosed, Drive-Up Library Materials Return and Library Materials Check-out service.

A summary of the square footage allocation for Circulation Services Office and Workroom is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Office</u>			
Workstation	1	90	90
Shelving unit	1	10	<u>10</u>
Subtotal NSF			100
<u>Workroom</u>			
Workstation (ILL)	1	80	80
Workstation (ILL ass't.)	1	64	64
Workstation (shared)	2	36	72
Double-face shelving	4	20	80
Work counter	1	63	63
Booktruck parking	6	8	48
Supply cabinet	1	36	36

Printer/scanner/fax station	1	24	24
Table w/three chairs	1	60	60
Automated materials handling bin	6	50	<u>300</u>
Subtotal NSF			827

Drive-in/Drive-up Return & Checkout

Library materials return & drive-up service	1	154	<u>154</u>
Subtotal NSF			154

Subtotal All NSF 1,081

Internal Walls & Circulation @ 20% 216

SUBTOTAL NASF 1,297

Occupancy

From six to 10 staff and volunteers at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Office

- 1 Workstation w/managerial task chair, PC networked to printer/scanner station (see below), telephone, two side chairs, one two-drawer lateral-pull file cabinet below the work surface, and one pencil drawer; allow 90 NSF

- 1 Wall-mounted steel section of 72"H single-face bookstack shelving w/four adjustable 10-inch shelves over one 12-inch tilt-base (15 linear feet) for 120 items; allow 10 NSF

Workroom

- 1 Open-office workstation w/an ergonomic managerial chair and one side chair, a PC networked to printer/scanner station (see below), telephone, nine linear feet of lockable shelving above the work surface, a two-drawer lateral-pull file cabinet below the work surface, one pencil drawer, and space for two booktrucks; allow 80 NSF.
- 1 Open-office workstation w/an ergonomic task chair, a PC networked to printer/scanner station (see below), telephone, six linear feet of lockable shelving above the work surface, a two-drawer front-pull file cabinet below the work surface, one pencil drawer, and space for one booktruck; allow 80 NSF.
- 2 Open-office workstations w/ergonomic task chair for each, three linear feet of shelving above the work surface, and a pencil drawer, allow 72 NSF (36 NSF each). (NOTES: [1.] Provide for PCs networked to printer station. [2.] Provide a telephone in one of the workstations.)
- 4 Sections (144 linear feet) of 84"H double-face, steel bookstack shelving w/ten 12-inch adjustable shelves over two 12-inch base shelves (36 linear feet per double-face section) for 1,400 items; for allow 80 NSF (20 NSF per double-face section). (NOTE: one of the sections will house 35 Book Discussion and Bi-Folkal kits, and Preschool kit bags. Confer w/Staff on how this section is to be outfitted.)

- 1 Work counter (4'D X 9"L X 7"H [countertop should be 42"H]) w/two ergonomic task stools and sink; allow 63 NSF. (NOTE: Millwork.)
- 6 Booktrucks; allow 48 NSF (8 NSF each).
- 1 Supply cabinet, lockable; allow 36 NSF.
- 1 Printer/scanner/fax station placed on a small table/ allow 24 NSF. (NOTE: The station **must** be a laser printer w/color printing/scanning/faxing capability.)

Drive-in/Drive-up Return & Checkout

- 1 This space to consist of:
 - Two separate "rooms," one of which (Materials Return) **must** be a two-hour fire rated room. For the Materials Return Room provide the following;
 - 4 Return slots that allow a person in a vehicle to place an item (book or media) into one of the slots from which it will slide down a chute w/rollers into a depressible "book bin." Arrange the slots in two rows, one of which would be at a height for normal-sized vehicles and the second row for larger vehicles, e.g. SUVs or pick-up trucks. Each pair of slots would be for books and media, e.g. one slot for books only, the second for media only
 - 6 Depressible books bins on casters (four placed beneath the slots and two in reserve.
 - 1 Two-hour fire rated door that is 48"W and over which a fully-loaded bin can be easily rolled and taken to the four sections of bookstack shelving.

- For the Library Materials Pick-Up Service provide the following:
 - 1 Counter w/one ergonomic task stool (*NOTE: Millwork.*)
 - 1 PC that allows for the check-out of materials as well as access to the Library's online catalog
 - 1 Telephone
 - 1 Electronic cash drawer
 - a. Section (12 linear feet) of 66"H single-face, wall-mounted steel bookstack shelving w/four adjustable 10-inch shelves for 100 items (*NOTES: [1.] This shelving is to house the items that Library customers have called ahead for and are driving by to checkout as well as a very small selection of current books that a customer may inquire about. [2.] It **must** be located near the window and the counter. [3.] For ease of use by the staff member there will be no base shelf, thus allowing the bottom of the four shelves to be 10 to 12 inches off the floor.*)
 - 1 Device located below or to one side of the window that allows the Library Customer to "buzz" for service and a Library Staff member working in the Workroom can quickly go to the window and assist the customer.

The key to success of this service is to [a.] make it a part of the larger Workroom (this is for staff efficiencies) and [b.] position it so the driver can use both the Return and Drive-Up without have to get out of the car or slide across the front seat.

Spatial Relationships

Adjacent to: Circulation Services Desk (Space 3).

