



# Answers to Frequently Asked Questions about the Salt Lake City Public Main Library

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## Library of the Year 2006

Selected by Library Journal panel made up of library and publishing professionals. Factors considered were:

- Our role as a crucial city center where democracy happens.
- Innovative programming and partnering with community organizations.
- Model of library leadership for the state and surrounding region.
- Collection and circulation statistics. With 3 million annual visitors we are the second most visited place in the state.
- Salt Lake citizen's generous and continued financial support of library services.

## Urban Room and Shops

- Think of it as an enclosed Piazza that serves as a community gathering space.
- Shops include: Library Gift Shop; English Garden, Joy's Deli, Salt Lake Roasting Company, Night Flights Comic Book Store, KCPW radio station, SLC Film Center, and the Downtown Place

## The Crescent Wall

- The wall is walkable and contains skateboard deterrent features (i.e. alternating cobbled sections).
- Retaining walls, on either side make it quite difficult to jump off.
- The wall was designed to enclose the plaza, and provide a way to scale the block for different sized events.
- The main level houses shops while the upper three levels serve as reading galleries.

## Browsing Library

- Contains best selling items, and a number of newspapers and circulating magazines
- Designed for quick and convenient access to popular materials.
- Located adjacent to the Roasting Company coffee shop on Main Level
- Books displayed on tables and cases rather than shelved like the rest of the library collection
- Items may remain in this area for up to nine months before being transferred to general collection.
- Houses the Large Print collection

## Seismic Stability

- Bridges connect to Reading Galleries and Bar Section of the building. These connecting bridges are on Teflon plates and have the ability to slide up to 22 inches.
- Glass curtain walls are designed to be flexible and can move if stressed.
- All glass in the building is a hybrid tempered laminate that disintegrates into pebbles if broken. Sky lights are designed to pull apart in sections rather than break and fall.
- The Crescent Wall tilts inward 21 feet at its center to keep it from rocking.

## Building Features

- Raised Floor (24") allows access to all electrical and technical components of the library and allows for flexibility.
- Radiant Heat in the floor of the Urban Room and Children's Library.
- Climate control from the ground up rather than ceiling down makes the building much more energy efficient.
- Designed to be quieter as you move upward through the library.
- Children's library glassed in to reduce noise.
- Double Lens creates a "thermal blanket" that helps store heat in the winter but can be easily vented out in the summer.

## Building Facts: Number of Things

Computers: 163	1.9 million lbs of steel	320 miles of electrical/communication wire
Parking Stalls: 600	Annual visitors: 3 million	Staff: 200
500,000 items for check out	Volunteers: 250	240,000 square feet
Cost: \$65 million	Glass: 176,368 sq feet.	Twenty-eight months to build (Oct 2000-Feb 2003)

## Bond

\$84 million, 20 year bond = \$43.50 annually on a \$150,000 home. Vote Passed by 68%

The bond funded the demolition of old buildings on the block, construction of new library, public plaza, and underground parking terrace, the remodeling and expansion of the Foothill and Sprague Branches, and expansion and upgrade of the heating and cooling plant for Washington and Library Squares.

### Architectural Selection

The process to select the winning architectural team included the following:

- A Request for Proposal (RFP) was sent out in which many design firms replied.
- RFPs were reviewed by a committee and the six best firms were then interviewed, narrowing the field to four.
- Firms were required to partner with a local architectural agency.
- Final four contenders participated in two workshops where they presented and modified their plans before a panel of ten people representing the library and community.
- The Selection Committee, another committee made up of members representing the library staff, library board, city dignitaries, and architects, then made a selection and presented it to the library board for review.
- After reviewing the recommendations, and reviewing information supplied by the four architectural groups during a final public presentation, the board selected Moshe Safdie in partnership with the local firm of VCBO to design the new library.

### Moshe Safdie

- <http://www.msafdie.com/>
- The Moshe Safdie Hypermedia Archive: <http://cac.mcgill.ca/safdie/>
- Principal office is in Boston with branch offices in Jerusalem and Toronto.
- Born in Haifa, Israel
- Educated at McGill University, Montreal
- Apprenticeship with Louis I. Kahn 1962-63
- Professor at McGill, Yale, and Ben Gurion 1960's-70's
- Director of Urban Design Program; Harvard 1984-89

### Public Art

- Chosen for its relationship to the building from among hundreds of entries.
- Selected by Public Art Committee represented by librarians, architects, patrons, and local artists.
- Kinde Nebeker (SLC) – Quotes found throughout the building.
- James Charles (SLC) – Mixed media painting by auditorium entrance.
- Bonnie Susec (SLC) and Day Christensen (Highland) – A series of vertical glass ribbons located on three levels.
- Ed Dolinger (Virginia) – Mixed media stairwell sculptures.
- Karl Schlamming (Germany) – Crystal Cave and Attic in the Children's Library. The lights on the ceiling of the cave form constellations.
- Ralph Helmick and Stu Schechter (Boston) – The title of "Psyche" comes from the ancient Greek word meaning 'mind' and 'butterfly.' About 1500 books and butterflies make up one piece. Words on the wings of the butterflies, that form a silver halo around the head, state the Declaration of Human Rights in 20 languages.
- Ric Blackerby (SLC) – Metal dragon fly on waterfall wall, as well as beetles and spider in Children's Library.

