



# Eco-Library Design

John A. Flannery · Karen M. Smith

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 Springer

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# ECO - LIBRARY DESIGN

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# Introduction

“A university is just a group of buildings gathered around a library.”

Shelby Foote

**“The only thing that you absolutely have to know, is the location of the library” Albert Einstein**

Pick your own favourite quotations about libraries, there are many to choose from. In a world where the cost of a university education is now so daunting that it precludes many, I was interested to read the following: “I spent three days a week for ten years educating myself in the public library, and it’s better than college. People should educate themselves - you can get a complete education for no money. At the end of ten years I had read every book in the library and I’d written a thousand stories.” Ray Bradbury (1920 - 2012).

My own particular granite columned haven was the Leeds Central Library in the industrial north of England. Built between 1878 and 1884 to a design by architect George Corson, this imposing example of Victorian architecture is now a grade 2 listed building. Aware of the economies of scale that the building would provide, Leeds City Council determined a hybrid model for the Central Library building. It would include not only a free public lending library, a reading room, and a reference library, but also municipal offices where the people of Leeds would pay their gas, water and rates bills. The first and second floors housed the Borough Engineers and the City Sanitary departments. The city’s art gallery was opened in the same building in 1888. Constructed from locally quarried Yorkshire stone in the 19th century, and surviving almost 130 years of continuous and adaptive re-use to date, the Leeds Central Library is manifest proof in my home town that sustainable library

architecture is not a new phenomenon.

The worldwide perspective of this publication reveals a diverse definition of the modern eco-library. In the developing world, a simple room in which to read, carefully constructed from locally salvaged materials can change the lives of a poverty stricken population. This is demonstrated in both the flood prone Old Market Library of Bangkok and the dust dry Gando School Library.

In the developed world, the determination of municipal authorities to develop main and branch libraries as a public demonstration of considered sustainable design is gaining momentum.

From the University of Aberdeen to McGill University’s Cybertheque, Montreal, technologically advanced libraries are now built as working models of best practice, providing an enhanced user experience by adapting to the changes in the way information is now stored and disseminated.

The featured projects consistently demonstrate a determination to reduce energy and water consumption whilst eliminating the wasteful use of material resources. When this can be done with limited finance and the help of the local population, as in the former East German city of Magdeburg, a rewarding renaissance in social and cultural life can often be an additional benefit.

The architects and engineers who have contributed to this book faced the challenge of new build, adaptive re-use, or a combination of the two with the common goal of delivering the best possible Eco Library Design to the communities they serve.

*John A. Flannery*



# Amsterdam Public Library

Amsterdam, Netherlands

2007

JCAU

JO COENEN ARCHITECTS AND URBANISTS

[www.jocoenen.com](http://www.jocoenen.com)

**Amsterdam Public Library** lies on the eastern edge of the historic city centre. With port operations moving westwards, an ambitious plan to urbanise the south bank of the IJouwer inlet was devised to cope with the growth of the city around the main transport hub of the Central Station. The expansion of residential, commercial, recreational and public facilities from the city centre on to the Eastern Dock Island (Oosterdokseiland) was identified as a catalyst for economic growth in the Dutch capital. The new metropolitan area is approximately 48,000 m<sup>2</sup> and will accommodate 225,000 m<sup>2</sup> of contemporary architecture.

The island's infrastructure includes a long-term energy storage system, (LTES), developed, installed and operated by Cofely GDF Suez. By combining heat and cold generation with in-ground storage, the connected buildings benefit from the

maintained sustainable energy source. Winter cooling energy stored in the ground is utilised in summer, with the process reversed in the winter. On the very coldest winter days the heat pumps are supplemented by a bio-oil fired boiler, which provides the last 5 - 10% of demand. Buildings with varying patterns of heating and cooling can balance demand using the residue of energy from neighbouring buildings, as both warm and cold wells are accessible simultaneously. Significant energy savings have been recorded through post construction monitoring. When former state architect (Rijksbouwmeester) Jo Coenen was commissioned to design the Amsterdam City Library, he invoked a Neolithic architectural philosophy for the building. The usable space would be 'internally carved' from a prestigious, stone clad, structure (Figs. 1, 2, 3).

Population | 820,654

Co-ordinates | 52°22'23" N  
4°53'32" E

Elevation | 2 m (7')

Precipitation | 914.6 mm (36.00")

Temperature | Average High:  
13.8 C (56.8 F)  
Average Low:  
6.4 C (43.5 F)

Humidity | 82.5%









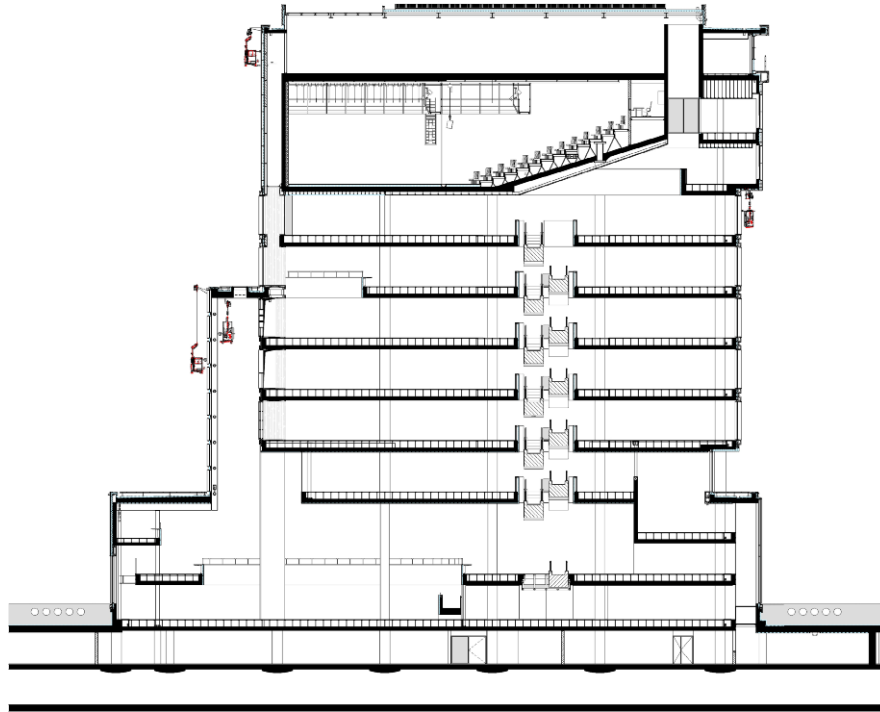


Fig. 4. above | Fig. 5. below

**Within this voluminous,** 28,500 m<sup>2</sup> civic building (the largest library space in Europe), Coenen 'carved' a series of ten, interconnecting, cavernous voids, stacked up to 40 metres high above the old dock. The projections and cantilevers were designed to tangentially harvest, and transfer Northern hemisphere daylight, (Figs. 4, 6). This strategy was enhanced by undercutting, and curving the fenestrated facades (Fig. 5). On plan, the building footprint measures an average of 40 metres wide x 120 metres long (Fig. 7). The structural composition of the building is derived from the desire to keep the internal space open, flexible, and user friendly. By limiting the use of structural columns and walls to maintain future-proof open plan spaces, the fire regulations had to be satisfied through strategically designed escape routes, combined with a sprinkler system. These measures mitigated the requirement to compartmentalise the building. This policy provided the additional benefit of CO<sub>2</sub> level triggered air changes being allowed to flow through the created voids, eliminating the requirement for ducting. Electrical and data cabling was accommodated in the industry standard, raised access flooring.



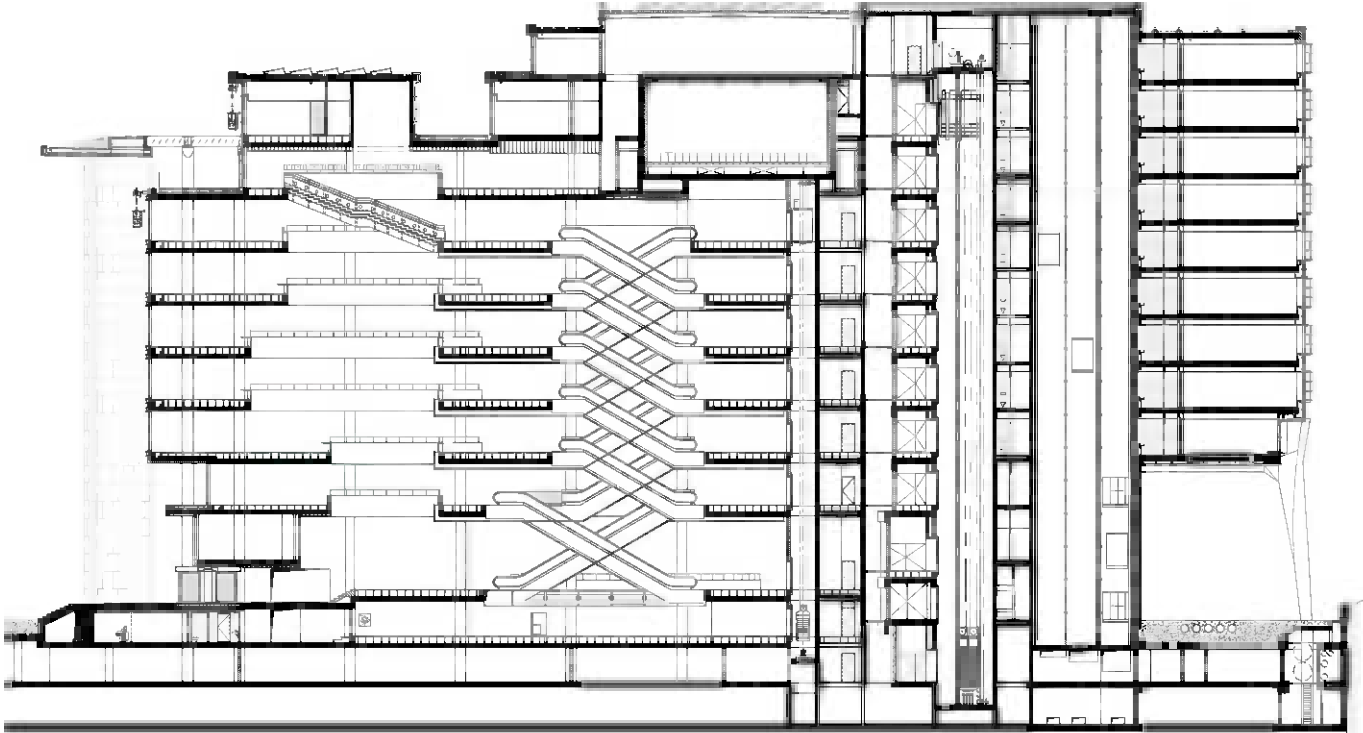
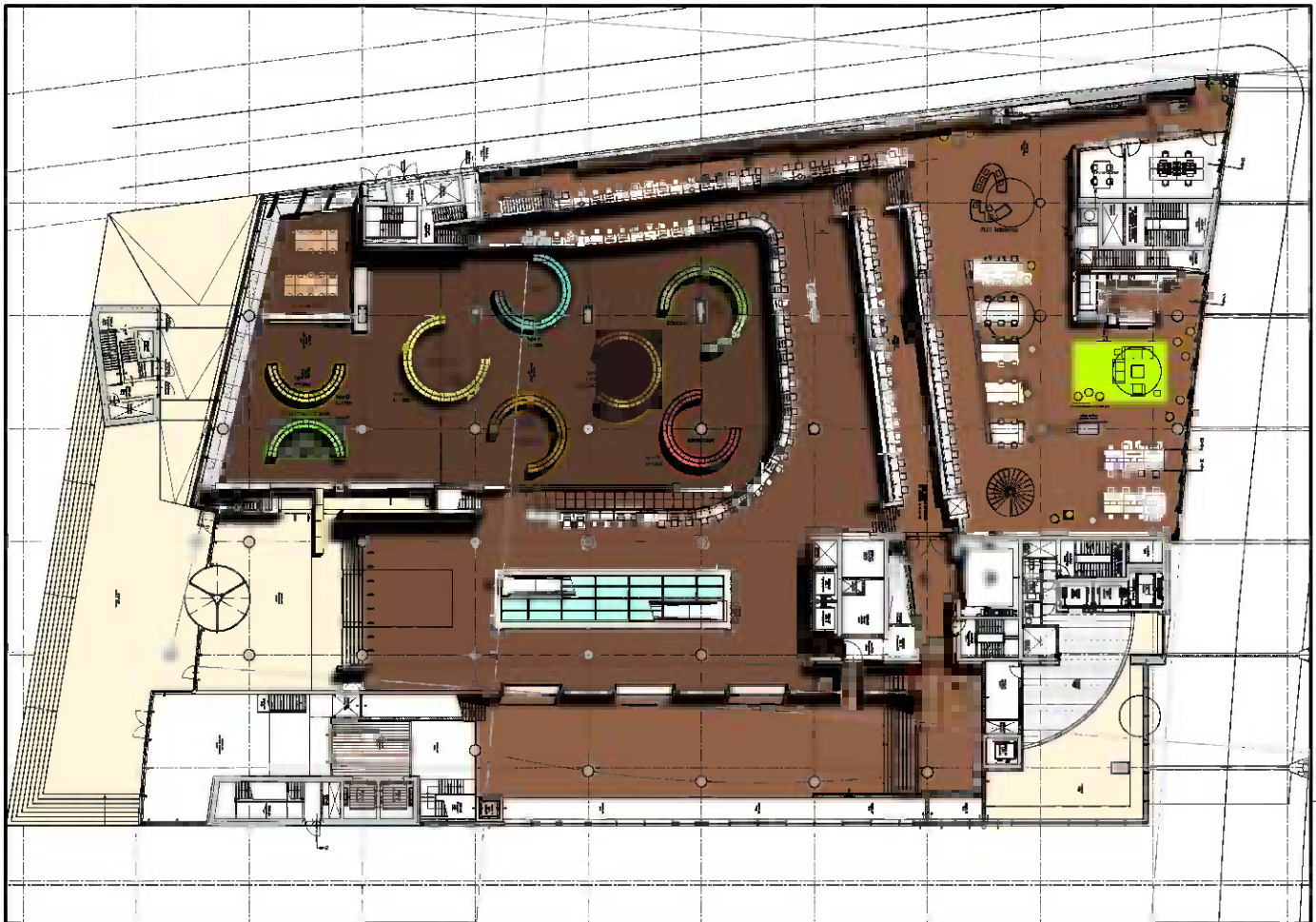


Fig. 6. above | Fig. 7. below





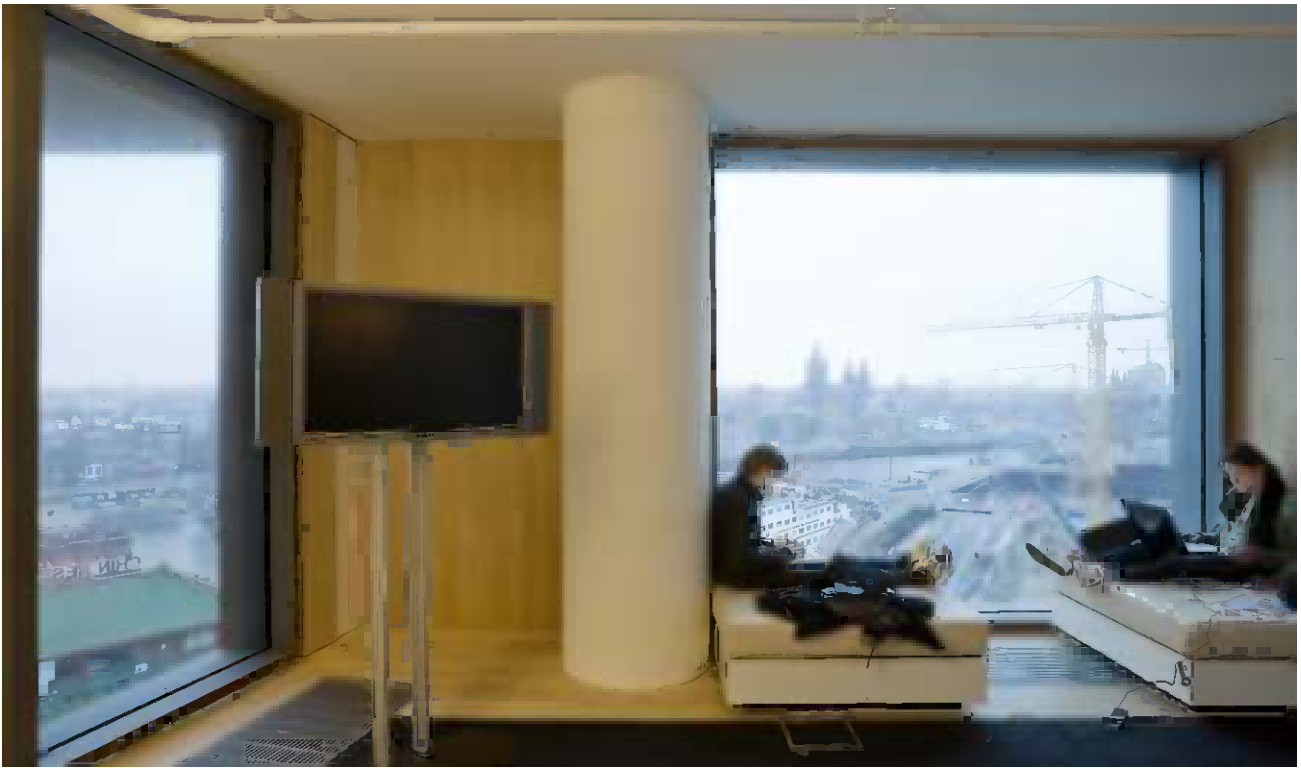
**Openbare Bibliotheek Amsterdam** is one of Europe's new generation of eco-cultural buildings, and has become a major attraction in a city that is also home to the Rijksmuseum and the Van Gogh museum. An average of 7,000 visitors pass through its revolving doors every day of the week from 10:00 a.m. to 10:00 p.m. The annual total is 2.5 million. Other than the library facility, believed to house more than 1.7 million books, visitors are attracted to the Library Museum, The Gerard Reve Museum, a 270 seat Library Theatre, a 50 person Education Room and 6 Meeting Rooms.

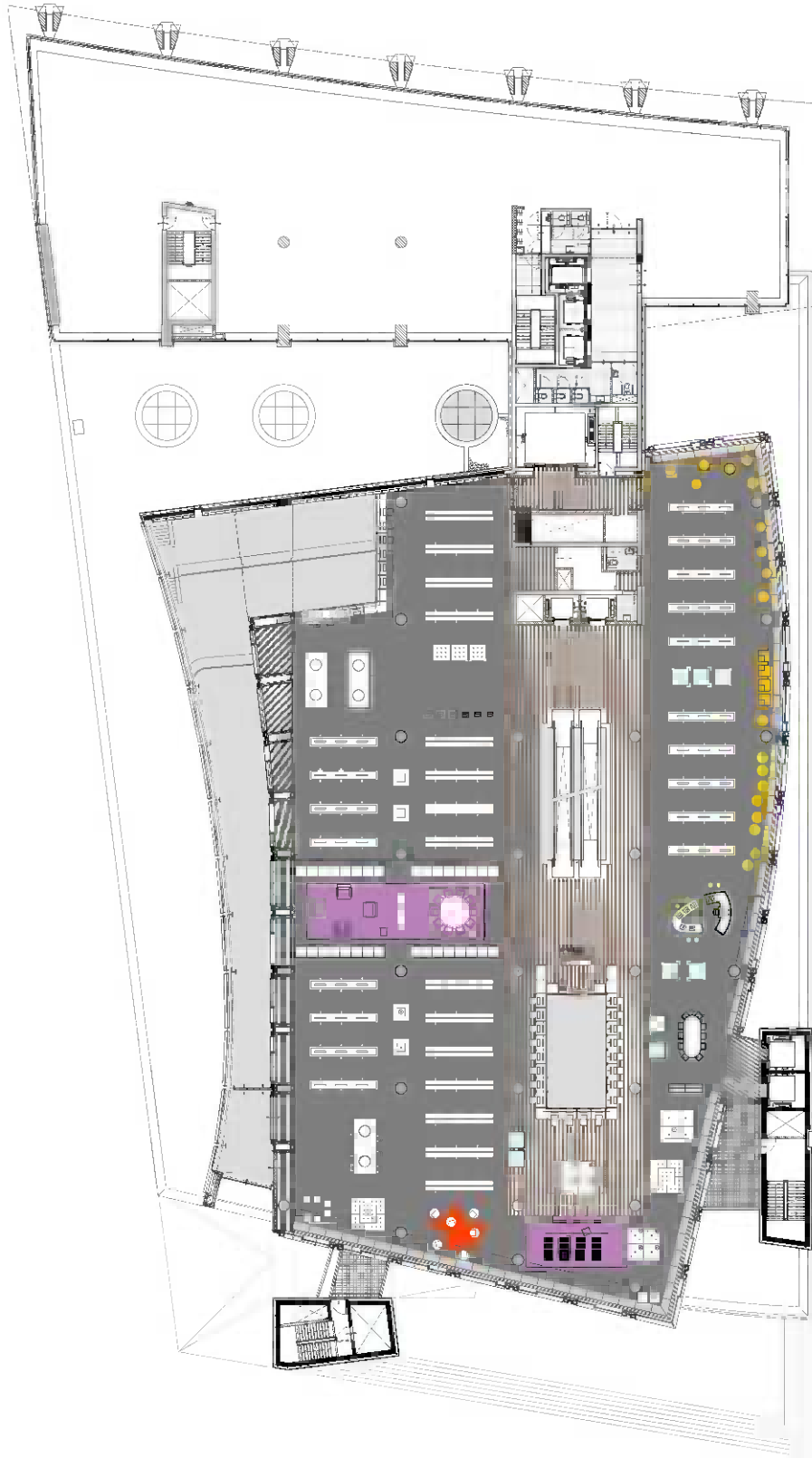
Additionally, the library patrons have access to 1375 seats in spaces of varied scale, 50 multimedia workplaces, 110 catalogue terminals, 26 lending machines, print and copy facilities and 600 PC restaurant with internet access and MS Office. Expert advisors serve the quick reference counter.

On the 7th floor a south-facing terrace provides views of the Dutch capital from the La Place self-service restaurant. The library is accessible

from the integrated public transport system comprising, train, tram, bus, and metro. There are 1,200 car-parking places and 2,000 bicycle racks for Amsterdam's cycling citizens. A total of 200 staff serves this metropolitan moveable feast. In designing the library's interior spaces, the architect sought to provide a series of "pleasant spots" to enhance the reader's comfort. Visitors can meet, socialise, browse or relax in a tranquil space, surrounded by books or overlooking the city (Figs. 8, 10). Where natural light fades in the core of the building, illuminated elevators provide a beacon to aid navigation. Light transmission to the stairwells via portholes provides a reminder of the site's nautical heritage (Figs. 9, 11). Similarly, a curved bay window, redolent of the stern of historic ships, provides a panoramic watery view. An opposing convex facade allows light penetration deeper into the building (Figs. 2, 3, 12, 16). The tradition of grand, balconied reading rooms is carried vertically through the library around the light filled atrium (Fig. 13).









**The ECO-Culture** project set up and funded by the European Commission DG-TREN with 1.93 million EUR. had the aim of “Demonstration and dissemination of ECO concepts for high-performing European cultural buildings”. The project’s primary objectives were to demonstrate reductions in energy usage and consequential falls in CO2 emissions. The project monitored the design, construction and operation of three new millennium buildings: the Royal Playhouse in Copenhagen, Denmark, the Opera House in Oslo Norway, and the Amsterdam Public Library in the Netherlands.

The varied technologies applied in the Netherlands included: energy storage, ground-source heat pumps, demand controlled hybrid ventilation, building integrated photo voltaic (PV) systems and advanced Building Energy Management Systems (BEMS). The EC final report (executive summary) concludes that the ‘whole building approach’ has proved to be a most effective tool for ensuring low energy consumption and appealing architecture.

Post-construction monitoring using the Building Energy Management System has revealed the following results for the library operation, compared to targets set by the ECO-Culture project:

**Reduce energy consumption related to cooling.**

Target reduction 75-80 %: Actual reduction 60%

**Reduce CO2 emissions related to cooling.**

Target reduction 75-80%: Actual reduction 60%

**Reduce energy consumption related to heating.**

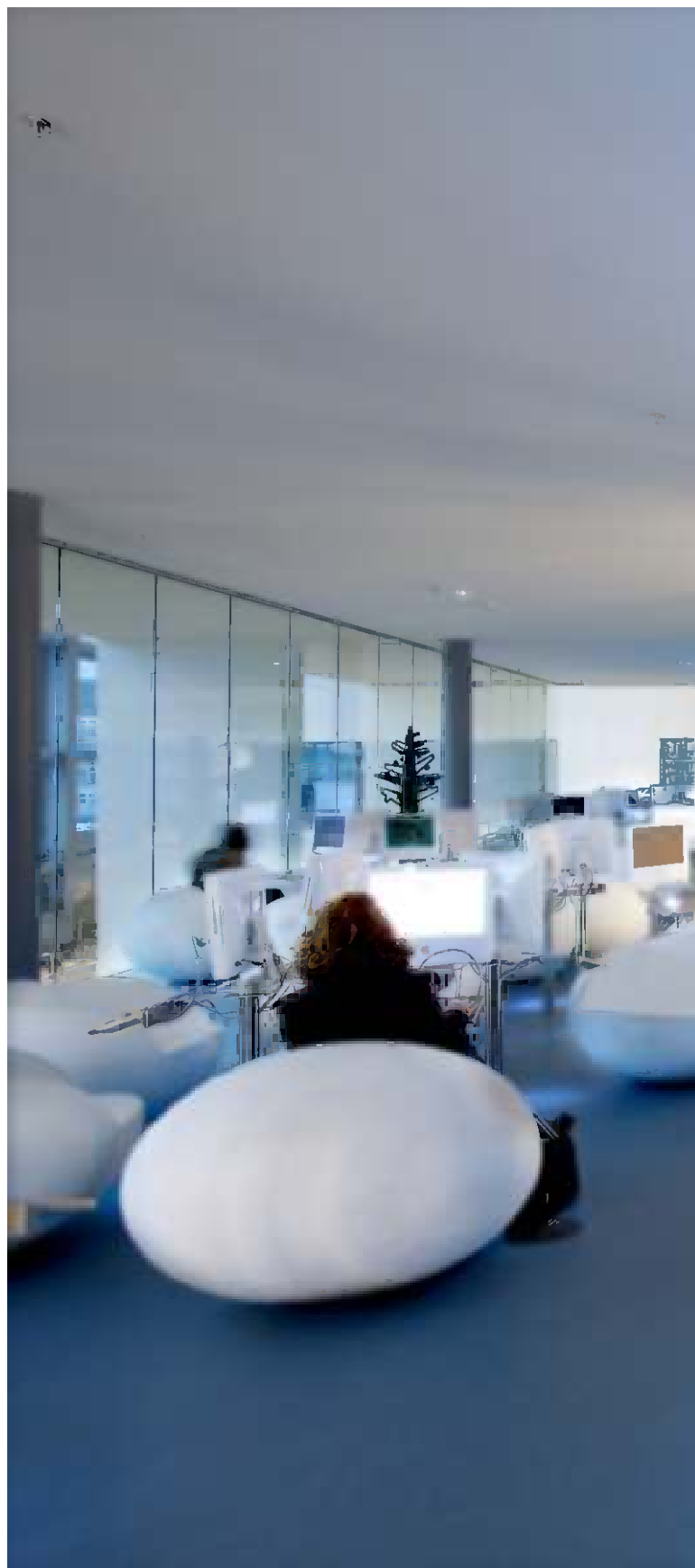
Target reduction 35-50%: Actual reduction 41%

**Reduce CO2 emissions related to heating.**

Target reduction 35-50%: Actual reduction 15%

The systems are constantly reviewed via the BEMS to optimise performance. Amsterdam Public Library possesses an Energy Performance Certificate with an impressive rating of A + 0.51.

A final ECO-Culture goal of dissemination is achieved with the public face of the library being punctuated by a photovoltaic solar energy system, enhancing public awareness of renewable energy in a highly visible location (Figs. 15, 16).











# Ballard Library and Neighborhood Service Centre

Seattle, USA

2005

Bohlin Cywinski Jackson

[www.bcj.com](http://www.bcj.com)

**The city of Ballard** was founded in the state of Washington in 1889. The settlers, of largely Scandinavian origin, were skilled in the traditional pursuits of boat building and fishing and thrived on the south shore of Shilshole Bay. By 1907 the growing population of Ballard had been annexed to Seattle in a pooling of essential water resources. Major civil engineering projects played a large part in ensuring that the Ballard community continued to prosper. The construction of the Ballard Locks was completed in 1917, and a ship canal project (1911 - 1934) greatly improved the area for industry.

The proliferation of the red cedar in the Pacific North West was also a major contributing factor in the story of Ballard. The abundance of this natural resource provided the raw timber for shipbuilding and construction. Mills along the waterfront

produced enormous quantities of red cedar shingles. The industrial activity was soon reflected in the success of the commercial businesses that lined Ballard Avenue, most of which is now protected as an Historic Landmark District.

The Seattle Public Library, the Neighbourhood Service Centre and architects, Bohlin Cywinski Jackson, mindful of the public realm of their new building, ensured that a collaborative design process included community and user groups.

The strong ties with Ballard's rich nautical and artisanal heritage are reflected in the architectural style (Fig. 2) with a galvanised version of the historic shingle evident in the facade. However, a periscope view of rooftop nature (Figs. 1, 3) allows Ballard's younger citizens to focus on a building with design philosophies firmly rooted in the 21st century.

Population | 165,923

Co-ordinates | 47° 40' 37.2"N  
122° 23' 6"W

Elevation | 38 m (124.67')

Precipitation | 867.7 mm (36.16")

Temperature | Average High:  
14.83 C (58.7 F)  
Average Low:  
7.27 C (45.1 F)

Humidity | 72.5%





Fig. 3 below right

**A grant to assist** with building modelling enabled an architecture student to be hired and engaged in day-lighting studies. The modelling facilitated considered placement of overhangs, louvres skylights and vertical fenestration to ensure that daylight penetrated the core of the building.

The study also identified a solar gain in the southwest corner of the lobby (Fig. 4). This potential was realised through the Seattle City Light Green Power grant. In order to qualify, the solar power installation was required to incorporate an educational element. The architects then devised the concept of a very public, permanent demonstration of solar energy via a high tech 'sundial'. Photovoltaic film procured from Schott Solar in Germany were applied to the panels of the bay window (Fig. 4) mitigating the potential heat build-up and providing a visible demonstration of the conversion of solar energy into electrical power. The variable nature of solar energy is readable on the meters located on the window cills (Fig. 6). The solar power installation is completed by roof mounted photovoltaic panels (Fig. 5).

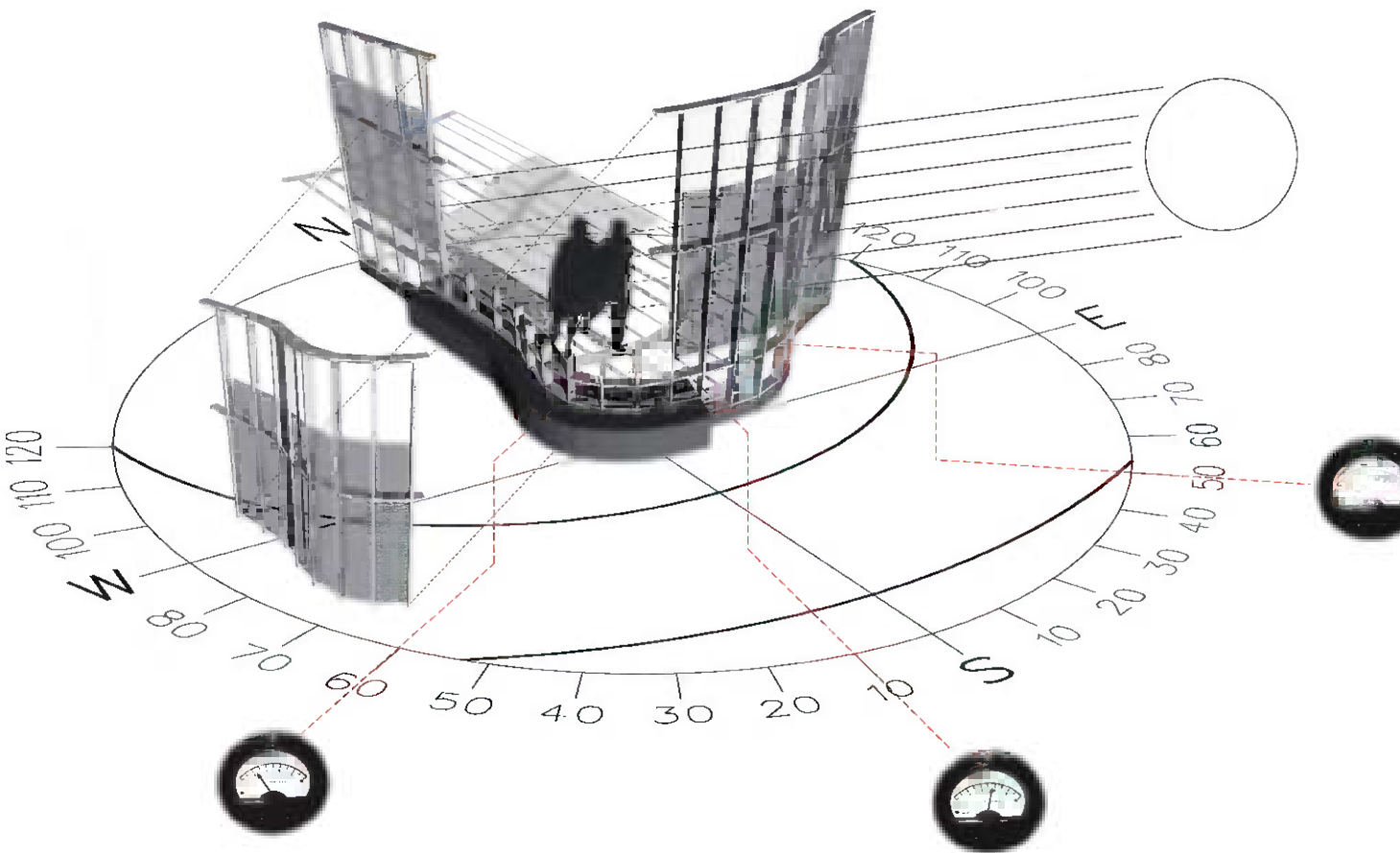
The eco - library design concept was then further embedded into the public realm when the public art component of the library was conceived. This involved interpretation of the microclimate surrounding the building's verdant, planted roof. The urban context of the site is transformed by the roof top planting. A random combination of drought tolerant, indigenous sedum and grasses has produced a remarkable meadowland. Pitched at a relatively low level, the soft landscape aesthetic provides pleasant green views for existing and future occupiers of higher developments. The roof and perimeter street level planting amount to a vegetated surface area of 80% of the plot, a net increase of 80% on previous use (Fig. 5).

The roof is designed to both drain and retain rainwater to irrigate the planting through capillary action and evaporation. The undulating, sloping surface is zoned to allow variable flow/retention rates via a series of lightweight recycled polyethylene cups and channels above the seamless membrane. To relate the ecology of the roof to the patrons of the library; wind speed, rainfall and other data such as building energy usage and light monitoring are transmitted to LED displays. The result is a merging of public art with ecological science.





Fig. 5 above | Fig. 6 below

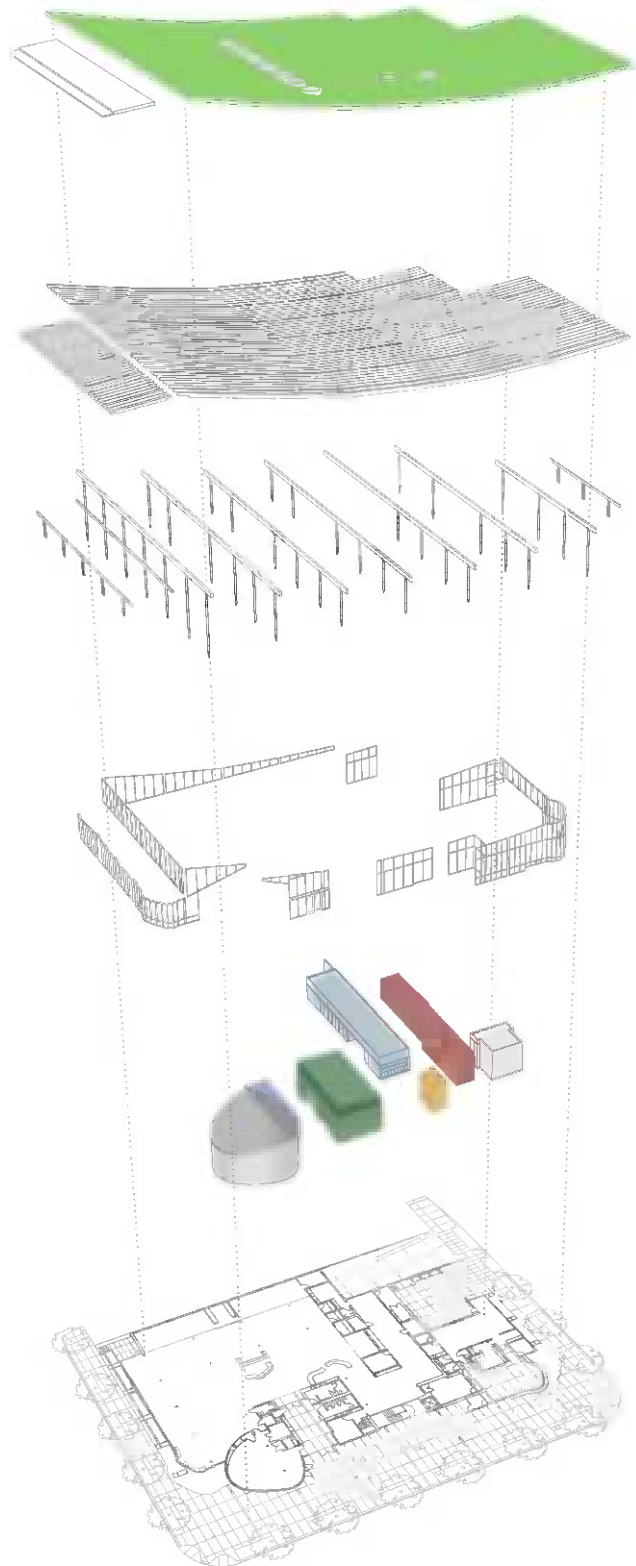


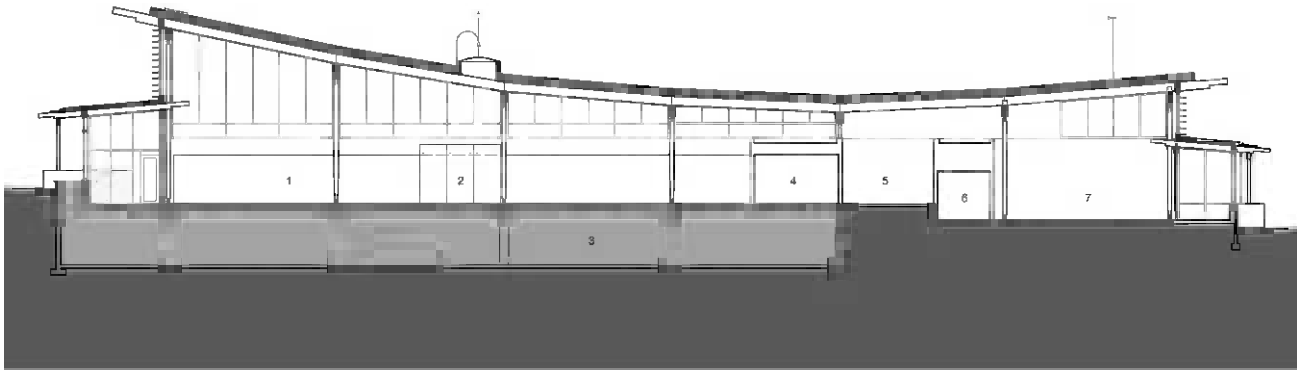
**The 40,000 square feet** sloping site is located next to a new city park, with the library and service centre occupying approximately half the western side of the plot; the eastern half is to be sold for mixed-use development. Construction costs incurred in providing subterranean parking (Fig. 8) will be offset by the proceeds of the sale. The car park entrance will be shared by the two developments in a bid to balance access to the new civic core between private and public transit, cyclists and pedestrians (Fig. 9).

From the outset the building was intended as a demonstration of the benefits of green design integrated into functional, forward thinking architecture. A modest budget of \$7,200,000 ensured that every aspect of value engineering was explored through both the design and construction phases. Building systems and components were carefully integrated for a multitude of functions. The 15,000 square feet library and the 3,600 square feet neighbourhood service centre required very different operational energy and conditioning requirements. By separating the two mechanical units, air movement routes were optimised reducing energy costs.

The design team were mindful to reduce heat sinks in the concrete construction, which led to innovations in the structural design. Columns and beams were cast in-situ and bridged with pre-cast concrete planks. The planks are covered with rigid insulation and a floating slab. This method separated the structure from the clean interior conditioned space, eliminating potential air quality issues and also reducing the volume to be conditioned. Additional benefits include reductions in noise and vibration. Future flexibility of layout was achieved by locating the electrical and data cabling in the floating slab.

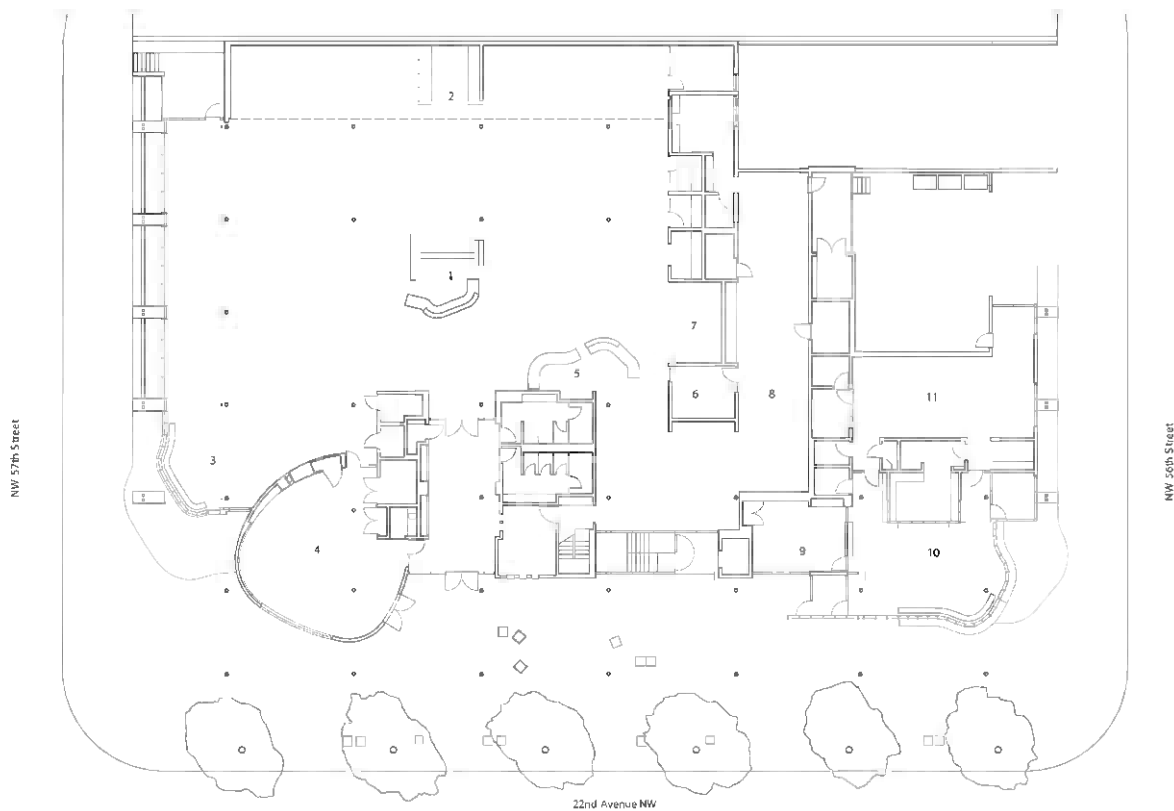
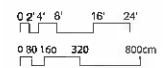
Above this, rows of tapered steel columns of varying heights support laminated timber beams below the planted roof (Fig. 7). Light penetrates the core of the building at high level as the roof curves upwards at the north and south edges. A covered front entrance porch is formed at the western edge by overhanging purlins. The Ballard Library and Neighbourhood Service Center was determined as the exemplar project for the new Ballard municipal centre master plan and provides a strong civic face along the pedestrian corridor, both day and night (Fig. 11).



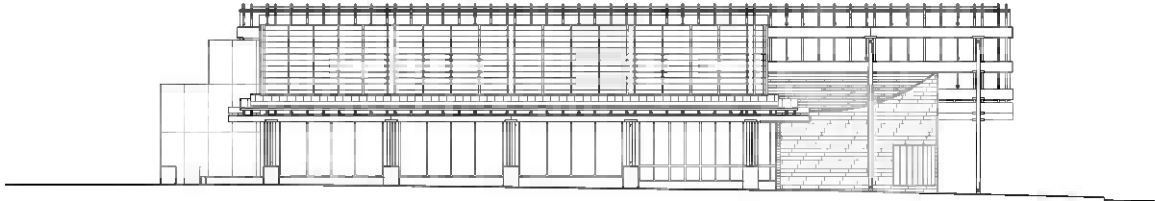


- 1 collections
- 2 quiet room
- 3 parking garage
- 4 office
- 5 library staff
- 6 service
- 7 neighborhood service center

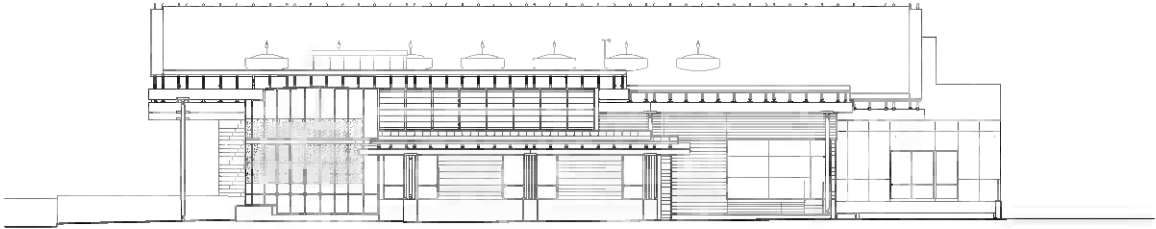
North-South Section



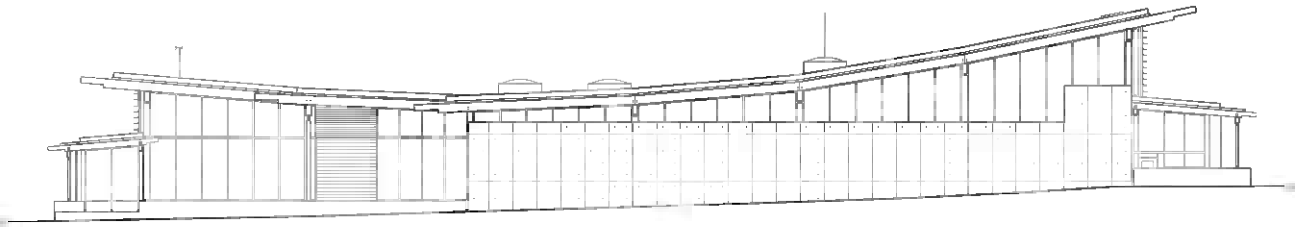
- 1 reference desk
- 2 quiet room
- 3 childrens area
- 4 multipurpose room
- 5 circulation desk
- 6 branch manager
- 7 reserves
- 8 library sta ff
- 9 conference room
- 10 neighborhood service center
- 11 NSC sta ff
- 12 luxury retail/ housing



North Elevation  
0' 2' 4' 8' 16' 24'  
0' 80' 160' 320' 800cm



South Elevation  
0' 2' 4' 8' 16' 24'  
0' 80' 160' 320' 800cm



East Elevation  
0' 2' 4' 8' 16' 24'  
0' 80' 160' 320' 800cm





Fig. 12 below right

**Inside the library,** the considered use of resources was applied to the furniture design. Site-specific modular furniture was manufactured using standard 8 feet x 4 feet sheets of plywood. The design incorporates slots and tabs for quick site assembly, allowing maximum density flat pack shipping loads to reduce transport. (Fig. 14).