Close to: Loading, Receiving, and Staff Entrance (Space 16).

Environmental and Engineering Needs

Communications: Provide telephones as indicated. Provide a two-way intercom or call box from the exterior of the Loading/Receiving/Staff Entrance (Space 17) to the interior of this space.

Data Cabling: Conduit to provide data network cabling to the private office and all workstations and potential workstations **must** be provided as well as a wire management system. Provide data network connection to the photocopy machine for eventual use of networked photocopy machines.

Electrical: Provide wiring and power for the private office and all workstations, and the printer/scanner/fax station.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for the private office and the workstations. Provide motion detection in the private offices.

Security: The Library Materials Room must have a separate fire suppression system and be designed and constructed as a two-hour fire-rated room. Provide card access for the private office and all interior doors.

Utilities: Provide for sink in counter.

Other Comments

The primary Spatial Relationship is being adjacent to the Circulation Services Desk (Space 3).

**Space 8
REFERENCE & ELECTRONIC SERVICES WORKROOM
674 NSF**

The function of this space is to provide a workroom w/workstations for the Reference Librarian and the Electronic Services Librarian as well as the Network Serve Room and open floor space for the storage of computer boxes and multiples of computer workstations being deployed or repaired.

A summary of the square footage allocation for the Reference & Electronic Services Workroom is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Workroom</u>			
Workstation (Reference Librarian)	1	48	48
Workstation Electronic Services Librarian	1	48	48
Double-face shelving	2	24	48
Single-face shelving	1	12	12
File cabinet	2	20	40
Worktable (counter height)	1	64	64
Supply cabinet	1	36	36
Open floor space	1	50	50
Booktruck parking	2	8	<u>16</u>
Subtotal NSF			362
<u>Network Server Room</u>			
Network server room	1	200	<u>200</u>

Subtotal NSF	<u>200</u>
Subtotal All NSF	562
Internal Walls & Circulation @ 20%	<u>112</u>
SUBTOTAL NASF	674

Occupancy

From two to four staff and volunteers at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Workroom

- 1 Workstation (Reference Librarian) w/managerial task chair, PC networked to desktop laser printer, telephone, one side chair, and one pencil drawer; allow 48 NSF.
- 1 Workstation (Electronic Services Librarian) w/managerial task chair, PC networked to desktop laser printer, telephone, one side chair, and one pencil drawer; allow 48 NSF.
- 2 Sections (72 linear feet) of 84"H double-face, steel bookstack shelving w/ten 15-inch adjustable shelves over two 18-inch base shelves (36 linear feet per double-face section) for 300 items and other; for allow 48 NSF (24 NSF per double-face section).

- 1 Section (18 linear feet) of 84"H wall-mounted, single-face, steel bookstack shelving w/five 15-inch adjustable shelves over one 18-inch base shelf (18 linear feet per double-face section) for *100 items and other*; for allow 12 NSF.
- 2 Four-drawer lateral-pull file cabinets; allow 40 NSF (20 NSF each).
- 1 Worktable (3"W X 4"L X 4"H) w/two ergonomic task stools; allow 64 NSF.
- 1 Supply cabinet, lockable; allow 36 NSF.
- 1 Open floor space; allow 50 NSF
- 2 Booktrucks; allow 16 NSF (8 NSF each).

Network Server Room

- 1 Room to house the network server, routers, etc; allow 200 NSF. (NOTES: [1.] A raised floor, perhaps no more than three inches, should be considered. [2.] The design consultant **must** confer w/Staff regarding all matters related to this Room and the Electronic Services workstation, etc.)

Spatial Relationships

Close to: Adult Services Public Space (Space 4).

Environmental and Engineering Needs

Communications: Provide telephones at both workstations and a wall-mounted telephone in the Network Server Room.

Data Cabling: Conduit to provide data network cabling to the private office and all workstations and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide wiring and power for all workstations and desktop printers.

Finishes: Consider a raised floor for the Network Server Room. Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for the workstations. Provide motion detection activated lighting in the Network Server Room.

Security: Provide card access for the Network Service Room and all interior doors.

**Space 9
CHILDREN'S SERVICES OFFICE AND WORKROOM
836 NASF**

The function of this space is to provide a private office for the Head of Children's Services and workroom space for the Children's Services staff.

A summary of the square footage allocation for Children's Services Office and Workroom is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Office</u>			
Workstation	1	90	90
Shelving unit	1	10	<u>10</u>
Subtotal NSF			100
<u>Workroom</u>			
Workstation	2	48	96
Workstation (support staff)	1	36	36
Double-face shelving (15"D)	4	24	96
Single-face shelving	10	10	100
Work counter	1	63	63
Booktruck parking	4	8	32
Supply closet	1	150	150
Printer/scanner/fax station	1	24	<u>24</u>
Subtotal NSF			<u>597</u>
Subtotal All NSF			697

Internal Walls & Circulation @ 20% 139

SUBTOTAL NASF 836

Occupancy

From three or four to six or seven staff and volunteers at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Office

- 1 Workstation w/managerial task chair, PC networked to printer/scanner station (see below), telephone, two side chairs, one two-drawer lateral-pull file cabinet below the work surface, and one pencil drawer; allow 90 NSF
- 1 Wall-mounted steel section of 72"H single-face bookstack shelving w/four adjustable 10-inch shelves over one 12-inch tilt-base (15 linear feet) for 120 items; allow 10 NSF

Workroom

- 2 Open-office workstations, each w/an ergonomic task chair, a PC networked to printer/scanner/fax station (see below), telephone, six linear feet of lockable shelving above the work surface, a two-drawer front-pull file cabinet below the work surface, one pencil drawer, and space for one booktruck; allow 96 NSF (48 NSF each).