### Landscaping

- Plazas, water features, and gardens designed to support civic events, and links Library Square to the City and County building on Washington Square.
- Designed by Civitas (Denver)
- Utilizes plants that require less water and can thrive in the extremes of the Utah climate.
- Plants chosen for their variety of colors and textures. Planting brochure is available upon request.
- Use of stone and gravel to form pathways and geometrical beds.
- East side of block was financed by a one time grant from the proceeds of the 2002 Winter Olympics.

### City Library not County Library

The City Library system has 6 locations and is not affiliated with the Salt Lake County Public Library System. However, city and county patrons may use either library system, but materials must be returned to the proper system when finished. Non-county residents may purchase a City Library Membership. For details, visit the Circulation Desk.

### General Funding

- Funded primarily through city property taxes.
- Other funds come from donations, Friends of the Library organization, overdue fines. Some additional revenue may be received from the use of library facilities for private functions during the hours the library is closed.

### Selection Policy

- Several librarians, trained in specific areas, order all materials for the system.
- All departments and branches have staff that review the collection and make requests to the system wide selectors.
- Patrons may also request materials for purchase.
- The library's Material Selection Policy addresses these policies and describes the procedure for addressing patron concerns.

# SALT LAKE CITY PUBLIC LIBRARY

Salt Lake City, Utah

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## Reaveley Engineers & Associates Role

Reaveley Engineers & Associates, Inc. role in the Salt Lake City Library's design was to assist the architectural team in choosing the most appropriate systems to create the spaces required for this magnificent 21<sup>st</sup> century facility. The selection of Moshe Safdie / VCBO Team through an architectural design competition early in the process gave a clear vision as to the Salt Lake City Public Library's future look and function. The integration of the structural systems into the architectural expression of the facility was especially important because 90% or more of the structural elements are visually exposed.



The Library's elegant design combines basic geometric shapes: triangles, rectangles, circles, arcs and spirals. The composition of these interconnected shapes form a complex structure with atriums, spiral staircases, and inviting spaces offering majestic views of the Wasatch mountains. All these forms are designed as independent structures and the elements that tie them together were designed to accommodate the differential movement between them.

- The Main Library, the triangular element located at the center of the building, houses the main stacks. It is designed as a five-story concrete special moment frame with a steel framed roof top garden. The convex glass enclosure referred to as the "lens wall" is mirrored on the southeast face by a curved concrete frame creating the majestic views to the southeast.
- The administrative functions are carried out in the six-story rectangular "bar building" which parallels the west face of the triangle. This component is a concrete shear wall system with beams and suspended slabs.
- The 600-foot long leaning Crescent Wall, which houses reading galleries, wraps the main plaza and north side of the library providing an ascending walking surface to the roof garden on top of the triangle by crossing a bridge high above the spiral stairs of the grand Urban Room. The Urban Room situated between the main stacks and the crescent wall hosts community events.
- Other features include a 350 seat auditorium, an expansive plaza complete with an amphitheater, a reflecting pond at the base of the lens wall, stepping fountains, future theaters, retail space and children's play area. All supported by a below grade two-story 660 stall parking structure.



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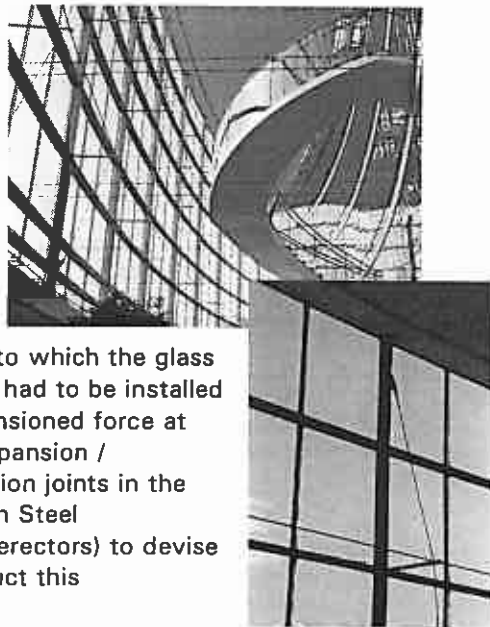
## Role of Other Consultants

Architect:	Moshe Safdie and Associates, Inc., Valentiner Crane Brunjes Onyon Architects, in Association  Moshe Safdie and Associates, offices are in Boston, Massachusetts Valentiner Crane Brunjes Onyon Architects is the architect of record and their offices are in Salt Lake City.
Landscape Architect:	Civitas Inc., Denver, Colorado Civitas was responsible for the landscape design
Mechanical Engineer:	Colvin Engineering, Salt Lake City, Utah Colvin Engineering was responsible for the HVAC and plumbing design.
Electrical Engineer:	BNA Consulting Engineers, Salt Lake City, Utah BNA was responsible for electrical system design
Engineering Consultant:	Ove Arup Engineering, Boston, Massachusetts Ove Arup was a special consultant for Mechanical, Electrical, Structural, and Acoustical Design
Geotechnical Engineer:	AMEC Engineers AMEC responsibilities included the geotechnical investigation and report as well as materials testing.