The majority of materials used in constructing the fabric of the building were selected with recycling in mind. Primarily steel, aluminium, glass, concrete and wood. Components were selected for ease of assembly and durability, furthermore layers of site finishings were eliminated to enable future deconstruction, sorting and recycling (Fig. 15). Similarly, recycled products used in the construction include glass backfill, concrete forms derived from milk cartons, and Plexiglas artwork in the Children's area also originally made from recycled milk cartons.

The natural light levels within the library are monitored by photo sensors linked to the control of the supplementary lighting (Figs. 12, 13).





**The main entrance** of the library building is aligned to a red metal channel, a blue channel aligned to the face of the building leads to the lobby of the neighbourhood service centre (Fig. 17).

The external works, a mixture of hard and soft landscaping, is punctuated by functional, robust street furniture designed by the architect. Folded from recycled content steel sheets the chairs are arranged in groups promoting social interaction and bringing a dialogue with the public building into the street. Permanently parked adjacent to the road, the furniture is not unlike the folded metal of the vehicles on the other side of the kerb (Fig. 16).

Architects, Bohlin, Cywinski, Jackson in evaluating the project state that, “our opportunity was to focus the community’s interest in green design to make this facility a dynamic teaching tool for sustainable design and environmental awareness”.

Monitoring and measurement for post-occupancy evaluation are built in at all levels. From the roof-top observation deck where climate and ecology are on the agenda of researchers and visting classes, to the solar energy systems now linked to Seattle City Light’s website.





# Centro Culturale Elsa Morante

Rome, Italy

2010

LCA Luciano Cupelloni Architettura

[www.lc-architettura.com](http://www.lc-architettura.com)

**Elsa Morante's La Storia (History)** is a novel about the harrowing realities of life in Rome during the Second World War. The principal female character, Ida Mancuso, a half Jewish primary school teacher is described in William Riviere's introduction to the Penguin translation as "too simple of spirit to read the newspapers in order to find out the official line on quite how damned or not damned her children and she may be on account of their mixed blood". From *La Repubblica* to *La Gazzetta dello Sport*, Italian newspapers go, literally, hand in hand with the morning espresso. It is fitting, therefore, that the new meeting place for the 32,000 citizens of suburban Rome's Laurentino 38 district should have a newspaper and periodical library at its centre. In response to calls from Laurentino's residents for a space for social and cultural gatherings, The City of Rome's Department for

Suburbs nominated an underused two-hectare expanse of car park. Existing underground services limited the building area to a longitudinal strip progressing through the site (Fig. 5). This limitation would inform the architect's decision to develop two horizontal construction planes connecting a series of piazzas.

The lower plane contains the multimedia pavilions and the pedestrian progression through them. The upper plane, mounted on slender columns, lies just below the foliage of the pine avenue (Figs. 1, 2) affording views beyond the rolling, grassed mounds typical of the Italian capital's connection between city and countryside.

The City of Rome's Deliberation 48/2006 determined the project's renewable energy policy resulting in the sculptural photovoltaic installations at each piazza.

Population | 2,777,979

Co-ordinates | 41°54'0"N  
12°30'0"E

Elevation | 20 m (70 ft)

Precipitation | 804 mm (31.65")

Temperature | Average High:  
20.4 C (68.7 F)  
Average Low:  
10 C (50 F)

Humidity | 75%





**B- Teatro**



**C- Piazza della Multimedialità**



**D- Mediateca**



**E- Emeroteca**

**The total production** of the Photovoltaic installations (Fig. 4) is 25,000 kWh/a, (20% of the total requirement). The assembly components are:

1. Tubular beam Fe 430 355.6 thickness 10 mm
2. Box-shaped frame 175 x 175 thickness 10 mm
3. Box-shaped braces 175 x 175 thickness 10 mm
4. Attachment flange – thickness 10 mm
5. Support for PV
6. PV panel
7. Technological tree assembly

The skylight components (Fig. 3) are detailed below.

1. Attachment flange
2. Box-shaped beam 100 x 40 x 3 mm
3. Box-shaped beam framework 100 x 40 x 3 mm
4. Internal sheet framework
5. Laminated tempered glass - 15 mm
6. Insulation
7. External sheet framework
8. Double eyelid - thickness 5 mm
9. Sun shade support 80 x 20 x 2 mm
10. Steel shelf
11. Attachment flange
12. Pine wood seat
13. Closing carter

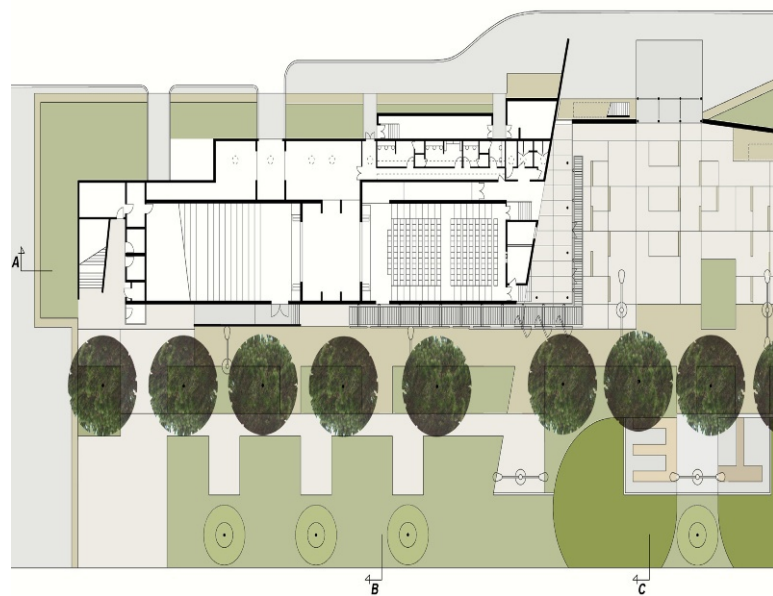
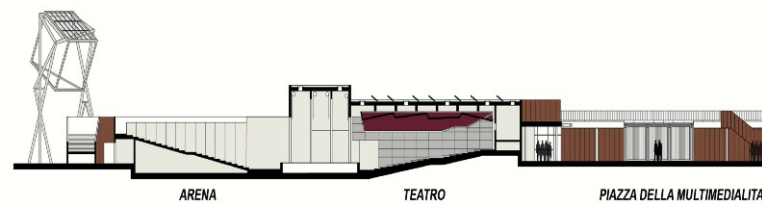
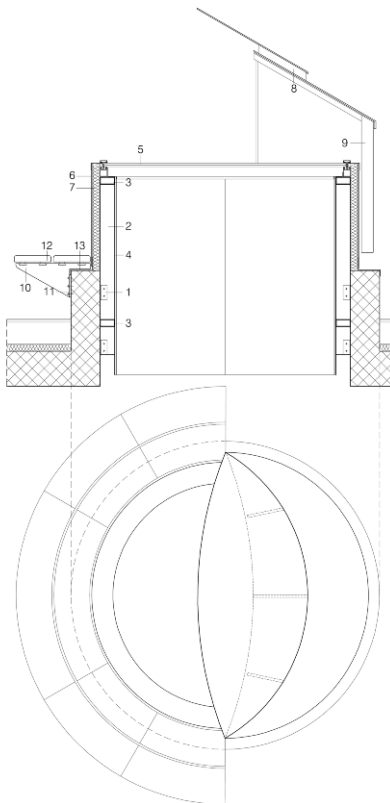
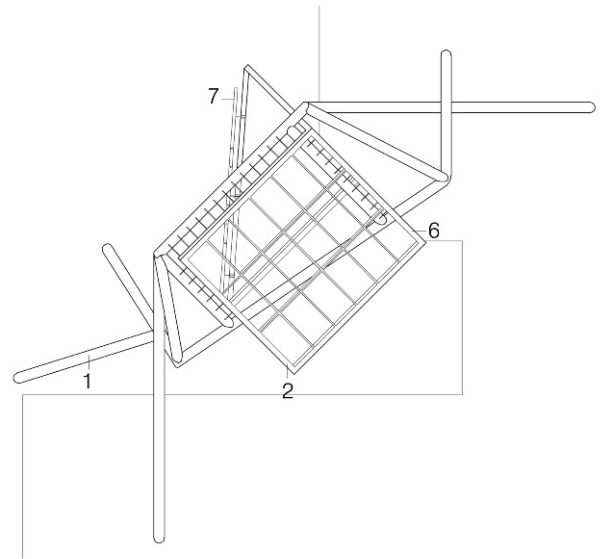
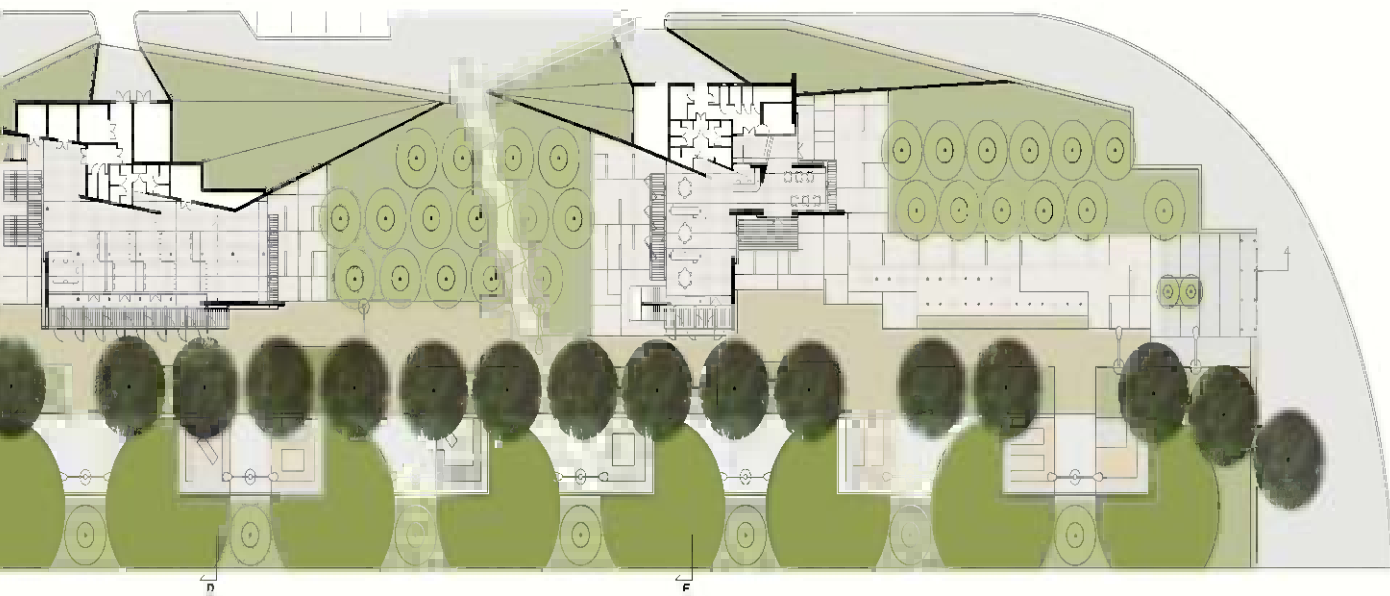
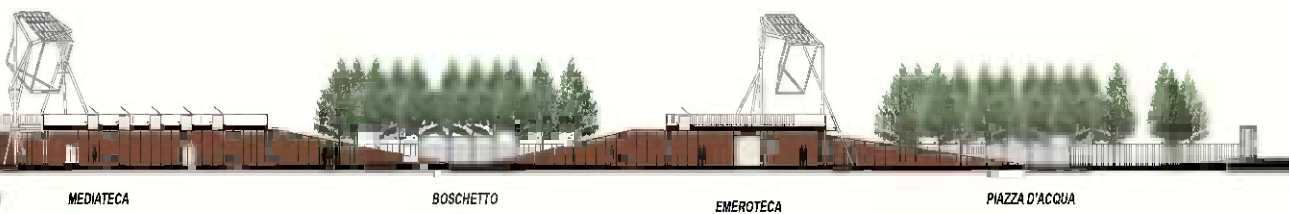
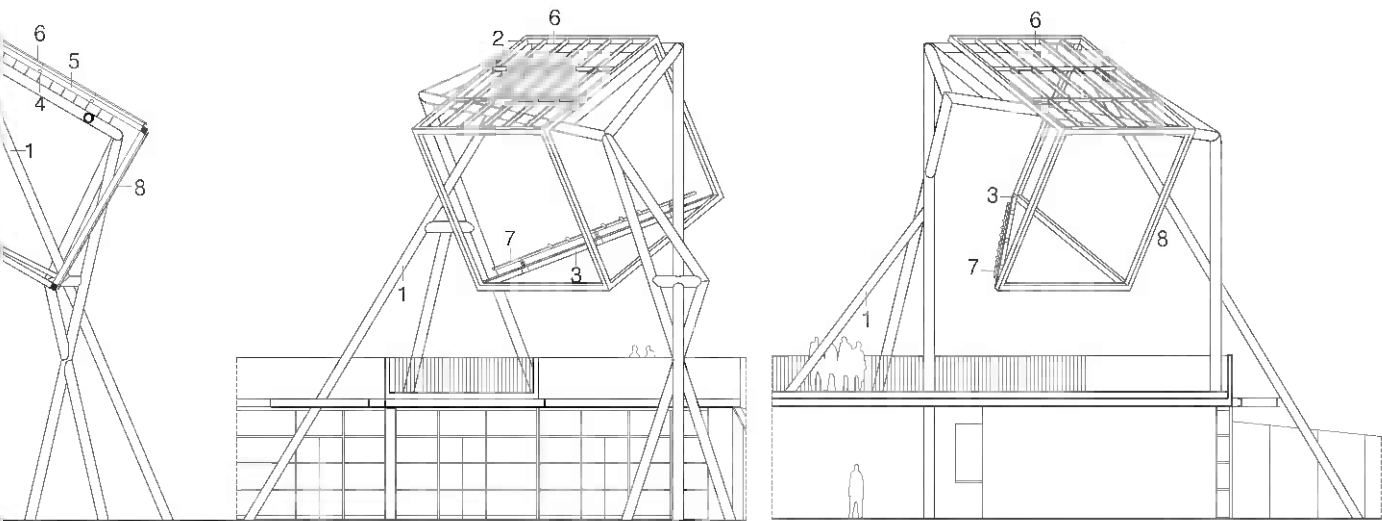


Fig. 4 below





**The design team** lead by Prof. Arch. Luciano Cupelloni focused on the technology of architecture to reduce energy consumption through both active (the technological trees) and passive (solar shading) elements of the design. The horizontal sun shades (Figs. 6, 7) are fixed at angles to suit orientation as follows: south/east 90°, south/west 30°, north/west 45°. The components detailed in Fig. 7 are noted below:

1. Steel double shelf 1500 x 250 x 10 mm
2. Anchorage plate 250 x 250 x 10 mm
3. Flange for sun shading attachment
4. Sun shade frame
5. Thin plates 30 / 45 / 90°
6. U profile for frontal connection
7. U head profile
8. Steel rail
9. Metal sheet carter

The vertical shades (Figs. 6, 8, 9) are adjustable, protecting the low E, insulating glass facade and screening the reading rooms from the park. The components illustrated in Fig. 8 are:

1. Steel frame 100 x 20 x 3 mm
2. Tubular fulcrum diameter 80 mm

3. Fixing boxed beam 20 x 30 mm
4. Thin plates 100 x 20 x 3 mm
5. Floor plate

The natural light provided to these rooms is supplemented by low energy, long life LED and fluorescent lighting. Other technologies employed include north side embankments constructed from natural clay and wood dust blocks designed to mitigate heat loss. Concrete structures are highly insulated with fir wood fibre panels. The highly specified materials combined with dynamic recovery advanced conditioning mechanical plant ensure low energy consumption.

Three tanks under the multimedia piazza and one beneath the 'little wood' provide a rainwater storage capacity of 250,000 litres. This facility irrigates the original row of *Pinus pinea* (Fig. 9), the grass lawned parkland, and 40 new trees, including three giant *Ginkgo biloba*.

Transforming the former 'heat island' car park has breathed new life into the previously exhausted neighbourhood. The Centro Culturale Elsa Morante writes a new, optimistic chapter in La Storia of the Roman suburbs.



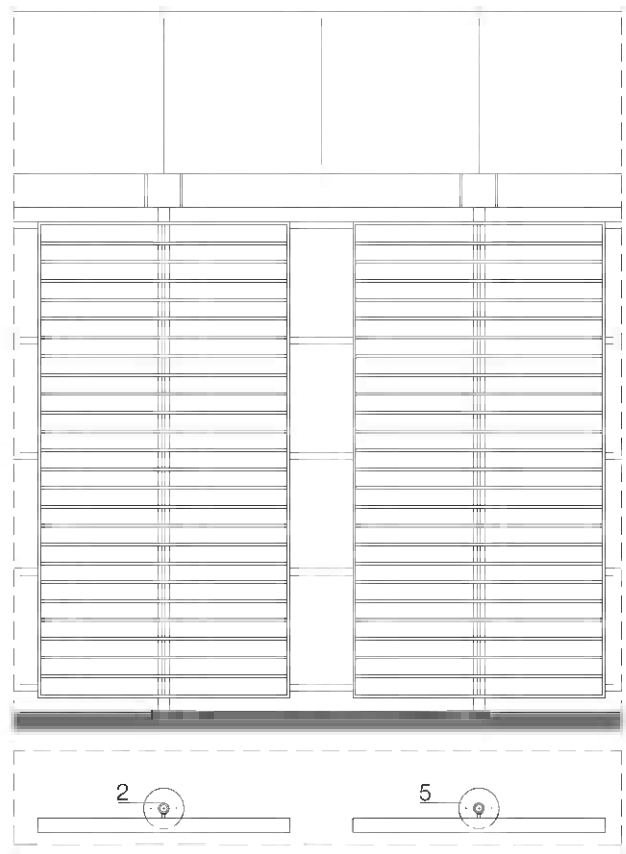
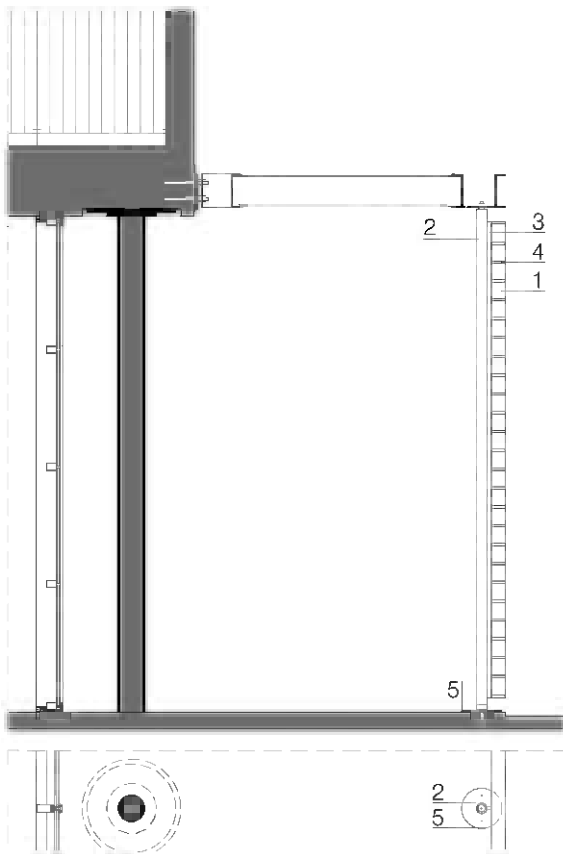
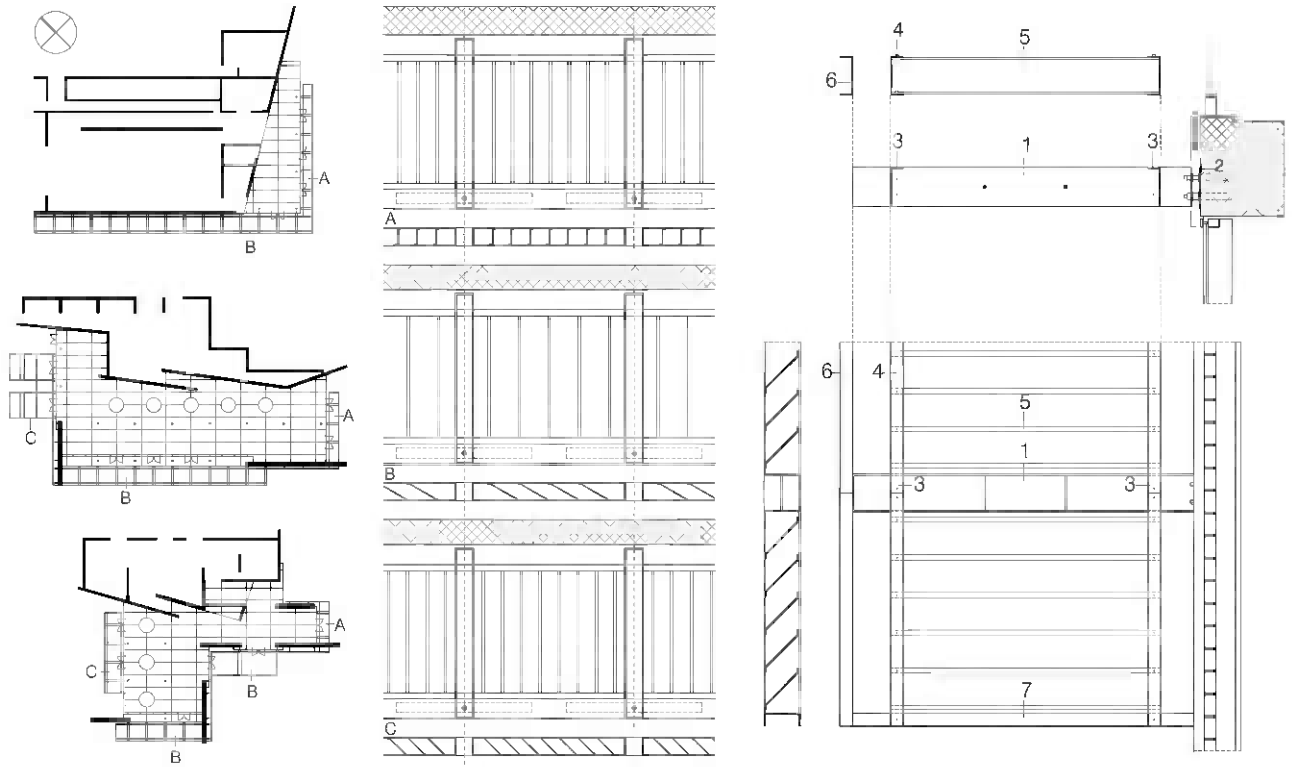




Fig. 9 above, the original row of Pinus pinea preserved | Fig. 10 below, the new 220 seat theatre





Fig. 11 above, simple green hillocks bring variety to the views | Fig. 12 below, the citizens of Rome enjoying their newspaper library



# Gando School and Library

Gando, Burkina Faso

2012

KEREARCHITECTURE

[www.kerearchitecture.com](http://www.kerearchitecture.com)

**In Africa**, a library project can be defined as any method of placing books into the hands of a population aspiring to learn. From Karen Blixen's school for 'her Kikuyu' in Kenya, to the prestigious, originally bookless, library of Alexandria in 21st century Egypt, the questions of, how to increase literacy, and introduce literature, to the population of the African continent has long been debated. In the West African country of Burkina Faso, architect Francis Kere was well aware of the challenges. Francis Kere was the first person from the town of Gando to study overseas. This privilege would manifest itself in his realisation that "education is the foundation for every social, technical and economic development". Kere's practice is based in the city of Berlin, Germany, where he studied at the Technische Universität. While studying, Kere began fundraising, founding

the Schulbausteine für Gando (Bricks for the Gando School). The estimated 35,000 euros required for the school project was compared to the price of a mid-range German luxury car. Kere decided to use local volunteers for the project; believing that "only people who take part in building processes can maintain and spread the word about these developments". Kere's catalytic project was the construction of a primary school capable of taking a young population to a level of reading, where, as adolescents, they could take advantage of the planned library (Fig. 1).

A population, who struggled initially to read drawings and acquire artisanal skills, eventually constructed the school building. This achievement created the platform for the former child of Gando to fulfil the remarkable dream of a library and cultural centre for his fellow villagers.

Population | 2,500

Co-ordinates | 11° 50'30"N  
0° 2'13"W

Elevation | 304.8 m (1,000')

Precipitation | 6 mm (0.236")

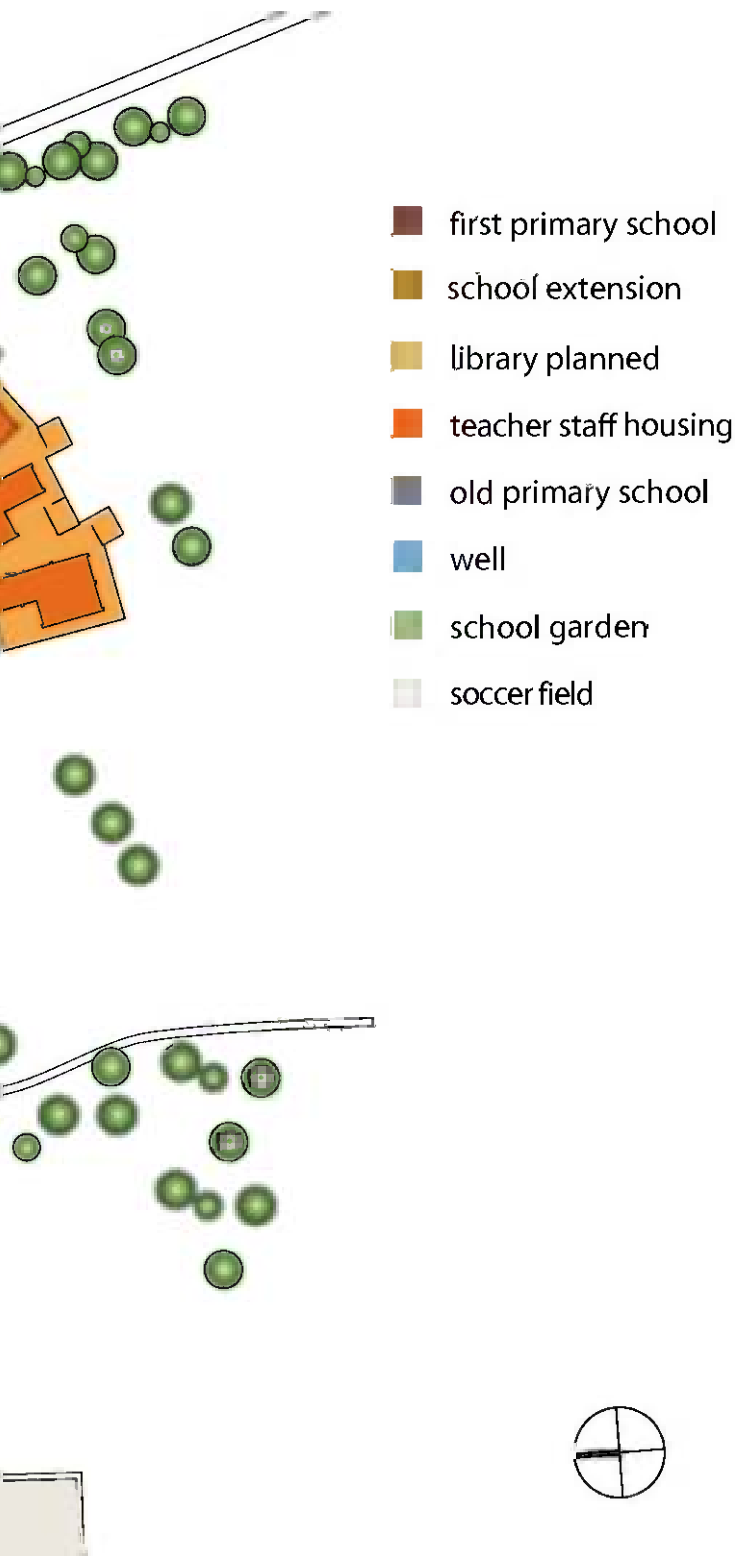
Temperature | Average High:  
25 C (77 F)  
Highest recorded:  
41 C (105.8 F)  
Lowest recorded:  
15 C (59 F)

Humidity | 38.4%







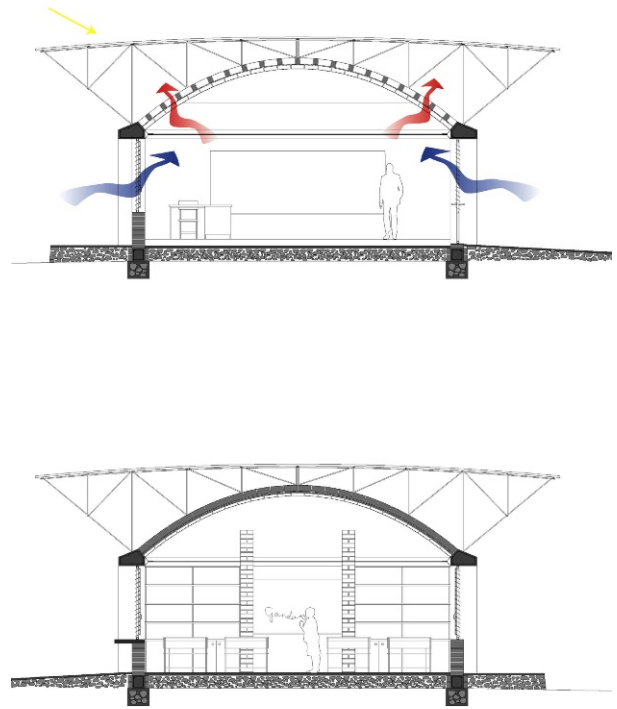


**The school extension** and library were realised to a high build quality by combining traditional construction materials and methods with innovative design responses to the Sudano Sahelian climatic conditions. This was literally a combination of earth and science. The load bearing walls were constructed from compressed earth bricks (Fig. 4). The bricks were hand made using imported Belgian moulds to bind and stabilise the clay with an 8% cement additive. The clay was excavated adjacent to the site. Securing the support of LOCOMAT, a government agency engaged in locally training the brick makers and masons was vital to the project. Water used in the process was drawn and carried to site, initially a distance of 7 kilometres, by the women of the village. This task was later greatly eased by sinking a deep well on the site (Fig. 3); however, the vegetable garden is irrigated with rainwater captured from the school roof. The abundant local clay was also used by the women to stamp in situ the classroom floors. The flooring surfaces were hand finished and impregnated with a protective layer of natural oils.



Fig. 5 below

The architect's greatest challenge was to provide a mechanism to comfortably cool the school and library rooms through natural means only. Historically, using corrugated steel roofing sheets as the only roofing component created a build up of heat within the classrooms. Consequently, the architect resolved to use the sheets only to form an elevated overhanging canopy to provide shade, and shelter from the rain, similar to a fly-sheet arching over a pitched roof tent, or the protective, upper leaf canopy of a large tree (Fig. 6). Below this canopy a ventilated ceiling constructed from the clay blocks (Fig. 8) allows heat to rise out of the rooms creating a draught input of fresh air through the louvered openings in the sidewalls. The impact of solar radiation on the steel canopy acts as the motor driving this process (Figs. 5, 7). Besides the clay bricks and steel roof sheets, a third key component, reinforcing bar, was used to site fabricate the support branches of the canopy. The resultant cooler, fresher, room conditions are more conducive to reading and learning.



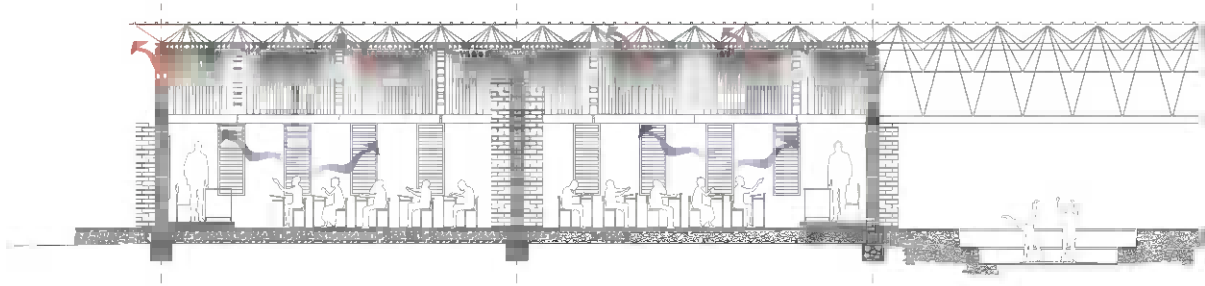
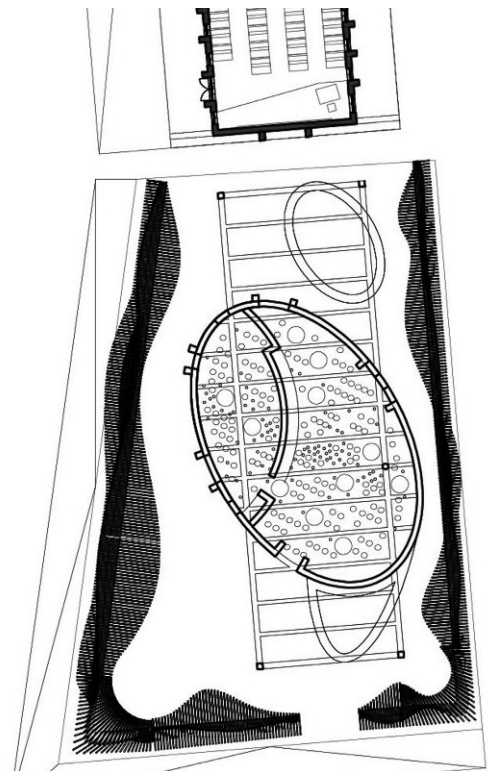
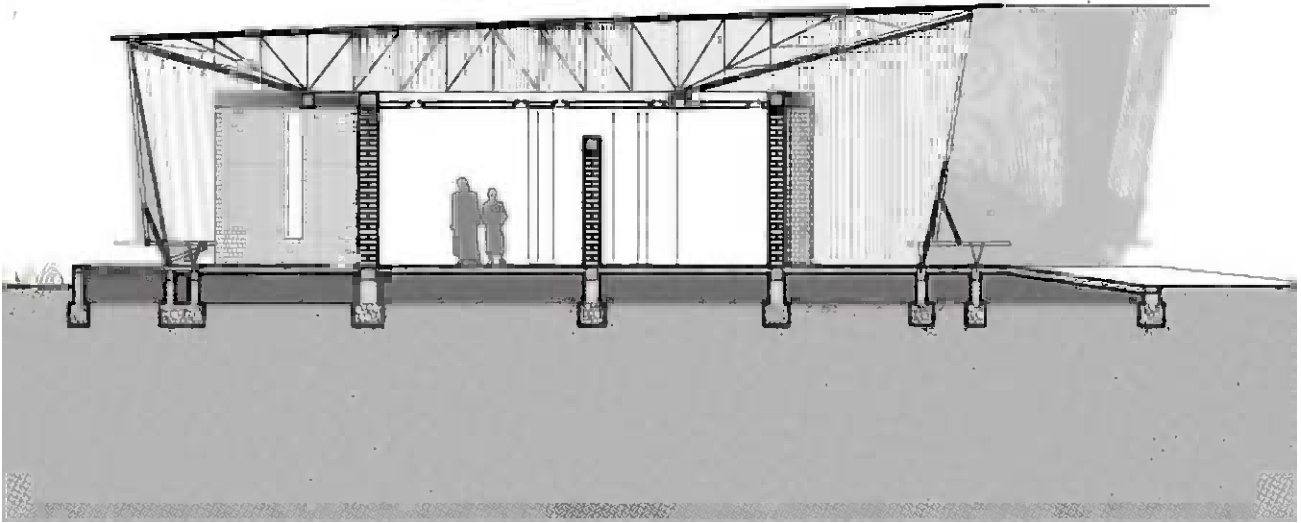


Fig. 9 below right

**The library building** at Gando follows the same design and construction ethos as the school building, with one or two notable developments. The elliptical shape of the library (Fig. 9) provides a distinct contrast to the formal rectangular schoolrooms. Circular, punctured clay pots, made by the women of Gando, were cast in to the library's concrete ceiling to ventilate and illuminate the space below. The corrugated steel sheet roof was again set on a fabricated frame to create a solar energised ventilated void.

The library roof is cantilevered well beyond the library perimeter to create a transitional space, enclosed and shaded by a screen of eucalyptus columns. The fast growing eucalyptus tree is not valued in the wild as it provides little shade and dries out the soil. This creative utilisation of an undervalued resource typifies the Gando project. In helping his native villagers to help themselves Diebedo Frances Kere received the Aga Khan Award for Architecture and inspired a new wave of Burkina Fasan eco-rural design.





# King Abdullah University of Science and Technology

Thuwal, Saudi Arabia

2009

HOK

[www.hok.com](http://www.hok.com)

**The declared mission** of the King Abdullah University of Science and Technology is to “address humanity’s most urgent scientific challenges related to energy and the environment”. The 5.5 million square feet research facility is open to international graduates studying sustainable solutions to mankind’s basic requirements of water, food and energy.

The project is a key component of Saudi Arabia’s policy of rapidly building an economic model for the future, beyond the current fossil fuel dependency. Consequently the design and construction of the campus was required to be exemplary in terms of sustainability.

With a demanding programme incorporating the design and construction of 26 university buildings in only 2.5 years the geographically dispersed design teams required guiding principles for the

project. By combining traditional Arabic building strategies with contemporary design, materials and technology, the team aspired to create a sense of place, equating the campus with the compactness of a traditional Arabic city (Fig. 4). The beating heart of the development is the 139,990 square feet academic library, strategically placed in an elevated position to command the marine views. A network of streets, garden meeting places and sculptured staircases lead down towards the Red Sea shore. The stone-glass tiles on the facade of the library appear to be solid during the daylight (Fig. 1). However, when night falls the translucent nature of the tiles is revealed as interior lighting permeates the facade (Fig. 2). The beacon of learning provides a focus for the nocturnal outdoor meetings and discussions that are traditional in Arab culture.

Population | 4,556

Co-ordinates | 22° 17'0"N  
39° 6'0"E

Elevation | 2.113 m (7')

Precipitation | 53.5 mm (2.12")

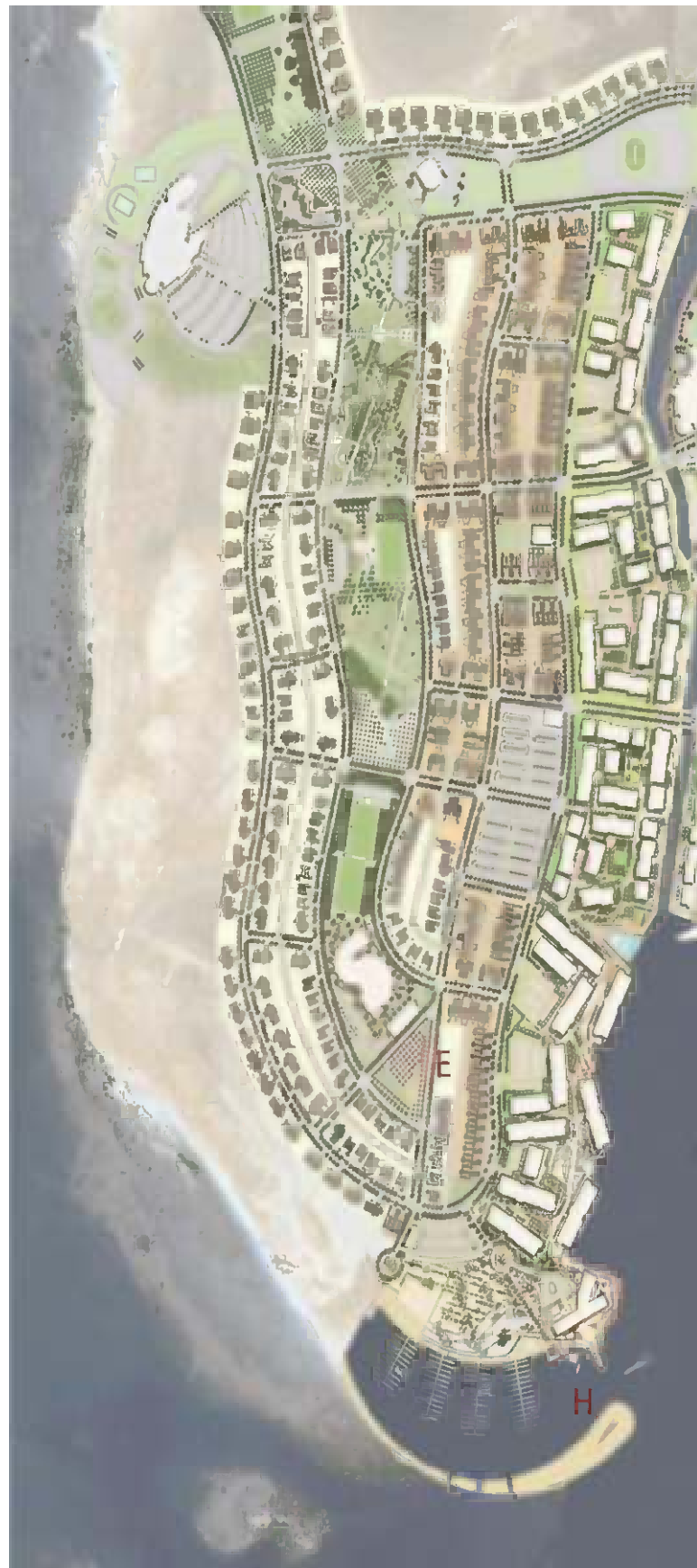
Temperature | Average High:  
40 C (104 F)  
Average Low:  
18 C (64 F)

Humidity | 62.75%





**King Abdullah University** is located on the Red Sea coast in the previously undeveloped fishing village of Thuwal, 50 miles north of the Saudi city of Jeddah. The development was carefully integrated into the environment with new infrastructure works designed to benefit both new and existing residents. The works included drainage and water supply networks, roads, schools, mosques and primary health care centres. Additionally, a historical centre and marina accommodate tourism alongside the traditional fishing fleet (Fig. 4). The fisherman's dock can shelter over 180 fishing boats, while the marine dock provides hospitality for more than 120 boats. The 'new village' houses 2,000 students and more than 3,000 faculty and staff providing further diverse employment opportunities. Design strategies for the library building, were focused on greatly enhancing energy performance without compromising the user experience (Fig. 3). These strategies are detailed on the illustration (Fig. 5) provided by architects HOK.