- 1 Open-office workstation w/ergonomic task chair, a PC networked to printer/scanner/fax station (see below), telephone, three linear feet of shelving above the work surface, and a pencil drawer, allow 36 NSF.
- 4 Sections (120 linear feet) of 84"H double-face, steel bookstack shelving w/eight 15-inch adjustable shelves over two 15-inch base shelves (30 linear feet per double-face section) for *various items*; for allow 96 NSF (24 NSF per double-face section). (*NOTE: Some of this shelving will be used to house 30 Discovery Kits which measure 26"H; w/four kits per shelf.*)
- 10 Sections (180 linear feet) of 84"H single-face, wall-mounted, steel bookstack shelving w/five 10-inch adjustable shelves over one 12-inch base shelf (18 linear feet per single-face section) for 1,800 *items*; for allow 100 NSF (10 NSF per single-face section).
- 1 Work counter (4'D X 9"L X 7"H [countertop should be 42"H]) w/two ergonomic task stools; allow 63 NSF. (*NOTE: Millwork.*)
- 4 Booktrucks; allow 32 NSF (8 NSF each).
- 1 Supply and storage closet w/adjustable shelves, at least 18"D, on three sides. Provide a secure, lockable door, opened only via card access; allow 150 NSF. (*NOTE: Millwork.*)
- 1 Printer/scanner/fax station placed on a small table; allow 24 NSF. (*NOTE: The station must be a laser printer w/color printing/scanning/faxing capability.*)

Spatial Relationships

Adjacent to: Children's Services Public Space (Space 6).

Environmental and Engineering Needs

Communications: Provide a telephone in the private office and in the workstations as indicated.

Data Cabling: Conduit to provide data network cabling to the private office and all workstations and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide wiring and power for all workstations, and the printer/scanner/fax station.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for the private office and all workstations. Provide motion detection in the private office,

Security: Provide card access for the private office and all interior doors.

**Space 10
YOUNG ADULT SERVICES WORKROOM
216 NASF**

The function of this space is to provide a workstation and workroom for Young Adult Services.

A summary of the square footage allocation for the Young Adult Services Workroom is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Workstation	1	64	64
Double-face shelving	2	20	40
File cabinet	1	20	20
Booktruck parking	1	8	8
Storage closet	1	48	48
Subtotal NSF			180
Internal Walls & Circulation @ 20%			<u>36</u>
SUBTOTAL NASF			216

Occupancy

From one or two staff and volunteers at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

- 1 Workstation w/managerial task chair, PC networked to desktop laser printer, telephone, one side chair, and one pencil drawer; allow 64 NSF.

- 2 Sections (72 linear feet) of 84"H double-face, steel bookstack shelving w/ten 10-inch adjustable shelves over two 12-inch base shelves (36 linear feet per double-face section) for 700 items; for allow 40 NSF (20 NSF per double-face section).
- 1 Four-drawer lateral-pull file cabinet; allow 20 NSF.
- 1 Booktruck; allow 8 NSF.
- 1 Storage closet; allow 48 NSF. (NOTES: [1.] Provide 12'D adjustable shelves on three sides of the closet. [2.] Millwork.)

Spatial Relationships

Adjacent to: Young Adult Services (Space 5).

Environmental and Engineering Needs

Communications: Provide a telephone at the workstation.

Data Cabling: Conduit to provide data network cabling to the workstation and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide wiring and power for all workstations and the desktop printer.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for the workstation.

Security: Provide card access for all interior doors.

Other Comments

1. The Young Adult Services workstation must be adjacent to Young Adult Services (Space 5) so that the YA Librarian has excellent visual control of the public spaces when he/she is working at the workstation.
2. Confer w/Staff regarding how the Storage closet is to be outfitted and its location within the larger space.

**Space 11
TECHNICAL SERVICES
910 NASF**

The function of this space is to provide office and workroom space for the Technical Services staff.

A summary of the square footage allocation for Technical Services is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Workroom</u>			
Workstation	1	64	64
Workstation	3	36	108
Photocopy machine	1	48	48
Worktable	1	64	64
Work counter	1	63	63
Double-face shelving	7	20	140
Booktruck parking	6	8	48
Printer/scanner/fax station	1	24	<u>24</u>
Subtotal NSF			559
<u>Supply & Storage</u>			
Supply and storage room	1	200	<u>200</u>
Subtotal NSF			<u>200</u>
Subtotal All NSF			759
Internal Walls & Circulation @ 20%			<u>151</u>

SUBTOTAL NASF 910

Occupancy

From three or four to five or six staff and volunteers at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Workroom

- 1 Open-office workstation w/an ergonomic managerial chair and one side chair, a PC networked to printer/scanner station (see below), telephone, nine linear feet of lockable shelving above the work surface, a two-drawer lateral-pull file cabinet below the work surface, one pencil drawer, and space for two booktrucks; allow 90 NSF.
- 3 Open-office workstations, each w/ergonomic task chair, a PC networked to printer/scanner/fax station (see below), three linear feet of shelving above the work surface, and a pencil drawer, allow 108 NSF (36 NSF each). (NOTE: Provide a telephone in the workstation for Outreach Services.)
- 1 Photocopy machine; allow 48 NSF.
- 1 Worktable (3'W X 4'L X 3'H w/two ergonomic task chairs; allow 64 NSF.