## New application of existing techniques / originality / innovation

The new Salt Lake City Library includes many innovative engineering solutions. Some of them include:

- The 60 foot high, 220 foot long glass “Lens Wall”, which forms the southeast enclosure of the building, was especially challenging from a structural design and construction perspective. The structure supporting this glass wall, not only must resist high wind forces created by this extreme exposure, but was required to disappear visually to not interfere with the magnificent views of the Wasatch Mountains. A system of vertical and horizontal pre-tensioned, high strength cables were attached to a grid of steel tube sections to create a sturdy and rigid structure to which the glass could be attached. The 220’ long horizontal cables had to be installed with a tolerance of  $\pm 1/16$ ” with 48,000 lbs. pre-tensioned force at 70 °F to attain a straight and true wall. Thermal expansion / contraction is accounted for with a series of expansion joints in the horizontal frame members. RE&A worked with Tech Steel (fabricators) and Western Construction Specialties (erectors) to devise fabrication and erection sequencing plans to construct this complicated structure.



- Steel moment frames provide the lateral support for the 600-foot crescent wall along the curved sides while an aesthetically pleasing “Y” type braced frame system supports the radial direction for lateral forces as the structure leans. Unique cast-steel end caps interconnect the steel pipe braces with a single pin at each connection.



- The library incorporates a distinctive mix of many different structural systems to achieve this spectacular building. Each major component has an independent structural system interconnected by bridges and skylights to create the total facility.

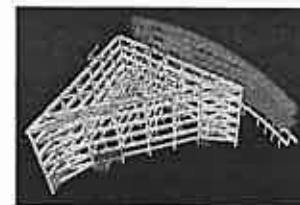


- Spiral Staircases gracefully cantilever into the spaces above the Urban Room and Children’s Library. The complex geometry of these custom designed stairways is attained by constructing box-shaped stringers from curved steel plates welded together. Special attention was placed on controlling the vibration characteristics to avoid a bouncy sensation.

### Technical Value to Engineering Profession

Sophisticated computer programs were required to accurately analyze and design the building’s structural elements. SAP 2000 Non-Linear was used extensively to provide reliable analyses of the various elements and components of this building.

- Movement between the elements of the building due to wind, thermal, and seismic conditions are accounted for by a complex system of sliding joints using low friction Teflon bearings and interconnected sliding tube sections. Up to 30” of total movement was required to prevent structural damage due to adjacent building elements from colliding during an earthquake.
- State-of-the-art Linear Dynamic and Non-Linear Static (push-over) Structural Analysis procedures were used in conjunction with site-specific seismic response spectra to independently verify that the building can withstand the maximum earthquake that the Wasatch Fault is considered to be capable of producing.
- The pre-tensioned, cable-stayed lens wall took extensive coordination with the construction team to insure proper erection of the system. Ultimately the lens wall was constructed within 3/16” of straight and plumb, remarkably close tolerance for a structure over 60 feet tall. This creative solution demonstrates how alternative building materials and methods can be used to solve challenging construction problems.



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## Social / Economic Consideration

The \$75 million facility more than doubled the capacity of the old library, established a new city landmark, and created an active gathering place with a focus on science, culture and education. The library is purposely situated to act as an extension of Washington Square, home of the historically significant City & County Building. The Library has become an icon symbolizing the new user-friendly Salt Lake City. This facility will attract people of all social and economic levels to the downtown area from the entire community. City officials feel spontaneous development will occur around the library block enhancing this overlooked neighborhood and overall economy of the City.



## Complexity

The complexity of the structural design was driven by the needs of the architectural design.

- Because the library incorporates many independent structural elements, many different types slip joints were required to accommodate movement between the elements. Detailing the joints to work within architectural constraints was time consuming and complex.
- The many different structural systems used in the construction of this facility had to be designed to work in harmony with each other. These systems include the following:
  - Cast-in-place reinforced concrete:
    - Mat foundations, footings
    - Columns, beams, vaulted ceilings
    - Shear Walls, Foundation, Plaza
  - Post-tensioned concrete slabs
    - Parking
    - Bar Element vaulted slab
  - Steel framing
    - Crescent Wall Structure
    - Lens Roof
  - Composite Steel
    - Roof Garden
    - Crescent Wall
  - Open Web Steel Joist / Deck
    - Auditorium Roof
  - Helical Piers
  - Lateral force resisting systems
    - Concrete shear walls
    - Special concrete moment frames
    - Steel braced frames
    - Steel moment frames
- Subterranean water under the complex requires pumps running 24 hours a day to keep the underground parking dry.
- Durability of concrete in parking areas is designed to provide a minimum 75-year service life.
- Extensive pre-cast concrete elements clad the Rectangle and Crescent components. Each section attached to the Crescent has a unique shape and curvature.