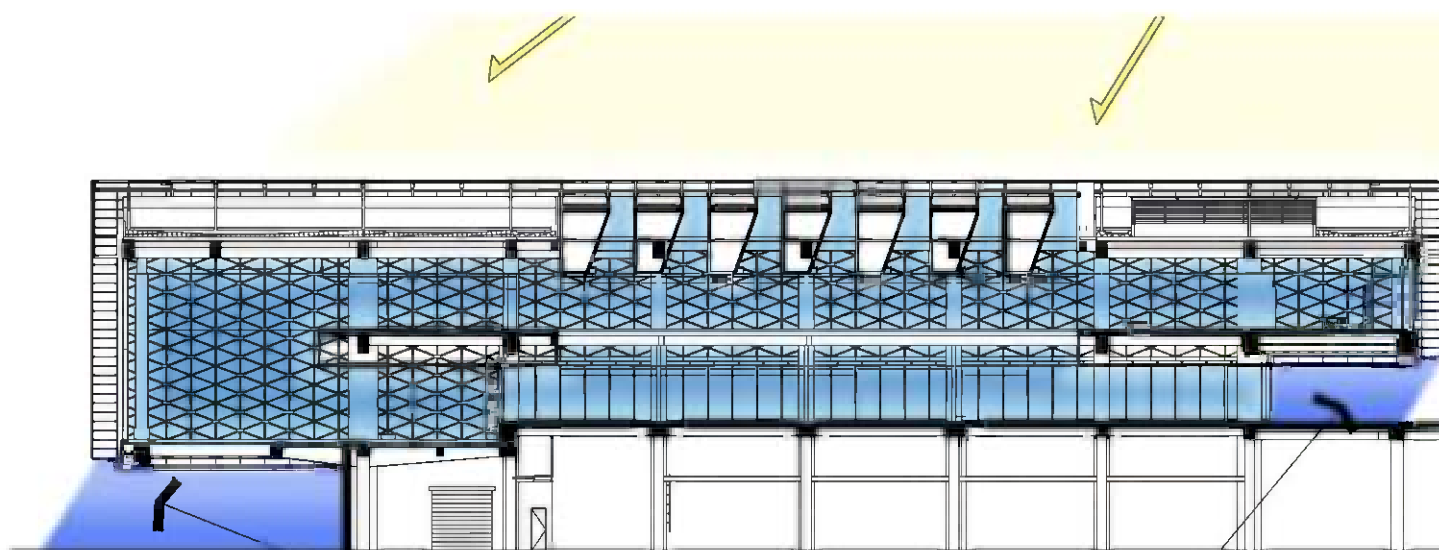
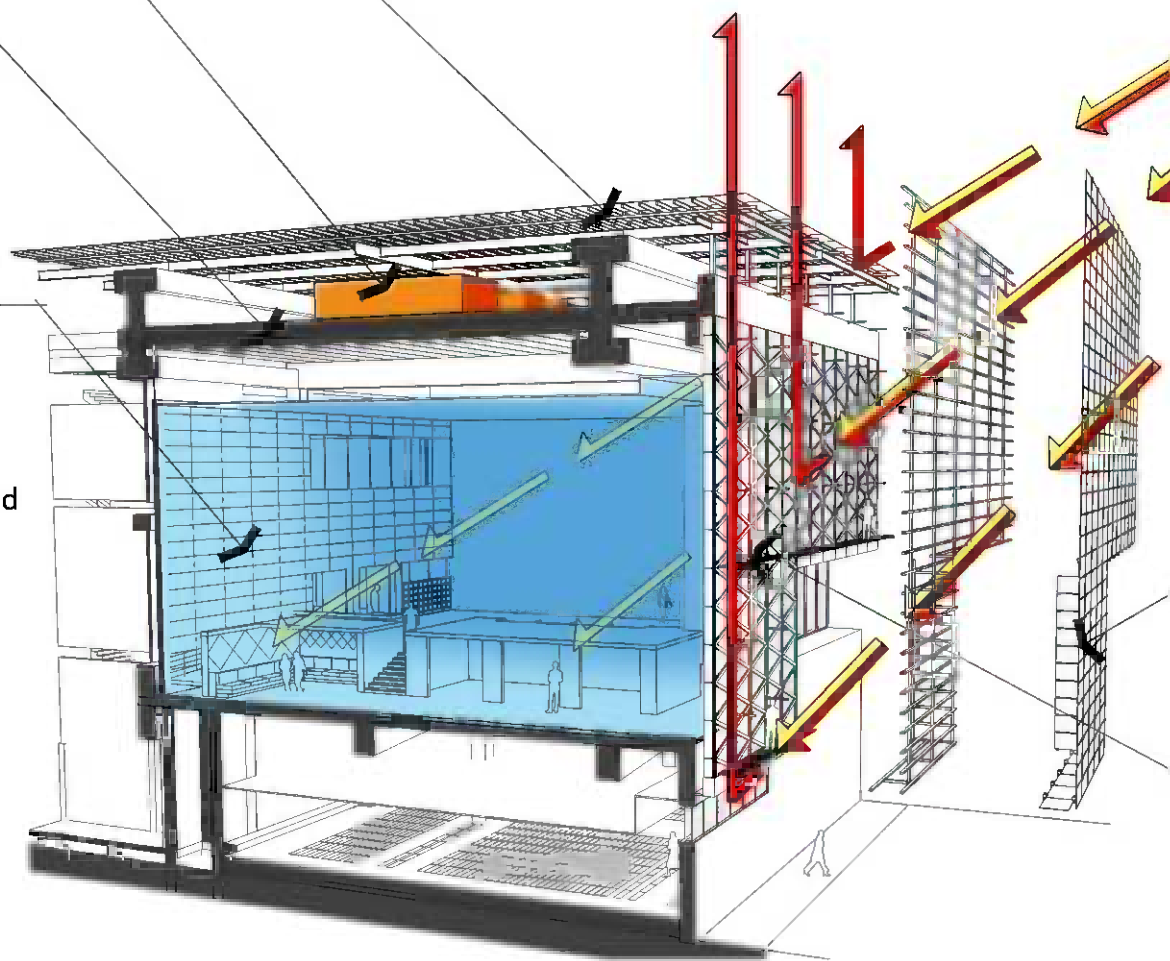




- Secondary roof shading system
- Heat recovery wheels
- 0.29 Envelope U. Value
- R-34 Roof insulation

- 50  
lig  
- No

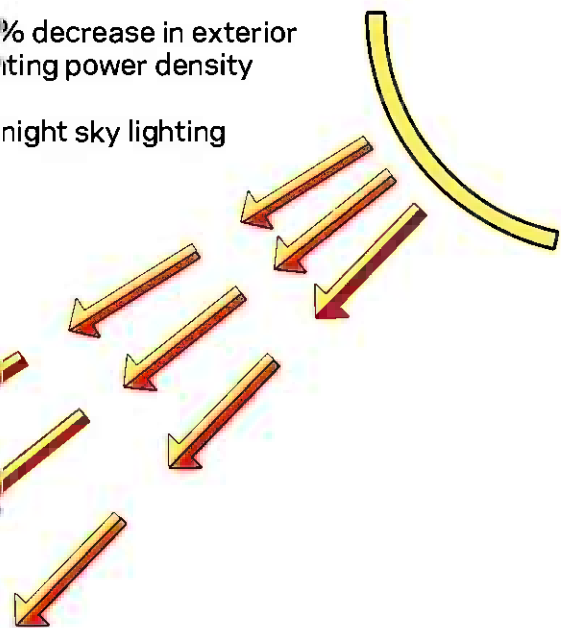
- Interior primarily naturally lit during daytime hours
- 15% decrease in interior lighting power density
- Ambient light levels reduced in lieu of task lighting
- All fixtures have dimming ballasts and are controlled by a time clock



Building overhangs create open shaded areas at building entry points

% decrease in exterior lighting power density

night sky lighting



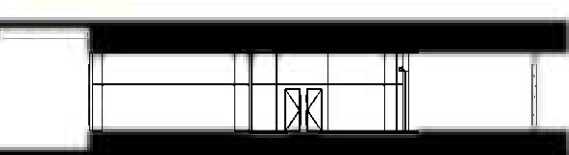
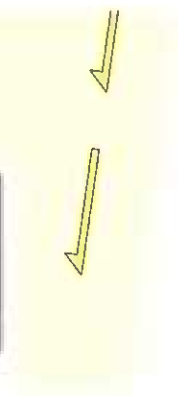
- Double layer curtain wall system diffuses sunlight and dissipates heat gain

- Solar heat gain coefficient appropriate to each facade (0.25 at east and west)

- R-20 exterior wall insulation

- Envelope has thermal breaks in order to reduce thermal bridging

- Solar ban low-emissivity glazing



**Building Orientation and Massing.** Campus buildings were oriented East-West to reduce solar heat gain and to take advantage of prevailing winds. Massing models led to a compact campus.

**High Performance Envelope.** The thermal performance of the building envelope components, including exterior wall insulation, thermal mass, glazing U-value, and solar heat gain coefficient, exceeded ASHRAE Standard 90.1 prescribed minimums.

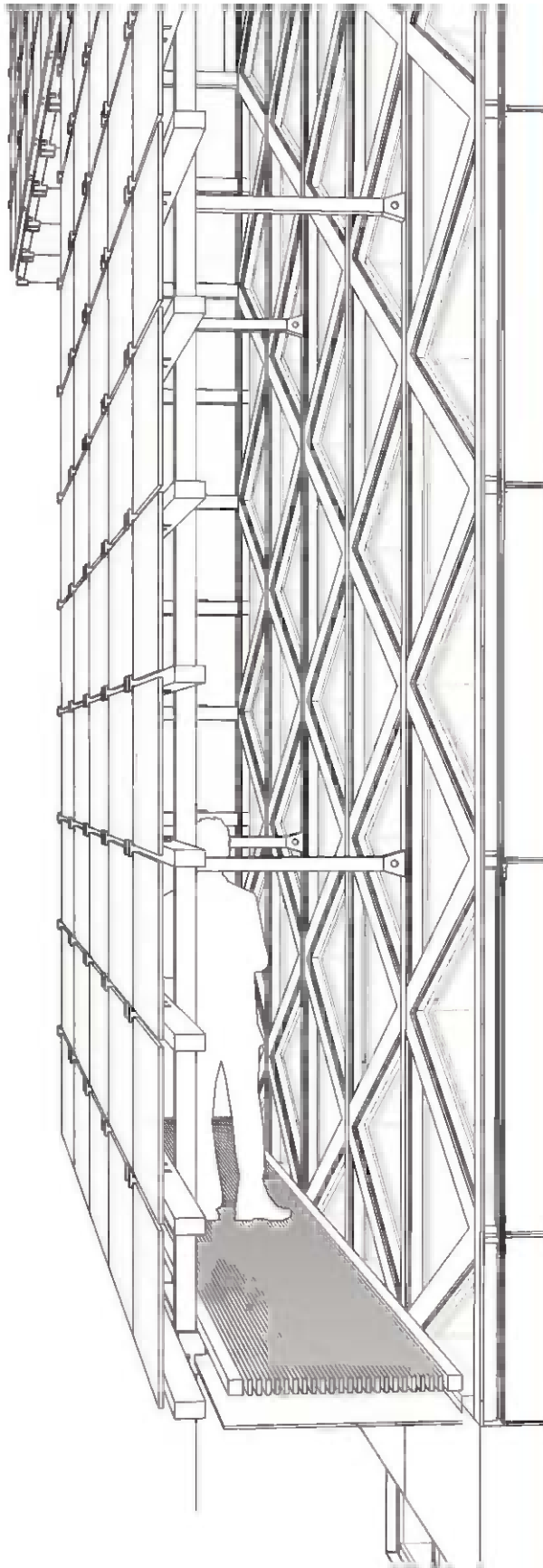
**External Shading Systems.** Louvered window shades, fins, overhangs, secondary roofing and skin systems, and building adjacencies were all used to limit solar heat gains and reduce energy loads.

**HVAC System Efficiency.** Systems include ventilation air recover, demand control ventilation, radiant cooling, variable air volume with high turndown capacity, and limiting reheat energy.

**Lighting Power Density and Lighting Controls.** Both exterior and interior lighting power density exceeded ASHRAE 90.1 prescribed values.

**Renewable Energy.** The library is plugged into a campus-wide system that includes large solar PV and solar thermal arrays on roof surfaces, providing 7.8% of the total campus energy demands.

These sustainable design measures resulted in very large reductions in the energy required to heat and cool the building. The design achieved an overall savings of 37.9% from the baseline established by ASHRAE 90.1 - 2004.





**Whilst the bioclimatic** design limits exposure to the punishing eastern and western sun a hyper-diagrid curtain walling system was specified for its inherent structural strength and thermal efficiency. This system is further enhanced by the perforated panels providing shade to the curtain wall (Fig. 6). The dynamic patterns of light created by the shades evoke those of the traditional mashrabiya screens. Similarly the veiled ‘cool roof’ detailed in Figure 5 creates an ambience beneath it that is redolent of the souk (Fig. 7).

The library’s voluminous study areas, seminar rooms and social spaces are no less dramatic. (Figs. 8, 9, 10, 11). In providing framed views of the courtyards, water gardens and the sea for the patrons of the library, a connection is made to the campus and the world beyond providing a fitting context for the studious work being undertaken. The library and the surrounding campus attained LEED platinum certification in large part due to achieving an Energy Use intensity (EUI) of 90 kBtus / sqft. despite the extreme climate conditions.

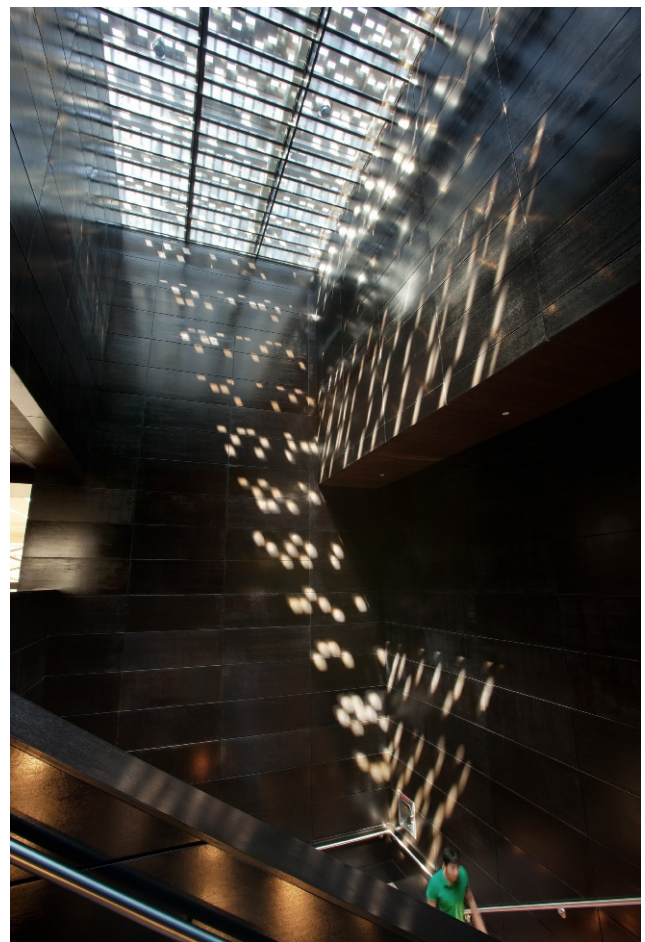




Fig. 8 above, seating lounge / learning commons | Fig. 9 below, cafe view room third floor atrium





Fig. 10 above, learning commons at dusk | Fig. 11 below, backlit stone shroud



# Liyuan Library

Huairou, China

2007

li xiaodong atelier

[www.lixiaodong.net](http://www.lixiaodong.net)

**The pleasure of reading** a book, is, more often than not, a solitary pursuit. The words on the page of a novel are transformed, through eye and mind, into an imaginary screenplay. The reader chooses to be engaged and enveloped by the world described by the writer. This escape can be affected in environments as diverse as a noisy, crowded, commuter train, or, a park bench. If a commuter's stress can be relieved by engaging in reading it can be well and truly dispelled when that person becomes immersed in reading in a quiet, peaceful, environment. This is why many novels are purchased in airport lounges, where holidaymakers select the books they hope will help them escape beyond the destination printed on their airline boarding pass. In China, the most populated country in the world, architect Li Xiaodong contemplated the

location and design of a library and reading room in the small village of Huairou. The village can be reached in just under two hours drive from the sprawling capital city of Beijing. Instead of conveniently constructing the new building in the centre of the village, the architect took the path less travelled and located the library and reading room in a tranquil setting, away from the village and closer to the mountains (Fig. 9).

The peaceful site is reached by undertaking a pleasant, five-minute walk, from the village centre. The walk provides "a setting of clear thoughts when one consciously takes the effort to head for the reading room" (Fig. 2). The architects plans, elevations and sections (Figs. 3, 5 to 8) illustrate the stepped design. Terraces and cantilevered balconies take full advantage of the stunning views provided by the canyon's rugged topography.

Population | 296,002

Co-ordinates | 40° 18' 33.76"N  
116° 39' 5.25"E

Elevation | 145m (475.7)

Precipitation | 410.7 mm (15.81")

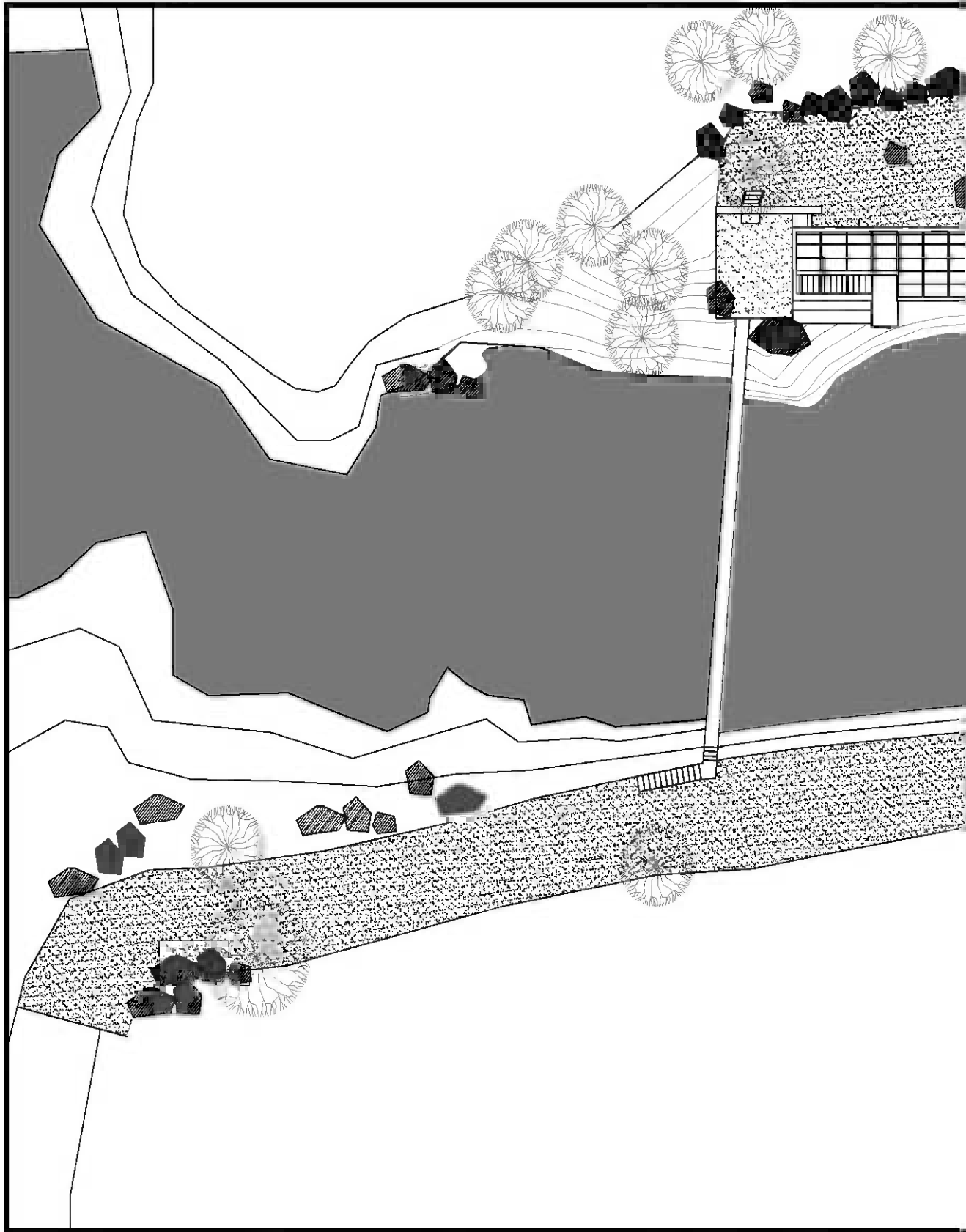
Temperature | Average High:  
31.1 C (87.9 F)  
Average Low:  
-10.8 C (12.5 F)

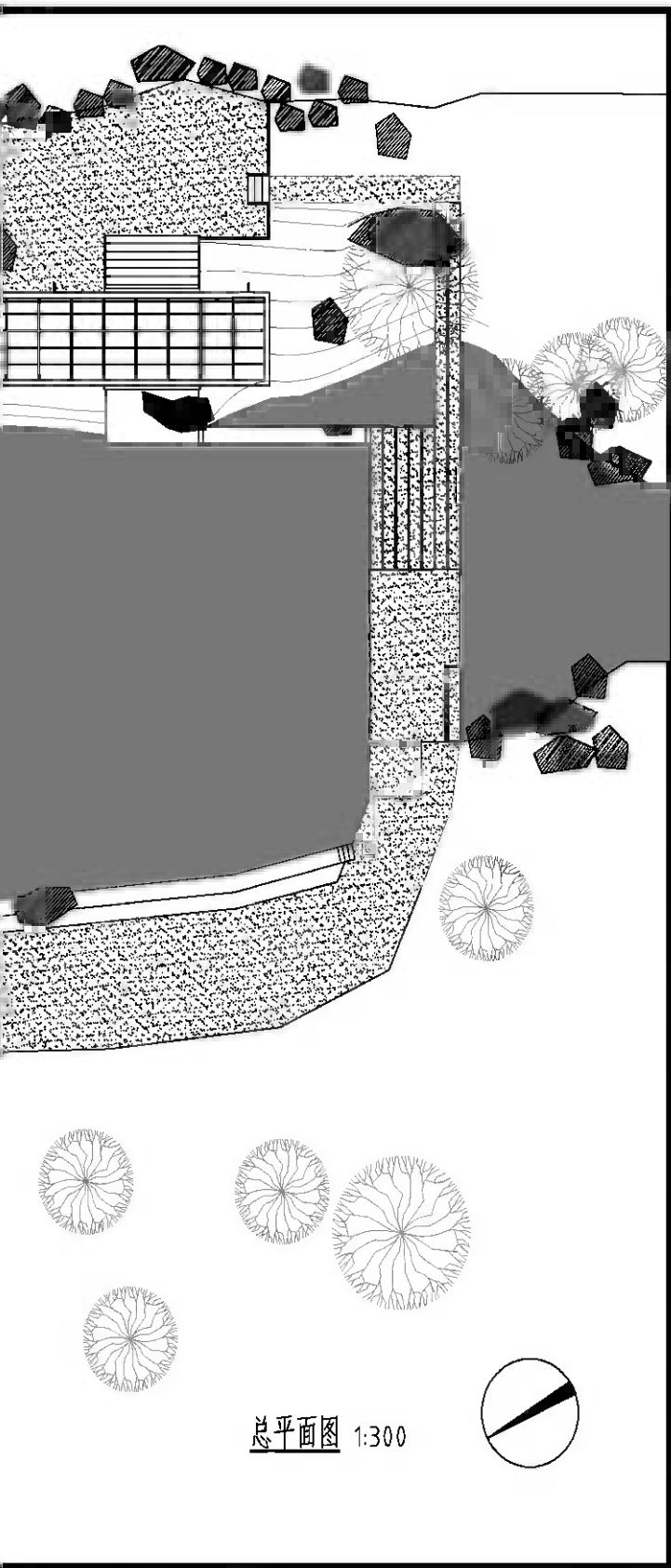
Humidity | 56.5% (Beijing)











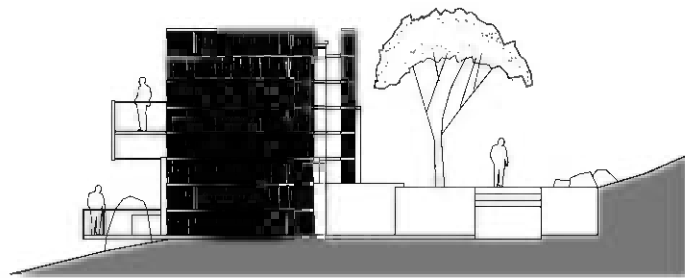
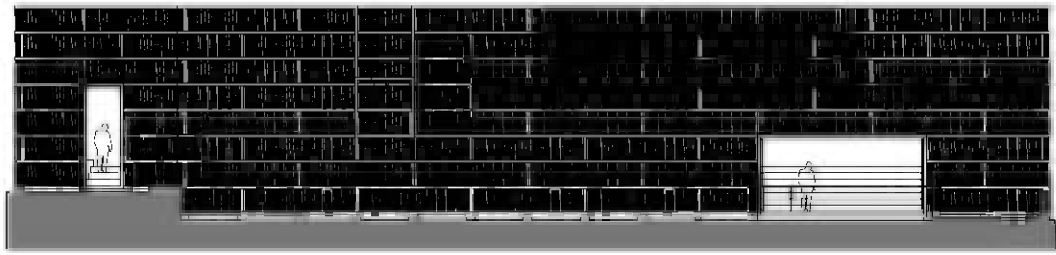
**The architecture of** Liyuan Library is derived from the landscape. The orientation of the building follows the north - south flow of the water course (Fig. 3). Li Xiaodong's site survey concluded that the overwhelming beauty of the surrounding nature could not be rivalled by any man-made structure. From that conclusion, the building's elongated elevation was carefully designed to blend into the canyon (Fig. 5).

The choice of construction materials was influenced by those found in the foothills. In particular the choice of a facade material was crucial to the ethos of the design. The lifestyle of the Huairou villagers would reveal this key component. Every house had a stockpile of wooden twigs used for the fuelling of cooking stoves.

The local abundance of the crop-able twigs made them the perfect choice for shading the glazed facade. Blending seamlessly into the surroundings, the library's man-made structure is camouflaged by its wooded envelope. Nature providing the solution as only nature can.

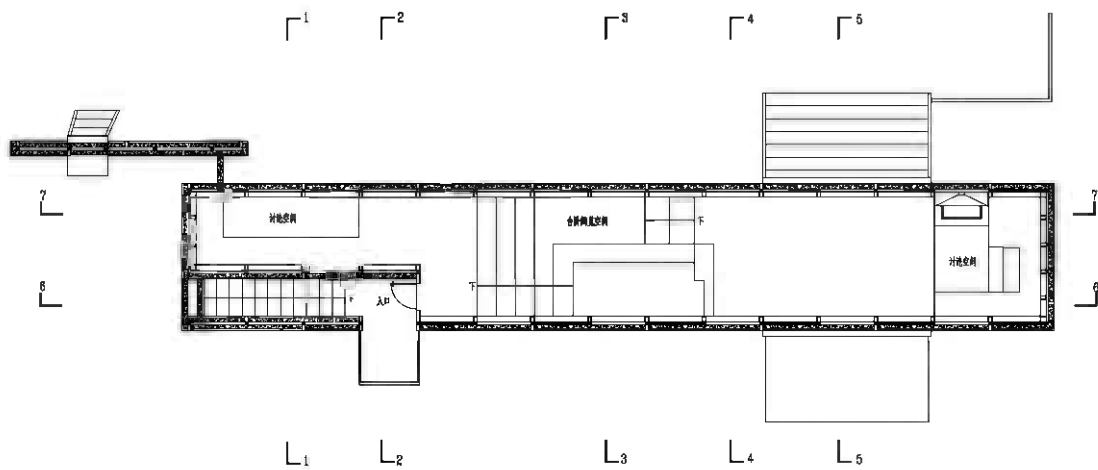


Fig. 5 below

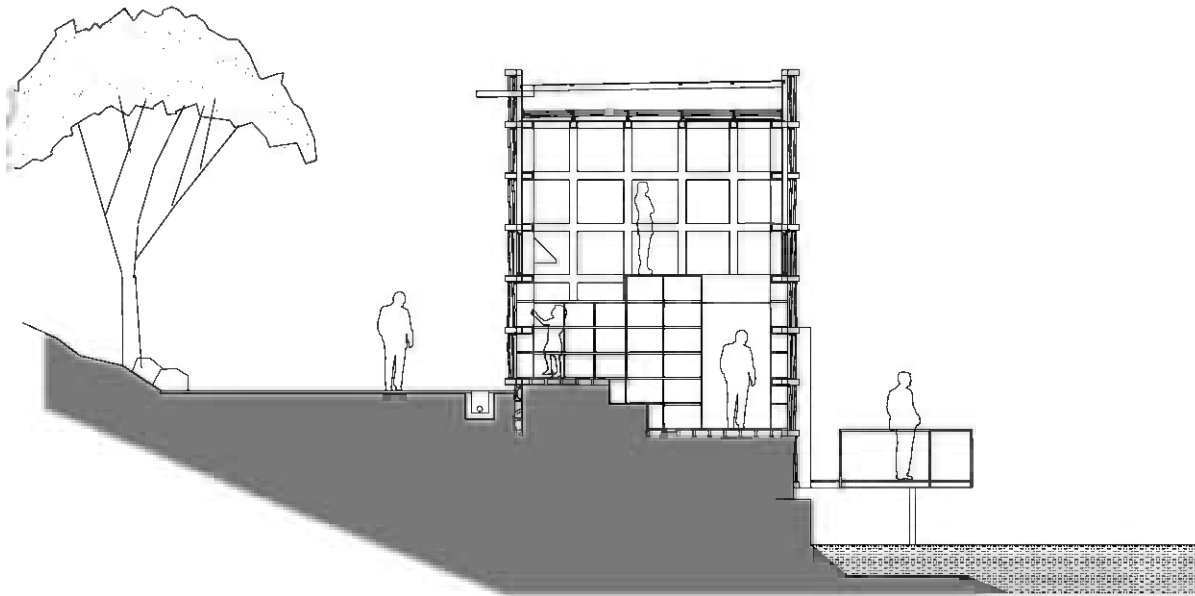


西立面 1:100

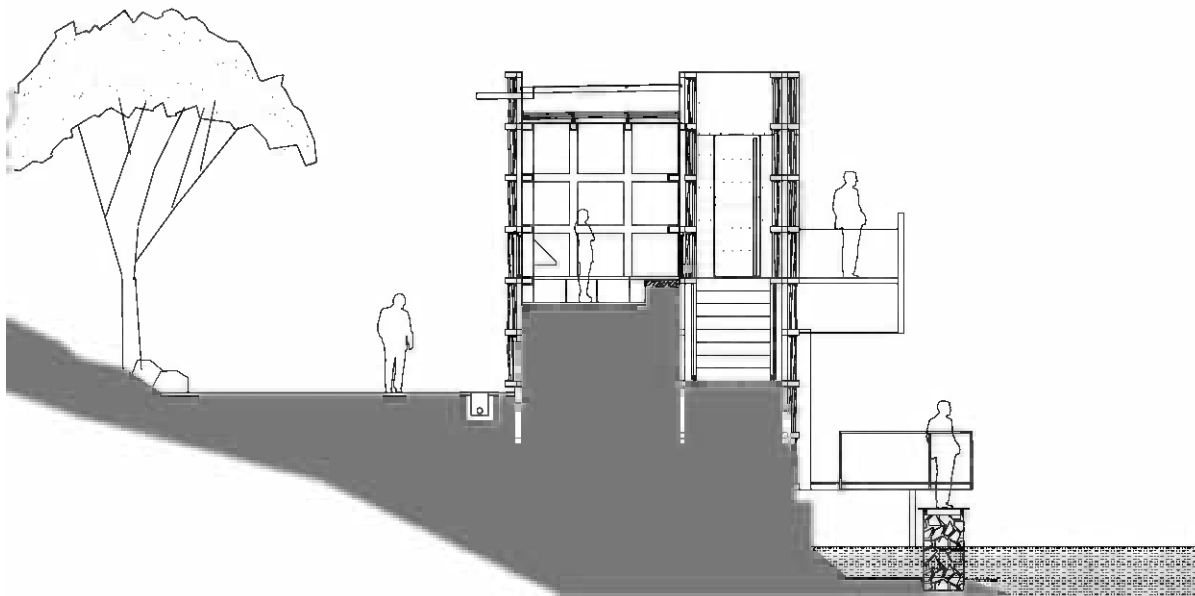
南立面 1:100



二层平面 4m 1:100



剖面3-3 1:50



剖面1-1 1:50





**In and around** the perimeter of the building (Fig. 9) a series of steps, bridges and platforms connect the rooms to the paths meandering through the canyon. The levelled, washed gravel surrounding the structure could be mistaken for the river bed from which it came (Figs. 10, 12, 13).

Inside the library, the reader is able to find a place to perch upon the undulating steps and platforms provided. The varied effect of the filtered sunlight is redolent of a spot in a shady forest, and is the only source of light available. The unshaded panes are strategically placed to allow the visitor to moderate the light through his or her position, as well as providing a view of the wilderness from the protected environment of the reading room (Fig. 11). The power of the sun warming the glazed rooms is the only source of heat applied to the building. The Liyuan library is not currently connected to any local fuel energy source and is closed to visitors in the winter months.

The impact on the ecology of the site is minute, and yet the effect on the well being of the library's visitors is immeasurable.



Fig. 10 above right | Fig. 11 below





Fig. 12 above | Fig. 13 below





# Oak Park Public Library

Oak Park, USA

2003

nagle hartray | architects

[www.naglehartray.com](http://www.naglehartray.com)

**“Ernest Miller Hemingway** was born in 1899. His father was a doctor and he was the second of six children. Their home was at Oak Park a Chicago suburb”. These words are printed at the beginning of each of the five classic Hemingway works published by Triad / Panther Books in 1977. Ten years before Hemingway’s birth, American architect Frank Lloyd Wright moved to Oak Park to build both his home and his career. The culmination of Wright’s twenty year period practicing in Oak Park was the completion of his first public building, Unity Temple, now a National Historic Monument. Mies van der Rohe commented on the completed building as follows, “This moment is the fountainhead of Modern Architecture”. Oak Park’s literary and architectural giants would undoubtedly have taken a special interest in the pairing of books and architecture that manifests

itself in the new Oak Park Public Library. The challenge for architects Nagle Hartray was to provide a sustainable design for Oak Park Library’s discerning patrons whilst continuing the strong architectural heritage of the village. The library’s Lake Street street elevation neighbours important Oak Park heritage building’s including Wright’s Unity Temple (Fig. 4). In contrast, the adjacent public facade of the library overlooks the Jens Jensen designed village green of Scoville Park. James W. Scoville was one of Oak Park’s earliest real estate developers. The large third floor reading room takes full advantage of the park and Michigan’s big sky views (Figs. 2, 3, 5, 6). The diverse nature of Oak Park, as both a suburb of the Chicago metropolitan area, and an historic village, is reflected in the new library’s recycled copper clad fenestrated facade (Figs. 1 & 2).

Population | 51, 878

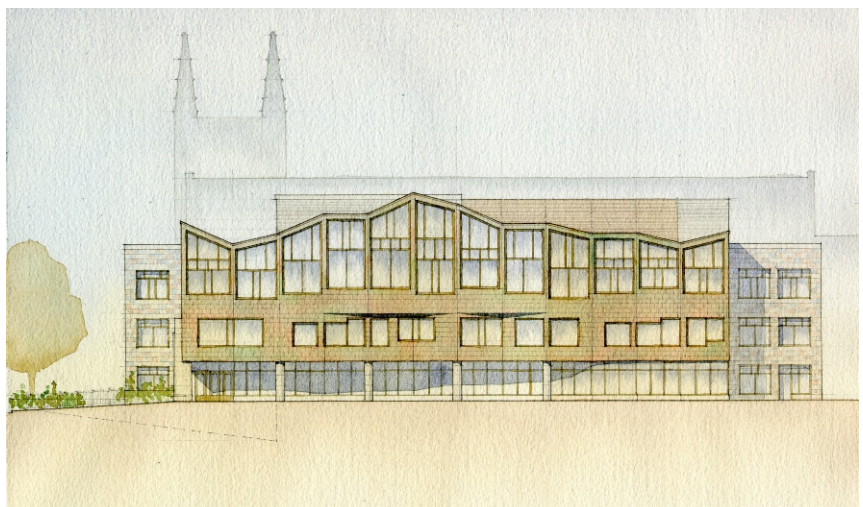
Co-ordinates | 41°53’N  
87°48’W

Elevation | 189 m (620’)

Precipitation | 921.26 mm (36.3”)

Temperature | Average High:  
23.94 C (75.1 F)  
Average Low:  
-2.72 C (27.1 F)

Humidity | 71% (Chicago)







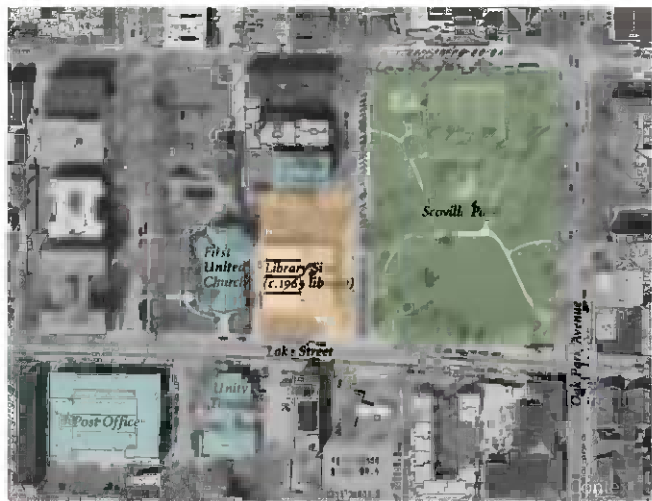
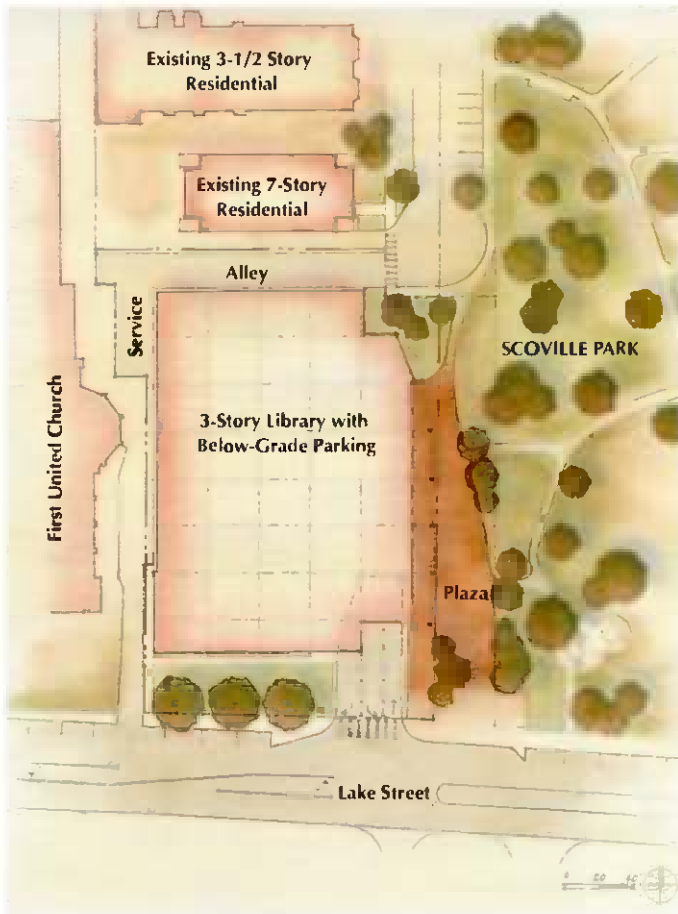
- |                           |                           |
|---------------------------|---------------------------|
| 1. Service Desk           | 6. Information Technology |
| 2. Reference/Nonfiction   | 7. Staff Workroom         |
| 3. Main Reading Room      | 8. Silent Study           |
| 4. Historical Collections | 9. Group Study            |
| 5. Computer Lab           |                           |

Third Floor Plan

Oak Park Public Library, Oak Park, Illinois

NAGLE HARTRAY ARCHITECTURE

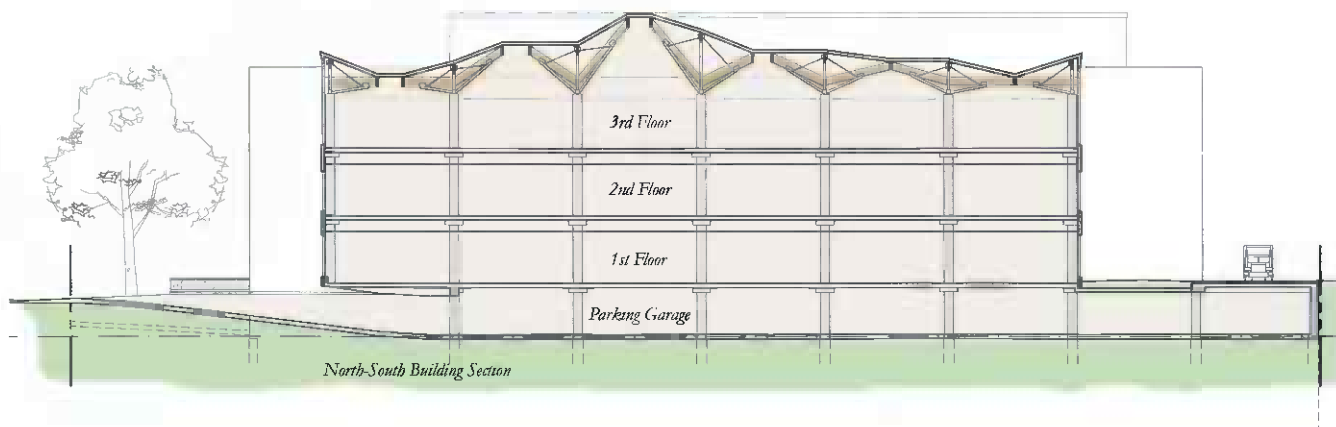
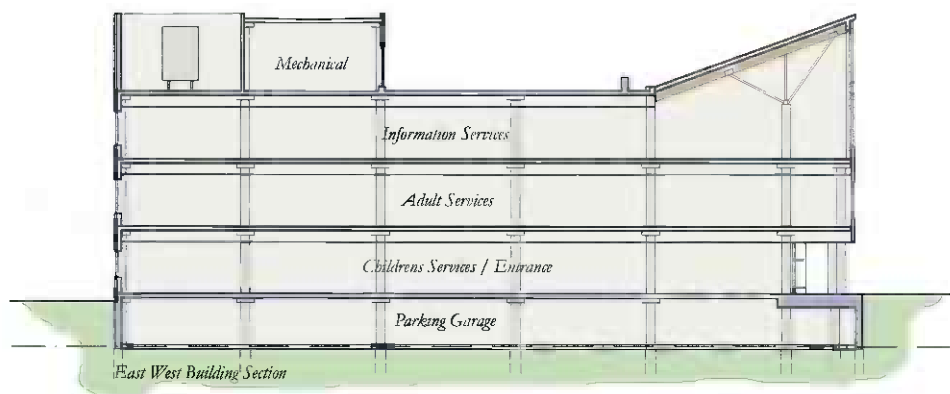
Fig. 3 above Third Floor Plan | Fig. 4 below, site plan.



Site Plan

Oak Park Public Library, Oak Park, Illinois

NAGLE HARTRAY ARCHITECTURE



Sections

Oak Park Public Library, Oak Park, Illinois

NAGLE HARTRAY ARCHITECTURE

Fig. 5 above, architects sections | Fig. 6 below, third floor reading room.

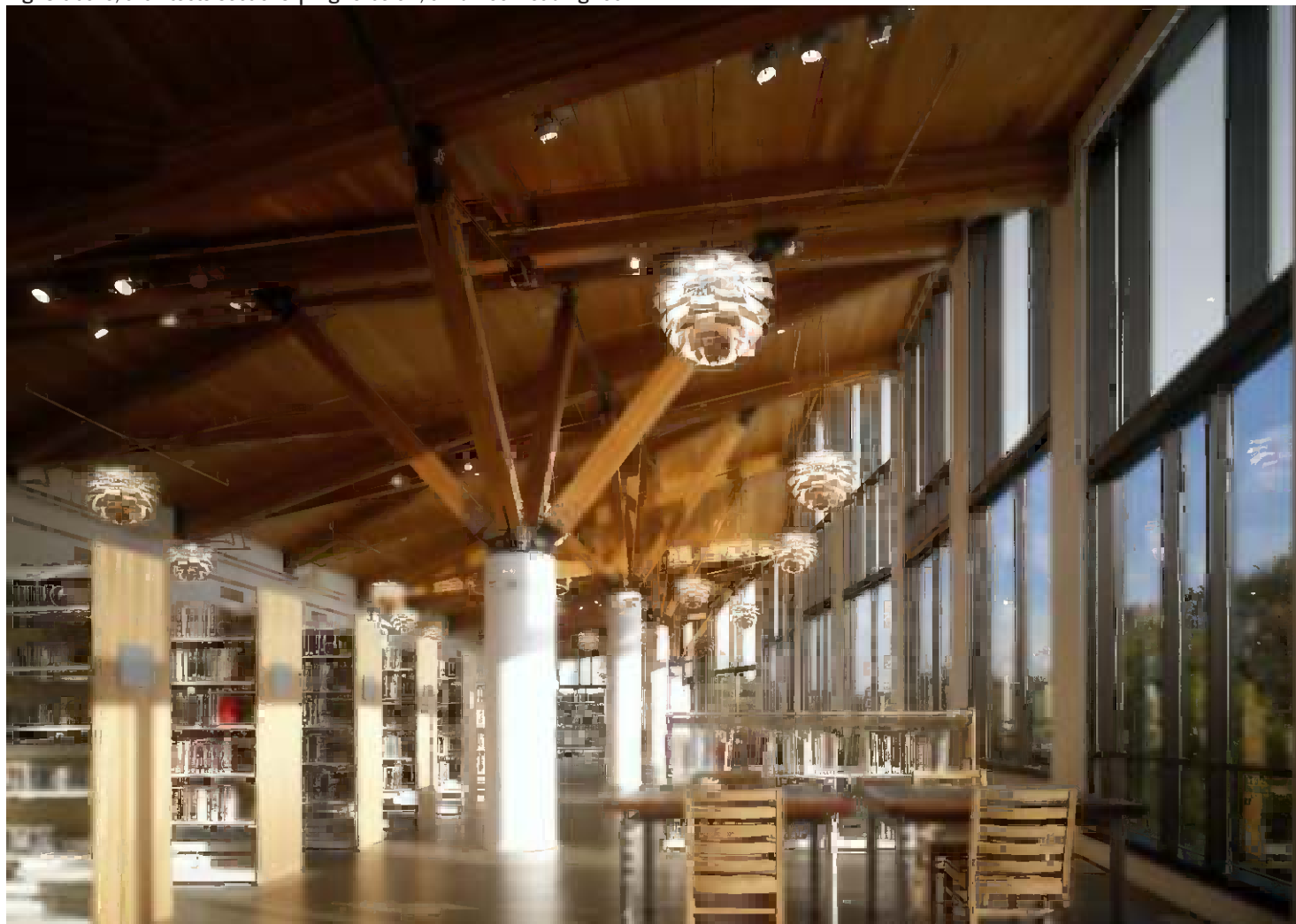


Fig. 7 below right

**The library's** total floor area of 104,000 square feet is finished entirely in recycled rubber flooring. The specification of this type of flooring finish in lieu of carpet was the largest non-commercial installation of its type, pioneering the trend of procuring this durable solution for areas subject to heavy footfall (Figs. 7, 8). The importance of maximising daylight is accommodated by the dimensionally diverse, diagonally opposed glazing (Fig. 9). Transition from daylight to dusk, and night, is enhanced by the immediate connection with Scoville Park's trees across from the paved plaza (Fig. 10).

The Friends of Oak Park Library's vision is stated as follows:

Encouraging lifelong learning.

Responding to the needs of our diverse community.

Ensuring freedom of access to information.

Offering space for people and ideas to come together.

Providing materials and programs that entertain and inspire.

We are committed to excellent service and stewardship of the physical and financial assets







71 Oak Park Public Library | Oak Park | USA | Fig. 11 above



**The Lake Street** elevation of Oak Park Public Library is manifestly monolithic, in keeping with the important public buildings nearby. Selecting locally quarried Kasota stone provided a welcoming, warm, aesthetic (Fig. 12) whilst reducing the need for costly long-haul transportation. Similarly, the vegetative roof provides a reduction of the ‘heat island’ effect, and consequently, a reduction in the energy consumption required for cooling the library in the summer months. This contemporary contribution to the village green is not apparent from street level.

The aerial photograph (Fig. 11) dramatically illustrates an organic connection with the adjacent parkland, anchoring the new building to the landscape in a way that Frank Lloyd Wright, the eminent founder of the ‘prairie school’ of architecture may never have dreamed possible. The LEED checklist was used as a guide to sustainable design, although certification was not sought. The architects of this important public building, like their predecessors, preferring to subject their work to the scrutiny of its discerning users.



# The Open-Air-Library

Salbke, Germany

2009

KARO\* architekten

[www.karo-architekten.de](http://www.karo-architekten.de)

The Berlin wall that divided Germany from 1961 to 1989 provided a physical manifestation of the ideological differences between the allied forces in Europe in the aftermath of World War II. The eventual demise of the 'iron curtain' resulted in the re-unification of Germany. This momentous political event in 1989 was not entirely welcomed by all of Germany's European neighbours who were still traumatised by the war visited upon them by the previous German super state. The task of uniting Germany was immense, as East Germany (GDR) had to adapt to a free market western economy following half a century of state control imposed by the communist ethos of the U.S.S.R. The re-unification of Germany is still a 'work in progress' that has challenged successive federal governments. German citizens committed themselves to a programme of wage restraint and union flexibility in order to absorb the former

communist state into the democratic federal republic. Unsurprisingly, the ensuing turmoil in unifying a population of 70 million people resulted in regionally diverse rates of growth. The abandoned industrial towns southeast of Magdeburg are littered with vacant plots and buildings. Unemployment blights the lives of the residents living in the shadow of closed factories. In this environment, pioneering architects and designers are now challenging conventional ways of providing the changes desired by the citizens of this resilient country. One such practice is Karo\* (Fig. 1). Karo\*'s modus operandi is to engage with the local population, identify a need, and quickly implement a pragmatic ecologically sound solution. This process is designed to inspire and empower the local population through involvement in a catalytic project that will attract investment and uplift surrounding buildings (Fig. 2).

Population | 231,525

Co-ordinates | 52° 8' 0"N  
11° 37' 0"W

Elevation | 513mm (141')

Precipitation | 402 mm (15.81")

Temperature | Average High:  
24 C (75 F)  
Average Low:  
-3 C (27 F)

Humidity | 77.2%





50

Fig. 3 below right

**In Salbke**, a fork in the road defined a fallow plot where a former district library once stood (Fig. 3). Some of the residents related their memories of what was regarded as an important part of the social fabric of the district. The residents determined that existing social networks could be enhanced by re-occupation of the space. They also hoped to create new social networks through the process. KARO\* would facilitate this throughout the design, planning and construction phases of the project.