- 1 Work counter (4'D X 9"L X 7"H [countertop should be 42"H]) w/two ergonomic task stools; allow 63 NSF. (NOTE: *Millwork.*)
- 7 Sections (294 linear feet) of 84"H double-face, steel bookstack shelving w/twelve 10-inch adjustable shelves over two 12-inch base shelves (42 linear feet per single-face section) for 2,650 *items*; allow 140 NSF (20 NSF per double-face section).
- 6 Booktrucks; allow 48 NSF (8 NSF each).
- 1 Printer/scanner/fax station placed on a small table; allow 24 NSF. (NOTE: *The station must be a laser printer w/color printing/scanning/faxing capability.*)

Supply & Storage

- 1 Supply and storage closet w/adjustable shelves, at least 15"D, on three sides. Provide a secure, lockable door, opened only via card access; Allow 200 NSF. (NOTE: *Millwork.*)

Spatial Relationships

Adjacent to: Loading, Receiving, & Staff Entrance (Space 16).

Environmental and Engineering Needs

Communications: Provide telephones in the workstations as indicated.

Data Cabling: Conduit to provide data network cabling to the private office and all workstations and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide wiring and power for all workstations, the printer/scanner/fax station, and the photocopy machine.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for all workstations. Provide motion detection activated lighting in the Supply & Storage closets,

Security: Provide card access for all interior doors.

Other Comments

There can be a close relationship between Circulation Services and Technical Services w/ the latter assisting the former in emergencies. Consider a "path" between the two workrooms that could facilitate movement back and forth.

**Space 12
ADMINISTRATIVE SERVICES
1,320 NASF**

The function of this space is to provide office, workroom, and conference room space for Administrative Services.

A summary of the square footage allocation for Administrative Services is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Reception</u>			
Lounge chair	2	35	<u>70</u>
Subtotal NSF			<u>70</u>
<u>Account Clerk' Office</u>			
Desk	1	48	48
File cabinet	2	20	40
Supply cabinet	1	36	36
Single-face shelving	3	10	<u>30</u>
Subtotal NSF			154
<u>Director's Office</u>			
Desk	1	60	60
Credenza	1	20	20
Printer/scanner/fax station	1	24	24
File cabinet	1	20	20
Bookcase	2	10	<u>20</u>

Subtotal NSF 144

Assistant Director's Office

Desk	1	50	50
Credenza	1	20	20
File cabinet	1	20	20
Bookcase	2	10	<u>20</u>
Subtotal NSF			110

Administrative Workroom

Conference table	1	200	200
Work counter (mail sort)	1	42	42
Worktable	1	64	64
Photocopy machine	1	48	48
Printer/scanner/fax station	1	24	24
File cabinet	3	20	60
Supply cabinet	1	36	36
Industrial shelving	4	10	40
Booktruck parking	1	8	8
Document closet	1	100	<u>100</u>
Subtotal NSF			<u>622</u>

Subtotal All NSF 1,100

Internal Walls & Circulation @ 20% 220

SUBTOTAL NASF 1,320

SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

Occupancy

From one to two staff and volunteers at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Reception

- 2 Two lounge chairs w/side table w/lamp between the two chairs; allow 70 NSF (35 NSF each). (NOTES: [1.] This will be an enclosed space w/a glass partition allowing the Account Clerk to have visual access of the Reception area. [2.] The Reception area will not be staffed. [3.] Provide stain resistant finishes/fabrics for the lounge chairs.)

Account Clerk's Office

- 1 Managerial desk w/ergonomic managerial chair, PC w/a desktop laser printer, and one side chair; allow 48 NSF.
- 2 Four-drawer, lateral-pull file cabinets; allow 40 NSF (20 NSF each).
- 1 Supply cabinet, lockable; allow 36 NSF.
- 3 Sections (45 linear feet) of 72"H wall-mounted, single-face, steel bookstack shelving w/four 10-inch adjustable shelves over one 12-inch base shelf (15 linear feet per single-face section) for various *items*; allow 30 NSF (10 NSF per single-face section).

Director's Office

- 1 Executive desk w/ergonomic executive chair, PC with laser printer, and two guest chairs; allow 60 NSF.
- 1 Credenza; allow; 20 NSF.
- 1 Printer/scanner/fax station placed on a small table; allow 24 NSF. (NOTE: The station **must** be a laser printer w/color printing/scanning/faxing capability.)
- 1 Four-drawer lateral-pull file cabinet; allow 20 NSF.
- 2 Bookcases, 66"H, single-face wood, w/four adjustable 12-inch shelves over one 12-inch fixed-base shelf (15 linear feet per single-face section) for 200 *books*; allow 20 NSF (10 NSF each).

Assistant Director's Office

- 1 Executive desk w/ergonomic executive chair, PC w/ a desktop laser printer, and two guest chairs; allow 50 NSF.
- 1 Credenza; allow; 20 NSF.
- 1 Four-drawer lateral-pull file cabinet; allow 20 NSF.
- 2 Bookcases, 66"H, single-face wood, w/four adjustable 12-inch shelves over one 12-inch fixed-base shelf (15 linear feet per single-face section) for 200 *books*; allow 20 NSF (10 NSF each).

Administrative Workroom

- 1 Conference table w/eight small profile conference chairs; allow 200 NSF.
- 1 Work counter (4'D X 6"L X 7"H [countertop should be 42"H]) w/one ergonomic task stool; allow 42 NSF. (NOTES: [1.] Immediately adjacent to this counter locate a set of "pigeon-holes boxes, open on either end. These will serve as mailboxes for Library staff to pick-up/deposit incoming/outgoing mail (interoffice and USPS. Confer with staff as to the number of "mailboxes" there needs to be. [2.] Millwork for the "pigeon-holes and the work counter.)
- 1 Worktable (4'W X 5"L X 3'H w/two ergonomic task chairs; allow 64 NSF.
- 1 Photocopy machine; allow 48 NSF.
- 1 Printer/scanner/fax station placed on a small table; allow 24 NSF. (NOTE: The station **must** be a laser printer w/color printing/scanning/faxing capability.)
- 10 Sections (420 linear feet) of 84"H double-face, steel bookstack shelving w/twelve 10-inch adjustable shelves over two 12-inch base shelves (42 linear feet per double-face section) for 4,200 items; for allow 200 NSF (20 NSF per double-face section).
- 3 Four-drawer, lateral-pull file cabinets; allow 60 NSF (20 NSF each).
- 1 Supply cabinet, lockable; allow 36 NSF.

- 4 Sections of 96"H wall-mounted industrial shelving w/15"D shelves; allow 40 NSF (10 NSF each).
- 1 Booktruck; allow 8 NSF.
- 1 Documents closet w/adjustable shelves, at least 12"D, on three sides. Provide a secure, lockable door, opened only via card access; Allow 100 NSF. (NOTE: Millwork.)

Spatial Relationships

Close to: A Public Services unit (Spaces 1, 2, 3, 4, 5, or 6).

Environmental and Engineering Needs

Communications: Provide telephones as indicated. Provide wall-mounted telephones in the Administrative Workroom. Provide a wall-jack for a telephone as needed by the Lounge Chairs in the Reception area.

Data Cabling: Conduit to provide data network cabling to the private office and all workstations and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide wiring and power for all offices and workstations and the photocopy machine.

Finishes: Furnishings and décor suitable for an executive setting. Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for the private offices and workstations. Provide motion detection activated lighting in the private offices, the Administrative Workroom, and the Documents Closet.

Security: Provide card access for all private offices and the Administrative Workroom.

**Space 13
BUILDING SERVICES
766 NASF**

The function of this space is to provide a workroom and office for Building Services staff as well as a storage & supply room.

A summary of the square footage allocation for Building Services is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
<u>Workroom & Office</u>			
Workstation	1	36	36
File cabinet	1	20	20
Industrial shelving	4	10	40
Subtotal NSF			96
<u>Storage & Supply</u>			
Open floor area	1	300	300
Industrial shelving	20	15	300
Subtotal NSF			600
Subtotal All NSF			696
Internal Walls & Circulation @ 10%			70
SUBTOTAL NASF			766

Occupancy

From one to two staff at any one time, depending upon the activity level.

Preliminary Listing of Furniture and Equipment

Workroom & Office

- 1 Open-office workstation w/ergonomic task chair, telephone, a PC networked to laser printer, three linear feet of shelving above the work surface, and a pencil drawer, allow 36 NSF.
- 1 Four-drawer lateral-pull file cabinet; allow 20 NSF.
- 4 Sections of 96"H wall-mounted industrial shelving w/15"D shelves; allow 40 NSF (10 NSF each).

Storage & Supply

- 1 Open floor area; allow 300 NSF. (NOTE: For boxes, drums, etc.)
- 20 Sections of 96"H, double-side industrial shelving w/18"D shelves; allow 300 NSF (15 NSF each).

Spatial Relationships

Adjacent to: Loading, Receiving, & Staff Entrance (Space 16).

Environmental and Engineering Needs

Communications: Provide a telephone in the workstation as indicated.

Data Cabling: Conduit to provide data network cabling to the private office and all workstations and potential workstations **must** be provided as well as a wire management system.

Electrical: Provide wiring and power for the workstation.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide task lighting for the workstation.

Security: Provide card access for all interior doors.

**Space 14
STAFF ROOM
491 NSF**

The function of the space is to provide a space where Library staff can go for coffee breaks, lunchtime, etc.