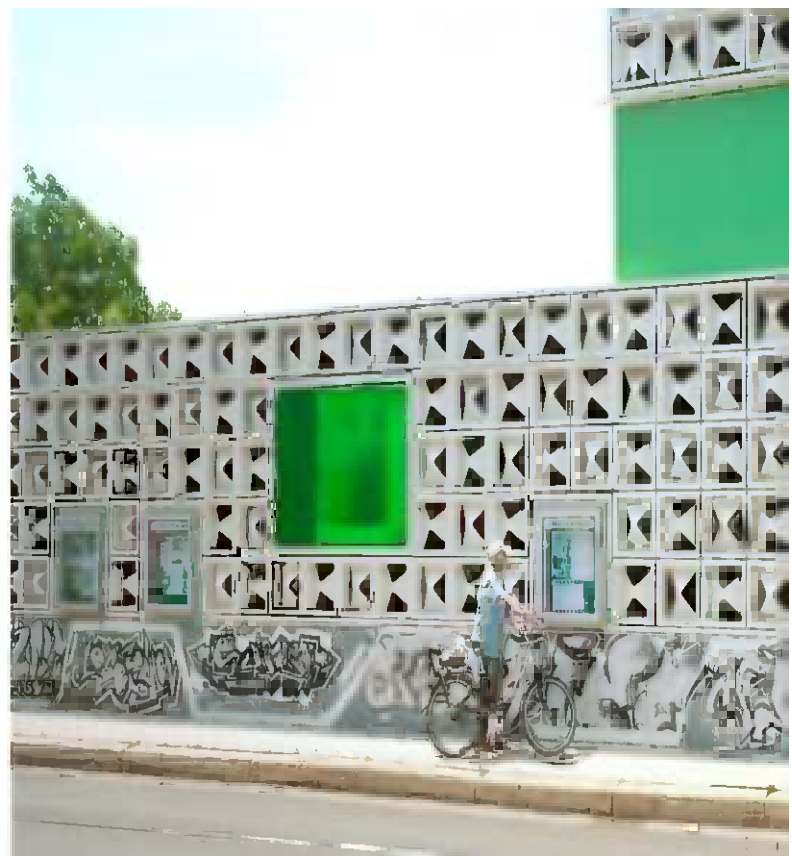
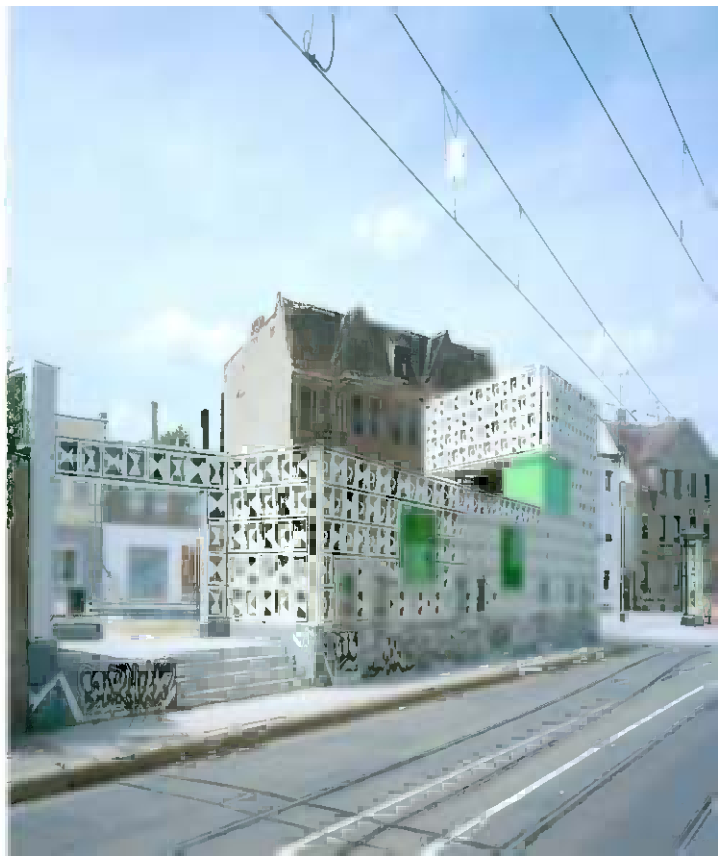
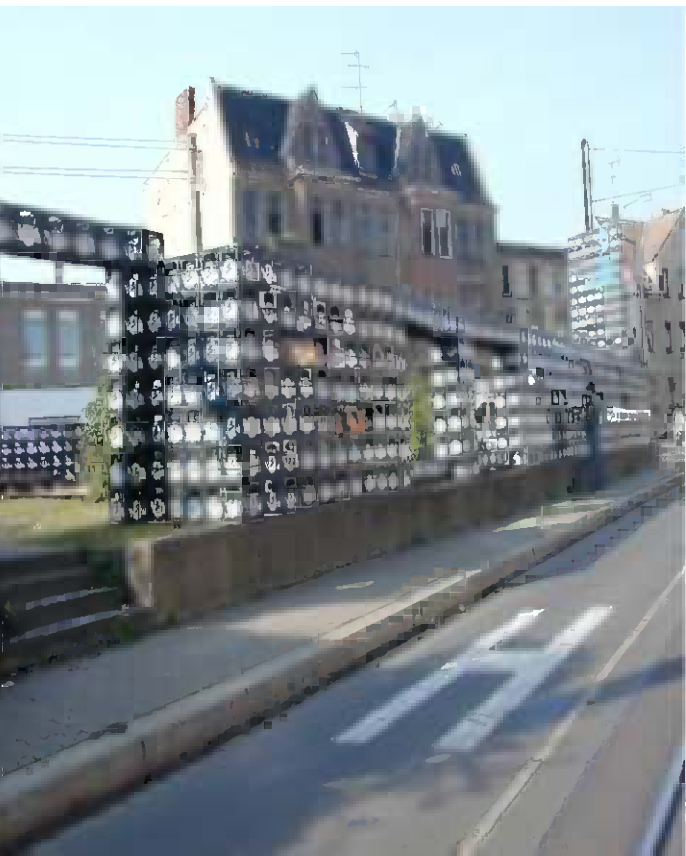
Using an adjacent vacant shop as a base, the residents and designers developed a strategy for reclaiming the site. Design sketches and models were created in close consultation with the residents, who were now busy collecting book donations and storing them in the old shop.

In 2005 the first social intervention took place when the residents constructed their favoured design as a 1:1 scale model on the site. The social sculpture was built from over 1000 beer crates that were lent to the residents for this purpose (Fig. 5). Book donations filled the shelves of the temporary library for two days, and a poetry slam completed the festival. The suitability of the site was established by the construction of the model, and, in 2006, the project became part of a research programme funded by the federal government. Eventually the financial resources were secured to design and construct the Open-Air-Library culminating in its official opening in June 2009.

Encouraged by the success of the beer crate model the citizens of Salbke urged the design team to source the facade for the new library from recycled material. This was achieved by re-using the modernist facade of the Horten warehouse in the city of Hamm. The warehouse was constructed in 1966 and became available when dismantled in 2007. The facade system is based on Edward Durrell Stone's design for the U.S.A. pavilion at EXPO 58 in Brussels. The salvaged facade and its mounting system required very little renovation prior to re-use (Figs. 4, 6, 7, 8). In its present incarnation the recycled modernist facade of the Open-Air-Library provides an example of a very low cost, sustainable building system, that has outperformed and outlived the wall that once divided the citizens of Germany.

The first phase of this remarkable collaboration between Salbke's residents and the KARO\* design team is presented by Karo\* in comic book style on the following page (Fig. 9).

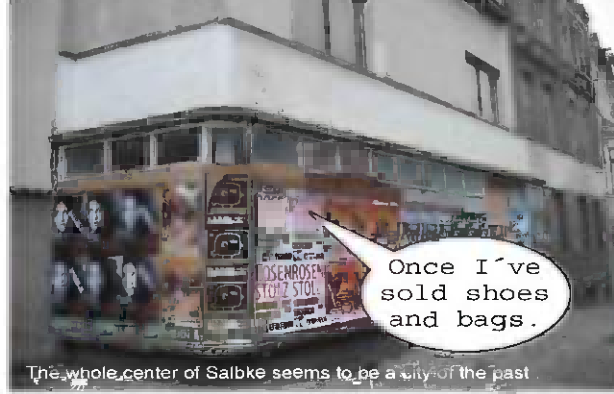






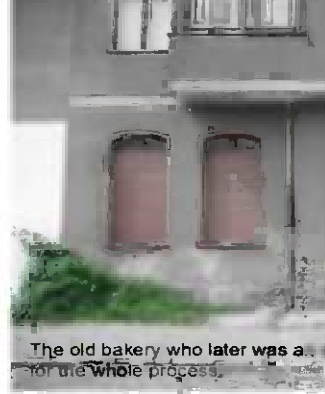
I was a library!

Bookmark for Salbke: Reclaiming an abandon site with the "book" as medium of transformation.

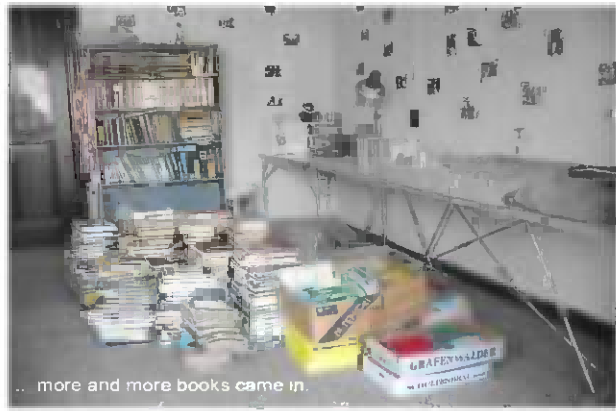


Once I've sold shoes and bags.

The whole center of Salbke seems to be a city of the past



The old bakery who later was a for the whole process.

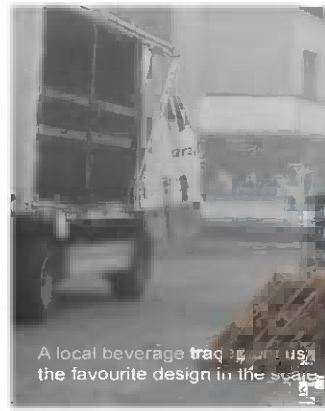


... more and more books came in.



I like the solution with the purple tree.

We started with a building-workshop and the kids were really into it.



A local beverage traq... the favourite design in the scale.



bo by box.



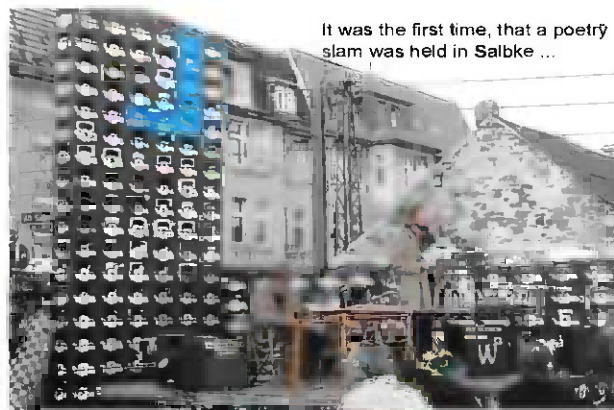
Construction site at 11 am



3x



... and th cially

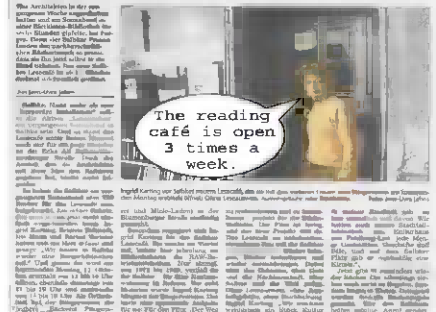


It was the first time, that a poetry slam was held in Salbke ...



and the... known reading...

### Lesen: Ohne Leserausweis, ohne Ausleihgebühr, ohne Bürokratie



The reading café is open 3 times a week.



In the period of one year, more than 10,000 books have been collected.



Now we get money to build the bookmark for real!



electro-shop served as base



I used to work in the bakery

Working in the shop, we got in contact with the locals easily ...



You asked for books, here are some.

We began to ask in the whole city



10 beer boxes to prove



Hey, the boxes are coming!

Mr. Miehle is one of the active local residents.



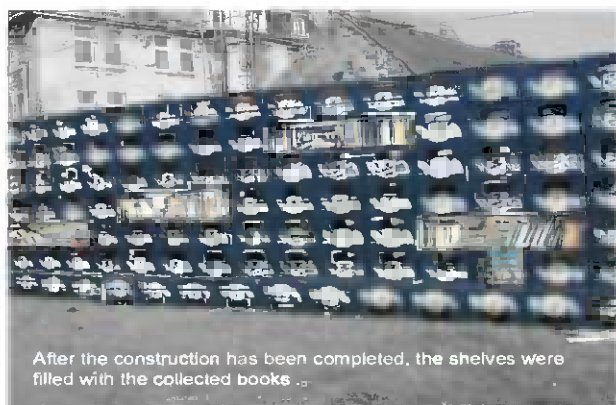
Then, the construction of the temporary library began ...



Construction site at 4 pm



The other day the landmark has been erected ...



After the construction has been completed, the shelves were filled with the collected books ...

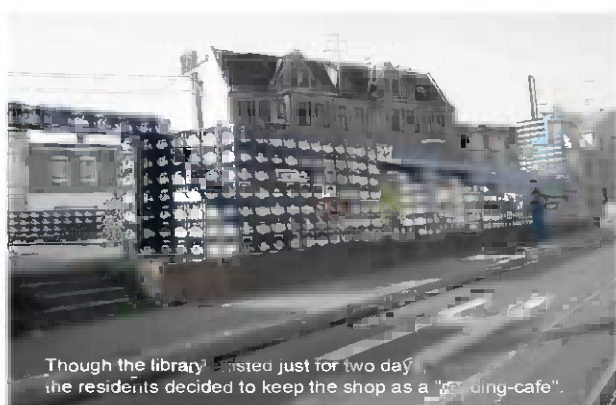


... and as he opened the fridge, he became suspicious. Maybe ...

Groeschmery



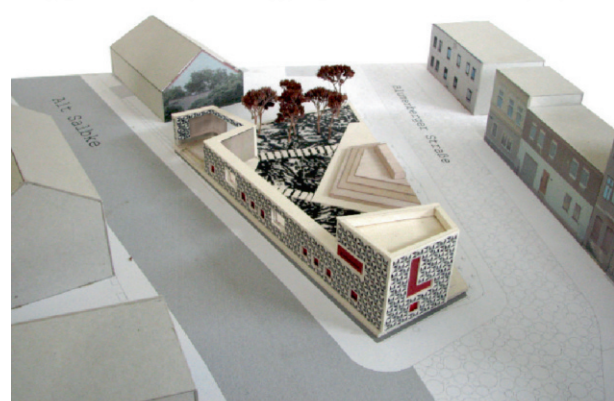
During the day, the library was in a heavy use ...



Though the library lasted just for two days, the residents decided to keep the shop as a "reading-cafe".



Information is going on ...



>>>An Alle Graffiti-Freunde:

**LESEZEICHEN**  
 WAS PURE BOMBENACT!

Am Lesenzeichen Salbke findet am 6. Juni 2009 eine legale Graffiti-Aktion statt, bei der ihr den Betonsockel der Freilichtbibliothek legal BOMBEN! könnt!

Interessierte können ihr TAG als Bilddatei (Auflösung 300dpi) bis zum 29. Mai bei WACKWORX per E-Mail einreichen unter: cansn@gmx.de / INFO unter: Lesenzeichen-Salbke.de

WRITING / WORKSHOP / BOMBING / HIPHOP

BILDER BIS 29. MAI BOMBEN! TAG 06. JUNI

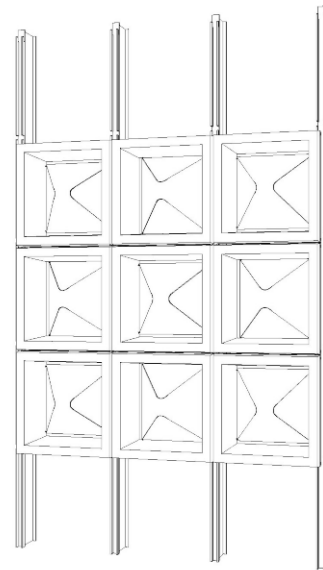
**BOMB'DIE WAND IN CHROME UND SCHWARZ II**

Fig. 10 below

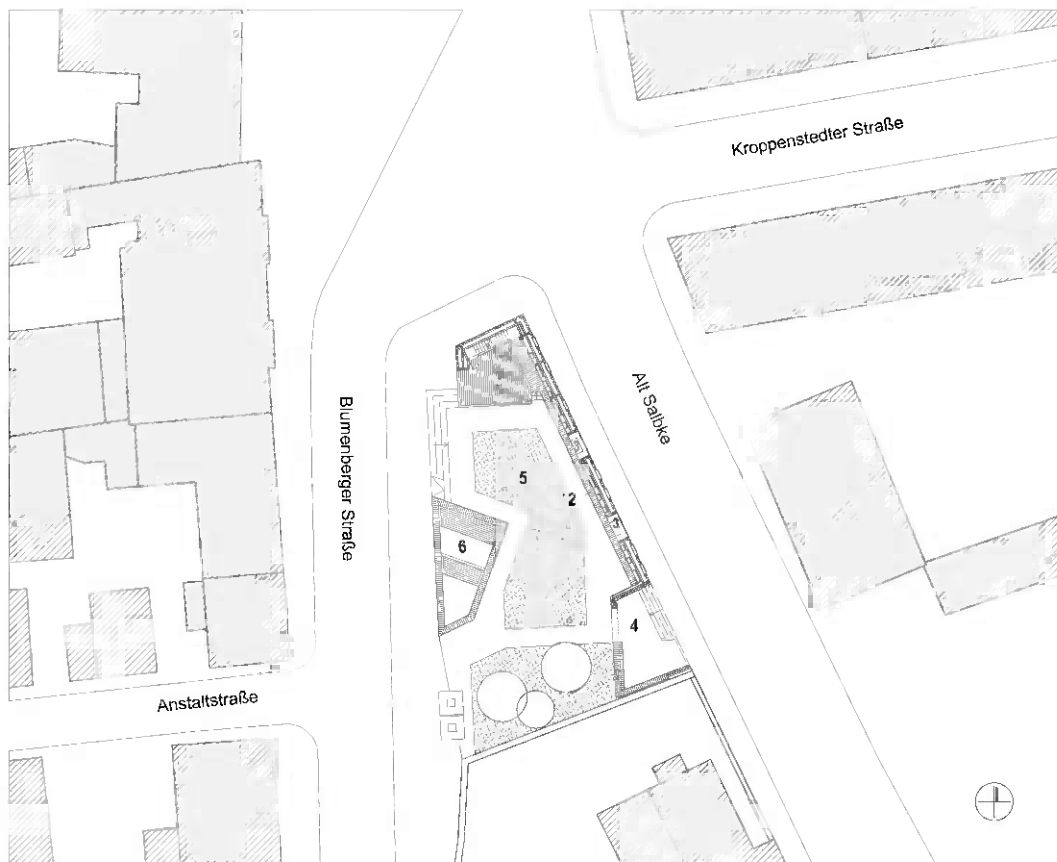
**The architectural merit** of the facade system stems from its durability and adaptability (Fig. 10). The system, and its variants, was used extensively in German cities in the second half of the 20th century. Once vilified by architectural critics, the engineered rail and panel facade is now experiencing a renaissance in more technologically advanced forms.

The main structure of the library, the book wall, provides seated shelter from the elements and envelopes a stage, which, apart from community readings, is used by the elementary school as a theatre. The stage also provides a performance space for local youth bands. An inverted 'youth corner' is incorporated into the book wall; symbolically turning its back on the main space. The functional and social elements of the library are carefully detailed on the architects plans, sections and elevations (Figs. 11, 12, 13).

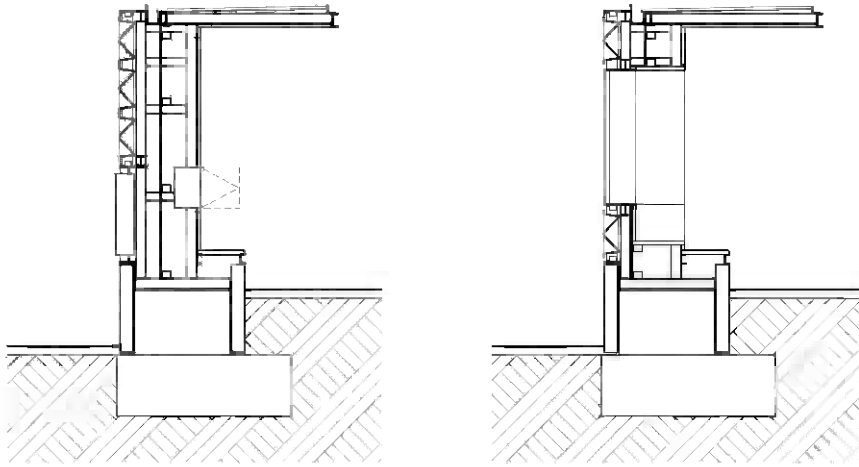
Cost savings made by salvaging the facade system allowed the mix of hard and soft landscaping to be finished to a high standard. (Figs. 14, 15). The green space at the heart of the town provides room for the citizens of Salbke to relax and read at leisure.



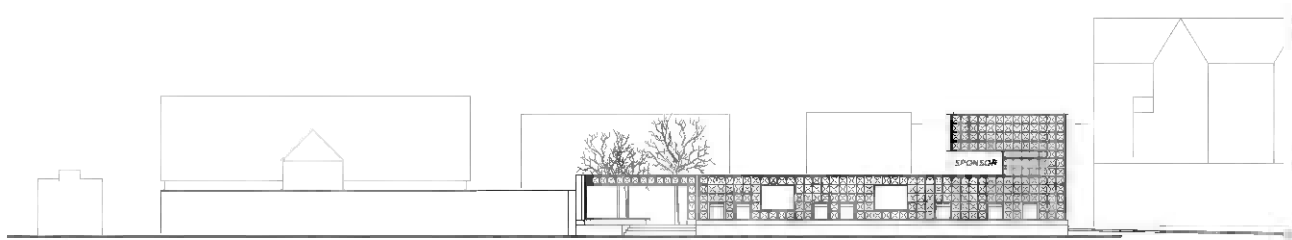
Facade-System



groundfloor - scale 1:250 LEGEND 1 stage // 2 bookwall // 3 seating unit // 4 youth-corner // 5 lawn // 6 terrace



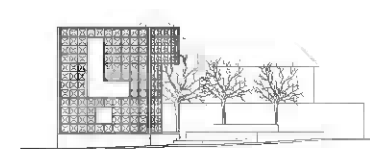
sections - scale 1:50



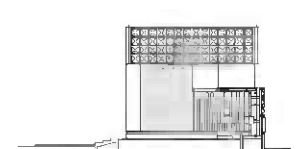
elevation east - scale 1:200



elevation west - scale 1:200



elevation north - scale 1:200



elevation south - scale 1:200





81 The Open-Air-Library | Salbke | Germany | Fig. 14 above



The Open-Air-Library continues in much the same way as it was started, ostensibly, as a social experiment. The library is open for 24 hours every day and the bookshelves are not locked. There is no registration system for the library's patrons. The local users describe this as, 'a library of confidence'. Borrowers are encouraged to take a book, and to return it, or replace it with another one in their own time. Salbke's enthusiastic residents have now complimented the open-air facility with a nearby reading cafe.

The public, street art, evident along the library's concrete base, (Figs. 14, 15) was commissioned by inviting local graffiti artists to realise their artistic visions at the finishing stage of the project.

The success of this ambitious cultural experiment, conducted in a very tough environment, can only be evaluated after a prolonged period of time. However, Karo\* report that neighbouring properties are being sold and renovated since the site was reclaimed, despite some vandalistic activity.

As the dust has now settled, it is clear to see the positive effect on both the cultural, and ecological environment of this small European oasis, when compared to its previous desert-like state.

# Phoenix Central Library

Phoenix, USA

1995 - 2011

will bruder+PARTNERS

[www.willbruder.com](http://www.willbruder.com)

**On Wednesday 8th February 2012** Phoenix architect, Will Bruder, discussed his desert architecture philosophy with an audience assembled at the Phoenix Art Museum. The architect of the landmark Phoenix Central Library (also known as the Burton Barr Library) revealed that the physical inspiration for the building was provided by Camelback Mountain, a 2,706 feet high monolithic rock formation that dominates the Phoenix Valley.

In “High Performance Buildings at Extreme Climate Location” (Lerum Vidar 2010 p6) Bruder explains how the building responds to location, climate and culture: “We looked at primitive cultures that built in stone and we looked at the more primitive, but recent cultures of wonderful old adobes off the main street of Phoenix and we remembered going to a dinner party in the middle of summer and

how the thermal swing was working with it. As we looked at this building we started to understand the code, cost and construct-ability implications, we came across the idea that it was going to really want to be made out of concrete”.

Located at the northern edge of the Sonoran Desert, Phoenix has a hot dry climate with summer daytime temperature between 40 - 45 degrees C. The architect’s ethos is one of site specific design informed by indigenous construction. Aligning the library’s long axis north - south, allowed the fully screened east and west elevations (subject to high solar gain) to accommodate all the service elements, elevators, stairs etc. in unconditioned space between the perforated copper sheet facade and the 300 mm thick concrete walls (Fig. 6). Bruder refers to this void in ‘western’ parlance as, “the saddlebags of service”.

Population | 1,469,471

Co-ordinates | 33° 26' 53.52" N  
112° 4' 25.8" E

Elevation | 350 m (1,150')

Precipitation | 210.8 mm (8.3")

Temperature | Average High:  
29.17 C (84.5 F)  
Average Low:  
16.21 C (61.1 F)

Humidity | 35%

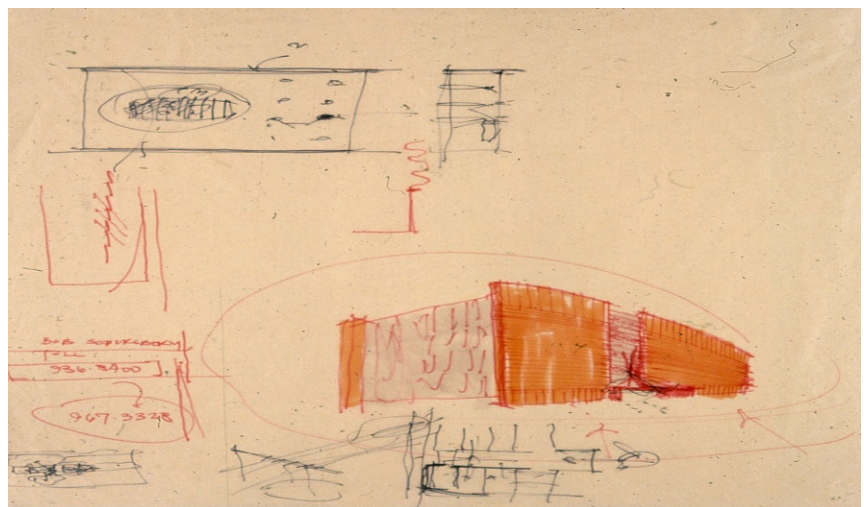
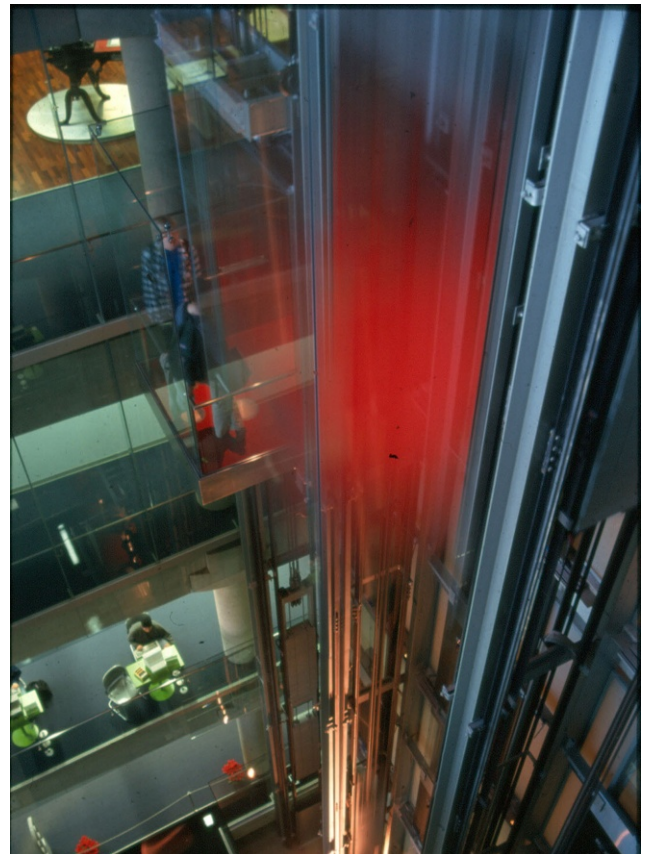




Fig. 3 below right

**With the service elements** excluded from the floor plate, the rectangular box of the building, an orthogonal grid of 32 feet 8 inch squares, provides a floor area of 280,000 square feet. The matrix is based on standard library stack modules and houses a 1,000,000-volume collection. The ground floor (Fig. 6) features a cafe, auditorium and an art gallery exhibiting the work of Arizona artists. On the first floor, new books, audio-visual, international languages and fiction are found alongside a 10,000 square feet children's library including a story room. The accessibility centre provides adapted computer equipment and large print materials. A large Spanish section ensures that the entire South Western U.S.A. community is well served.

Access to the five floors of library space is organised around the spectacular 'crystal canyon'. The glazed atrium is animated by three high-speed elevators which rise from a black reflecting pool at the heart of the building (Fig. 3). Above the 'crystal canyon', computer programmed, solar tracking skylights provide a daylight show for the patrons crossing the base of the canyon (Figs. 4, 5).



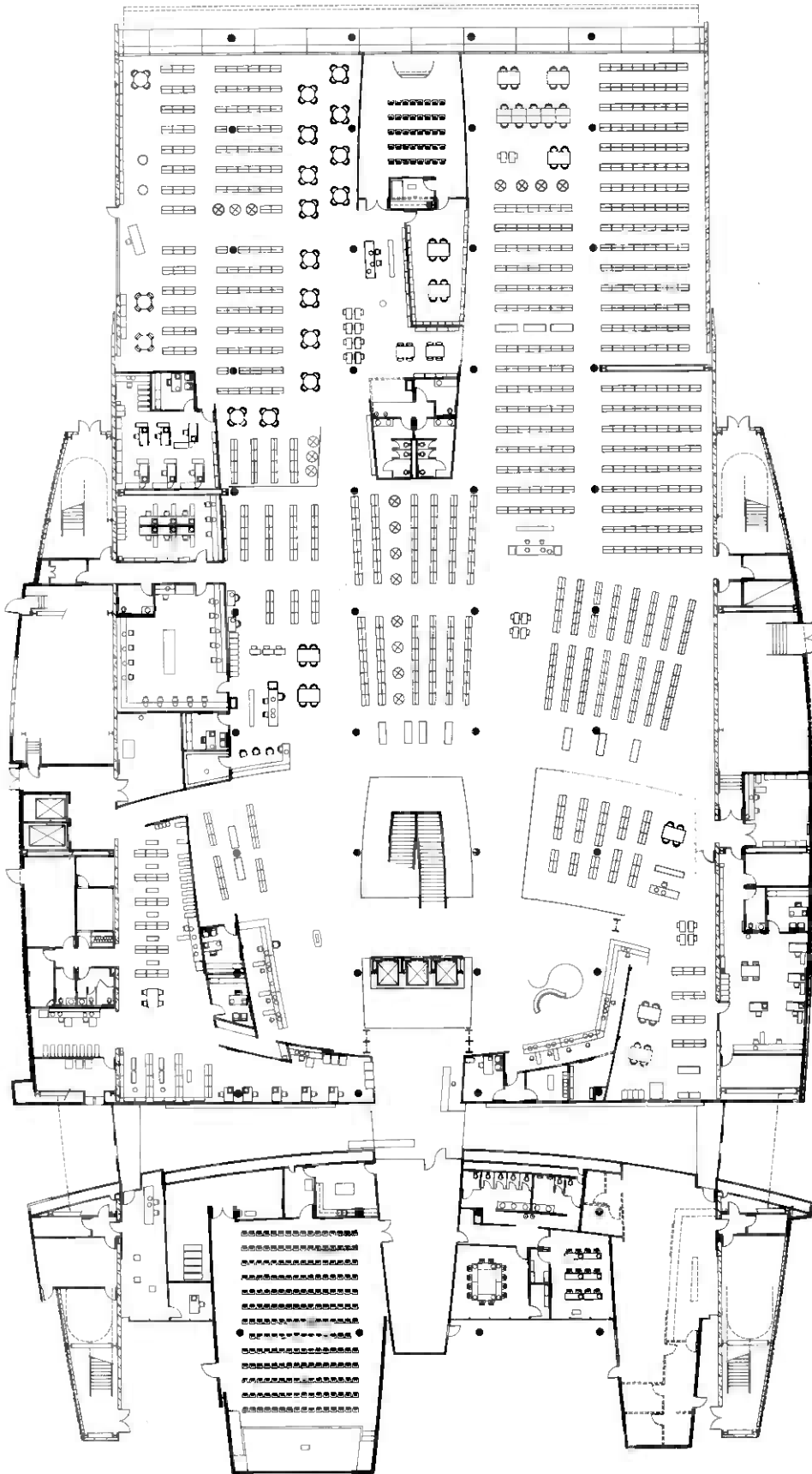
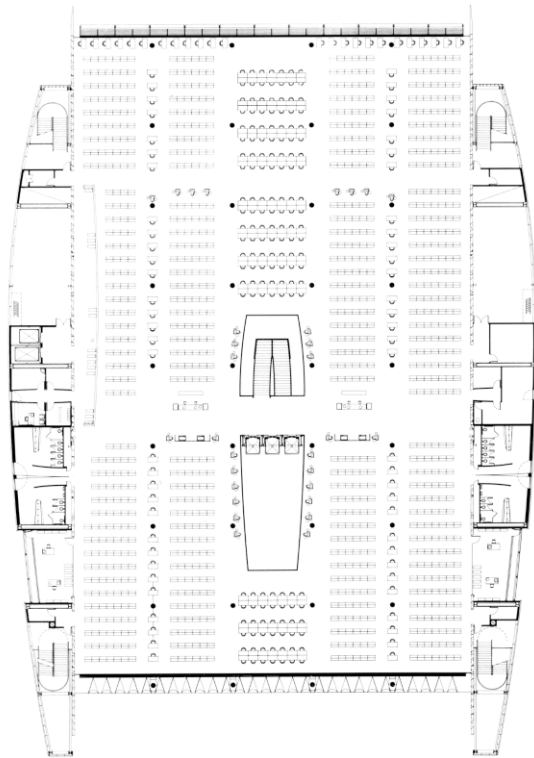
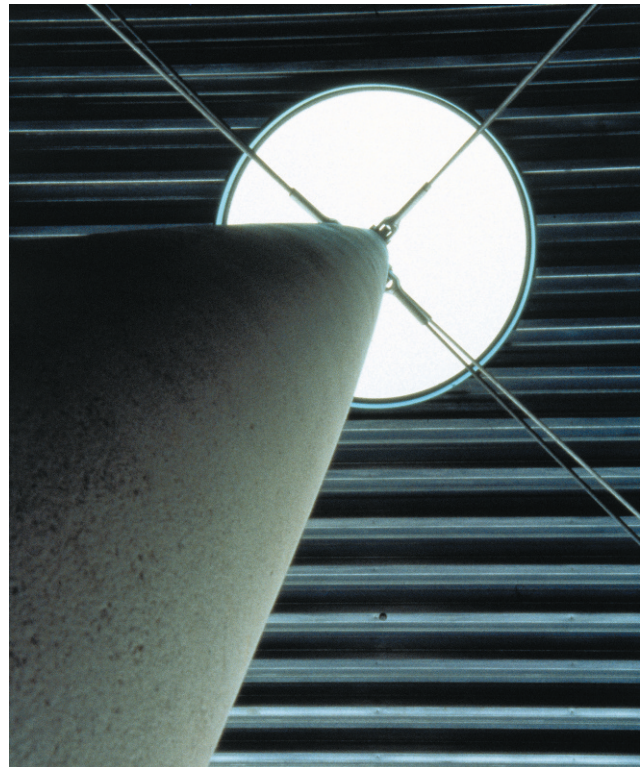
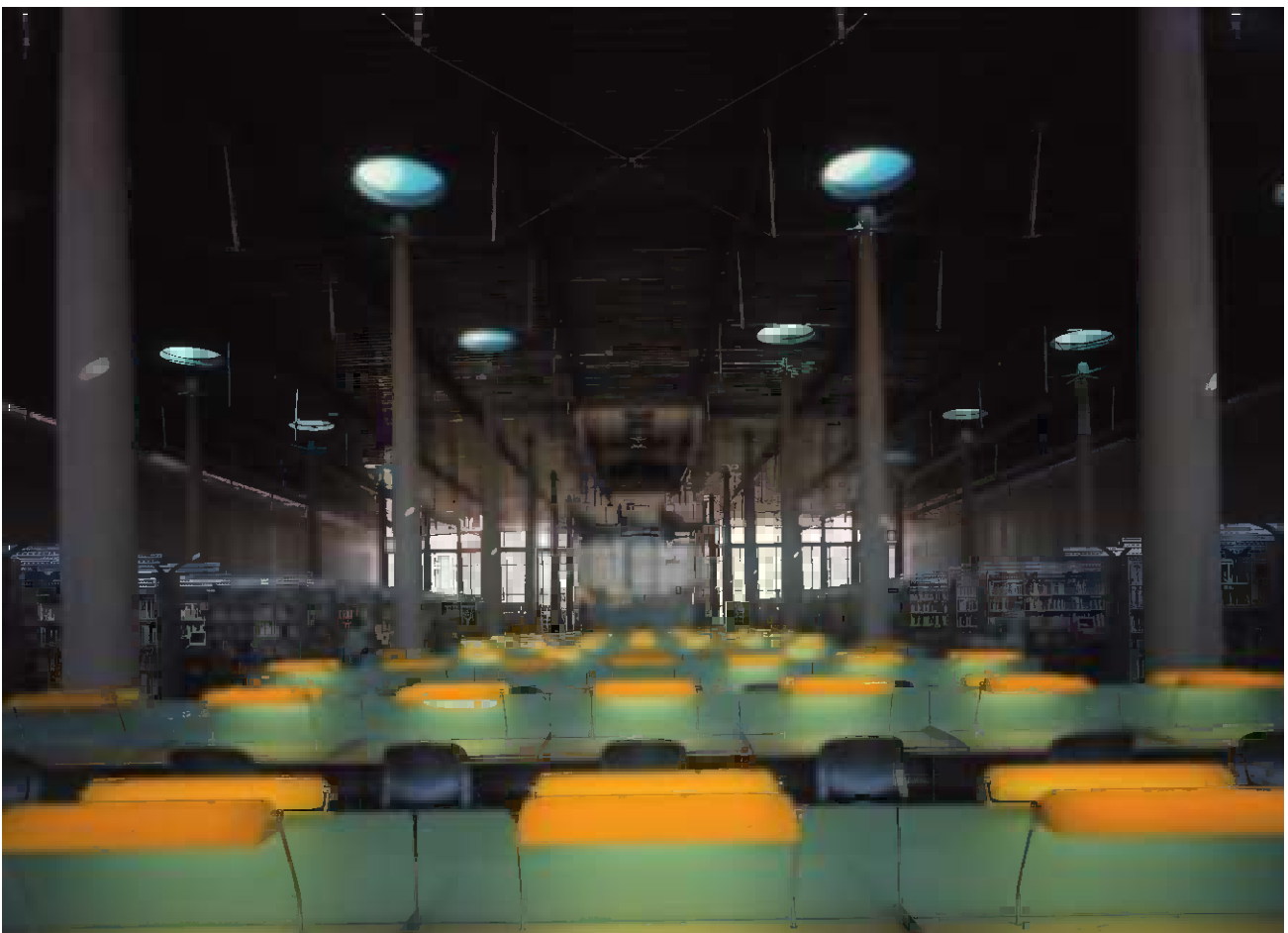


Fig. 7 below right

**At the summit** of the 'crystal canyon', The Great Reading Room, occupies the entire 43,000 square foot fifth floor. The theatrical nature of the room is enhanced by the grand staircase (Fig. 9), which provides a human scale beneath the 32 feet high, exposed tensegrity roof. The unique structure relies upon a geometrical web of steel cables and ties, retained by the columns positioned on the buildings primary structural grid (Figs. 7, 8, 10). The spotlights illuminating this vast stage are provided by the skylights above every column (Fig. 7). A reminder of the vitality of the sun to desert cultures, both ancient and modern, is provided by the minute, clear apertures, strategically positioned to 'ignite' the tip of each column at mid-day on the summer solstice. This penthouse paradise for sun worshipping readers houses the non-fiction collection (Figs. 8, 11). On other floors, the showcase scale of the amenities, and splashes of coloured Venetian plaster are reminiscent of the hotel desks and roulette tables of its Nevada neighbours (Figs. 12, 13, 14).









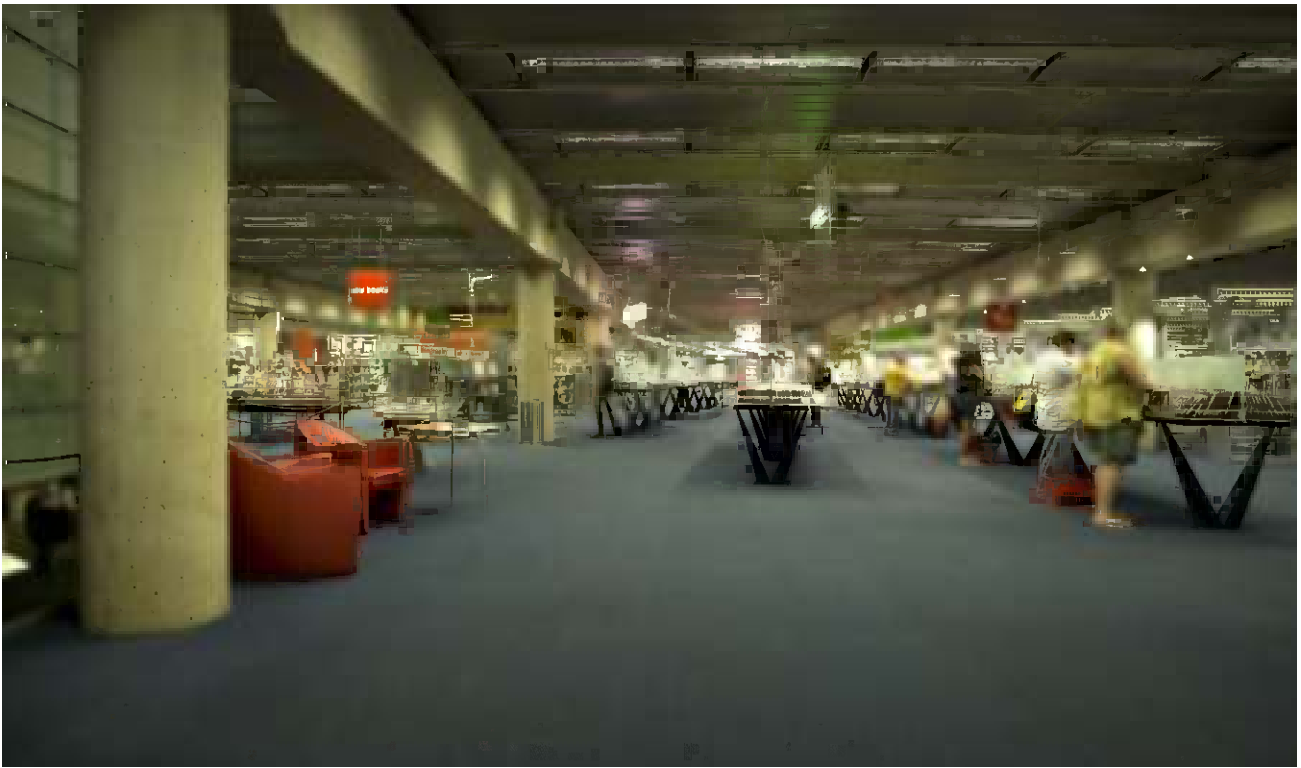
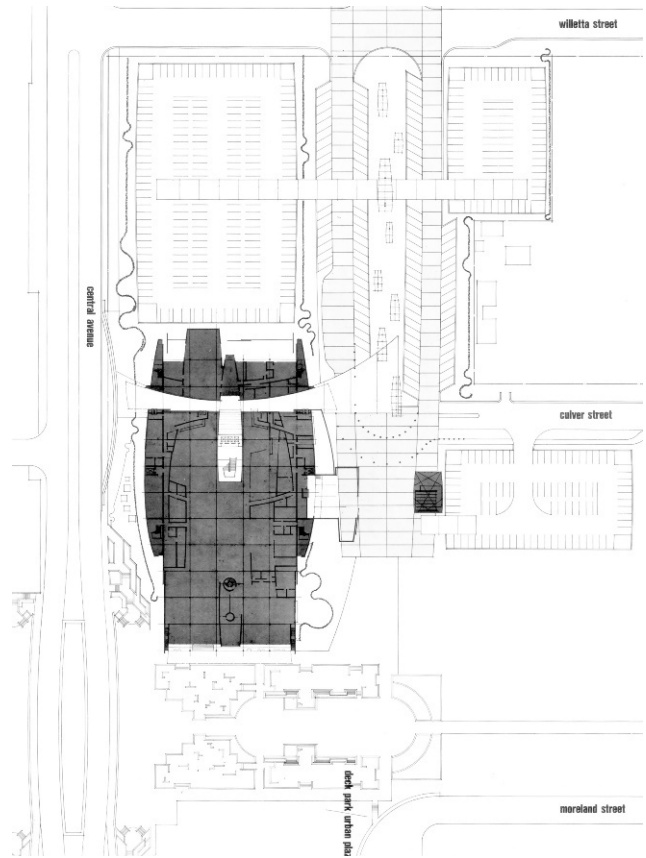


Fig. 15 below right

**The materials that** colour the external facades of the library building are chosen from a palette of concrete, copper, stainless steel and glass. East and west copper screened elevations are split by a sky reflecting stainless steel gap, which creates an urban representation of Arizona's monumental mesas riven by vertical, narrow canyons. The sandstone colour variations are achieved by the use of both corrugated and flat panelled copper sheets (Fig. 18).

In contrast, the south elevation (Fig. 16) is totally glazed bringing a transparency that animates the building when viewed from the outside. Occupants are protected from the Sun's radiation and glare by automated, solar tracking, deep louvres.

To the north elevation (Fig. 18) the glazed curtain wall is passively shaded by vertical fabric strips supported by lightweight aluminium spars at each mullion. Views from inside and outside were to remain unobstructed. Consequently, FTL Design Engineering specified a mesh fabric with 50% perforation (Fig. 17). This appropriately theatrical solution ensures that the shades appear to be transparent when backlit at night.





**Phoenix Central Library** has been regarded as a monumental example of sustainable design since its completion in 1995. The key design features were the thermal mass of the adobe style walls and the highly efficient mechanical system. This combination reduced by two-thirds the energy usage originally projected by the city's utility planners. Innovative task lighting design combined with ambitious day-lighting strategies resulted in an electrical lighting demand of only 1.38 watts per square foot. The Phoenix Central Library building was completed at a total project cost of \$28,000,000, equating to \$98.00 per square foot.

Despite being a building initially completed in the last century, innovative design and construction has continued on the site. In July 2011 progressive construction and installation of 42 solar wings commenced in the North parking lot. The Examiner.com reports that the \$1,300,000 project is funded by an Energy Efficiency Conservation Block Grant through the American Recovery and Reinvestment Act of 2009. Each 'wing' will cover two parking spaces providing a total of 84 covered parking spaces. Sky Renewable Energy estimate that the library's solar farm will generate 148.05 kW DC for the building reducing the power drawn from the grid. The shade effect of the wings will also help to mitigate the heat island effect experienced in large uncovered expanses of tarmac.

Phoenix Central Library successfully combines considered green engineering solutions with architecture that caters for the specific needs of its patrons. The scale of the building required an inspired architectural solution. By taking his inspiration from the desert geology surrounding Phoenix, architect Will Bruder has provided the citizens of Arizona, with a unique, iconic library to be proud of. An "urban mesa" for the desert city.





# Traverwood Branch Library

Ann Arbor, USA

2008

inFORM studio

[www.in-formstudio.com](http://www.in-formstudio.com)

**The story of** Traverwood Branch Library is inextricably linked to the story of the City of Ann Arbor, Michigan. In 1824, Virginians John Allen and Elisha Rumsey registered claims for land on the hilly, wooded, banks of the Huron River. The claims were registered in Detroit, a fur trading post forty miles east of the new settlement plat. Speculation on the origin of the name Ann Arbor includes the theory that both Allen and Rumsey's wives were named Ann, and the site was notable for its prolific stands of trees. Given these circumstances, Ann Arbor seemed to be a suitable choice of name. In keeping with the arboreal theme, the Michigan Ojibwa name for the settlement was "kaw-goosh-kaw-nick", mimicking the sound emanating from John Allen's saw mill. In 1873 the city of Ann Arbor became the home of the University of Michigan. This fortuitous

relocation from Detroit has fuelled long-term growth of the local economy. Research and development undertaken at the University and an abundance of graduates living in the area attracts investment into the city. Proximity to the Great Lakes endows the region with a humid continental, reasonably comfortable climate with four distinct seasons. In 2005 the architects at inForm studio were commissioned by the Ann Arbor District Library to provide a sustainable design for a new branch library at Traverwood. The inForm team began the design process by initiating a series of desktop and field studies. This essential research phase would reveal through graphical representation "the complex nuances and relationships" between the four branch libraries and the main library located downtown. The studies and their conclusions are illustrated in (Fig. 5).

Population | 113,934

Co-ordinates | 42° 16' 53" N  
83° 44' 54" W

Elevation | 256 m (840')

Precipitation | 953.8 mm (37.55")

Temperature | Average High:  
15 C (59 F)  
Average Low:  
4.63 C (40.34 F)

Humidity | 60%







Fig. 3 below right

**Research Phase (Fig. 5) text provided by inFORM**

In the early stages of a programme development of the new North East Branch of the (AADL), a research phase was initiated intending to investigate and study the complex nuances and relationships between the downtown main library and the four branch libraries. The process explored a variety of methodologies, graphically representing gathered data to locate and analyse existing and latent relationships within the comprehensive library network. This provided a basis to better understand how each of the separate facilities related to one another as a cohesive institution. Conclusions and recommendations were gathered from the research phase, including general and system wide findings concerning substantial cost savings in overall operations within the Main-to-Branch and Branch-Branch connections, as well as conclusions more specific to the North East Branch location.

**Conclusions:**

**Library Sites**

**Destination**

Particular in location, identity and collection, similar in size (Recommended this approach for system branch libraries and presented complimentary typologies for the North East Branch, including an interpretive centre focused on environmental awareness and topical programming, a cafe and a small book store component.

**Total Circulation**

Distribution - Circulation of material is moving towards equality between all locations (storage of popular material should be relatively equal at each location) Hierarchical Storage - recommended that there be a distinction between popular materials and permanent collection and makes these distinctions in space allocation (Permanent collection at Downtown location and compress the space dedicated to it).

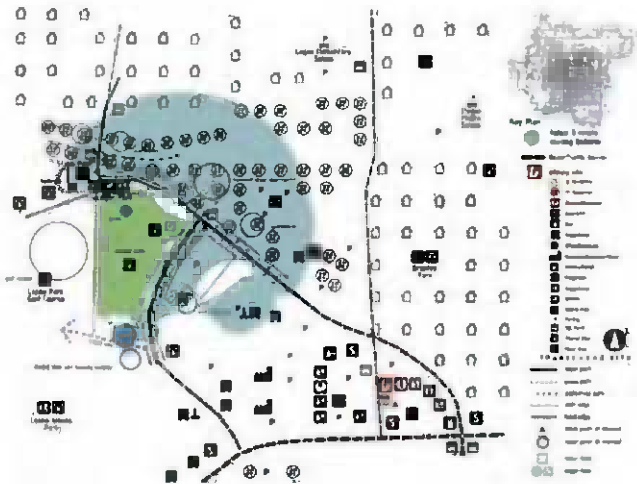
**Floating Collection**

The research illustrated that too much time and money was invested in out-dated method of moving materials between branch libraries and the main. In order to achieve a desired heterogeneity between branch locations, our recommendation was the implementation of a floating collection.

**Institution Size**

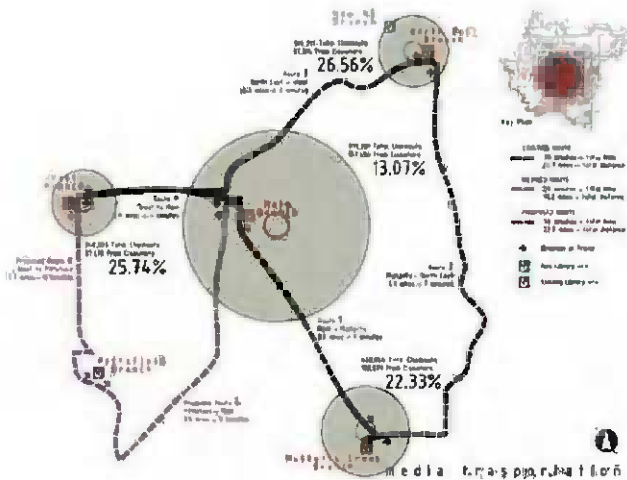
Collection Size - Can increase substantially in comparison to the existing square footage of library space and should not have direct affect on the needs for additional space.





### neighboring typology

What surrounds and supports the library?  
 How will circulation to-and-from the library work?  
 What is walkable within 5 minutes from the library? 10 minutes?



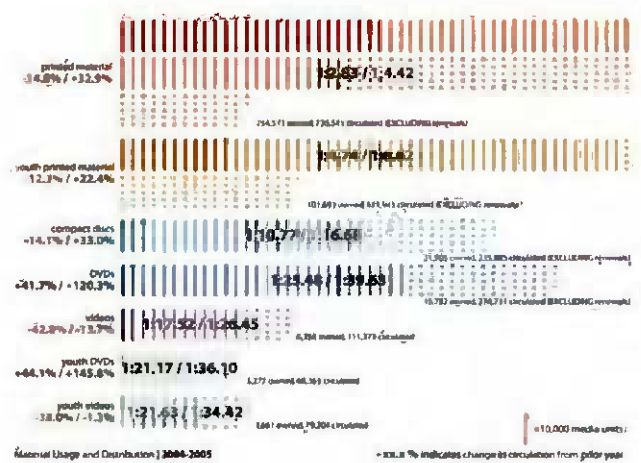
### media transportation

How is the media (books, DVD's etc.) transported?  
 How long does it take to move material from branch to branch?  
 Is there a more efficient route or method of delivery?



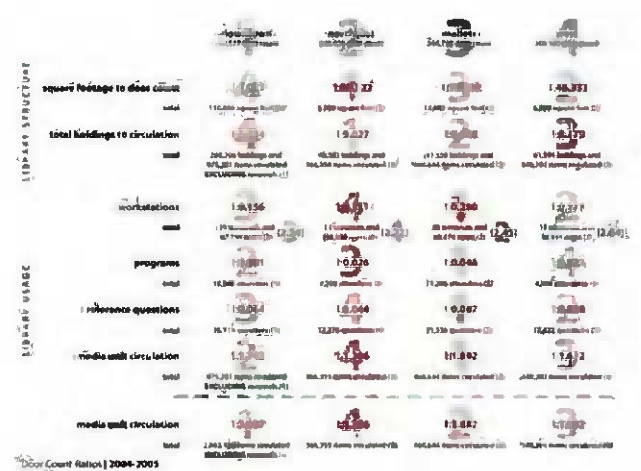
### complimentary typology

Are there potential partners to improve the quality of the library?  
 What services would compliment the library?



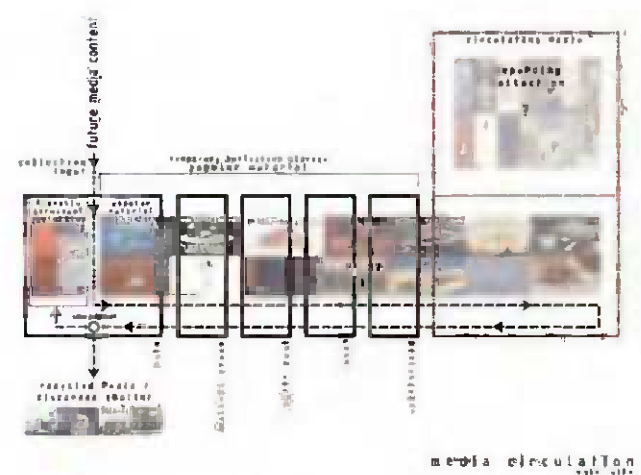
### collection vs circulation

Does the current collection support the circulation demands?  
 What is circulating the most? Where is the demand?  
 How can the library position itself to meet these shifts?



### door count | usage ratios

What is the total door count relative to library sq ft?  
 What is the ratio of total holdings to circulation?  
 What is the ratio of door count to program attendees?  
 How has this been affected by on-line check-outs?



### media circulation

How does media circulate within the library?  
 How do future dynamics of an expanding collection affect space?

**The subplot in** the story of Traverwood was revealed when the trees on the heavily wooded site were considered as a source of material for use in the construction of the library building.

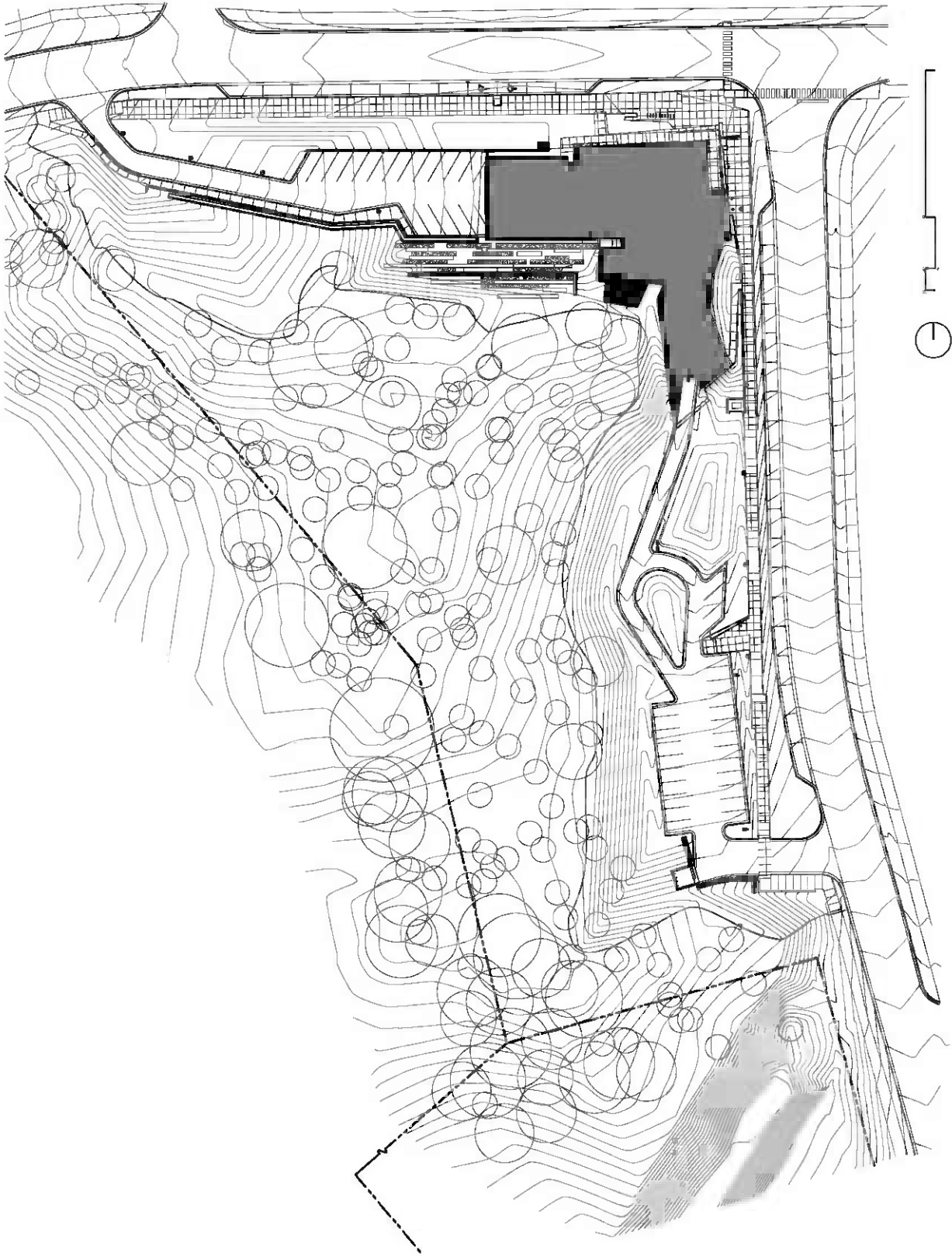
The site's numerous ash trees had been infested by the Emerald Ash Borer. The larvae of this species feed on the vital water and nutrient carrying tissue located directly beneath the surface of the bark. This persistent parasite can kill a mature tree in 3 to 5 years. Recent reports cite the Emerald Ash Borer as being responsible for the demise of up to 70 million ash trees in the American mid-western states and southern Canada.

The Traverwood project team commissioned a specialist autopsy on the dead trees and discovered that only the surface of the logged species was affected by the insect larvae, leaving the core timber useable. The death of the ash forest could now provide an abundance of raw material to be harvested on the site of the new library. The 'windfall' would enable the design team to value engineer their approach to the fabric of the

building. Consequently, the processed ash would be used in the floors, walls and ceilings, providing the interior surfaces with a warm ambience throughout (Figs. 3, 4, 11, 12, 13). Additionally, some log sections were large enough to be used as structural columns, poignantly positioned along the large expanse of glazed facade facing southwest into the remainder of the preserved woodland (Figs. 1, 8, 15, 17). These columns bear the surface scars left by the Emerald Ash Borer providing a visual story within the library of the demise of the North American ash tree.

The building and its attendant hard landscaped external works were located along the southwest margins of the site (Fig. 14). This considered placement would benefit the development by forming an effective barrier between the city and the woodland. The elongated building provided the necessary urban street presence for the library (Figs. 6, 7). This key decision to minimise urban sprawl on the site was the catalyst for developing the remaining sustainable objectives (Fig. 9).





## **Sustainable Objectives (text provided by inFORM)**

### **Natural Ventilation**

Natural ventilation is the process of supplying and removing air through an indoor space by natural means. There are two types of natural ventilation occurring in buildings: wind driven ventilation and stack ventilation. The most efficient design for a natural ventilation building should implement both types of ventilation. The AADL has a series of mechanically controlled operable windows to utilise both types of ventilation.

### **Sun Shading**

Sun Shading is accomplished with a large overhang on the south face of the building along with motorized shading devices along both the west and south facing glazed facades. These shades are linked to solar sensors, which automatically lower the shades as the path of the sun shifts from afternoon to evening. The proportions of the overhang allow some sun to penetrate into the building during the winter, but block direct sun in the summer avoiding excessive heat gain. Additionally, the building's proximity to the dense deciduous vegetation blocks the direct light of the setting sun to the west during the summer months, but allows a filtering of light through the leafless trees in the winter. Generous amounts of glazing will allow for penetration of indirect light.

### **Storm Water Manipulation | Heat Island Reduction**

Implementation of a sub surface storm water filtration system, a multi level rain garden and reduced impervious paving, all of which improve water quality, eliminate erosion and alleviate flooding on the existing retention system through;

- Reduction of sprawl on the site as a result of the new building and additional parking
- Maintain the existing biodiversity of the natural systems on the site through minimal occupation and disturbance
- Respond to the microclimate and natural energy flows
- Restore and maintain and/or enhance the natural character of the site through use of sustainable vegetation design (75% native plantings, removal of invasive species, mitigation of dead ash)
- Handling of first flush and bank full on site (only 100 year can be diverted to neighbouring retention pond)
- Minimized the negative impacts of the natural site hydrologic cycle as much as possible by;
- treatment of storm water close to where it falls

and;

- reduction of down stream impacts and improving the overall water quality and clarity.
- originally designed with a vegetated roof which was removed from the project after the bidding phase due to the escalating construction costs

Heat Island Reduction through;

- Use of high reflective, high emissivity roofing
- Underground parking
- Shading of on-street parking with street trees
- Shading of on-site parking with tree clusters
- Light coloured surfaces around and adjacent to the building (concrete/meadow lawn)

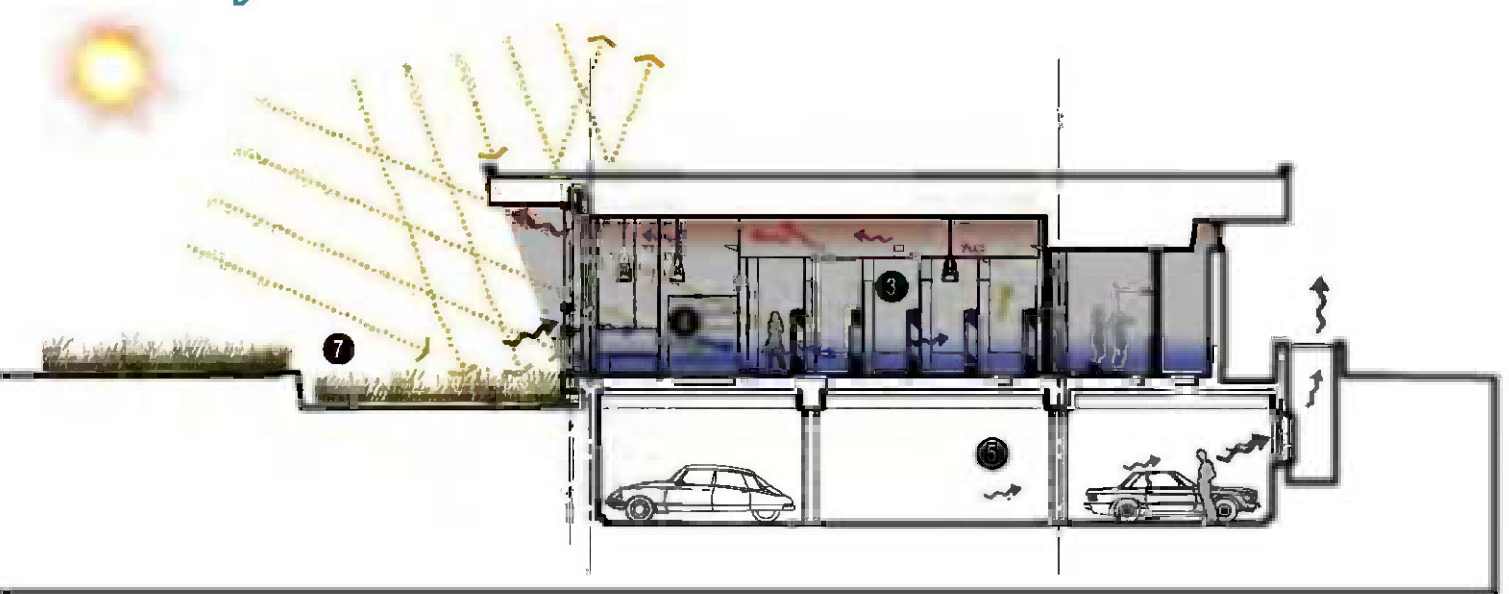
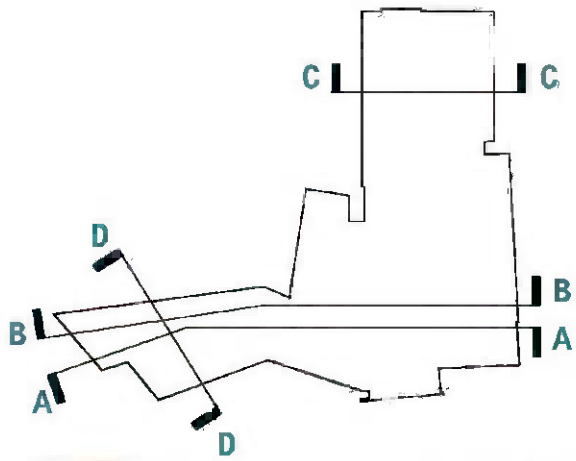
### **Interior Sustainable Objectives**

- Use of indirect light fixture provide a more even distribution of lighting, reduced contrast and low glare benefits
- Shallow floor plates allow natural day lighting strategies to become the primary source of light within the library.
- Extensive view through large expanses of glass to the west and south allow for a visual connection to the preserved natural areas of the site



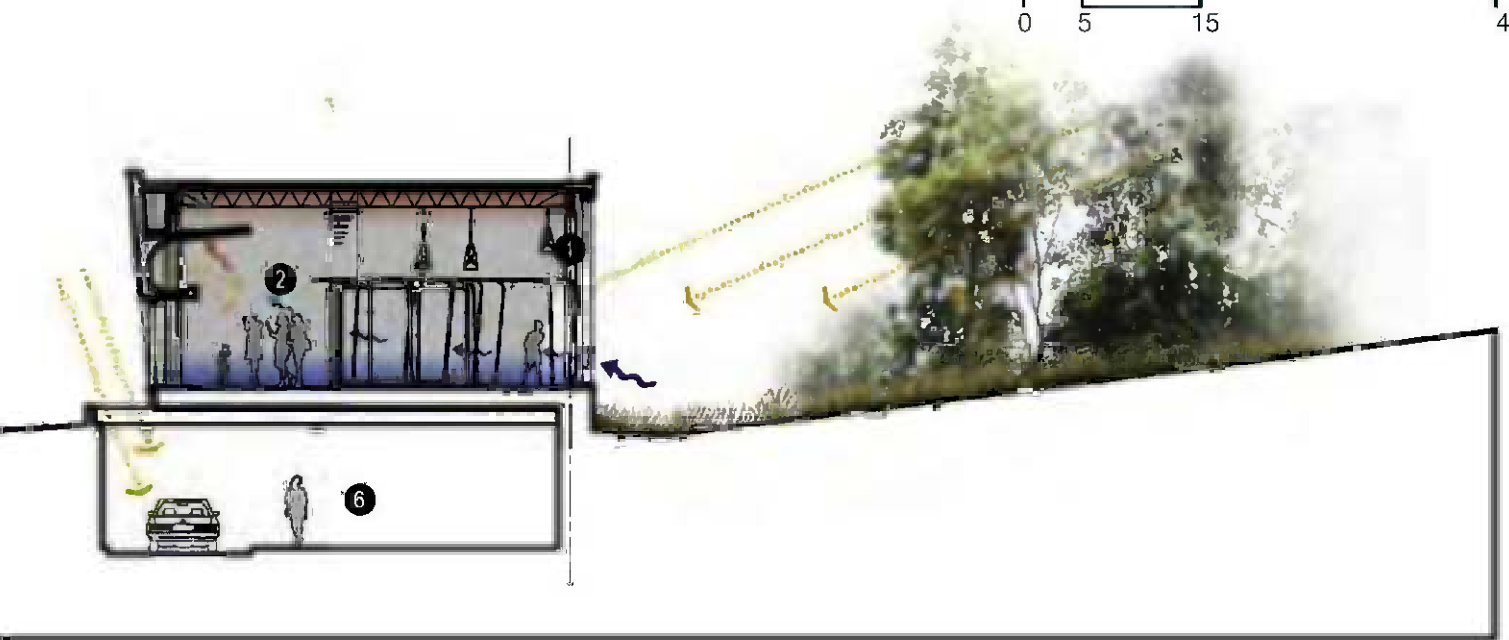
## section legend

- ① reading room
- ② collection (adult)
- ③ public meeting room
- ④ collection (children)
- ⑤ parking (lower level)
- ⑥ exit drive (lower level)
- ⑦ exterior rain garden



north | south section C-C

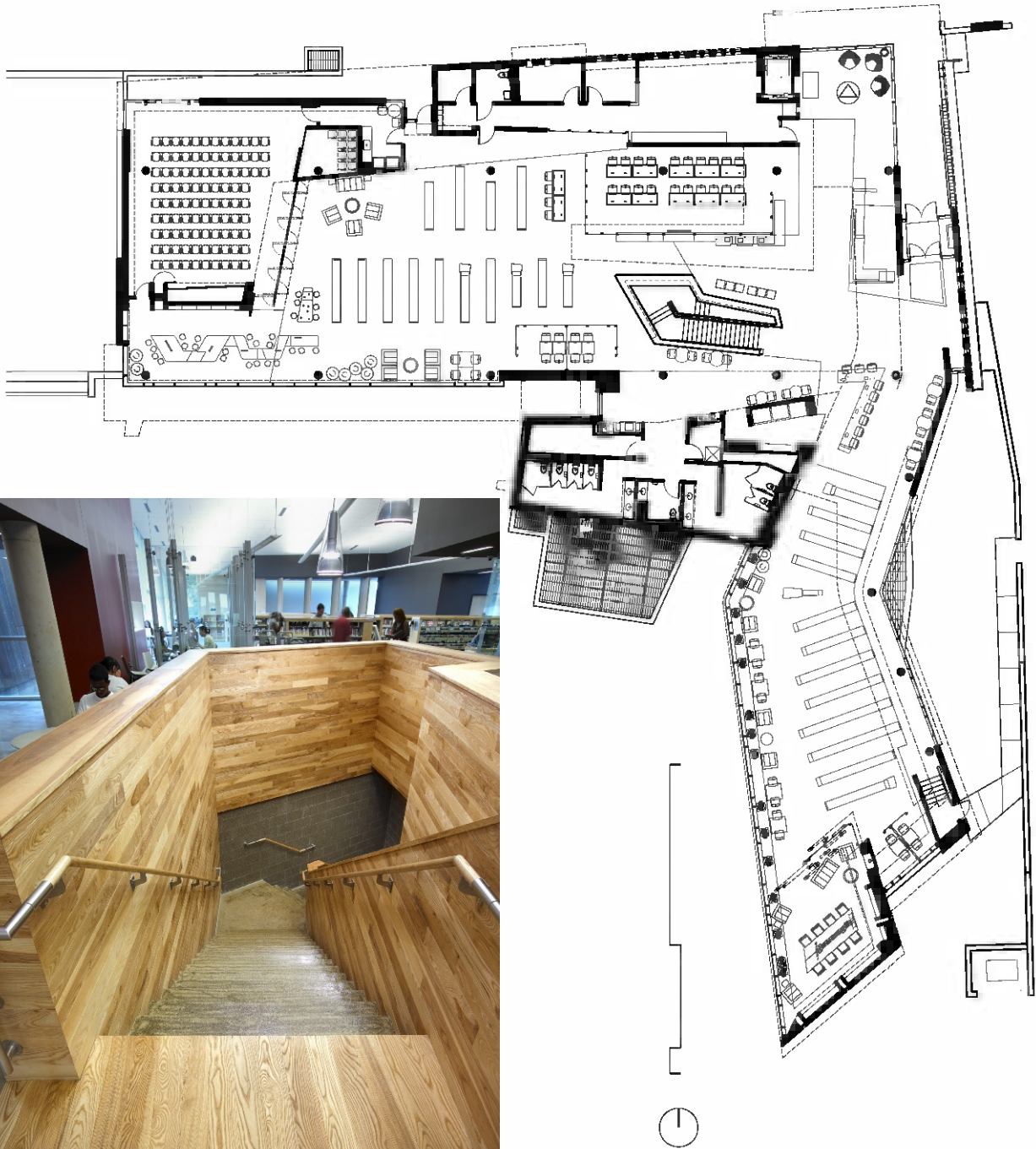
0 5 15 40 feet



east | west section D-D

0 5 15 40 feet

Fig. 10 below, clean floor plan with furniture



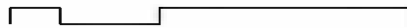
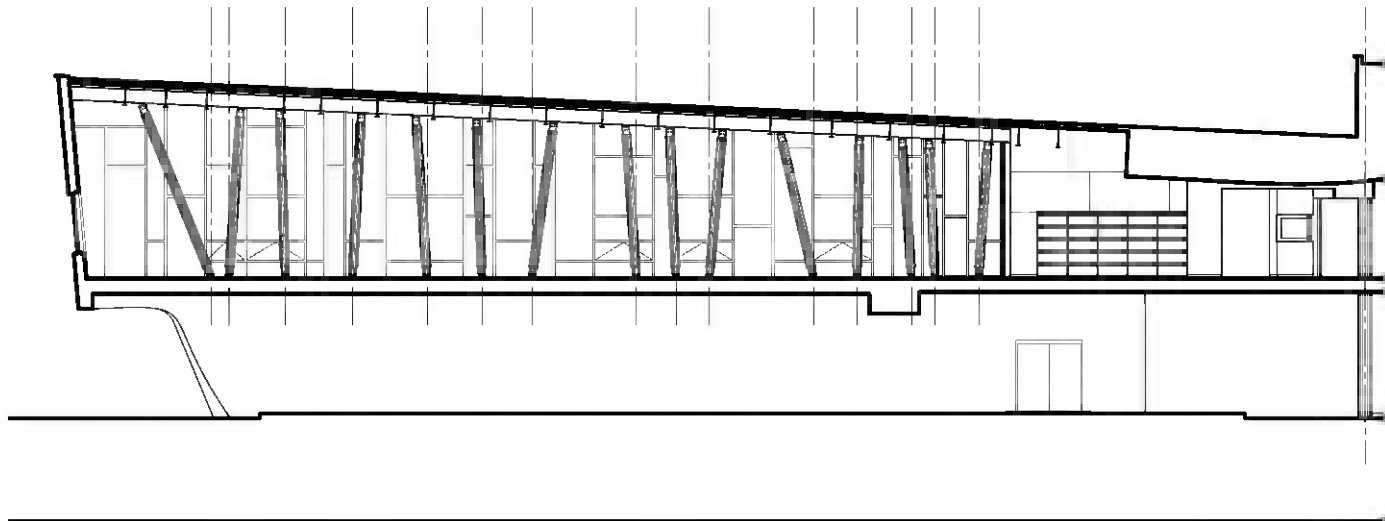
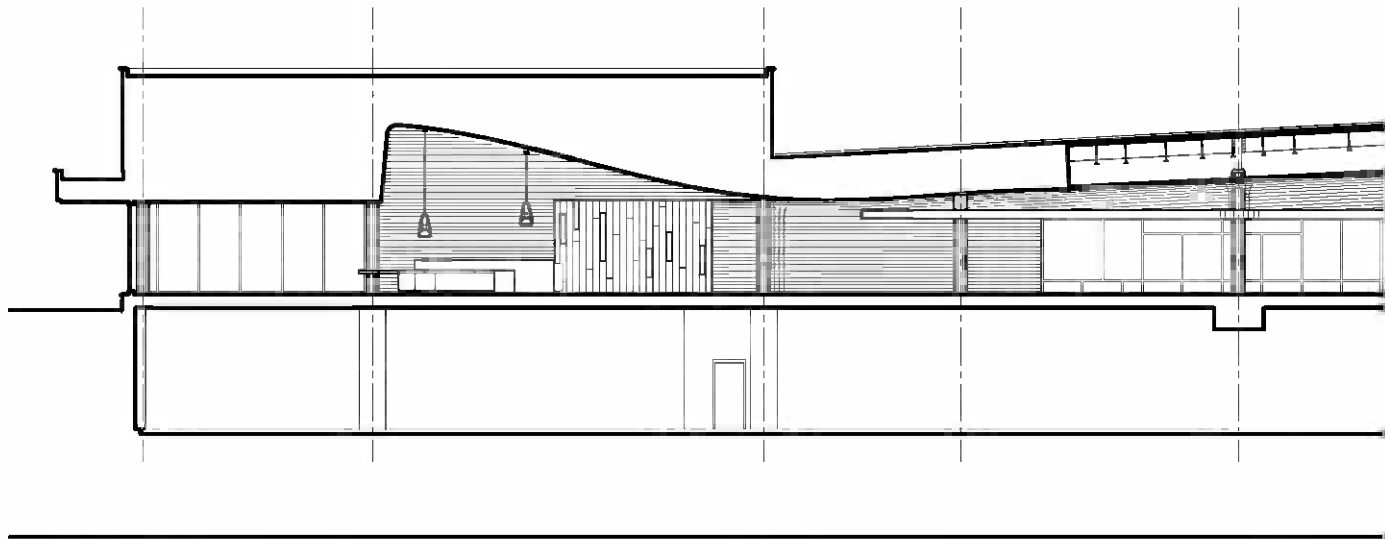


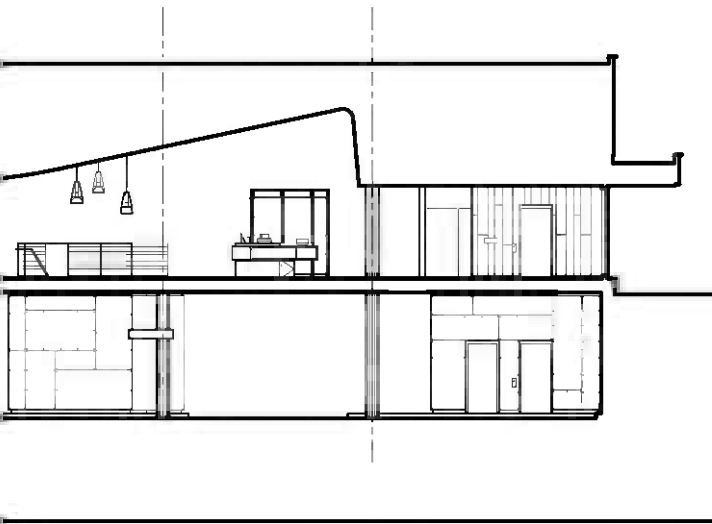
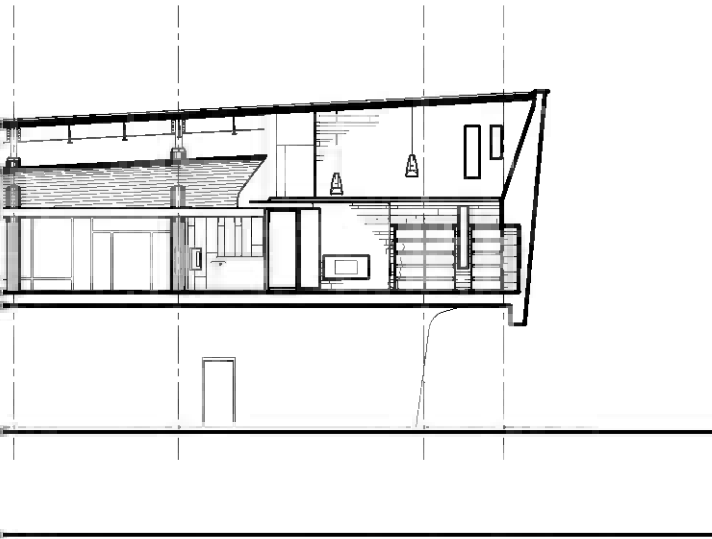




105 Traverwood Branch Library | Ann Arbor | USA | Fig. 14 above







**In 2009** the inFORM design received honour awards from both the Detroit and the Michigan chapters of the American Institute of Architects. In 2010 the project received an honourable mention in the Construction Association of Michigan Green Building of the Year Awards. The architects at inFORM studio followed the U.S. Green Building Council guidelines throughout the design phase, however LEED status was not applied for. The funding required for certification was directed into the building itself. Ann Arbor District Library director, Josie Parker, is quoted in the October 2009 edition of ARCHITECT, the Magazine of the A.I.A., as follows; “in our community, it isn’t necessary to pursue LEED to have a project validated and supported, what’s important is that we do the right thing by our community”. This may well be the perceived wisdom of many project directors grappling with the certification question. As an important centre for liberal politics since the 1960s the citizens of Ann Arbor have enjoyed a hard fought reputation for bold decision making. This remarkable project typifies that pioneering spirit.

# University of Aberdeen New Library

Aberdeen, UK

2011

schmidt / hammer / lassen architects

[www.shl.dk](http://www.shl.dk)

In 1495 Bishop William Elphinstone wrote to Pope Alexander VI, requesting that a University be founded in Aberdeen. The supplication was made on behalf of King James IV of Scotland.

Dr. Leslie J. Macfarlane, Honorary Reader in the Department of History at Aberdeen University, has verified the request through a search of the Vatican archives in Rome. His findings are revealed in his biography of Elphinstone published by Aberdeen University Press.

Dr. Macfarlane's research describes the details of Bishop Elphinstone's visit to Rome during which he was able to elaborate on the King's desire to educate the Christian laymen of Scotland who aspired to practice medicine, law and scholarly teaching. Elphinstone's audience with Pope Alexander VI (Roderigo Borgia) took place on the 6th February 1495. The papal consent (Bull

of Foundation) was granted, inscribed and dated by the 10th February 1495. The construction of King's College and its chapel could now begin. This document was brought back to Aberdeen by Elphinstone and is retained in the University's substantial archive.

Although Bishop Elphinstone was a man of great vision, it seems unlikely that he could have imagined the archive growing to its present size, or the building that would be required to house it. The New Library, a shimmering glazed eight storey high cube (Fig. 2) with a full height, spiralling atrium at its core, could be described as 'cathedral like', a new beacon of learning, soaring skyward above the surrounding landscape (Fig. 1). At the topping-out ceremony on the 6th October, 2010, Morten Schmidt of schmidt hammer lassen architects was quoted in the *e-architect* website as follows:

Population | 220,420

Co-ordinates | 57° 7' 60" N  
2° 6' 0" W

Elevation | 91 m (299')

Precipitation | 856 mm (33.7")

Temperature | Average High:  
11.8 C (53.2F)  
Average Low:  
4.7 C (40.5 F)

Humidity | 84.5%





**“University of Aberdeen New Library** will be an exciting embodiment of the library of the future: open, multi-functional and accessible. It will be both a meeting place and a cultural centre for the University and the wider Aberdeen community; offering public spaces, exhibitions and events”. Aberdeen is home to a community of 14,000 students who make full use of the 12,000 reading spaces available within the 15,500 square metres of floor space. The ground floor lounge and cafe areas provide a comfortable social space, which can also be used as exhibition or performance areas when required.

The code for sustainable building in the UK, BREEAM, is administered by the Building Research Establishment. The goal of achieving BREEAM excellent certification and minimising this substantial building’s long term running costs and energy use shaped the design philosophy behind the project.

Central to the design is the building envelope, which is constructed from a combination of insulated panels and high performance glazing. The resulting irregular patterned facade, combined with a cascading central atrium (Fig. 3), ensures that daylight penetrates both the periphery and the core at almost every level of the building. The exception to this is the archive area and secret garden (see areas 5 and 8 in section aa Fig. 5). The use of space throughout the facility, located on the King’s campus, is illustrated on the architect’s plans and sections (Figs. 4, 5, 6).

Additional sustainable strategies employed include the on-site generation of supplementary electrical energy. This was achieved by strategically positioning photovoltaic cells on the roof of the building,

Aberdeen’s oceanic climate classification is surprisingly milder than its northerly location might suggest, and the photovoltaic installation takes advantage of the recorded 1,400 hours of sunshine per annum. Daylight is restricted to 6 hours and 40 minutes at the winter solstice; this quickly increases to 8 hours and 20 minutes by the end of January. Conversely, the summer solstice sees 17 hours and 57 minutes of daylight between sunrise and sunset. At this time of year the nautical twilight lasts throughout the night. Summer daytime temperatures rarely rise above 17 C in the proximity of the North Sea.

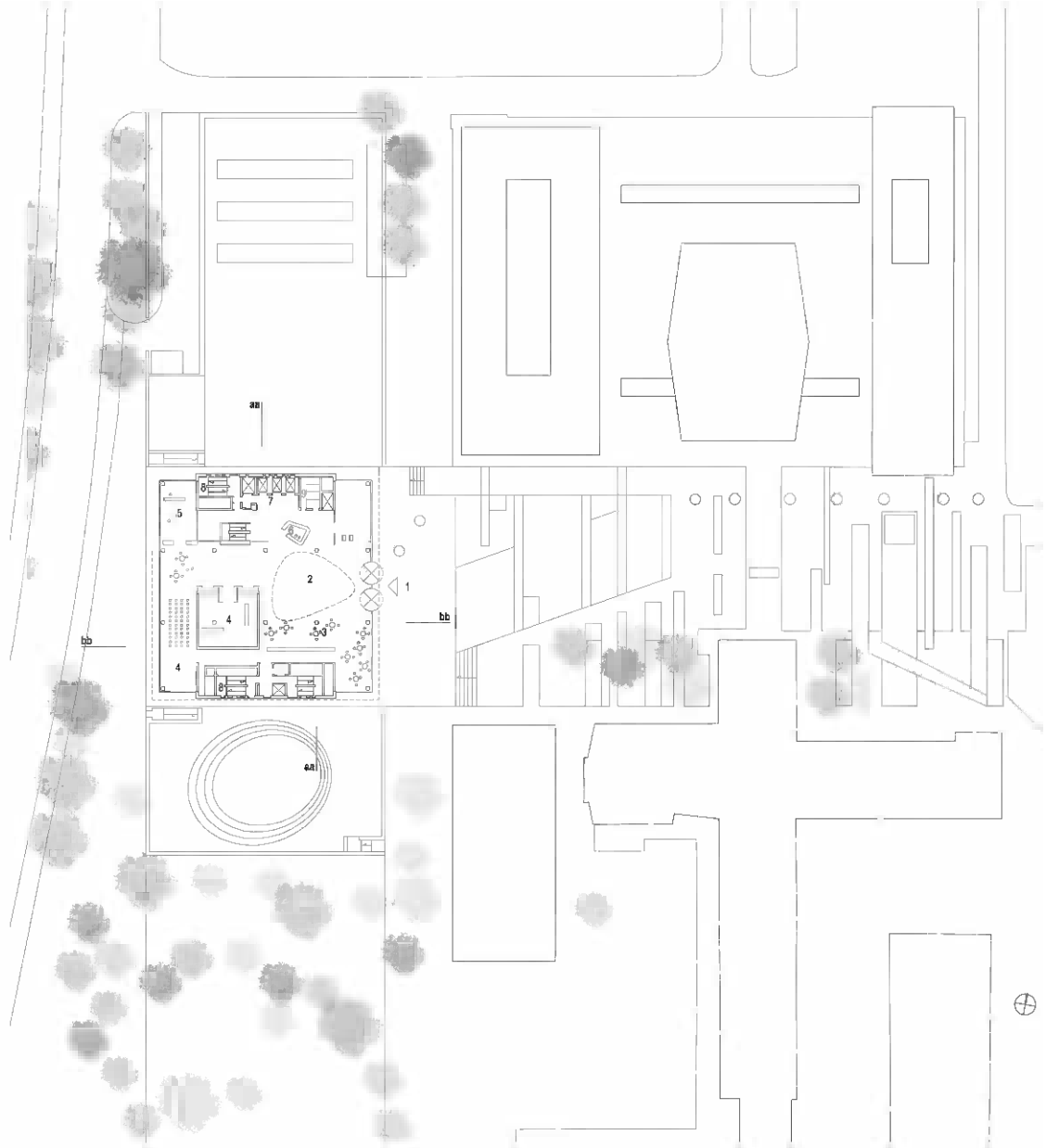






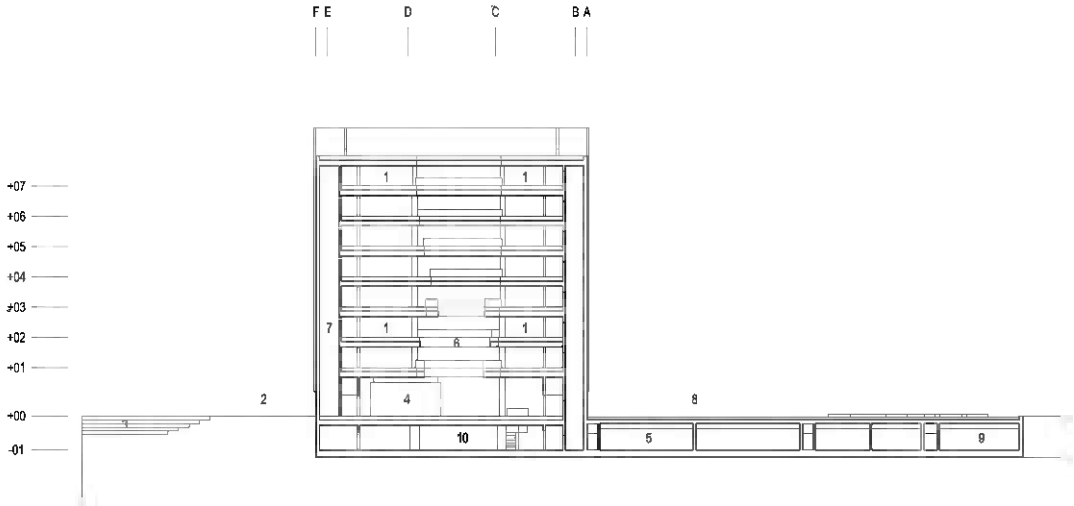
Ground floor 1:750

- Entrance
- Foyer
- Café
- Exhibition area
- Print shop
- Control Point
- Lifts
- Stairs
- Toilets



Section aa 1:750

- 1. Library
- 2. Library garden
- 3. Amphitheatre
- 4. Exhibition area
- 5. Archive
- 6. Atrium
- 7. Lifts
- 8. Secret garden
- 9. Conservation suite
- 10. Reading room



Section bb 1:750

- 1. Library
- 2. Public area
- 3. Main entrance
- 4. Exhibition area
- 5. Reading room
- 6. Atrium

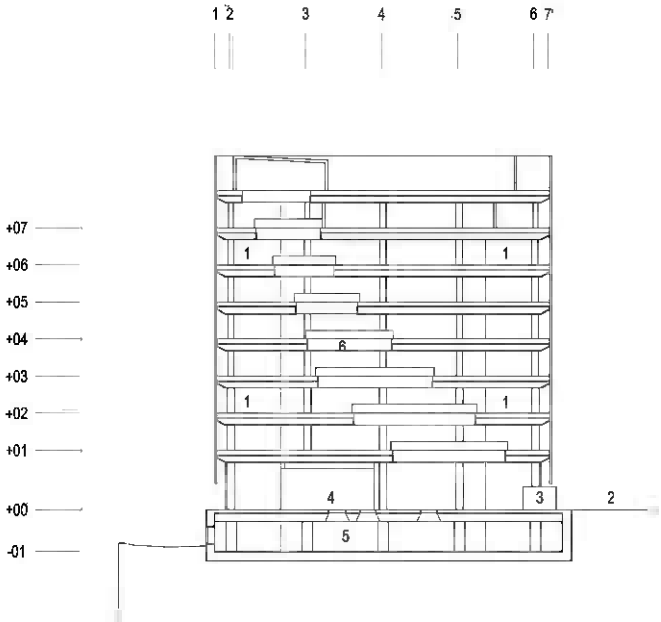


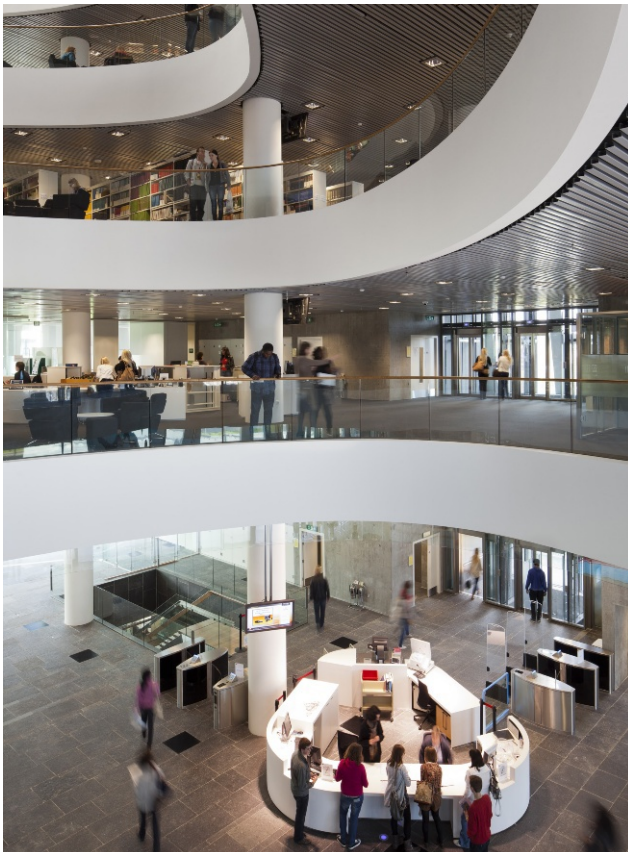
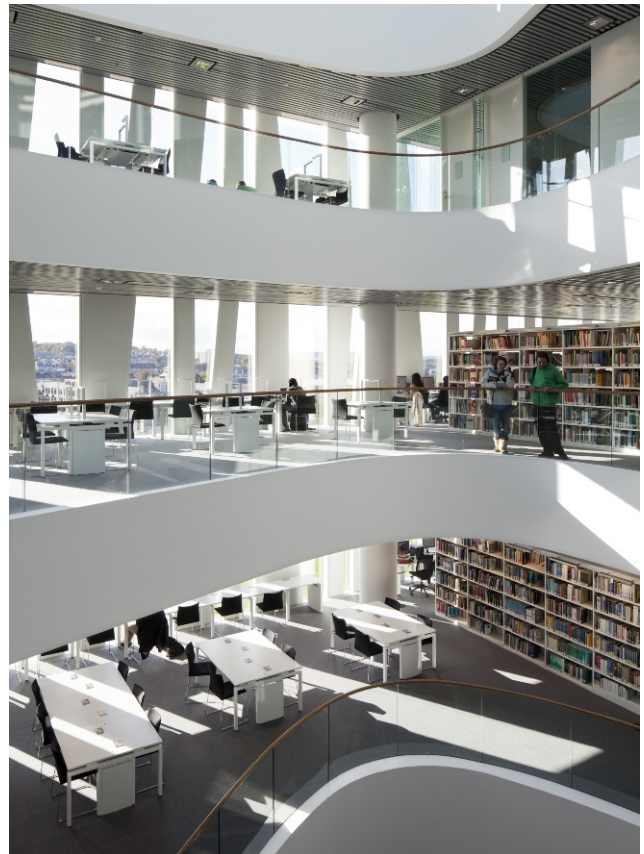
Fig. 7 below right

**A further contribution** to the library's green credentials was the installation of roof collection, storage and recycling of the regional average precipitation of 856 mm (33.7 inches). The recycled water is used for flushing the building's toilets.