A summary of the square footage allocation for the Staff Room is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Dining table, 2-place	2	20	40
Dining table, 4-place	2	80	160
Lounge chair	2	35	70
Sofa	1	40	40
Kitchenette	1	100	100
Pantry	1	36	<u>36</u>
Subtotal NSF			446
Internal Walls and Circulation @ 10 percent			<u>45</u>
TOTAL NASF			491

Occupancy

From two or three to 10 to 20 Library staff (16 seated), depending upon the level of activity.

Preliminary Listing of Furniture and Equipment

2 Two-place dining tables w/two chairs each; allow 40 NSF

(w0 NSF each).

- 2 Four-place dining tables w/four chairs; allow 80 NSF.
- 3 Lounge chairs w/one side table and one lamp between two of the three chairs; allow 105 NSF (35 NSF each). (NOTE: Provide stain resistant finishes/fabrics for the lounge chairs.)
- 1 Sofa; allow 40 NSF. (NOTE: Provide stain resistant finishes/fabrics for the sofa.)
- 1 Kitchenette w/counter w/a sink, a water purifier unit, cabinets above and below the countertop, small refrigerator, microwave, coffee pot, and trash and recycle bins; allow 100 NSF. (NOTE: Millwork.)
- 1 Pantry, lockable; allow 36 NSF. (NOTE: Millwork.)

Spatial Relationships

Close to: One or more Staff Workrooms (Spaces 7, 8, 9, 10, or 11).

Environmental and Engineering Needs

Communications: Provide a wall-mounted telephone.

Electrical: Provide ample electrical outlets. Provide for the appliances in the Kitchenette.

Finishes: Provide a hard surface in the Pantry and hard surface w/floor drain in the Kitchenette and carpet tile for the rest of the space.

Lighting: Provide lighting controlled by motion detection. Provide for the table lamp on the side table between the two lounge chairs.

Rest rooms: Provide access to the staff restroom(s).

Utilities: Provide for utilities in the Kitchenette. Provide for the sink in the Kitchenette. Provide proper ventilation to minimize food odors from the Kitchenette.

Other Comments

Consider an outdoor patio for this space.

Space 15
FRIENDS OF THE LIBRARY
495 NASF

The function of the space is to provide a space for the Friends of the Shrewsbury Public Library to receive, sort, and organize books and other items for sale in the Library Story and at the book sales held during the year.

A summary of the square footage allocation for the Friends of the Library is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Workstation	1	36	36
File cabinet	2	20	40
Worktable	2	75	150
Double-face shelving	4	20	80
Open area	1	120	120
Booktruck	3	8	24
Subtotal NSF			450
Internal Walls and Circulation @ 10 percent			45
TOTAL NASF			495

Occupancy

From two or three to six to eight volunteer Friends, depending upon the level of activity.

Preliminary Listing of Furniture and Equipment

- 1 Open-office workstation w/ergonomic task chair, telephone, one side chair, a PC networked to laser printer, three linear feet of shelving above the work surface, and a pencil drawer, allow 36 NSF.
- 2 Four-drawer lateral-pull file cabinets; allow 40 NSF (20 NSF each).
- 3 Worktables (3'W X 5'L X 42"H, each w/two ergonomic task chairs; allow 225 NSF (75 NSF each).
- 4 Sections (168 linear feet) of 84"H double-face, steel bookstack shelving w/twelve 10-inch adjustable shelves over two 12-inch base shelves (42 linear feet per double-face section) for 2,000 *items*; for allow 80 NSF (20 NSF per double-face section).
- 1 Open area; allow 200 NSF
- 3 Booktrucks; allow 24 NSF (8 NSF each).

Spatial Relationships

Close to: Loading, Receiving, and Staff Entrance (Spaces 16).

Environmental and Engineering Needs

Communications: Provide a telephone at the workstation and a wall-mounted telephone near the worktables.

Electrical: Provide ample electrical outlets.

Finishes: Areas subject to abuse or along the path of booktruck movement **must** have industrial type finish, up to and including stainless steel wainscot and corner protectors.

Lighting: Provide lighting controlled by motion detection. Provide for task lighting at the workstation.

**Space 16
LOADING, RECEIVING, & STAFF ENTRANCE
538 NASF**

The function of the space is to provide a Loading area, a Receiving (and Shipping) Room, and a Staff entrance.

A summary of the square footage allocation for Loading, Receiving, & Staff Entrance is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Loading area	1	225	225
Receiving (and Shipping) room	1	200	200
Staff entrance	1	64	64
Subtotal NSF			489
Internal Walls and Circulation @ 10 percent			49
TOTAL NASF			538

Occupancy

No staff or customers on a regular basis.

Preliminary Listing of Furniture and Equipment

- 1 Loading area w/an iron, portable ramp and/or a dock leveler to allow easy off-loading from a truck onto the dock, two sections of 96"H industrial shelving, and one dolly; allow 225 NSF. (NOTES: [1.] The Outreach Services van will use the Loading area and its van is quite tall, as in from the base of

*the wheels to the topmost part of the van. [2.] The Loading area **must** be a covered space, and ideally an enclosed space w/a wide doorway leading into the rest of the Library building.)*

- 1 Receiving (and Shipping) room; allow 200 NSF. Provide:
 - 1 Worktable (6'L X 4'W X 4'H); allow 50.
 - 2 Sections (42 linear feet) of 84"H steel, single-face wall-mounted bookstack shelving w/six adjustable 10-inch shelves over one 12-inch base shelf (21 linear feet per single-face section) for 400 items; allow 20 NSF (10 NSF per section).
 - 1 Open floor space; allow 130 NSF.
- 1 Staff entrance; allow 64 NSF. (NOTE: Provide overhead protection as Staff enters/leaves via the Staff Entrance.)