Displacement ventilation of the building employs low energy air handling units delivering appropriate air volumes to occupied zones only at a temperature of 18 - 19 C. When external temperatures are below 17 - 18 C the air does not require cooling.

The building's facade has a ratio of 50% opaque panels to 50% glazed units spanning floor to ceiling (Fig. 7). This generous day lighting greatly reduces the supplementary lighting requirement. The high performance glazing and opaque panelling also reduces the need for cooling by preventing significant solar gain. Similarly, heat lost to the outside is minimized.

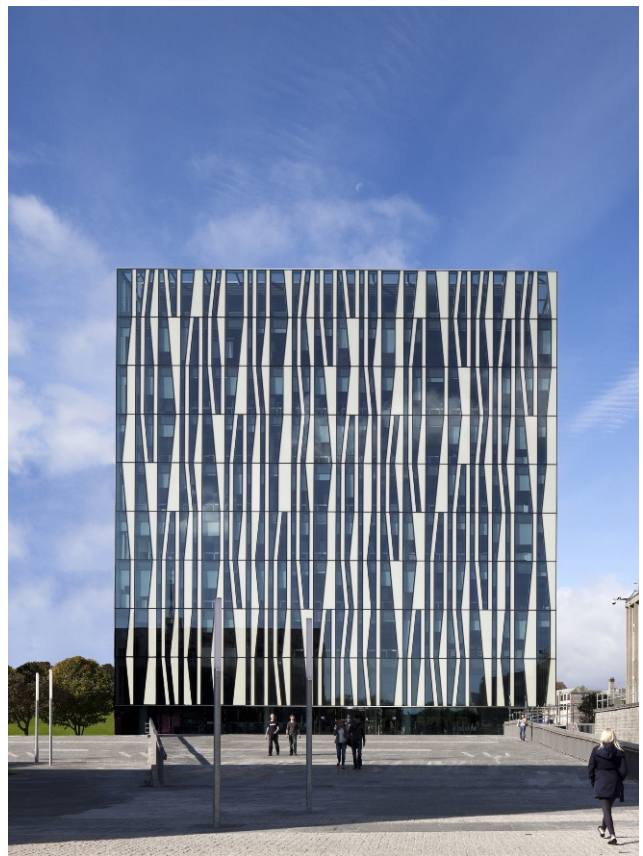
Consequently, the combination of these features resulted in an energy performance certificate with a rating of B43.







117 University of Aberdeen New Library | Aberdeen | UK | Fig. 11 above



**Aberdeen University New Library** houses approximately 250,000 books. Additionally, the University's historic collections comprise more than 200,000 rare books and over 4,000 archive collections including valuable historic maps. This is the enduring legacy of King James IV and Bishop William Elphinstone.

Fittingly founded on a base of Scottish granite (Fig. 12) the investment in the new library is a significant milestone for the University of Aberdeen and for Scotland. In an increasingly competitive intellectual world, the library project is regarded as vital to the academic ambition of the institution. The sharply modernistic design may seem inappropriate in 'the granite city' (Fig. 11) however; the building is required to provide a state of the art modern study facility, employing 21st century information technologies. The University recognises that the future of the institution is largely dependant on the quality of the facilities provided to future generations of students. An enduring reminder of these responsibilities, the 500-year-old Kings College Chapel, can be found on the same campus.

# University of Arizona Poetry Center

Tucson, USA

2008

Line and Space LLC

[www.lineandspace.com](http://www.lineandspace.com)

**“Poetry is the food** of the spirit, and spirit is the instigator of all revolutions, wether political or personal, wether national, worldwide, or within the life of a single quiet human being”. These words are attributed to Ruth Walgreen Stephan (1910 - 1974) who first visited Arizona in the 1930’s. Ruth Stephan was a distinguished novelist and poet who donated a collection of several hundred books, and a cottage, to the University of Arizona campus in 1960. This modest beginning belied the vision of Mrs Stephan, who continued to generously contribute to building a distinguished collection of poetry that would, in time, gain both national and international significance.

The Poetry Center’s Reading series is now renowned worldwide since its inaugural series in 1962. Guest readers and lecturers are invited to stay in the Poet’s Cottage. When the number of

volumes grew to 70,000 items by 2004, architects Line and Space were commissioned to commence the design phase of a new building to house the precious collection. The Helen S Schaeffer Poetry Center was named in recognition of the chair of the Poetry Center’s Development Committee.

The greatest challenge facing the architects was how to reconcile the inherent contradictions in the brief and provide a place suitable for active discourse as well as quiet solitude. A similar dilemma was the desirability of harnessing natural light for reading, whilst protecting the valuable books from damaging ultra violet rays. The value of the collection meant that security had to be factored into the design without compromising the poetry’s accessibility. These apparent contradictions would both challenge and inform the design concept.

Population | 525,796

Co-ordinates | 32° 13’18”N  
110° 55’ 35”W

Elevation | 728 m (2,389’)

Precipitation | 299.7 mm (11.8”)

Temperature | Average High:  
37.88 C (100.2 F)  
Average Low:  
3.83 C (38.9 F)

Humidity | 38.5%







**Innovative passive design** strategies were employed specifically to enhance the visitors experience in a facility located in the harsh environment of the Sonoran Desert. The design team focused on the need to reduce the resources required for the building to function. To achieve this, the structure and fabric of the building was required to respond to its climactic environment and its topographical location.

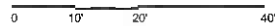
The primary consideration was that of protecting the indoor and outdoor space from the intense heat of the desert sun. This was achieved by creating a series of stacked and overlapping roof planes (Figs. 3, 6). The architect's sections A and B illustrate the transitional shaded space outside the Humanities Seminar Room. This softly illuminated sitting area is protected by an old Mesquite tree, which provides a connection between the building and the natural world enhancing the experience of the outdoor readings on a warm desert night (Fig. 5). Utilising the Mesquite tree was part of the strategy aimed at improving the site's ecological

balance. Landscape designs targeted the existing asphalt parking areas surrounding the site. Native Sonoran desert trees and drought tolerant plants were introduced to provide shade for the new building and the car park to mitigate the heat island effect and provide a habitat for wildlife. Fractured granite and river rock were liberally used in the hard landscaping to improve ground water retention and reduce storm water run-off.

The transport strategy resolved to make use of the nearby multi-storey car park, adding only 17 spaces to the new site. Shaded bicycle racks promote the use of pedal power. From the adjacent residential neighbourhoods, via the busy 400 seat Humanities Seminar room and adjoining transitional space the visitor continues on what the architects describe as "a progression towards solitude". On their journey through increasingly more intimate spaces the poetry pilgrims pass through a myriad of considered design features before emerging into the bamboo garden; a place of quiet contemplation (Figs. 1, 2, 4).



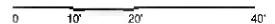
**Section A**



- 1. Shaded Transition Space
- 2. Humanities Seminar Room
- 3. Seating Area
- 4. Collection Stacks
- 5. Turning Wall
- 6. Bamboo Garden
- 7. Binary Wall
- 8. Meeting Room
- 9. Administration Offices



**Section B**



- 1. Odeum
- 2. Sitting Area
- 3. Librarian Office / Workroom
- 4. Lounge
- 5. Administration Offices
- 6. Existing Mesquite Tree

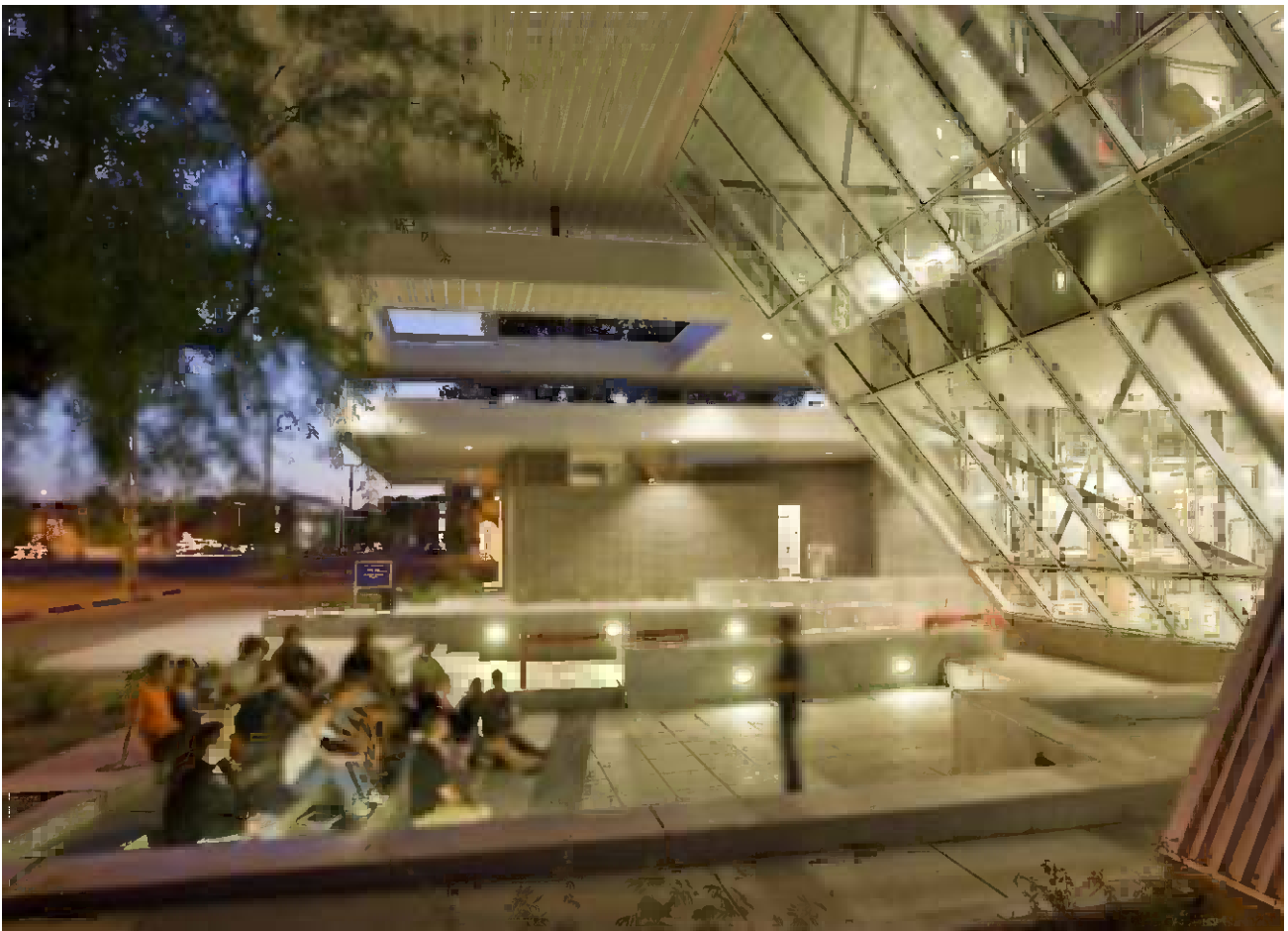








Fig. 7 above | Fig. 8 below | Fig. 9 next page above





**Energy efficiency** is achieved primarily through passive solar design principles. This traditional Arizonan approach employs walls without fenestration, shaded by vegetation on the east and west elevations to mitigate direct solar heat gain. Daylight is delivered into open plan spaces via north and south windows that are sheltered by overhangs calculated by solar modelling of the site. This calculation carefully balances adequate summer shading whilst allowing the warmth required from winter sun to enter the building.

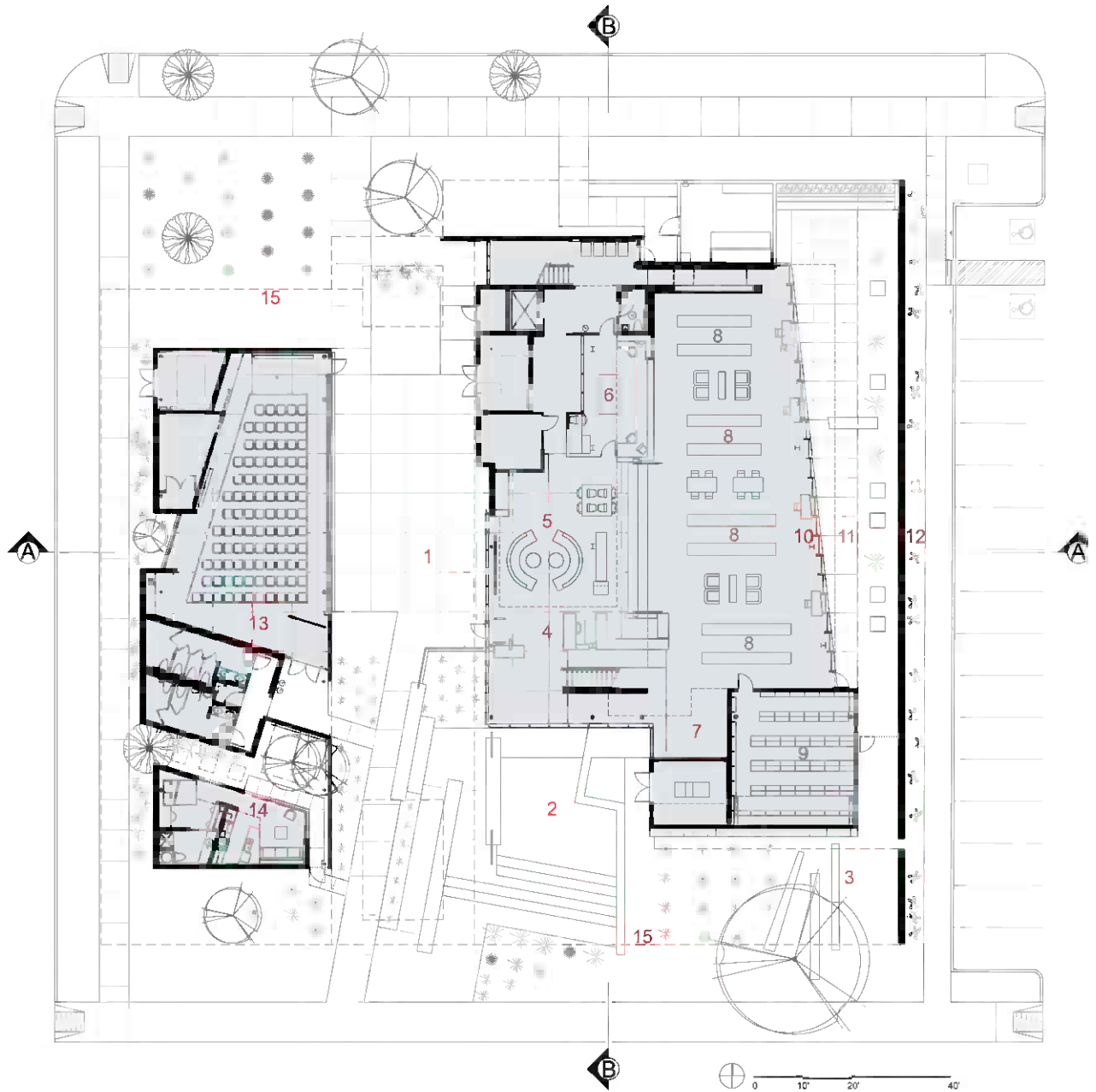
Additionally, this strategy employed in library design allows reading in natural daylight. It also minimises the U.V. damage on the reading material, however additional progressive measures have to be taken in book storage. Volumes are transferred from general access shelves to archive, restricted access, and finally climate controlled areas for the most vulnerable volumes.

The Humanities Seminar Room is naturally ventilated by the prevailing breezes from the transition space which is oriented north south and bi-sects the facility. The sum of these passive design strategies results in reduced demand on the mechanical and electrical systems. Precious

water resources are conserved by seasonally programming irrigation, use of low flush fixtures and waterless urinals. Condensation produced by the mechanical units is trapped and directed to the soft landscaped areas.

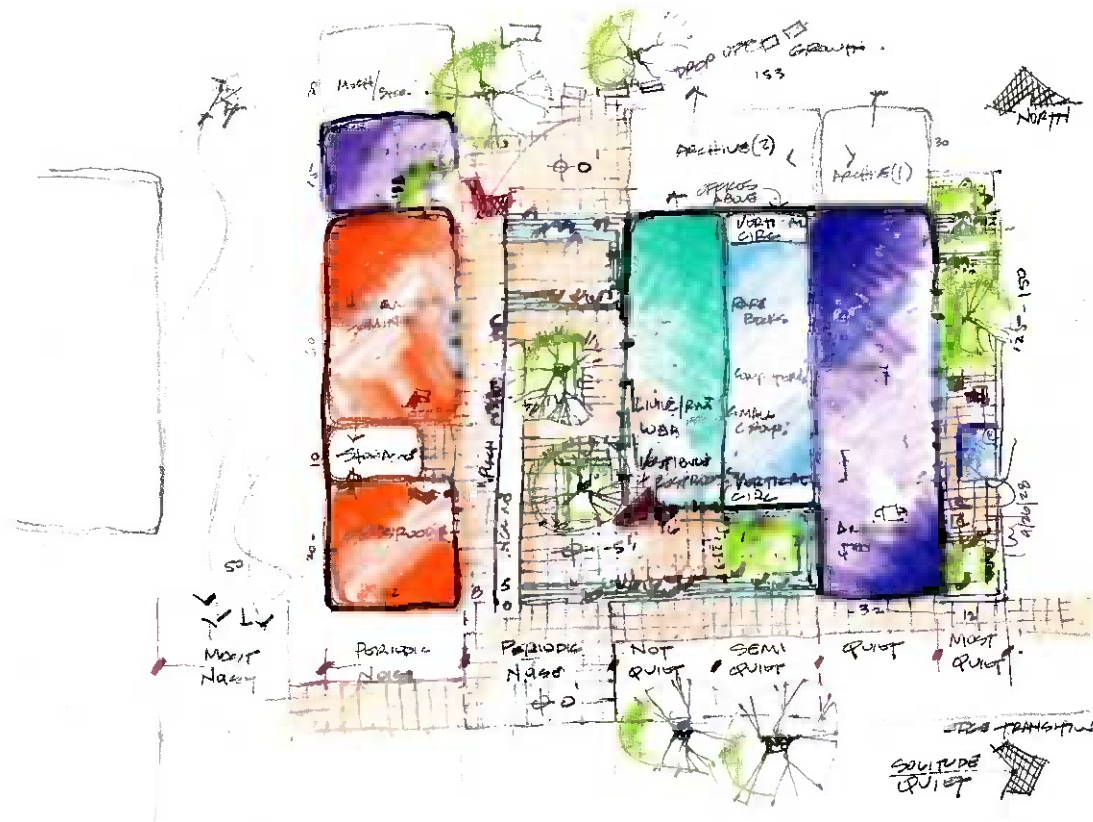
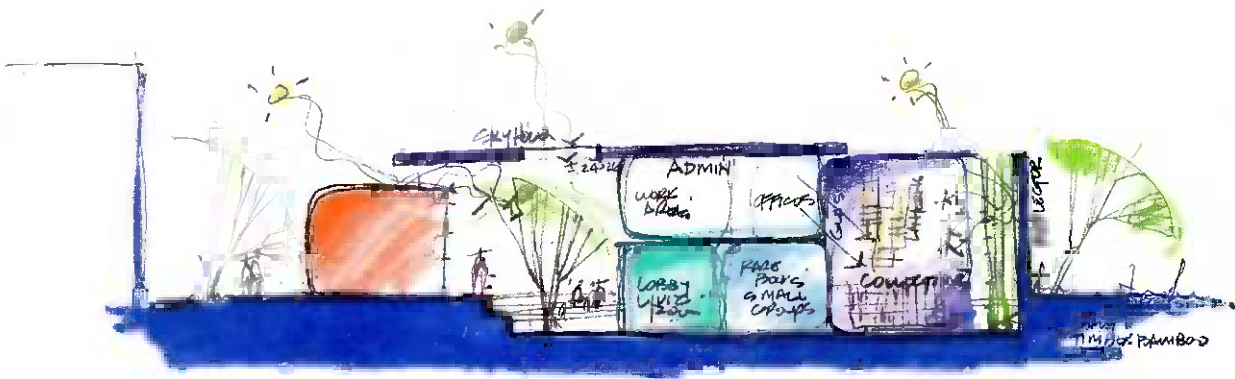
The library's interior fit-out considered the long-term flexibility and adaptability of the space (Figs. 7, 8, 9). The components within the layout were designed for ease of disassembly, versatility and durability. The sliding glazed panels of the seminar room blurring the lines between indoor and outdoor for example (Fig. 8). The images also illustrate the design philosophy for the main structural elements of the building, that of economy and ease of maintenance. The structural steel frame and concrete masonry walls are recyclable beyond the projected life cycle of the facility.

The elements of architecture that may seem intangible to the visitor; those of orientation, scale, relationship, progression and indeed line and space, are originally conceived in the architects design concept sketches (Figs. 11, 12). These sketches more than any reveal the seeds sown in the early stages of design that bear fruit in the Poetry Center's visitor experience.



## Ground Level Plan

- |  |                             |
|--|-----------------------------|
| 1. Transition Space                          | 9. Archive                  |
| 2. Odeum (covered poetry presentation space) | 10. Turning Window Wall     |
| 3. Sandstone Benches                         | 11. Bamboo Garden           |
| 4. Reception                                 | 12. Binary Wall             |
| 5. Sitting Area                              | 13. Humanities Seminar Room |
| 6. Librarian's Workroom                      | 14. Poet in Residence       |
| 7. Children's Area                           | 15. Edge of Roof (Above)    |
| 8. Collection Stacks                         |                             |





# City of Sydney Library Customs House

Sydney, Australia

2005

Lacoste + Stevenson Architects

[www.lacoste-stevenson.com.au](http://www.lacoste-stevenson.com.au)

**History and heritage** are words of great significance to all Australians. The history of Circular Quay and Customs House as a symbol of British power over sea and trade is well documented since the original building was constructed in 1845. However, an enlightened view of the region's history now acknowledges the tragic impact that colonialism had on the indigenous population.

Long before the work of the customs officers began, the Aboriginal Gadigal clan, part of the Eora group of people, had hunted, fished and traded around the coves of the inner Sydney region for thousands of years. When Captain Arthur Philip landed the first convict fleet on 26th January 1788, Gadigal land was claimed as a British Colony and the white man's history in the region began. The rich Aboriginal culture became submerged by the

subsequent waves of uninvited people, who carried with them diseases not previously encountered by the Aboriginal population. Thousands died as a result and the depleted Aboriginal people became marginalised in their own country.

The histories of the indigenous population and the people who settled in their land are now starting to be acknowledged and reconciled as 21st century Australia looks forward.

As well as being a traditional library, Customs House is now an important Sydney venue, embracing numerous multi-cultural events attended by Sydney citizens and visitors from overseas. Ground floor French windows installed to the northern facade cafes create a seamless transition to a new terrace overlooking a renovated Customs Square where many of the events take place (Fig. 2).

Population | 4,627,345

Co-ordinates | 33° 51' 35.9" S  
151° 12' 40" E

Elevation | 40 m (131')

Precipitation | 1212.8 mm (47.7")

Temperature | Average High:  
21.7 C (71 F)  
Average Low:  
13.8 C (57 F)

Humidity | 69%



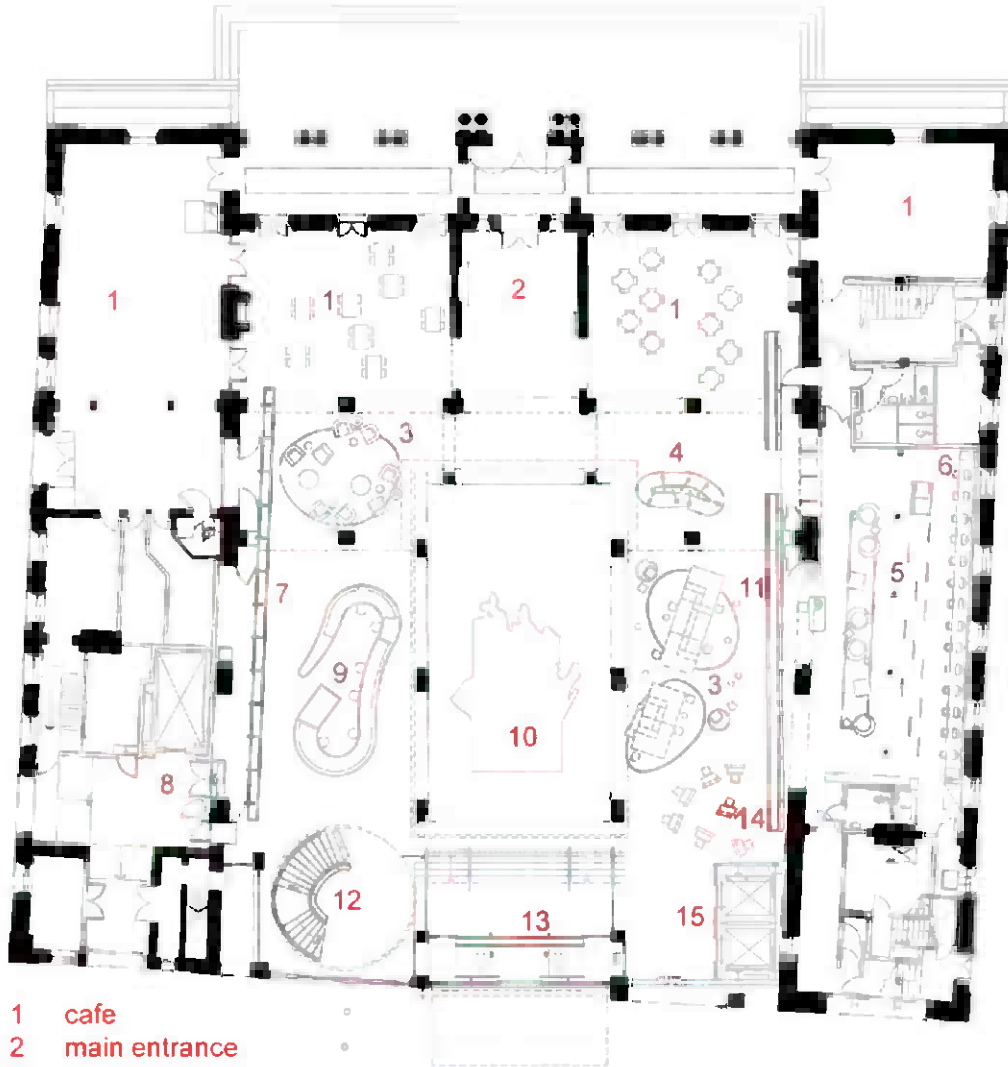


the  
} and  
&

Fig. 3 below right

**The delicate balance** required to preserve an historic building whilst embracing the varied needs of the modern library user required full utilisation of the three available levels of the building. As the ground floor was inextricably linked to the open air piazza of Customs Square, as a meeting place and events space, the Customs House ground floor was designed to service the social and contemporary functions of the modern library. Architects, Lacoste + Stevenson describe the ground floor as “a living room for Sydney”. The cafe service, newspapers, magazines, paperbacks, digital information and projected images all rub shoulders with the eclectic mix of lounge furniture. The heritage of this important public building was retained by maintaining the original, structural grid, and consequently the spatial volumes within it as illustrated on the ground floor plan (Fig. 5). Additionally, the exposed fabric of the building was preserved as far as possible. The eccentric spiral stair provides a traditional civic alternative to the elevators (Figs. 3, 4).





- 1 cafe
- 2 main entrance
- 3 lounge seating
- 4 newspaper reading desk
- 5 magazine racks
- 6 internet bench
- 7 media wall
- 8 goods lift
- 9 information desk
- 10 city model
- 11 newspaper wall
- 12 spiral stair
- 13 customs house lane entrance
- 14 internet pods
- 15 lifts

ground floor plan



Fig. 6 below right

**The significant new** interventions are identified by their contrasting, vibrant, red finish. Curved, and freestanding, the main desk grabs the attention of those visitors who need help with their browsing (Figs. 4, 7, 8).

The selection of new materials was influenced not only by the aesthetic requirements of the historic building, but also their durability and sustainability. Recycled materials were given priority; the best example is the use of recycled cork floor sheeting which is finished to a dark patina. The flooring combined with the dark timber ceilings provides a pleasing contrast with the light filled atrium and media wall (Figs. 7, 8). Other items salvaged for re-use include the display lighting and display hanging systems.

The hub of this interactive whirl is the City of Sydney model displayed beneath the glass floor of the atrium. Above this, the traditional library functions of levels 1 and 2 are screened by a layered veil conceived and constructed in association with the artist Andrew Donaldson (Figs. 8, 9).

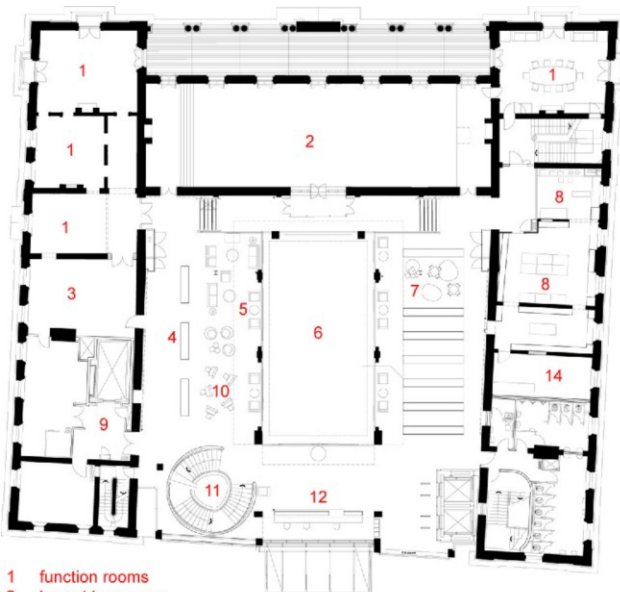
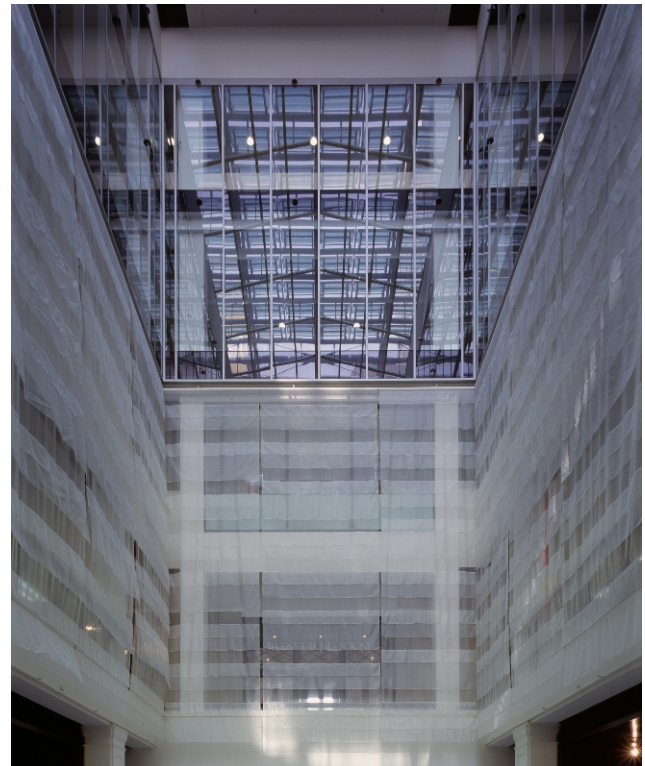




Fig. 9 below right

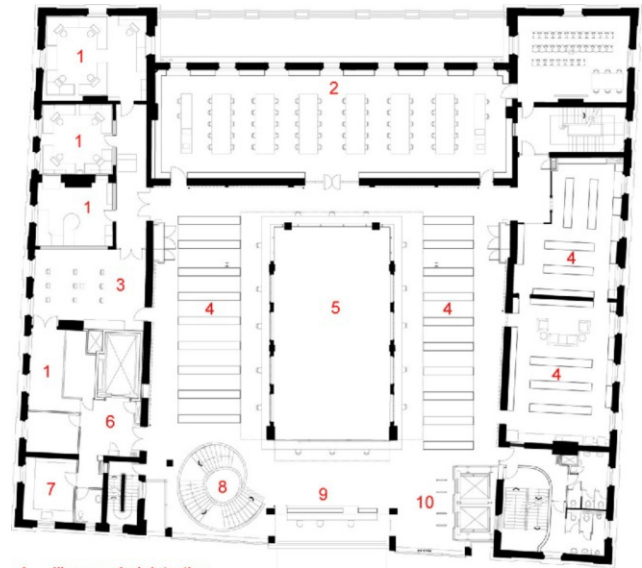
**The upper levels** of Customs House Library reveal the primary sustainable strategy of the project, that of retaining the architectural integrity of the historic building's division of space. On levels one and two, the reading rooms and book collections are housed in rooms once inhabited by the state's Customs officers. Shelving dimensions are customised to respect the ceiling heights of the rooms. The strategy of retaining the original volumes and external fenestration openings of these rooms has succeeded in preserving the character of Customs House for a new generation of Australians engaged in book work (Figs. 11, 12).

The carefully considered re-use of the building in a prime Sydney location has resulted in the project receiving prestigious awards for interior design and lighting, as well as being "Highly Commended" in the National Trust Heritage Awards in 2006. Customs House Library and Customs Square at Circular Quay has now been added to the growing list of the city's architectural landmarks.



- 1 function rooms
- 2 barnet long room
- 3 kitchen
- 4 exhibition
- 5 lounge seating
- 6 atrium void
- 7 childrens collection
- 8 av collection
- 9 goods lift
- 10 internet pods
- 11 spiral stair
- 12 loans desk
- 13 fiction collection
- 14 work room
- 15 lifts

first floor plan



- 1 library administration
- 2 reading room
- 3 training room
- 4 non-fiction collections
- 5 atrium void
- 6 goods lift
- 7 staff room
- 8 spiral stair
- 9 loans desk
- 10 lifts

second floor plan





# Cybertheque, McGill University

Montreal, Canada

2008

e k m

Emond, Kozina, Mulvey, architectes

[www.ekmarchitecture.com](http://www.ekmarchitecture.com)

“Education costs money, but then so does ignorance.” Sir Claus Moser’s philosophical musing, etched in the glass of the new Cybertheque library at The McGill University (Fig. 2) now reflects the bold, forward thinking of the ‘information age’. Tasked with serving the voracious academic appetites of 3.5 million library visitors each year, Janice Schmidt, McGill’s Director of Libraries, needed to address the reality of supply and demand. The incidence of borrowing a hard-copy book, 60 or 70 times per semester cannot rival the ability to download the electronic version up to 10,000 times in the same period. This principle of leverage defines the Architecture and Design project undertaken by e k m and B+H Architects in transforming the former repository of books into a state of the art, research and study suite. In a radical departure from the conventions of a typical

library, Cybertheque facilitates the methods which the contemporary student will employ to acquire knowledge in the digital era.

The new library can simultaneously accommodate individual research, small group study, and larger group collaboration. The e-classroom (Fig. 3) can function as a traditional lecture theatre or a digital studio. Whilst the use of space within the floor plan (Figs. 1, 5) is defined, the room has been cleared of obstructions, and is transparent as far as possible. The glazed wall of the reading room, overlooks the central campus (Fig. 4), a green landscaped space in the heart of Montreal. Cybertheque’s transparency connects students engaged in solitary study. The resulting communal environment is greatly appreciated by the students who are often dispersed and isolated in their various accommodations.

Population | 1,649,519

Co-ordinates | 45° 31' N,  
73° 39' W

Elevation | 6-233 m (20-764')

Precipitation | 98 cm (39")

Temperature | Average High:  
26 C (79 F)  
Average Low:  
-13 C (9 F)

Humidity | 70%





Education is simply the soul of a generation to another  
Gibbert K. Chesterton

Education costs money, but the  
Sir Claus Moser 1920M. 2061 r12

Un intellectuel, c'est un écrivain  
qui ne cesse de le contester

Oliver Wendell Holmes  
formel d'un  
sensations  
... 6... mind.

Les lignes, cela fatigue  
Le bon de la carte

Fig. 3 below

**The light levels** and vibrant colours of the lounge furniture (Fig. 3) were carefully chosen and combined to provide a stimulating, environment designed to mitigate the fatigue factor. Cybertheque's apparent qualities of lightness and transparency belie the robust durability imbued in the considered interior design. Where materials literally come into contact with the student body, maple and fabric curved combinations ensure a sturdy, warm welcome. The transient circulation areas are more sharply and clearly defined by stainless steel, aluminium and glass. The diffusion and reflection of light is compounded by the choice of these materials for the boundaries of the e-classroom (Fig. 4). One of Cybertheque's greatest challenges was to integrate user comfort with ergonomic design and high-tech functionality. This is most evident in the drawings produced for the Small Group Study Banquettes and the Quick Access Computer Stations (Figs. 7, 9).

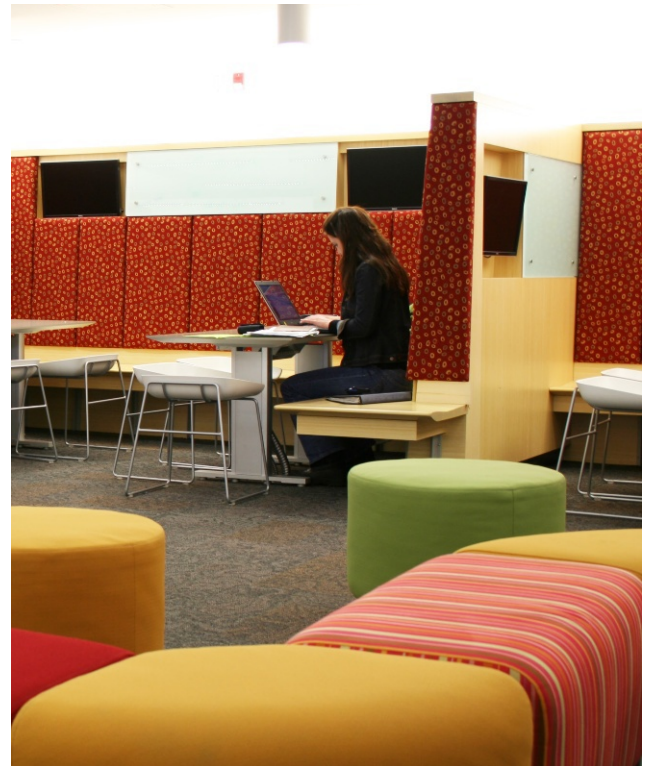








Fig. 11 below right

**Cybertheque's pieces de resistances** are the four, centrally aligned, glass walled meeting pods (Figs. 11, 12, 13). The pods pivot around bamboo clad columns that have been expanded into bulkheads housing the upgraded HVAC systems. Etched glass 'white boards' and plasma screens linked to the conference tables complete the clever exploitation of both horizontal and vertical planes. The academic tradition is enhanced by the French and English language quotations about libraries and learning which are etched into the full height glazed walls.

In terms of sustainability, the most important philosophy embedded into the project was that of re-developing underutilised prime space in a building that was already well serviced by existing infrastructure. This key decision enabled Cybertheque's design team to leverage the existing envelope of the building and its attendant services. The environmental impact was thereby minimised by eliminating the enabling works of a new-build. The team was mindful of the benefits of this judgement throughout the design, procurement and production phase of the project. The existing facility was dismantled rather than demolished. This provided the opportunity to repair, re-finish and re-use items such as glazed hardwood frames, and radiator covers. These items were then either selected for integration into the design or nominated for re-use elsewhere in the University. Existing furniture was also utilised elsewhere in the library facilities or donated to the University community at large. Salvaged masonry and steel components were all recycled.

This policy of recycling and selecting recyclable material defined the procurement policy for ceilings, joinery and flooring. Carpet tiles were selected to provide sound absorption and minimise waste when replacements are required in a facility with a very high footfall. Upgraded HVAC systems and long-life fluorescent lamps were carefully selected to reduce energy consumption. Additionally, the principles employed in the remodelling, in particular the flexibility of the floor plan, and the fit-out will facilitate inevitable future changes.

Should former McGill alumni, actor William Shatner of Star Trek fame, visit Cybertheque, he may well find the surroundings familiar. The design teams led by Francois P. Emond of e k m and Douglas Birkenshaw of B+H have produced a remarkable resource at McGill University that simultaneously respects its illustrious past, whilst looking confidently forward to the future.







# Old Market Library

Bangkok, Thailand

2009

TYIN tegnestue Architects

[www.tyintegnestue.no](http://www.tyintegnestue.no)

**Established in 2008**, TYIN tegnestue Architects is run by the partnership of Andreas G. Gjertsen and Yashar Hanstad. Based in Trondheim, Norway, the practice has forged a close working relationship with LINK Arkitektur AS Norway, one of the largest architectural firms in the Nordic region. Working under the protective wing of the LINK organisation has enabled TYIN to explore a diverse range of projects far beyond the steep shores of Norway. TYIN's architects develop rapid, pragmatic, architectural solutions, in conjunction with poor communities, to improve the physical and mental quality of life of those most in need of change. Andreas Gjertsen describes this philosophy as "the architecture of necessity". A good example of the method is the design, and construction of the Old Market Library in the Min Buri, 'city of fish' district of Bangkok, Thailand.

Bangkok, 'city of angels', is the political and economic centre of Thailand and home to approximately 12 million citizens. The capital city has a tropical wet and dry climate under the Koppen climate classification and lies on swampland only 2 metres above sea level. The entire Chao Prya river basin and tributary complex filters through the city into the Bay of Bangkok. An extensive network of canals divides the urban sprawl into plots of land that were historically the city's districts. Despite the Bangkok Metropolitan Administration efforts to build higher bank levels, the water will often breach them flooding the street levels during the monsoon season. October 2011 brought heavy flooding in 13 city districts. The annual flood level was just one of the challenges faced by the team working on the Old Market Library.

Population | 115,212

Co-ordinates | 13° 48' 50" N  
100° 44' 53" E

Elevation | 2 m (6.56")

Precipitation | 1.496 mm (58.93")

Temperature | Average High:  
32.7 C (90.9 F)  
Average Low:  
24.1 C (75.4 F)

Humidity | 79.9%





Fig. 3 below right

**A fire** in the late nineties had forced the relocation of commercial market activity to the other side of the canal (Fig. 7). Furthermore, uncertain land rights had resulted in a reluctance to invest in the deteriorating properties (Fig. 4). To ensure the success of the project it was essential that the architects engaged with the community to ascertain their aspirations for the once thriving district.

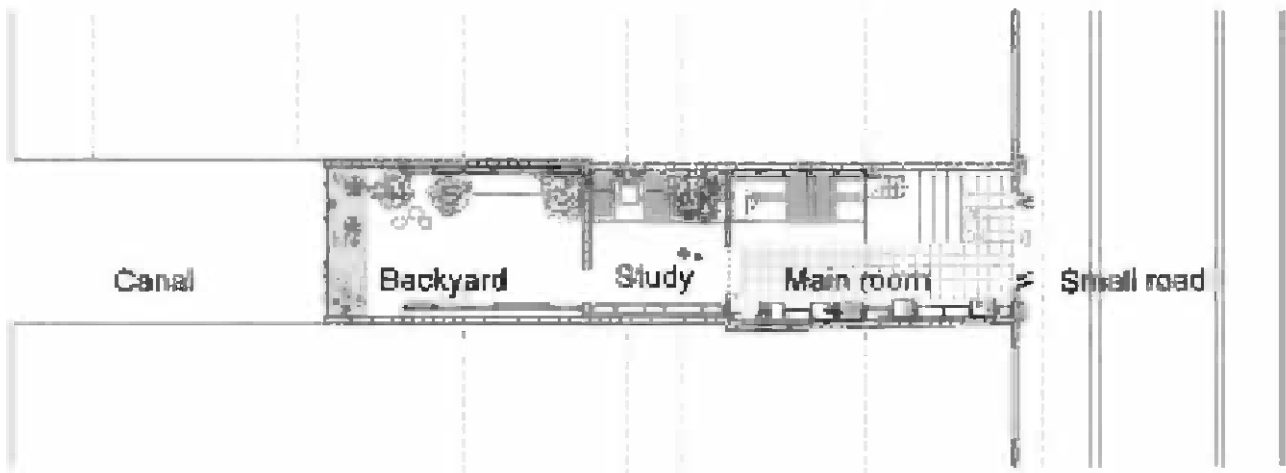
A series of meetings were held, where drawing, model making and clearing refuse helped to develop a consensus. The younger members of the community were more forthcoming, and engaged in the process more readily than their elders. However when the designs were finalised (Figs. 6, 7) more of the adults came forward to offer their skills to the process (Fig. 5).

Eventually a sense of attachment took hold and a consistent group of Old Market residents regularly arrived to help with the refurbishment. This local commitment was deemed essential for the future sustainability of the library.





TYIN tegnestue, Old Market Library  
drawing section  
scale 1:200



TYIN tegnestue, Old Market Library  
drawing plan  
scale 1:200  
paper A5

Fig. 8 below right

**In considering** the flood risk, an individual flood protection scheme for the building was deemed to be too costly. A START (Global Change System for Analysis, Research and Training) report on Asian coastal cities at risk identified that Bangkok is sinking into the Chao Phrya river delta at a rate of 2 cm to 5 cm per annum due to sediment compression and tectonic depressions in the region.

Consequently, the design focused on elevating the useable spaces in the library to a level above the annual flood. The 100-year-old structure could not support any superimposed loads, therefore the proposed new mezzanine reading room (Fig. 13) had to be structurally independent. The second hand, load bearing, timber sections (Fig. 11) were selected and purchased from a local merchant, whereas the wall cladding was trimmed from wood collected in the immediate area of the library.

A pergola was constructed to provide shade to the back yard meeting space (Fig. 8). Pot plants are nurtured in the indoor / outdoor space.

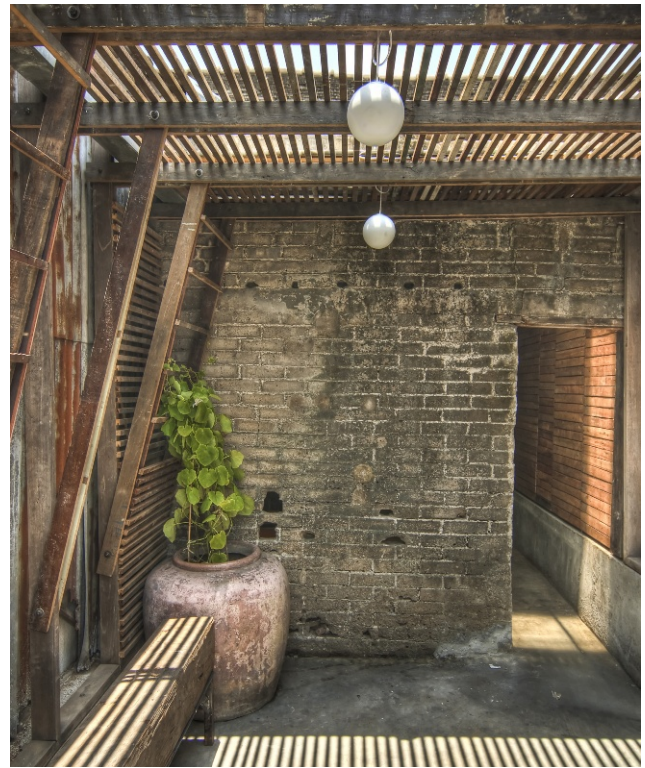




Fig. 12 below



**The colourful bookcases** (Figs. 10, 11, 13) were fashioned from packing boxes supplied by CASE Architects (Community Architects for Shelter and Environment) who collaborated on the project. The goal for TYIN Architects was to engage and work with one of the poorest urban communities in Asia in a programme of design and construction. Running from March to May 2009 at a total cost of 27,000 NOK (approximately 4,500 U.S Dollars) the project demonstrated that with very limited resources, positive changes could be made very quickly. Further improvements in the Min Buri environment may ensue. The fuel for the refurbishment project was the open exchange of knowledge and skills, some of which had been laying dormant waiting for a spark. The joint venture between the residents of Min Buri and the TYIN architects resulted in the dramatic transformation of a dilapidated building. Old Market library is now a valued resource in a fragile area, and provides a source of pride and inspiration for the community.







# Willingboro Public Library

Willingboro, USA

2004

Croxton Collaborative Architects LLC

[www.croxtoncollaborative.com](http://www.croxtoncollaborative.com)

**The years immediately** following World War II saw a prolific growth in the population and housing requirements on the Eastern seaboard of the United States. Servicemen returning from the war in Europe and the Pacific were assisted by government in their desires to settle into a peaceful family life. To cope with the demand for new homes Abraham Levitt and his sons William and Alfred had developed a 'fast track' construction process, which involved pre-fabrication of framing off-site. Production line methods were required to keep pace with the demand fuelled by government loan schemes and mortgage tax breaks. Levitt & Sons alone built in excess of 140,00 houses. The resulting suburban sprawl became home to the 'baby boom' generation. The Willingboro New Jersey Levittown comprised 12,000 homes divided into ten neighbourhoods.

The basic retail and commercial needs of the 33,000 strong populations were served by Willingboro Plaza. The Plaza shopping centre covering 56 acres and containing 380,000 square feet of retail property was completed in 1959. By 1990, just over thirty years of social, political and economic upheaval brought the Plaza to the point of failure. The once thriving retail park was abandoned in the shadow of Highway 130. Inevitably the Plaza's dilapidated buildings began to attract drug related and other criminal activity, heaping additional problems on the by-passed community. Furthermore, the slide into disuse brought with it considerable environmental damage with transformers leaking PCB's and neglected vessels containing oil and gasoline failing to hold their contents securely. A programme of remediation was urgently required.

Population | 31.629

Co-ordinates | 40° 1' 39" N  
74° 53' 1" W

Elevation | 12 m (39')

Precipitation | 1016 mm (40")

Temperature | Average High:  
10.38 C (50.7 F)  
Average Low:  
2.88 C (37.2 F)

Humidity | 71.31%





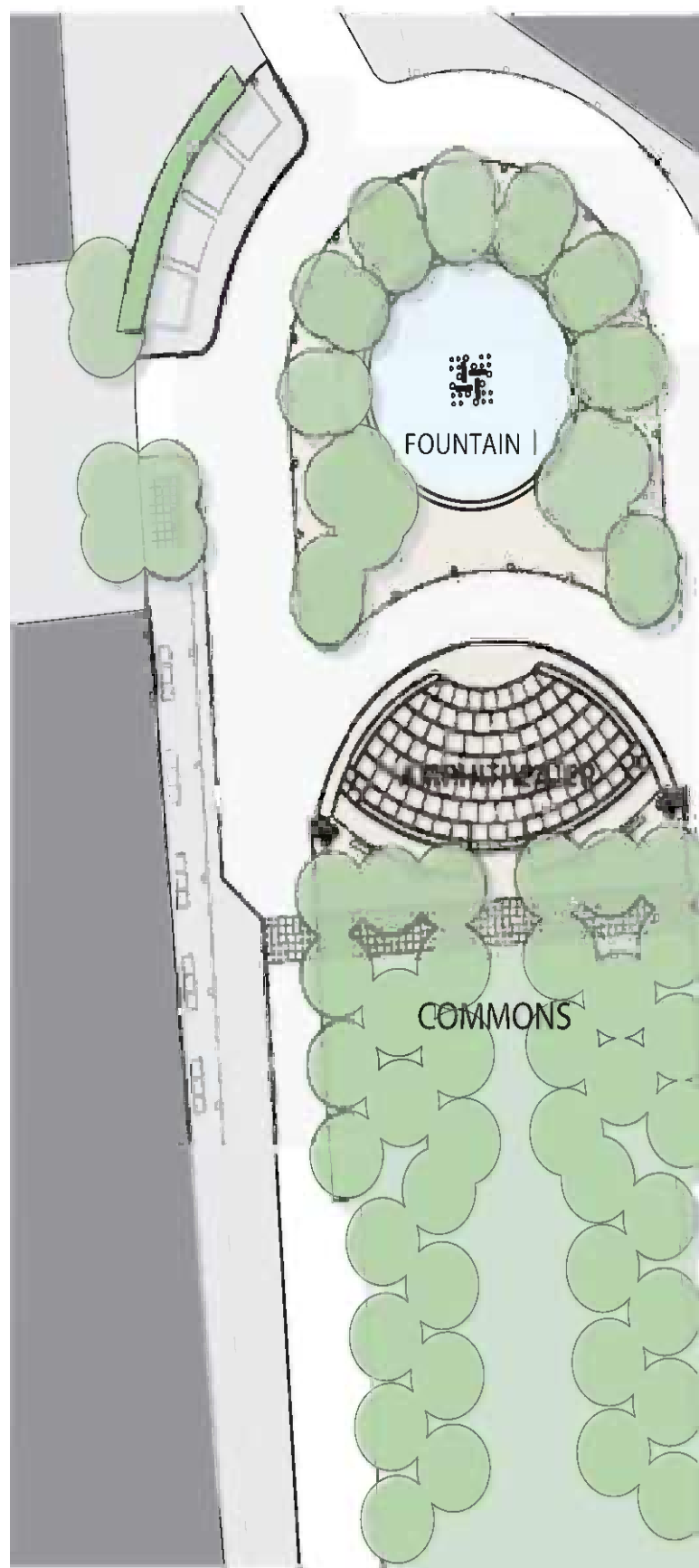
**A Sustainable Master Plan** was developed with the involvement of the town council, community representation and Croxton Collaborative Architects. An EPA (Environmental Protection Agency) grant for Brownfield Remediation was applied for. The Sustainable Concept was conceived as follows:

An increase in density and a diversity of uses for the site on a 24/7 basis would build in the inherent site security required. A mixed use flexible strategy for occupancy, for example, retail, commercial, town centre, residential, parkland, pharmaceutical and library. Greening of the site would be implemented by introducing soft landscaping into the vast hard landscaped areas previously used for parking. Reducing vehicle parking in favour of park and ride schemes integrated with the bus and light rail transport infrastructure was to be applied as a basic principle in development negotiations.

To attract new occupiers to the site an exemplary first project was needed. This required a bold commitment from Willingboro Public Library to relocate onto the site. This would attract visitors to the green space and park at the heart of the Master Plan.

Croxton Collaborative Architects believe the first principle of sustainability is to value all existing assets and to be resourceful in every decision. With this in mind the architects became committed to using 100% of the structural steelwork, framing joists and foundations of the existing Woolworth building. The architects then persuaded the sceptical client and potential users to buy in to the idea of creating a modern library facility in the recycled building. This would result in cost savings of 11% and a reduced programme time saving of 3 months.

To maximise footfall the facility was designed to include an attached row of retail stores, a community art gallery (Fig. 5), a computer room and a multi-functional community meeting room (Fig. 3). The design principle that Croxton's identify as 'loose fit' enabled the taller of the two Woolworth buildings to receive an additional upper row of new windows. This area became the Children's Library and Storytelling Room overlooking the adjacent Park (Figs. 3, 4). By creating an open and unobstructed area for fit-out, the building can be readily adapted for future change of use, the built in flexibility further increasing sustainability.



COLLEGE

CHILDREN'S  
PARK

- Retail
- Main Library
- Library Staff Areas
- Library Special Purpose
- Children's Library
- Community Space
- Children's Play Area

LIBRARY

RETAIL

RETAIL

SERVICE

SITE PLAN

N

Fig. 4 below





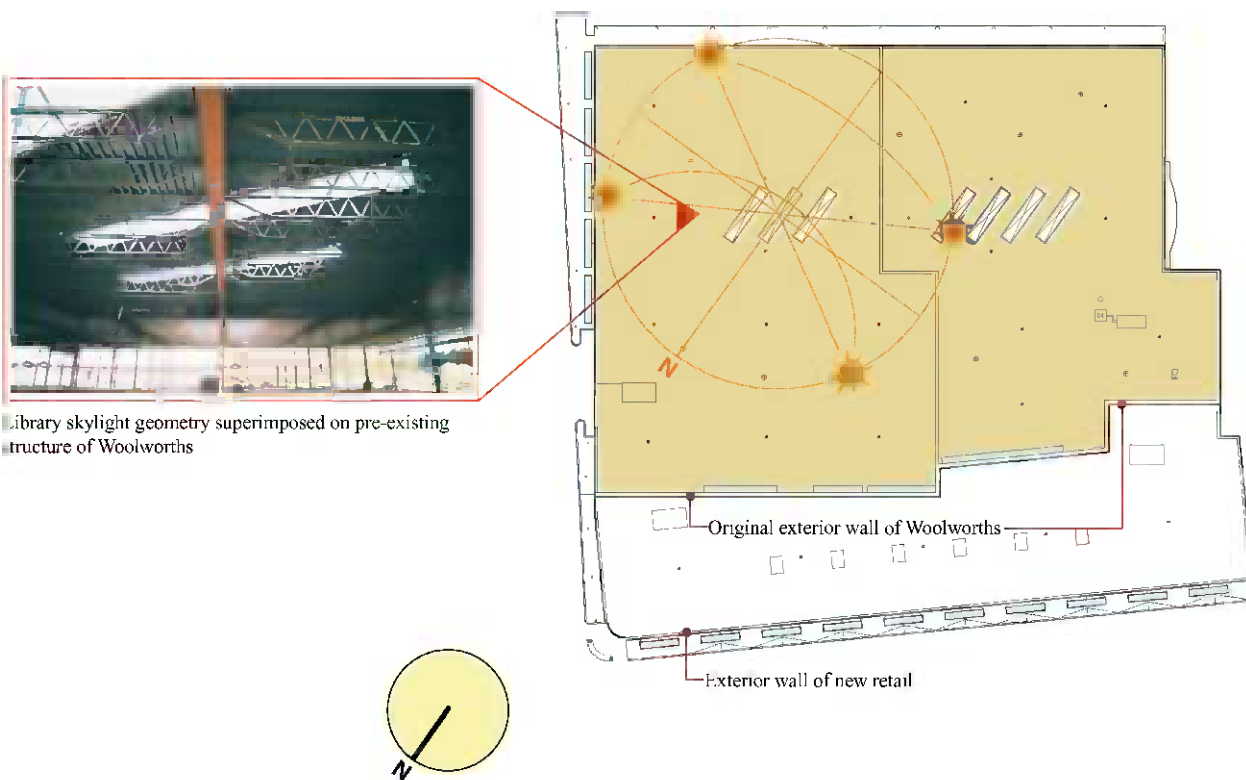
**The definitive strategy**, in keeping with a new-build library, is increased day-lighting. However, unlike a new-build the building orientation could not be chosen. To overcome this obstacle seven skylights were installed on a north-south axis to capture the maximum available annual daylight. The geometric modelling for this installation is illustrated in (Fig. 8). With the existing structural beams running through the skylight installations some bell-form shaping of the sheetrock finishes was required (Fig. 9). The overall effect throughout the main hall of the library is a rotational varied pattern of 95% diffused light available from the spring to fall equinox. Supplementary high efficiency fluorescent light fittings are controlled by both daylight and occupancy sensors. Sensors of an enthalpic nature are employed in the ventilation system to detect when the local climate provides air that is sufficiently dry and cool enough to be drawn through the building. The heating and cooling is powered natural gas, which when burned produces lower levels of pollutant

gases in comparison with gas or oil. These strategies are combined with high performance insulation in the roof (R20) and walls (R11). Energy modelling produces the following performance figures for the unit as follows:

- Peak Electrical Demand Reduction = 57%
- Global warming (CO2) Reduction = 44%
- Acid Rain Reduction = 49%
- Energy Saving = 46%

These performance figures greatly exceed those expected from building stock aimed at a market rate of \$175 per square foot.

Regarding materials selection, Croxton Collaborative employed precautionary principles in excess of current LEED / USGB standards for this project. Products containing P.V.C., chromic acid, lead and cadmium were excluded. Selection principles in rough order begin with human health impact, followed by functionality, provenance and recycled content, aesthetics, cost, durability, maintainability, ease of disassembly and re-use, embodied energy and nature of extraction.



## Willingboro Public Library - Roof Plan





**An important programme** of external works was required to redefine the storm-water management system. To replace the large areas of impervious asphalt and enclosed storm-water pipes, a system of open vegetated swales and 'rain gardens' were constructed and connected to the natural riparian systems of the site. Additionally, a planting scheme of indigenous deciduous trees was implemented throughout the site to provide a seasonally balanced elevated canopy. The tree canopy is particularly welcome in the promenade running from the drop-off lay-by to the children's play area.

Perhaps the most definitive external feature is the illuminated terrace to the perimeter of the building, which provides a warm comfortable glow to the entrance areas and beyond (Fig. 11). The iconic-cantilevered canopy with its distinctive lettering (Fig. 12) combines functionality with the dash of civic pride required in reclaiming the once lost Plaza. The attractive facade is highly visible from Highway 130 fulfilling another important requirement voiced by the residents of Burlington County New Jersey.

The Sustainable Master Plan is now coming to fruition. The apartments of Wellingboro Square units have been completed bringing the desired 24/7 occupancy of up to 500 residents to the development.

Additionally, all of the commercial properties have attracted developers or are in negotiation.

The brave footsteps taken by the Wellingboro Public Library and its supporters are now being well and truly followed.

In recognition of their remarkably innovative work on the Wellingboro project, Croxton Collaborative Architects received the following awards:

**2006 Design and Sustainability Award / AIA New Jersey**

**2007 Committee on the Environment - Top Ten / AIA National**

**2008 Greater Philadelphia Sustainability Award**





# Albertslund City Library

Albertslund Kommune, Denmark

2004

HENNINGLARSENARCHITECTS

[www.henninglarsen.com](http://www.henninglarsen.com)

**Albertslund Kommune** in Hovedstaden region can be found on the island of Zealand in Eastern Denmark. It can be reached in 20 minutes from Copenhagen Town Hall Square. Over 60% of the municipality is a mixture of forested and green areas. The community of approximately 28,000 people prides itself on its stewardship of the environment. Energy efficient design is given the highest priority in the urban development programmes. As part of the Alberton Concept, a collaborative project dealing with the renovation of homes, Alberton was named as the Nordic Energy Municipality in 2011.

The municipality promotes a dynamic cultural life for citizens of all ages, however children and young people are given special attention, particularly in day care nursery programmes where over 80% of the food is organic. Albertslund City Library

is central to the community's cultural and social activities and also includes an entertainment programme in the form of a cinema, and a music venue. Henning Larsen Architects won first prize in the competition to remodel the library.

The challenge facing the architects was how to create a modern library within the footprint of a malfunctioning building constructed in 1973. A dilapidation survey revealed features and flaws typical of the era. For example, the small windows restricted daylight, and the flat roof construction had developed leaks. The problems were compounded by an obsolete ventilation system operating in a building with insufficient insulation. The key concept sketch (Fig. 1) featuring a series of roof lanterns to solve both the daylight and ventilation issues in a natural way was developed into detailed plans and sections (Figs. 3, 4, 5, 6).

Population | 28,000

Co-ordinates | 55°39'25" N  
12°21'49" W

Elevation | 14 m (46')

Precipitation | 613 mm (21.43")

Temperature | Average High:  
22 C (72 F)  
Average Low:  
-3 C (27 F)

Humidity | 79%

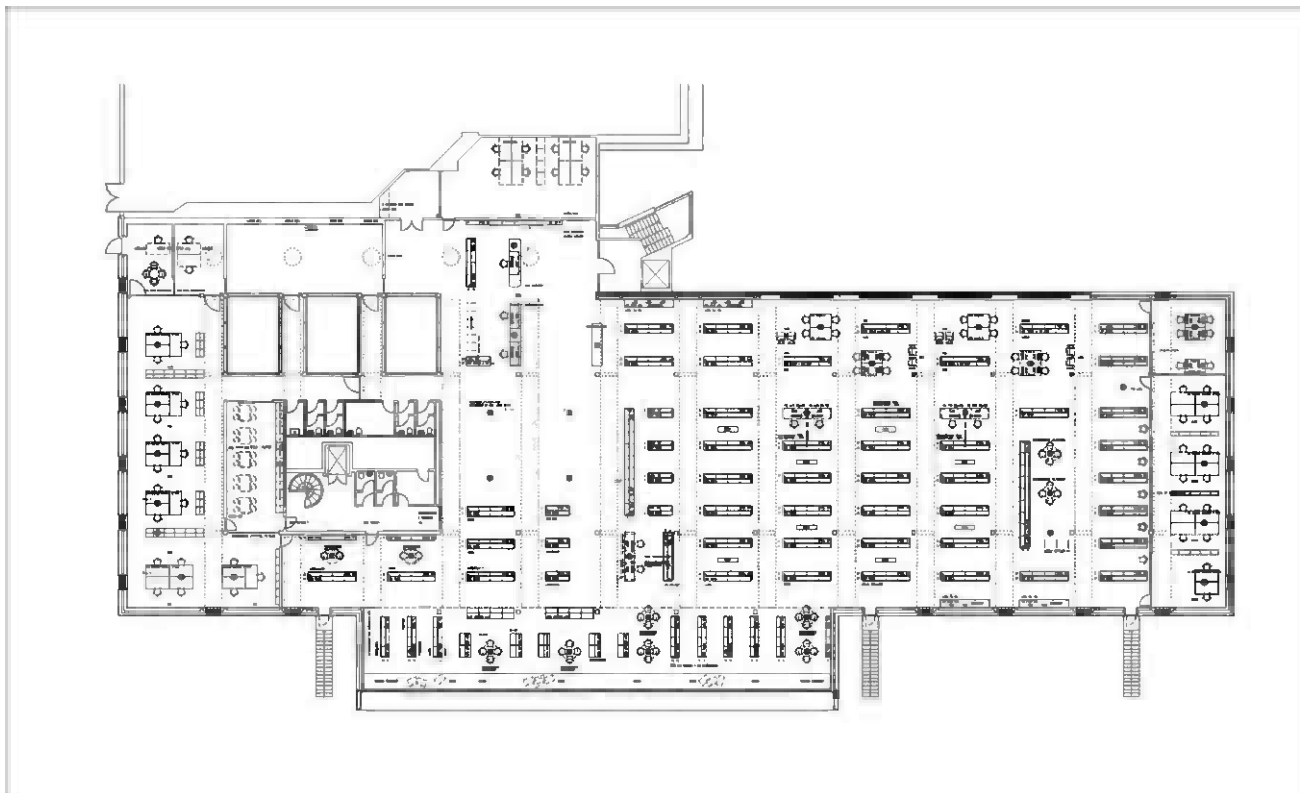
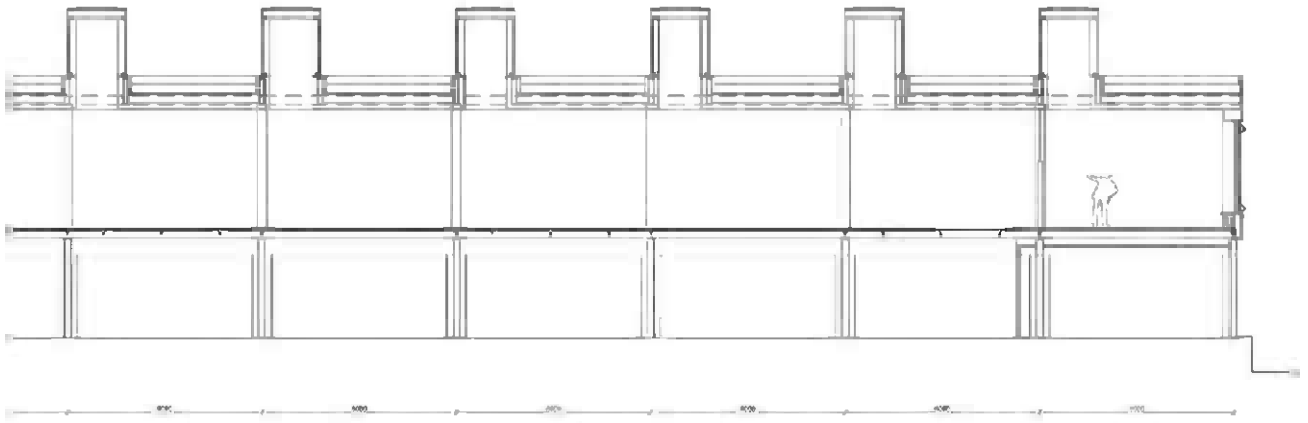


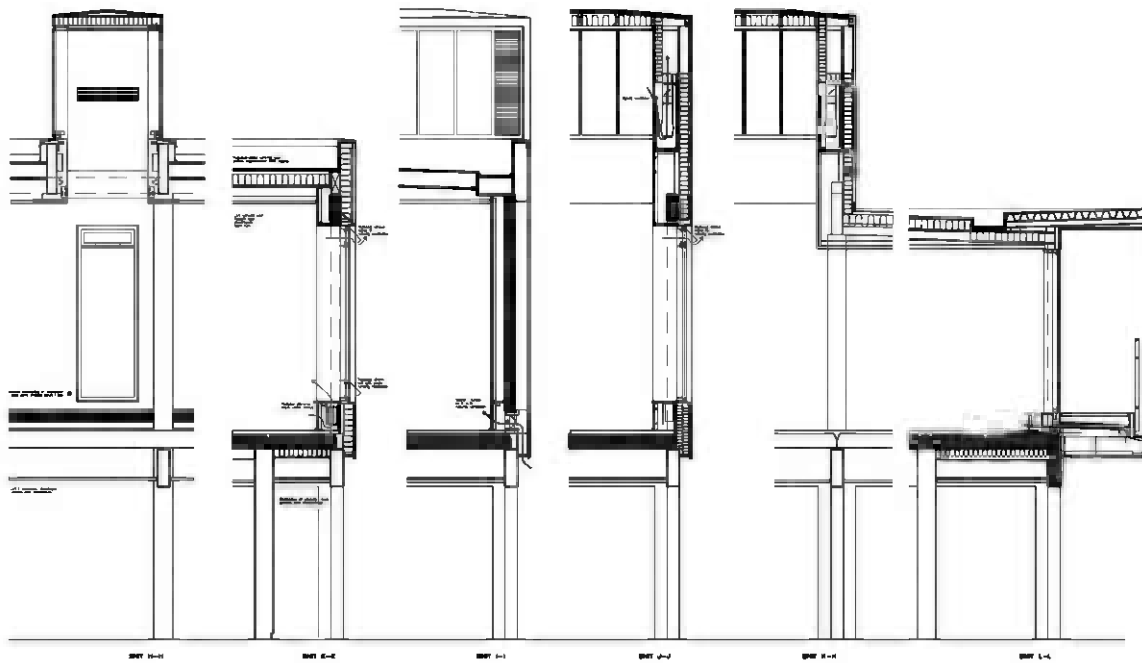
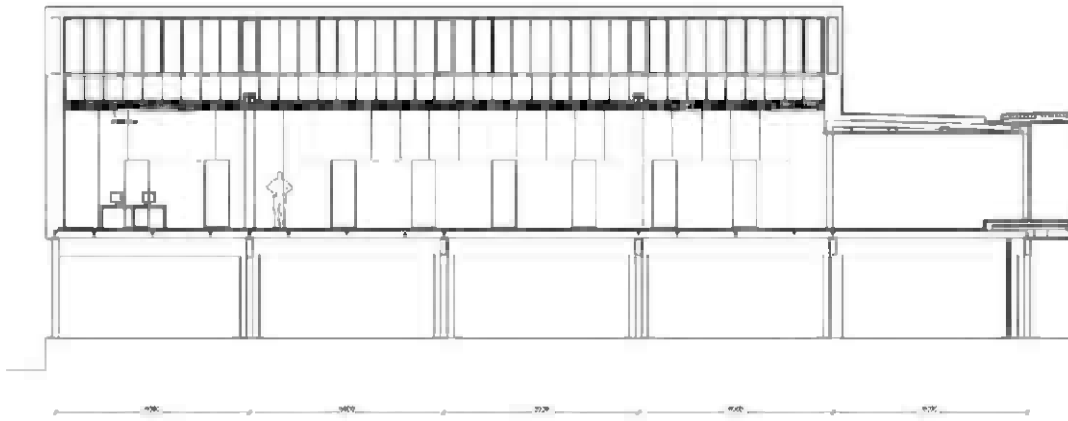


Fagliteratur

Fagliteratur

Fig. 3 below

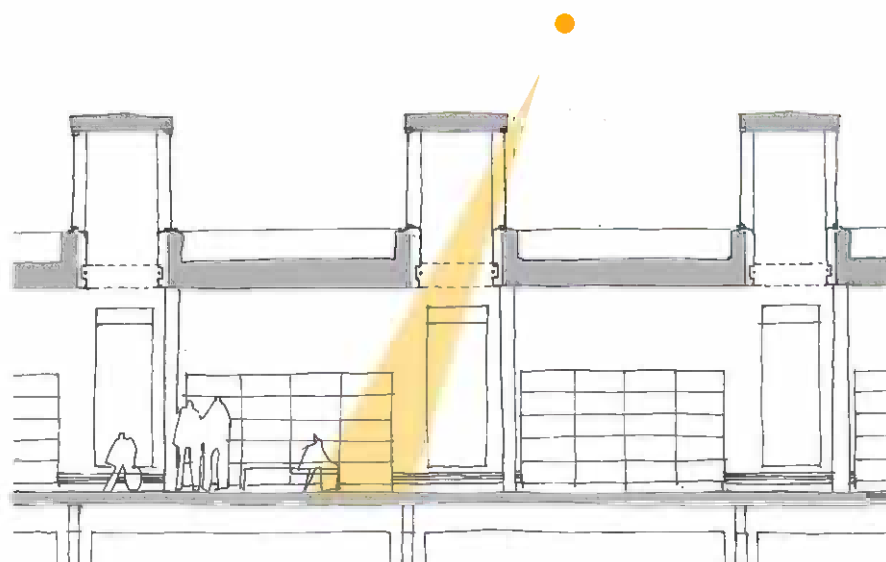




**Using the existing** base framework of the building, an entirely new library facility was constructed at first floor level. The dark tombac clad roof structure incorporated a series of horizontally glazed lanterns projecting above the roofline. This innovation creates a striking serrated profile on the skyline, providing a strong identity for the building, (Fig. 9) as well as flooding the library interior with the essential daylight element that was lacking in the previous design (Figs. 2, 8). The lanterns are an important element of the Integrated Energy Design (IED) developed by the architects to implement the use of natural / hybrid ventilation and control of daylight. Approximately 60% of the library's lighting requirement is provided naturally during the scheduled opening hours. The depth of the window bar incorporates a blind to shield and protect against the direct angles of solar radiation. The natural ventilation is provided by air intakes incorporated into the facade. Spent air is exhausted from the building via the opening overhead lights, (Fig. 11). These are also designed

to ventilate heat build up, or smoke. On days of higher temperatures the mechanical systems supplement the natural ventilation. The reconstructed building volume presented the opportunity to change the spatial organisation of the library (Fig. 4). The children's library was relocated in a protruding area of the south facade, affording views of tall trees and the provision of a terrace at a lower level facing Nordmarks Alle. The reading room containing newspapers and journals benefits from the north facing large glazed panels overlooking the town hall lake. The interior finishes and new library furniture was carefully selected to compliment the daylight filled spaces, white walls and acoustic ceilings (Figs. 2, 10, 12). The bookcases were ergonomically designed for easier placement and selection of books, DVDs and other medium. Feature light fittings are built into the shelf markers for functionality and complete the pleasing aesthetic of the interior. The overall result is an enhanced visitor experience for the culture-seeking citizens of Albertslund.



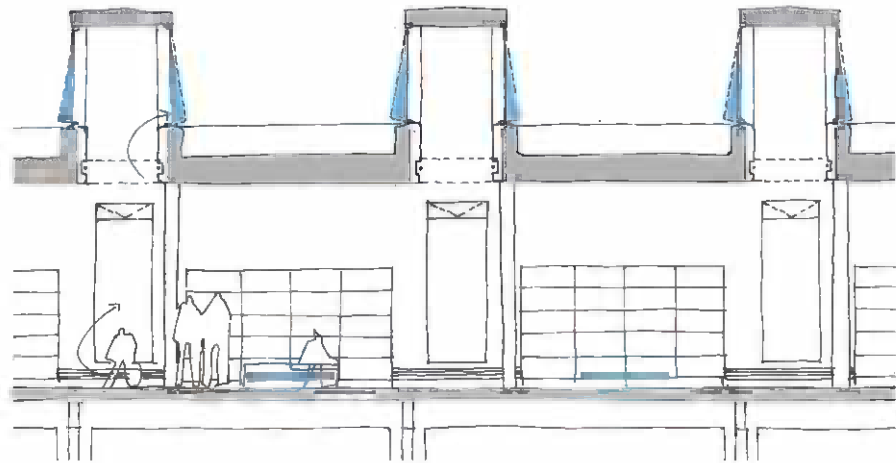


DAGSLYS •









VENTILATION ●



# Arkansas Studies Institute

Little Rock, USA

2009

Polk Stanley Wilcox Architects

[www.polkstanleywilcox.com](http://www.polkstanleywilcox.com)

**Arkansas Studies Institute**, a unique collaboration between The Central Arkansas Library System, and The University of Arkansas, Little Rock, illustrates the fact that dedicated partnerships can greatly exceed the sum of their combined parts. Merging the resources of the Metropolitan Library with those of the State University enabled the inspired re-use and renewal of historic brownfield building stock in the rejuvenated Arkansas riverfront area. Existing buildings constructed in 1883 and 1914, were considered to be worthy of preservation. The renovated buildings were combined with a 21st century construction to create an architectural timeline for the state of Arkansas.

Severe dilapidation recorded in the surveys of both the 1880 and 1910 buildings was of great concern (Fig. 1). However, the architects, Polk Stanley Wilcox, Structural Engineers, Crafton Tull

Sparks / Kenneth Jones & Associates and Civil Engineers, McClelland Consulting Engineers endeavoured to find solutions to retain the historic buildings for inclusion in the project.

Consequently, the aesthetic merits of the architecture can now be read progressively, like books on a shelf, by taking a westerly stroll along President Clinton Avenue (Fig. 2). Alternatively, the bus, or light rail system, will transport visitors to this major cultural attraction.

The ecological credentials of the project were enhanced through considered exposure of the timber, concrete and structural steel frames. Through this physical demonstration of Arkansas's historic artisanal skills, the need for costly internal finishes was eliminated. The architect's site plans (Fig. 3) demonstrate the functional use of space, and the urban regeneration context of the project.

Population | 193,524

Co-ordinates | 34° 44' 10" N  
92° 19' 52" W

Elevation | 102 m (335')

Precipitation | 1,263 mm (49.74")

Temperature | Average High:  
22.7 C (72.9 F)  
Average Low:  
11.2 C (52.2 F)

Humidity | 70%

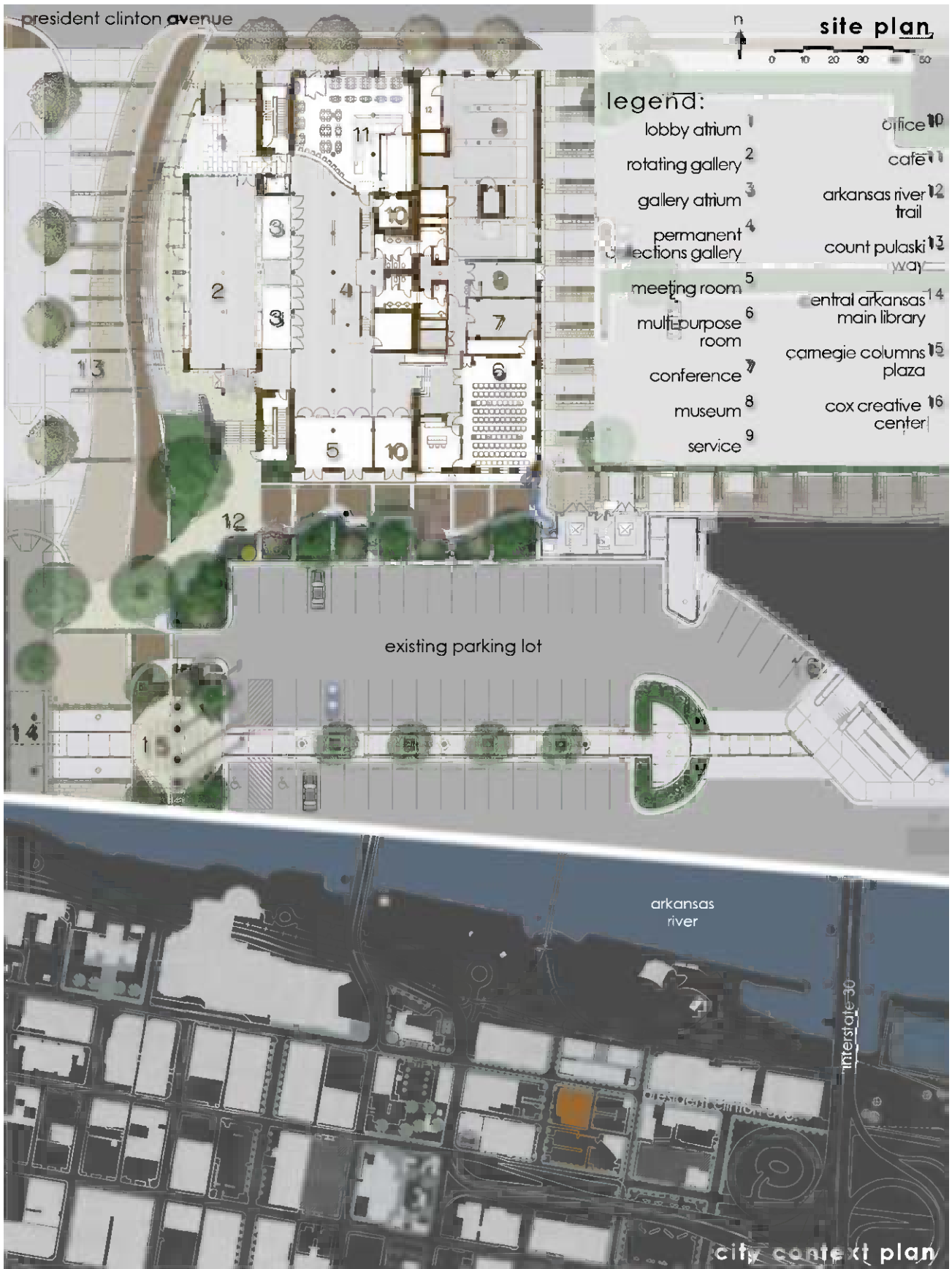


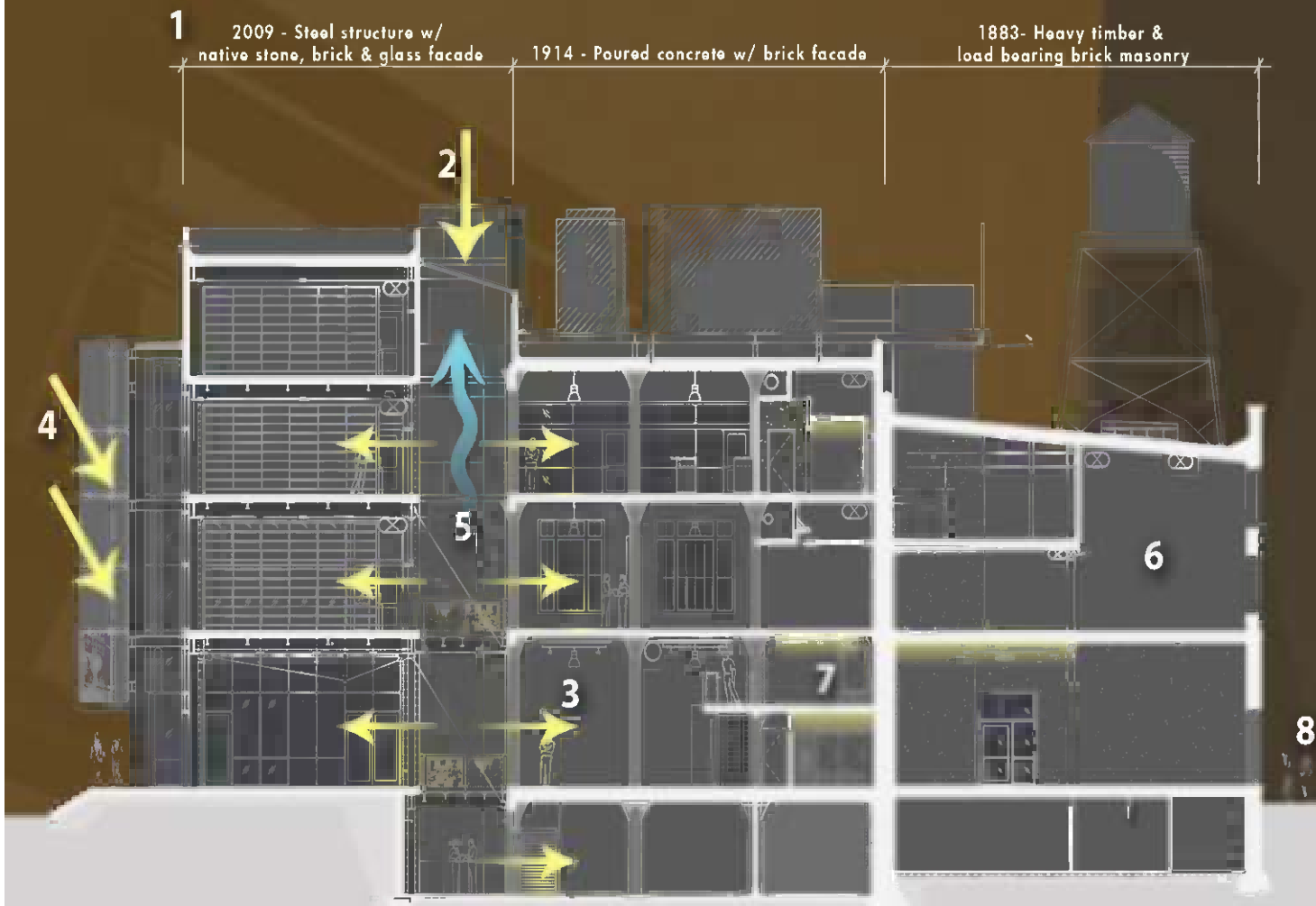


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**The sustainable strategies** for the project (Nos. 1 to 8), are illustrated on the architect's section detailed above (Fig. 4), and described by the architect below:

"1. Materials found on site from the existing historic 1880's and 1910's buildings were salvaged and re-used throughout the renovation. Stone was made into a long seat wall defining a plaza in the shape of the Arkansas River, while brick went into repairing the 1883 building's load bearing walls. In all, 44,000 square feet of construction was saved, and the history of place was preserved.

2. A linear atrium through the new center of the complex and a soft story at level one allows natural diffused light into galleries on three sides.

3. The gallery atrium, only 10ft. wide, floods all floors of 2 buildings with light. The light-filled atrium doubles as a vertical gallery, displaying historic images imbedded in railing using the buildings main environmental attribute - natural

light.

4. The western facade is defined by a double wall, designed as a 3 - story steel and glass screen. No librarian or patron is more than 30 ft. away from natural light.

5. The light well / atrium (by code, not an atrium), serves as the return air path, eliminating half of the normal ductwork needed.

6. Regional materials were selected for durability, maintainability, low toxicity, recycled content and availability; while at the same time expressing the State's industries.

7. Occupancy sensors and lower electric light levels allow for use of more task lighting at work stations saving energy.

8. Immediate access is available for public transportation, including a bus and light rail system."

Fig. 5 below

**The Construction Phase** images (Figs. 6, 7, 8, 9), demonstrate, more than any others, the primary sustainable strategy for the project; that of creative re-use. The structural engineers determined that the existing 1880 and 1910 structures would not support the superimposed loads of the archive collection, therefore, an additional, new, steel framed building had to be constructed to house the weighty documents (Fig. 4). The existing parking lot, deemed incompatible with the local planning and transportation strategy, was explored as the potential site for the new building. Excavations revealed that the asphalt parking surface covered the remains of a demolished building that once stood on the site.

The materials recovered proved suitable for re-use in the restoration of the existing buildings. The brick was used to increase the structural integrity of the 1880s load bearing walls. The stone manifested itself in a half block long seat-wall, defining the profiled plaza, shaped to represent the course of the Arkansas river (Fig. 5).







Fig. 10 below right

**The Arkansas Studies Institute (ASI)** was constructed as a research and archive facility for the study of the state's history. Among the 10,000,000 manuscripts, 46,000 books, numerous photographs, audio-visual recordings and artworks can be found the papers of seven Arkansas Governors, most notably those of President William Jefferson Clinton.

The industrial, no nonsense nature of the interiors not only reveals the architectural history of the merged buildings, it is designed to demonstrate an open, transparent approach to sharing the information contained within its 71,000 square feet (Figs. 10, 11, 12).

Whilst Arkansas has no shortage of eminent, voluble statesmen, most of the 100 historic images displayed in the glazed balustrades are those of 'ordinary' Arkansans; engaged in farming, industry or employed in the armed services (Figs. 13, 14). The state's hardworking, silent majority are also represented on the building's external frosted glass sun shades (Fig. 15).











181 Arkansas Studies Institute | Little Rock | USA | Fig. 16 above



**Continuing the theme** of transparency, the new-build section of the ASI consists of a glazed building facade set inside a projecting steel grid frame (Fig. 17). The structural steel contains 97% recycled content and was sourced within the city of Little Rock to minimise transportation. Similarly, the aluminium curtain wall facade was fabricated just six blocks from the site. The stone used to add gravity to this important public building travelled 100 miles to its current resting place. Copper cladding defining the main entrance (Fig. 16) was inspired by the appearance of a well worn, leather bound book in the possession of the designer.

Energy efficiency was enhanced by employing a central chilled / hot water system for the two older buildings. A variable speed energy recovery wheel further reduces consumption. The separate archive cooling / humidity control conforms to NARA standards.

The ASI defies modern classification as over 60% of the building is formed from 100-year old uninsulated masonry structures.

# Centennial Library Winnipeg

Winnipeg, Canada

2005

Patkau Architects / LM Architectural Group

[www.patkau.ca](http://www.patkau.ca)

**Winnipeg, Manitoba** (the gateway to the West) lies on the eastern edge of the Canadian prairies. The capital and largest city of Manitoba is located close to the longitudinal centre of North America at the confluence of the Red and Assiniboine rivers. 'The Forks', as it is now known, was historically a canoe route junction, lending itself naturally as a point of trade long before European settlement. Winnipeg winters can be snow covered from November to early April with an average of 49 days experiencing wind-chill temperatures of -30 C or less. Consequently, the downtown pedestrian circulation areas are typically enclosed. When the Winnipeg Centennial library commissioned Patkau architects to reconfigure the circulation and expand the collection spaces, the connection to the city tunnel and skywalk system began to inform the design ethos. The library was

originally constructed in 1976 as a three-storey building adjacent to a large public park. Both the building and the park are constructed above a subterranean car park. Expanding the library into the park area would destroy a valuable public space and incur costly foundation reinforcement in the below grade car park. The Patkau design study resolved to expand the library by adding a lightweight fourth floor to the building, also facilitating a much needed re-roofing. At the second level, where the library is connected by bridges to the city's enclosed pedestrian walkways a section of floor area was cleared to form an inviting two storey lobby with a cafe and gift shop. From this intersection, the public are transformed into the library's patrons as they are drawn further into the building by the light falling through the new glazed wall by the park (Figs. 1, 2).