Spatial Relationships

Adjacent to: Building Maintenance (Space 16).

Environmental and Engineering Needs

Communications: Provide an intercom connecting the Staff Entrance w/the Circulation Services Workroom (Space 7).

Electrical: Provide ample electrical outlets.

Finishes: Provide a hard surface in all area and a floor drain in the Loading Dock.

Lighting: Provide lighting controlled by motion detection.

GATHERING SPACES
SPACE 17
MULTI-PURPOSE MEETING ROOM
2,640 NASF

The function of the space is to provide a large, well-appointed room that can be divided into two smaller rooms. It is anticipated that such activities as:

- Film showings
- Lectures
- Chamber music concerts
- Live theatre
- Art exhibits
- Sit down dinners
- Special event programs for children and young people
- Recitals
- Community meetings
- Service club meetings and luncheons
- Voting

may all take place in this Room over the course of a year or two.

A summary of the square footage allocation for the Multi-Purpose Meeting Room is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Stack chair	125	12	1,500
Stage platform	1	80	80
Lectern	2	10	20
Smart board	1	10	10
Storage room	1	300	300

Catering kitchen	1	120	<u>120</u>
Subtotal NSF			2,030

Internal walls and circulation @ 30%			<u>610</u>
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TOTAL NASF			2,640
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Occupancy

From 30 or 40 to 100 to 150 users (150 seated), depending upon the level of activity.

Preliminary Listing of Furniture and Equipment

125 Stacking chairs; allow 1,500 NSF (12 NSF each). (NOTE: Provide five chair dollies.)

36 Lightweight, folding tables; NSF included in circulation space allowance above. (NOTE: Provide five table dollies.)

1 Stage platform; allow 80 NSF. (NOTES: [1.] A platform that can be either "folded" into the wall, or "slides" into the wall so that when not in use is not taking up floor space. [2.] Should be between 1' and 2' H. [3.] Provide for electrical power and the ability to control the projection equipment {see below}.)

2 Lecterns on lock-down casters; allow 20 NSF (10 NSF each).

1 Smart board on lock-down casters; allow 10 NSF.

- 1 Storage Room; allow 300 NSF. (*NOTE: Provide for a piano if one is forthcoming.*)
- 1 Catering kitchen w/commercial refrigerator w/ice-maker, double sink w/garbage disposal, lockable cabinets above and below the countertop, two warming drawers, one warming oven, three 30-cup coffee pots, and electric dishwasher; allow 120 NSF. (*NOTE: Provide a Dutch door, extra wide.*)
- 2 Ceiling-mounted projection units; NSF included in circulation space above. (*NOTE: One of the units must be such that it can serve the entire room as well as one of the smaller rooms when the dividers are in place.*)
- 2 Ceiling-recessed projection screen, motorized; NSF included in circulation space above. (*NOTE: One of the screens will be quite a bit larger than the other two when the Room is used and the room dividers are not in place.*)
- 1 Retractable divider(s), motorized; NSF included in circulation allowance above. (*NOTE: The divider should be located as to allow the Room to be divided into two equal, smaller spaces.*)

Spatial Relationships

Adjacent to: Children’s Services (Space 6).

Environmental and Engineering Needs

Acoustics: Provide sound insulation batt in walls of the Room and the Catering Kitchen.

Communications: Provide a wall-mounted telephone in the Catering Kitchen and the Storage Room. Provide two telephone jacks in the Room, one for each of the smaller spaces when the divider is in place. Provide speakers for the building-wide public address system.

Data Cabling: Conduit to provide data network cabling to the Room.

Electrical: Provide ample electrical outlets in the Room. Provide for the projection equipment and screens. Provide for the appliances in the Catering Kitchen.

Finishes: Provide a hard surface w/floor drain in the Catering Kitchen.

Lighting: Provide motion detection activated lighting in the Room, Storage Room, and Catering Kitchen. Provide for the lighting of wall-hung exhibits that will be in the Room from time to time.

Rest rooms: Provide access to the public rest rooms in such a manner that the rest rooms can be used by attendees at a function/event in the Room that may be on going at a time when the rest of the Library is closed and that cannot be used as a way to bypass the library materials security system when the Library is open for business.

Utilities: Provide for utilities in the Catering Kitchen. Provide for the double sink in the Catering Kitchen. Provide proper ventilation to minimize food odors from the Catering Kitchen.

Other Comments

Consider an outdoor area that could be opened if there was an exceptionally large crowd and/or a place for breaks if the activity is a lengthy one.

**SPACE 18
COMPUTER LAB
468 NASF**

The function of the space is to provide a computer lab for classes as well as general use when classes are not being taught.

A summary of the square footage allocation for the Computer Lab is as follows:

<i>function</i>	<i>no. of units</i>	<i>unit area</i>	<i>total area</i>
Workstations	10	30	300
Instructor station	1	36	36
Printer/scanner station	1	24	24
Storage room	1	30	<u>30</u>
Subtotal NSF			390
Internal walls and circulation @ 20%			<u>78</u>
TOTAL NASF			468

Occupancy

From three or four to eight to 11 users (10 seated + instructor), depending upon the level of activity.

Preliminary Listing of Furniture and Equipment

- 10 Workstations, each w/one ergonomic task chair; allow 300 NSF (30 NSF each).

- 1 Workstation (for the Instructor); allow 36 NSF.
- 1 Printer/scanner station; allow 24 NSF
- 1 Ceiling-mounted projection unit; NSF included in circulation space above.
- 1 Ceiling-recessed projection screen, motorized; NSF included in circulation space above.
- 1 Storage room; allow 30 NSF. (NOTES. [1.] Provide adjustable shelves, at least 12"D, on two walls. [2.] Provide secure door and control w/card access.)

Spatial Relationships

Adjacent to: Information Technology Services (Space 10).

Environmental and Engineering Needs

Acoustics: Provide sound insulation batt in walls of the Room.

Communications: Provide a telephone at the Instructor workstation. Provide speakers for the building-wide public address system.

Data Cabling: Conduit to provide data network cabling to the Room.

Electrical: Provide ample electrical outlets in the Room. Provide for the projection equipment and screens.

Lighting: Provide lighting controlled by motion detection.

**Table 8
Comparison – Existing Building and Proposed Building as
Reflected in Building Program – Net Assignable Square Feet
(NASF)**

<i>Space</i>	<i>Existing NASF</i>	<i>Building Program</i>	<i>+ or (-)</i>	<i>% + or -)</i>
Entrance/Lobby and Circulation Services	281	1,448	1,167	415.3
Adult Services	10,994	13,266	2,282	20.7
Young Adult Services	962	1,922	1,554	99.8
Children's Services	2,812	7,377	4,565	162.3
Technical Services	1,585	910	(675)	(42.6)
Staff Offices/Workroom:				
Director's Office	160	144	(16)	(10.0)
Other	805	4,199	3,394	421.6
Building Services	625	766	141	22.5
Staff Room	185	491	306	165.4
Multi-Purpose				
Meeting Room	1,173	2,640	1,467	125.1
Computer Lab	0	468	468	100.0
Library Café & Store	0	820	820	100.0
Friends of the Library	0	495	495	100.0
Loading, Receiving, and Staff Entrance	<u>0</u>	<u>538</u>	<u>438</u>	<u>100.0</u>
TOTALS	19,582	35,484	15,902	81.2

SHREWSBURY PUBLIC LIBRARY REVIEW OF 2004 BUILDING PROGRAM STATEMENT (BPS)

RESPONSE TO LIBRARY STANDARDS FOR STATE GRANT

THE 605 CMR, Board Of Library Commissioners 605 CMR
 6.08: Library Improvement Program - Public Library
 Construction states:

(a) Space for Collections. The minimum space allocated to house materials should be equal to the square footage requirements of the present collection plus the total square footage required to house the projected collection growth for the next 20 years based on the library building program. This program shall include adequate space for print, non-print and electronic resources. At a minimum book collection size should equal that found under the "Basic" level in these standards given below. Volumes Held per Capita (Print) Regardless of the population served, the minimum total volumes held is 8,000 volumes

Municipal Population of 25,000 to 49,999:

- Basic = 3.7 per capita
- Moderate = 3.9 per capita
- Enhanced = 4.3 per capita
- Excellent = 5.6 per capita

(b) Seating. Seating shall meet or exceed the standard as calculated using the following table. For a library whose population falls between the figures given, the recommended number of seats shall be calculated in proportional relation. Total square footage for seating shall be equal to the number of calculated seats x 30 square feet.

Seats that have the capability for wireless use, but are available for other purposes should be included in the total for seating capacity. Special-use space, at electronic workstations, microform readers and other such dedicated seating should not be counted in the total capacity, nor should seats in rooms such as auditoriums and general meeting rooms not normally open at all times to library patrons.

Municipal Population of 25,000 = 4.5 per 1,000
 Municipal Population of 50,000 = 3.0 per 1,000

Shrewsbury Population Projections

The Central Massachusetts Regional Planning Commission's Population Projections for 2000-2030* for Shrewsbury indicate the following:

2000	2005	2010	2015	2020	2025	2030
31,640	33,000	34,400	37,000	39,800	40,500	41,300

* Projections accepted/endorsed/approved March 2006.

Shrewsbury Public Library in Response to the Standards

With a population projected to reach 41,300 by 2030 the Basic level for collections will be 152,810. Shrewsbury will have:

Adult Books =	88,945
Young Adult Books =	7,200
Children's Books =	52,600
Adult Media =	10,100

Young Adult Media = 1,000
Children's media = 4,000
Periodicals = 309

Total collection housing capacity = 164,154

Total collections per capita = 3.97

As for seating:

If based on the 25,000 standard, a need for 186 seats

If based on the 50,000 standard, a need for 124 seats

Total seating capacity = 237

The consultant believes that this Building Program Statement more than meets the requirements of the Massachusetts Board of Library Commissioners w/regard to collections and seating.