Population | 663,617

Co-ordinates | 49° 53' 58" N  
97° 08' 21" W

Elevation | 11 m (36')

Precipitation | 522 mm (20.6")

Temperature | Average High:  
26 C (79 F)  
Average Low:  
-22 C (-8 F)

Humidity | 67.4%











**The 'interior street'** is animated by displays and book events as the visitors progress steadily onwards and upwards towards the new fourth floor. The full height addition, glazed park wall promenade, is punctuated by intermediate reading terraces, scaled to the park geometry. These reading and resting stations also effectively connect the otherwise independent floors (Fig. 3). Progressing zonally from the park, the library is now organised from the day lit wall to the depths of the building where offices, quiet meeting rooms and service areas are located. This progression is reflected in the placement of library furniture and function, moving from reading tables and casual seating, (low mass) to reference collections, help desks and computer stations, (medium mass) and finally, the high mass shelving. The new fourth floor houses the non-fiction collection. The adaptive re-use of the building has minimised the footprint of the library addition, leveraging existing infrastructure. By visually connecting the library to the park and the cityscape beyond via the new glazed wall, a new, more open identity has been established (Fig. 3).

# Central Library of Law University of Hamburg

Hamburg, Germany

2004

me di um Architekten

[www.medium-architekten.de](http://www.medium-architekten.de)

**The Free and Hanseatic** City of Hamburg, covering an area of 755 sq. km. is seven times greater than the area occupied by Paris, and twice that of London. This port city on the River Elbe is the cultural and economic centre of northern Germany, and home to 1.8 million people. Hamburg is also a state, one of sixteen federal states that make up the Federal Republic of Germany.

Surrounded by an abundance of historic buildings, rivers, lakes, canals, bridges and green parkland, Hamburg's citizens possess a sense of civic pride in a metropolis that is 14% green space. The leafy environment is carefully protected, and buildings in excess of 10 floors are prohibited. The scenic quality of Alster Lake is so revered that only white walled, copper roofed buildings are allowed to grace its periphery. This environment sets the standard extremely high for architects tasked

with providing new buildings to accommodate the growth and ambition of a city with the highest GDP (Gross Domestic Product) in Germany.

When architect Klaus Roloff of me di um Architekten was commissioned to reconcile the various law libraries at the University of Hamburg, he resolved to house them in a new, compact, linear book tower, adjacent to the existing faculty of law building. As the southern facade of the new library building would form the backdrop to one of Hamburg's listed, 19th century, white walled, copper roofed villas, the architect designed the facade to resemble a light dappled, imaginary parkland (Figs. 2, 3). The stylised tree motif of the glazed facade (Fig. 1) is further animated by the darker green vegetation in the foreground, proceeding toward the direction of the Avenue Rothenbaumchaussee.

Population | 1,802,041

Co-ordinates | 53°33' 55"N  
10°0'5"E

Elevation | 0-958 m (0-3143')

Precipitation | 727.7 mm (30.42")

Temperature | Average High:  
12.7 C (54.9 F)  
Average Low:  
5.2 C (41.4 F)

Humidity | 80.7%

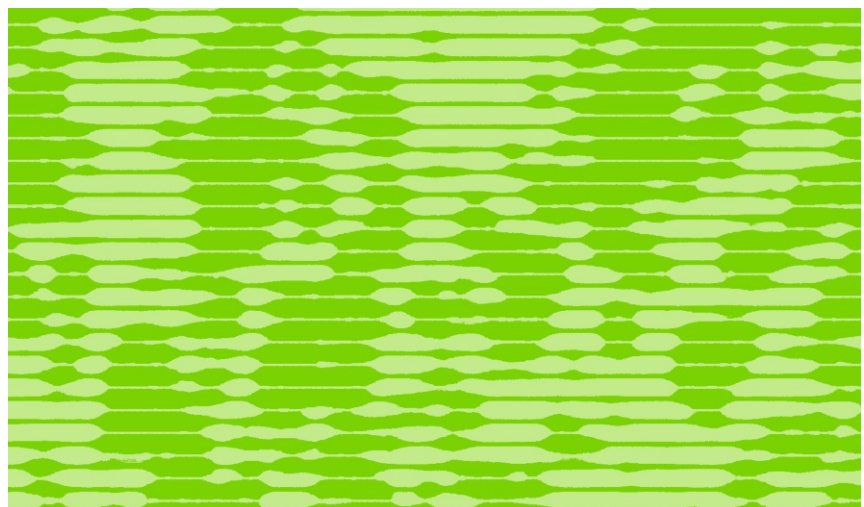




Fig. 3 below right

**The footprint and massing** of the new building creates a new forecourt whilst preserving the existing western entrance to the Faculty of Law, as illustrated on the site plan (Fig. 4). Unification of existing and new buildings was achieved by the construction of a glazed atrium that connects all the facilities by means of a lift and staircase core. The spatial void is dramatised by bridge and cantilevered stair connections (Fig. 5).

With public seminar rooms, cloakrooms and lockers located in the basement area, the mezzanine levels above are arranged exclusively for the library functions (Figs. 6, 7, 8, 9). The organisation of space is consistent on all floors, with the information and research facilities located in the open galleried areas adjacent to the atrium. Naturally lit reading spaces are aligned to the outer facades with 27,000 linear metres of shelving housing 700,000 volumes concentrated in the inner space against the security fire wall. The 1200 reading spaces are designed to be available to students for 24 hours per day.

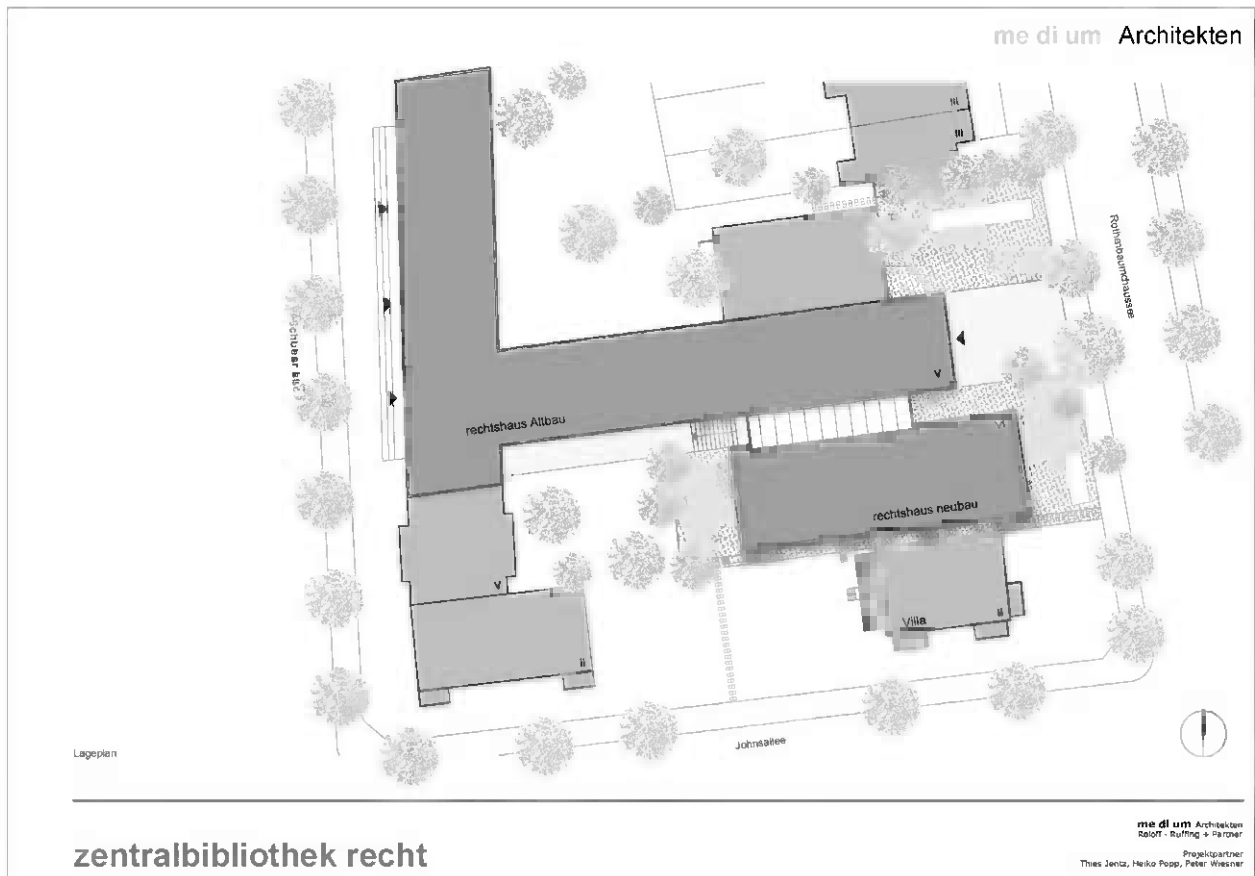




Fig. 6 below, architect's plan, basement

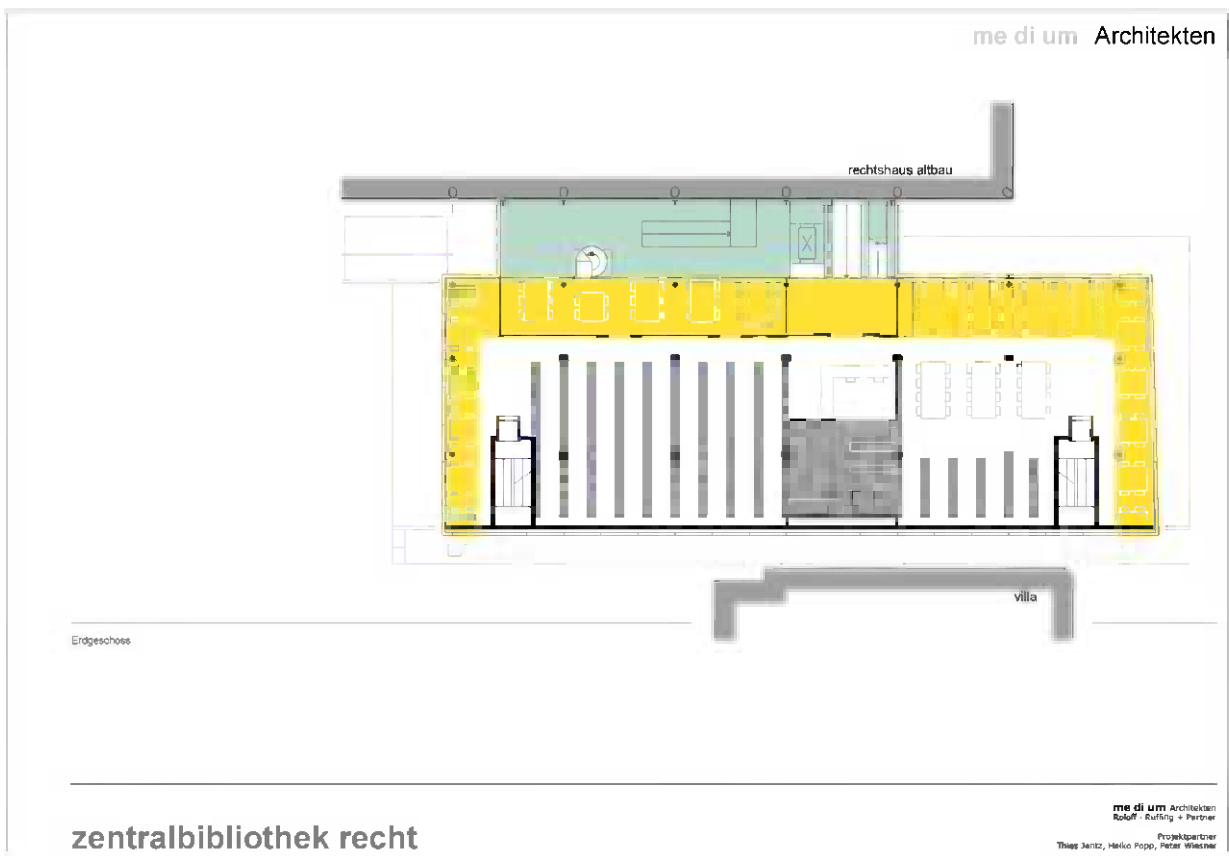
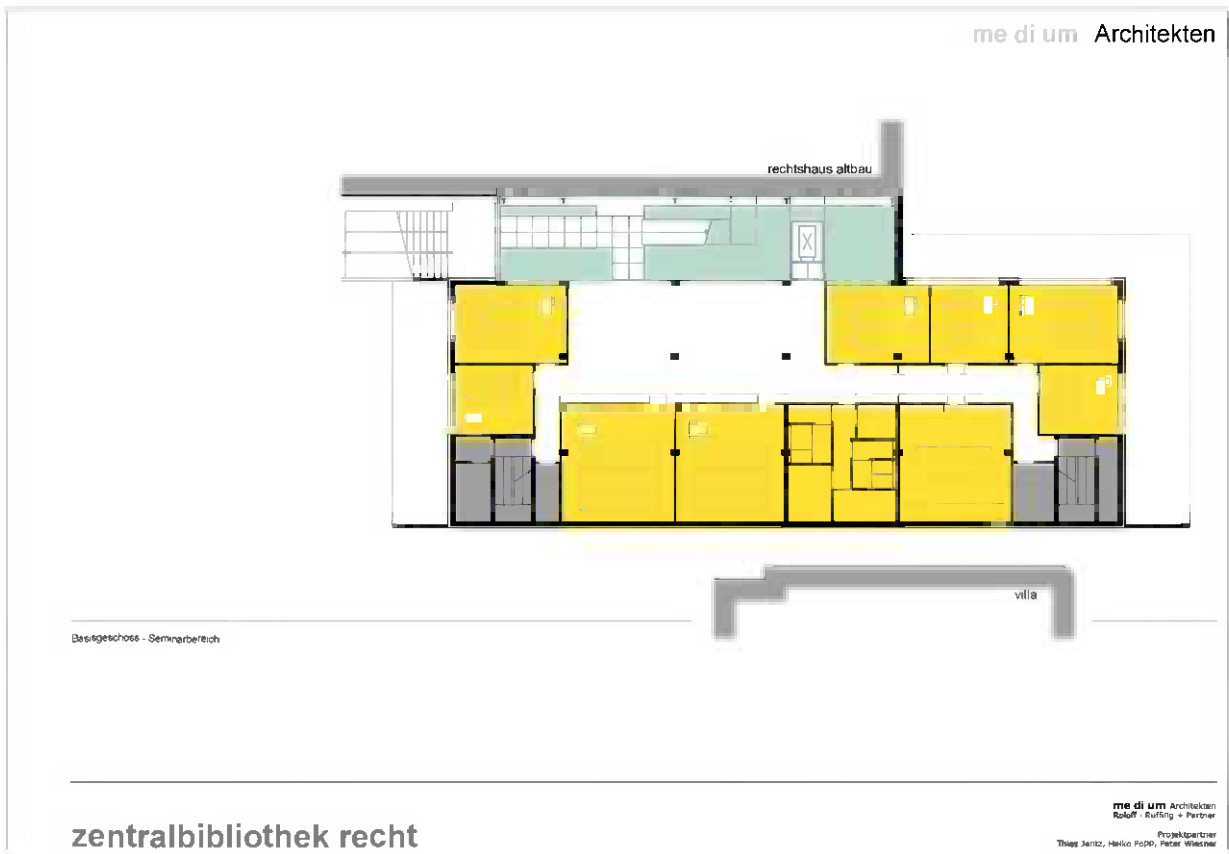


Fig. 8 below, architect's sections

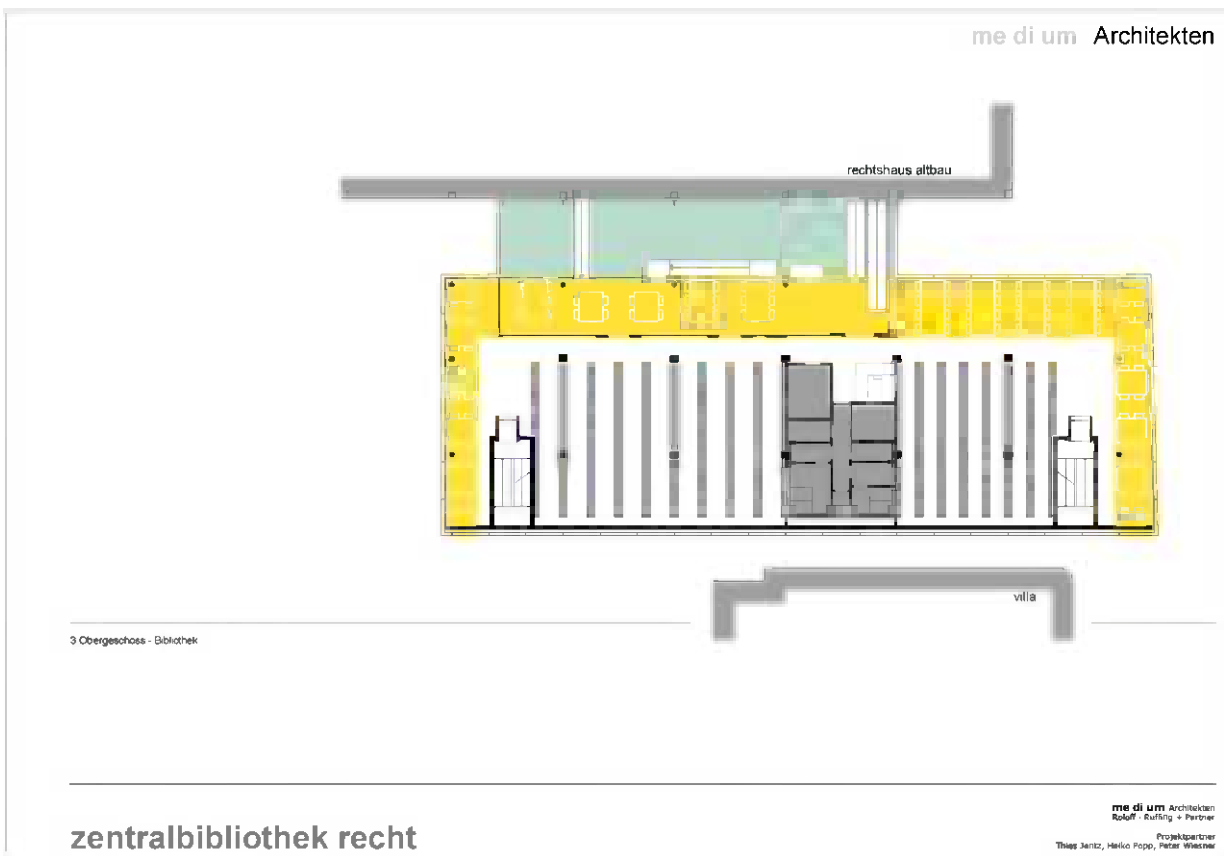
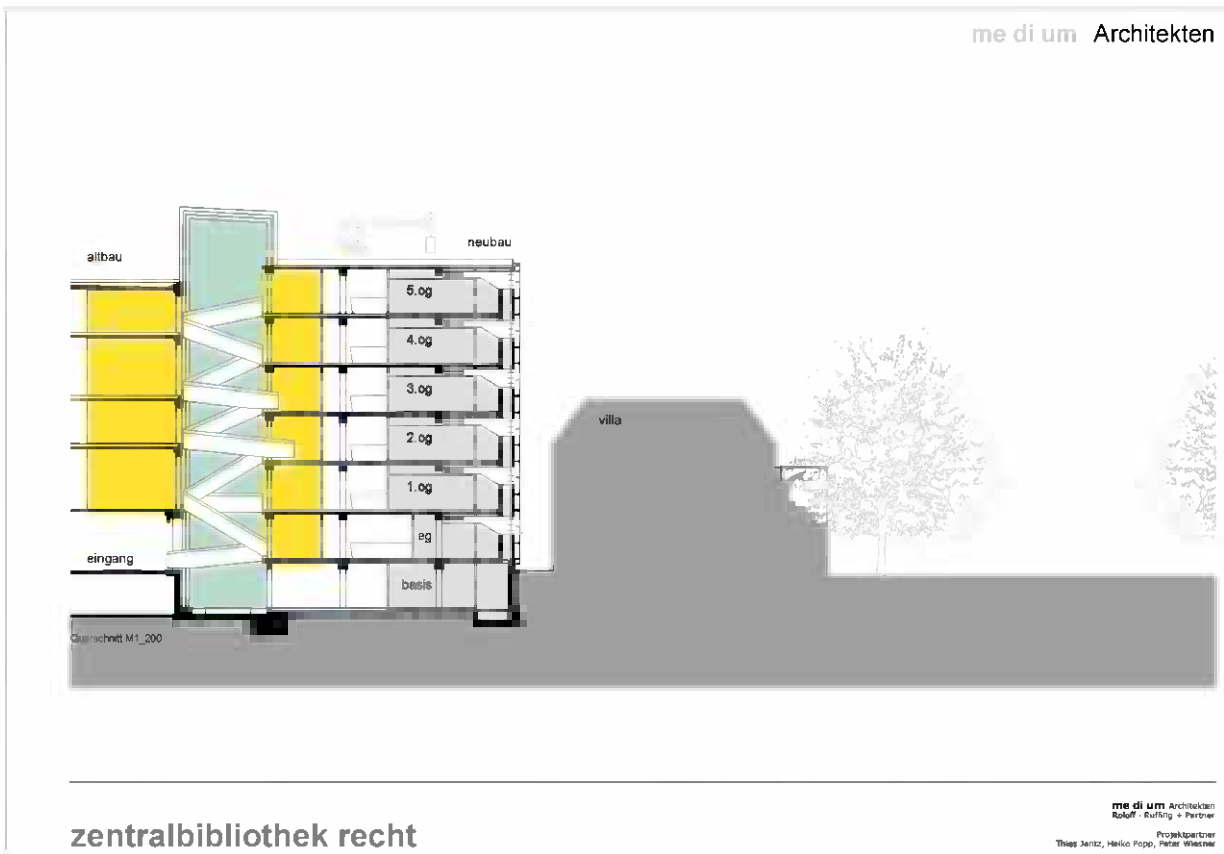




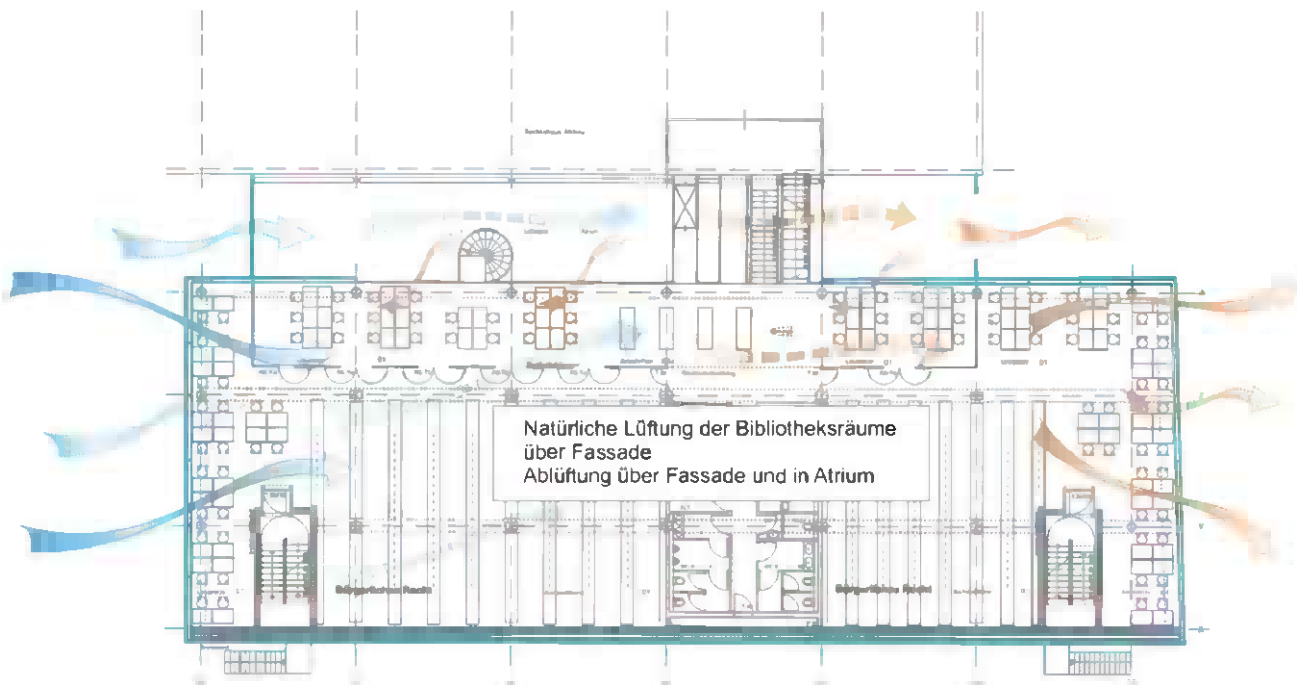
Fig. 10 below right

**The building climate concept** was literally driven by the thermal flue effect of the atrium. The multi-functional space connecting the two buildings acts as a climate buffer, mitigating heat loss, and permitting the library users to enjoy the open gallery seating positioned inside the safety of the balustrade (Fig. 14). This space is protected from the elements and day lit by the glazed roof. Daylight is reflected into the northern depths of the atrium by strategically positioned polished aluminium lamellas. Louvres in both gables, aided by the flue effect, naturally ventilate and aerate the library floors (Fig. 10). Co2 sensors monitoring air quality, act as control.

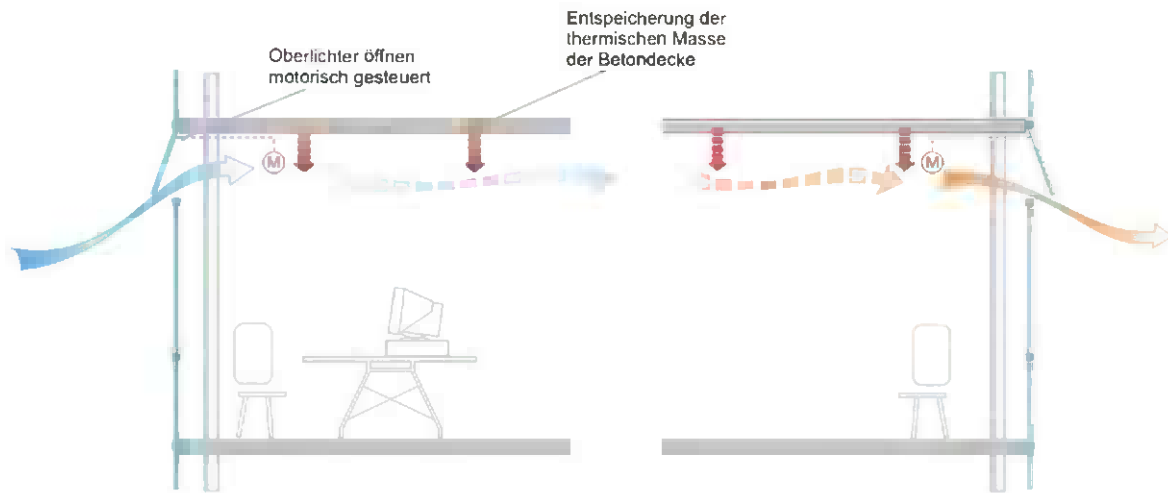
The mass of the library's concrete mezzanine floors provides thermal storage that is released in phases. Heaters are used to supplement the stored solar energy when required. This passive energy strategy is aided by a minimised building facade. Water features in the well of the atrium also provide an element of the climate concept for the library (Fig. 14). The refinements of the summer and winter strategies are detailed in (Figs. 11, 12, 13, 15, 16).



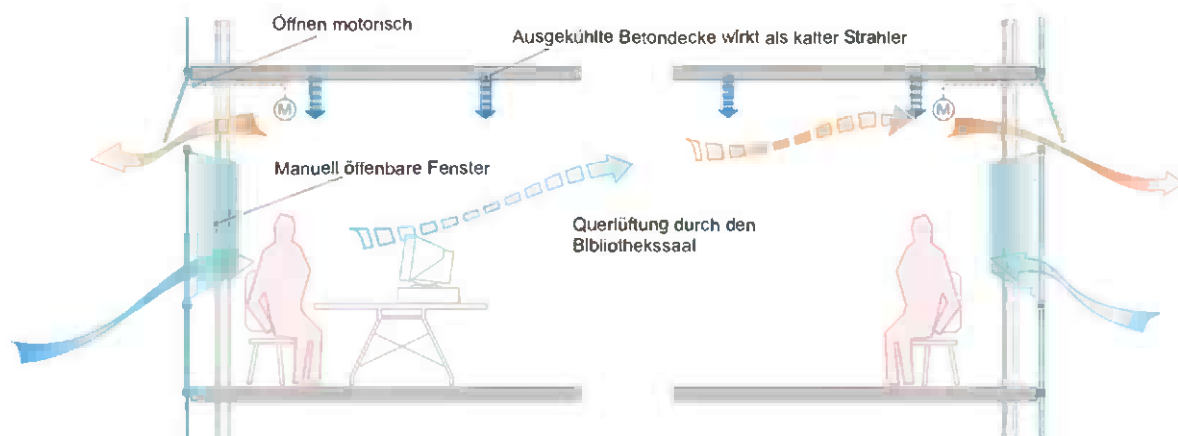
## Sommer - Querlüftung über die Fassade



### Hamburg Rechtshaus - Bibliotheksgeschoß Nachtlüftung Sommernacht

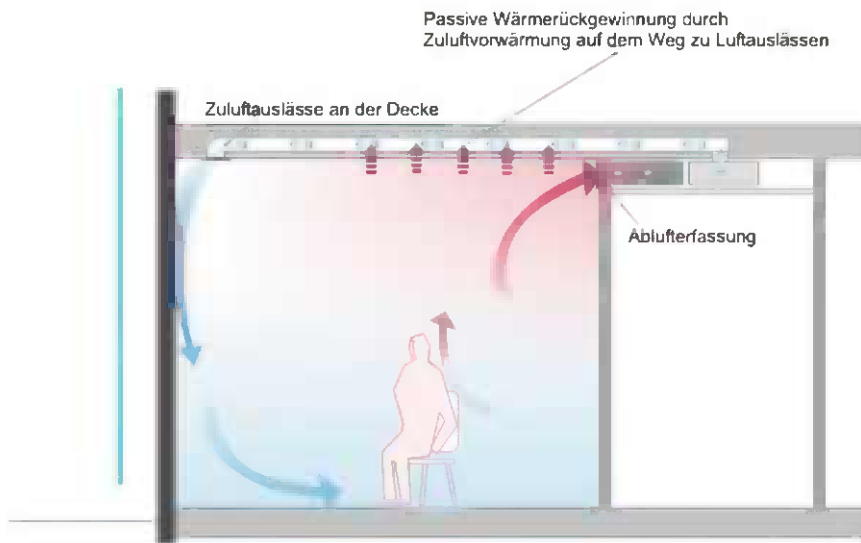


### Hamburg Rechtshaus - Bibliotheksgeschoß Natürliche Lüftung Sommertag

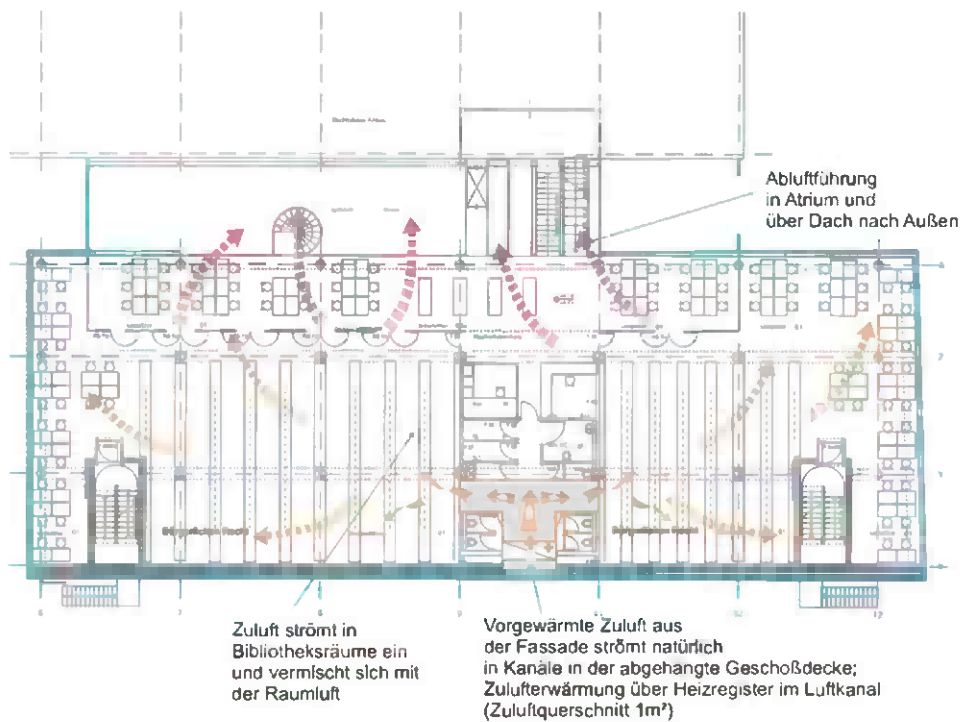




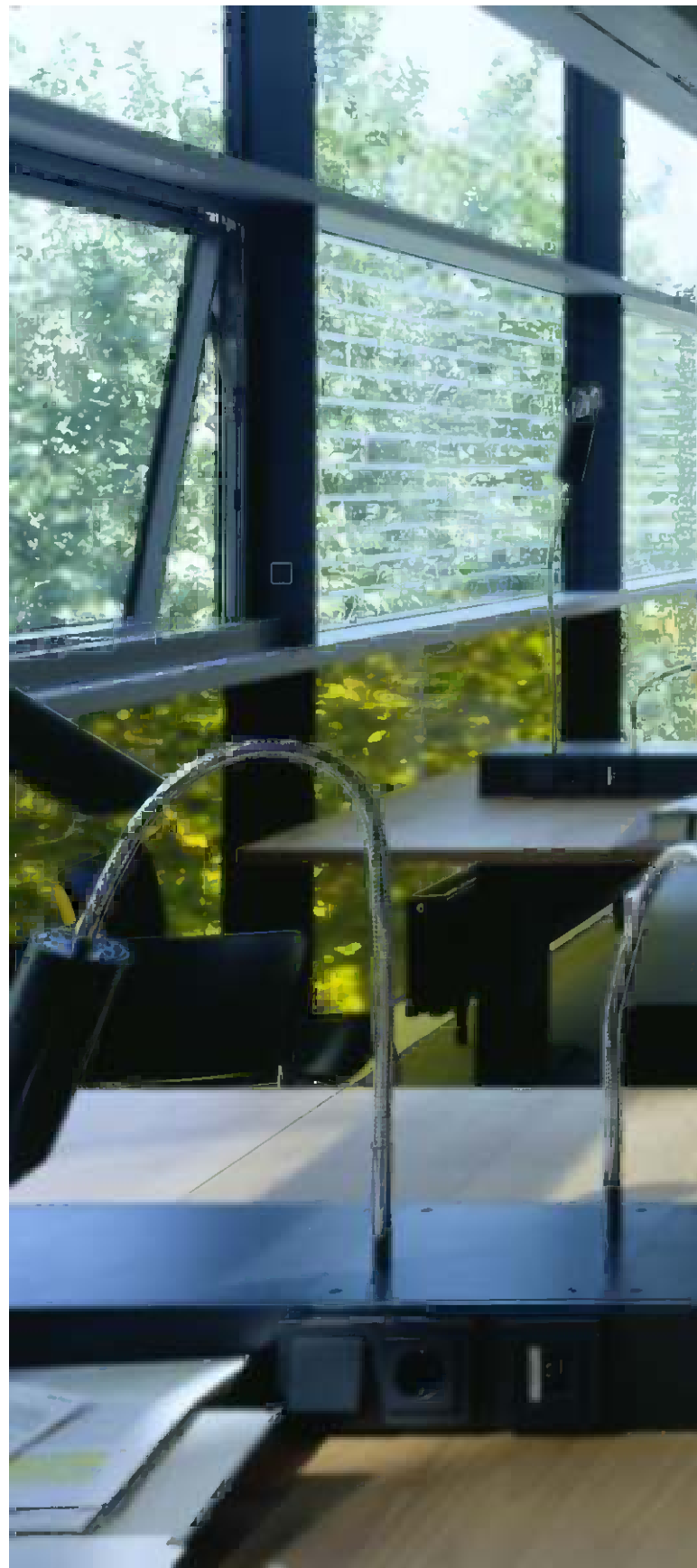
## Basisgeschoß



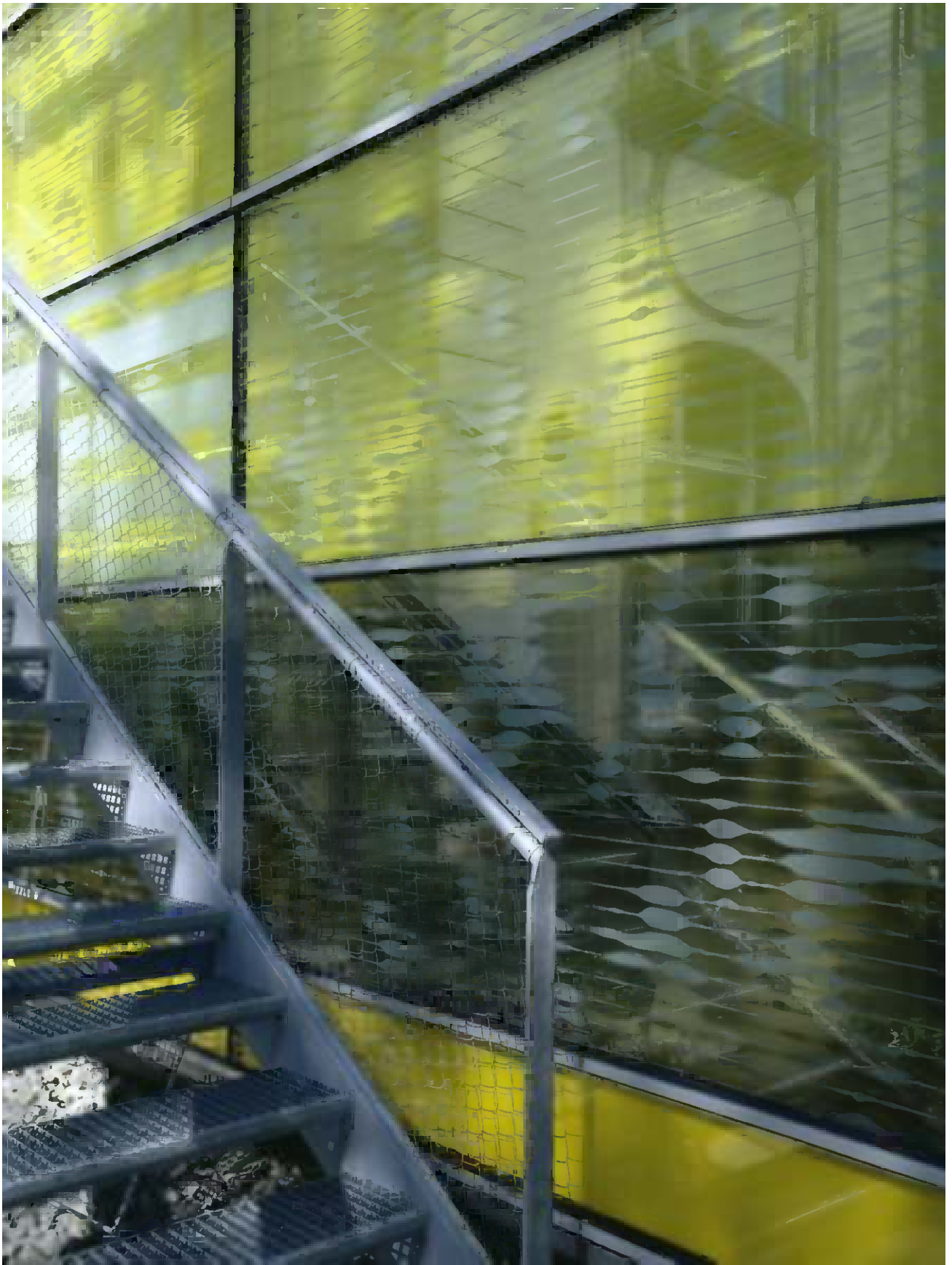
## Winter - dezentrale, natürliche Zuluft

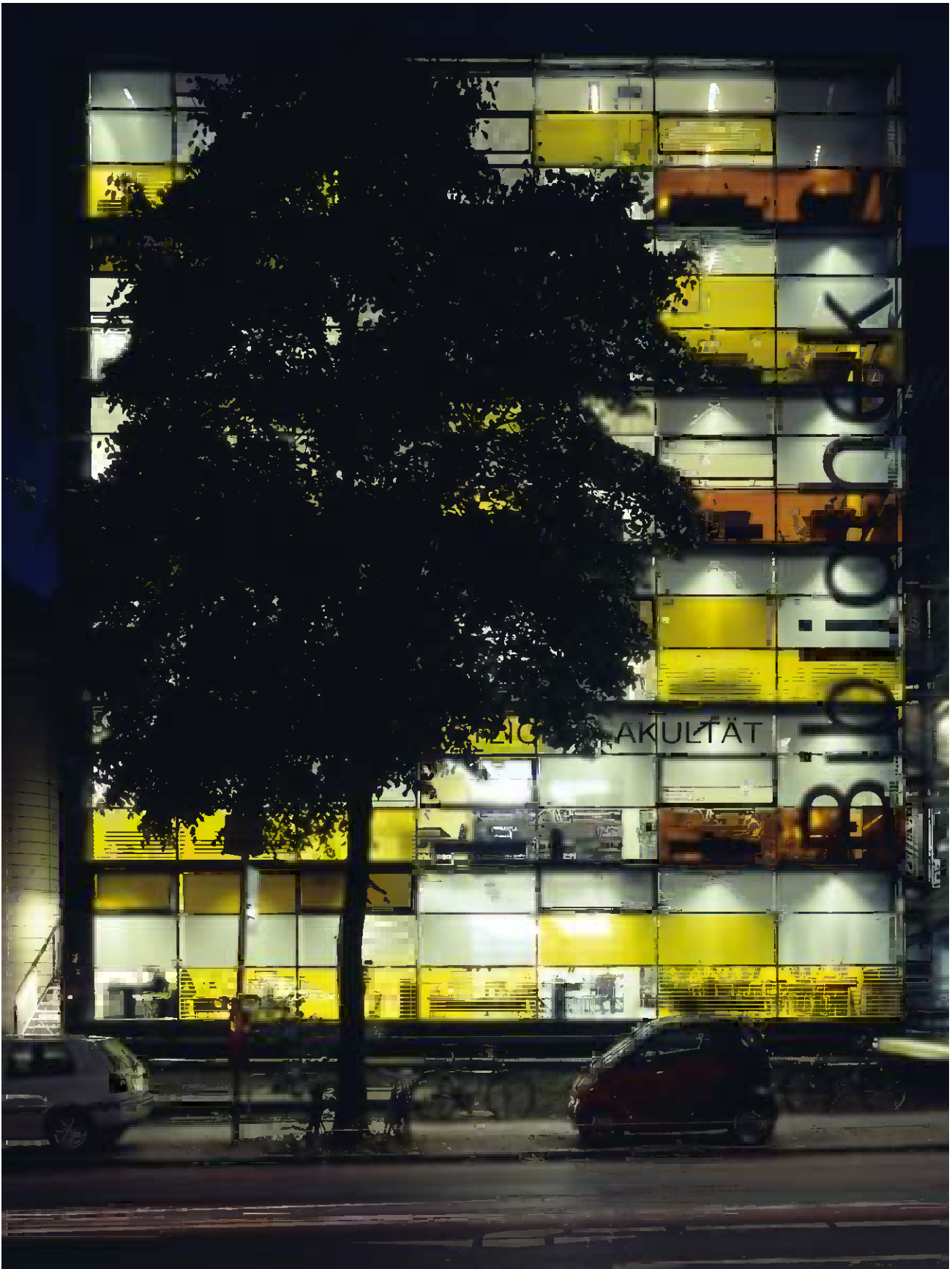


**The CZAK desk** provides the key component of the interior design, and was designed to suit the specific requirements of the Central Law library building. The reading desks are positioned alongside the floor to ceiling glazed facade. Constructed from a sturdy, yet minimalist, bridge shaped, steel frame, which also forms a cabling conduit, the generous multiplex work surface is provided in two sizes to provide a flexible, multiple occupier study space. Electrical power to the convenient, desk level, sockets is fed through the CZAK frame from the raised access flooring. The (KRANISCH), or Crane desk lamp, constructed from a flexible, chrome plated tube and diagonally cropped metal shade, is an integral component of the desk. The multi positional nature of the Crane lamp introduces a playful feel to the study area. The furniture ensemble is completed by the S43 swing chair designed by Mart Stam, and the S38 / S1 stool designed by Egon Eiermann. Characterised by sturdiness and functionality, the library's fixtures and fittings are designed to accommodate visitors for 24 hours of every day. The facades of the reading places are composed from four different yellow and amber tones. The panels provide a varied balance of privacy and external views. The single pane security glass panels, manufactured by Mayer'sche Hofkunstanstalt GmbH of Munich, include a sun protection foil to the reading areas. The southern forest simulation facade, which is also a fire protection wall, is made up from six different green tones alongside occasional opaque, autumnal yellow stripes (Fig. 18). Throughout the course of the day, the exterior of the building changes with the subtleties of the light conditions playing upon the myriad of coloured glass panels. As night falls, the Library of Law takes on a more solid, subtly illuminated presence, providing a warming glow to the campus and the streets of Hamburg (Fig. 19).











# Library on Cork Street

Winchester, USA

2004

Reader & Swartz Architects

[www.readerswartz.com](http://www.readerswartz.com)

**Winchester, Virginia** lies at the northern end of the Shenandoah Valley, between the Blue Ridge and the Appalachian mountain ranges.

Located in Winchester's Historic District, the Library on Cork Street (Fig. 1) comprises primarily three meticulously designed reading rooms surrounding a Zen garden. The quiet, idyllic setting of the property, dating from the 1890s, in the home of the Shenandoah Apple Blossom Festival, disguises a less than peaceful past.

During the American Civil War, control of the Shenandoah Valley and its resources was vital to both sides. The Union Army, under Major General Sheridan, notoriously destroyed the 'border' barns and mills filled with grain and flour. Herds of livestock were slaughtered and burned to deprive General 'Stonewall' Jackson's Confederate Army of the sustenance required to carry the fight.

Control of Winchester was fiercely contested and is reported to have changed hands as many as 72 times during the course of the war.

A century before the Civil War, Winchester was the headquarters of George Washington, who commanded Virginia's troops on the 300 mile western frontier during the war with the French and their Indian allies. Washington had moved to Winchester in 1748 to survey land for Lord Fairfax who had been granted vast tracts of Virginia by King Charles II. George Washington's office at 32 West Cork Street is now a museum.

On 21st century Cork Street, Dr. Peter Bullough, mindful of his stewardship of the historic building housing his private library, commissioned Winchester architects Reader & Swartz to "preserve and responsibly enhance the building's character while modernising it for the future".

Population | 26,203

Co-ordinates | 39° 10' 42" N  
78° 10' 0" W

Elevation | 221 m (725')

Precipitation | 1927.1 mm (36.5")

Temperature | Average High:  
17.33 C (63.2 F)  
Average Low:  
6.44 C (43.6 F)

Humidity | 48.6%



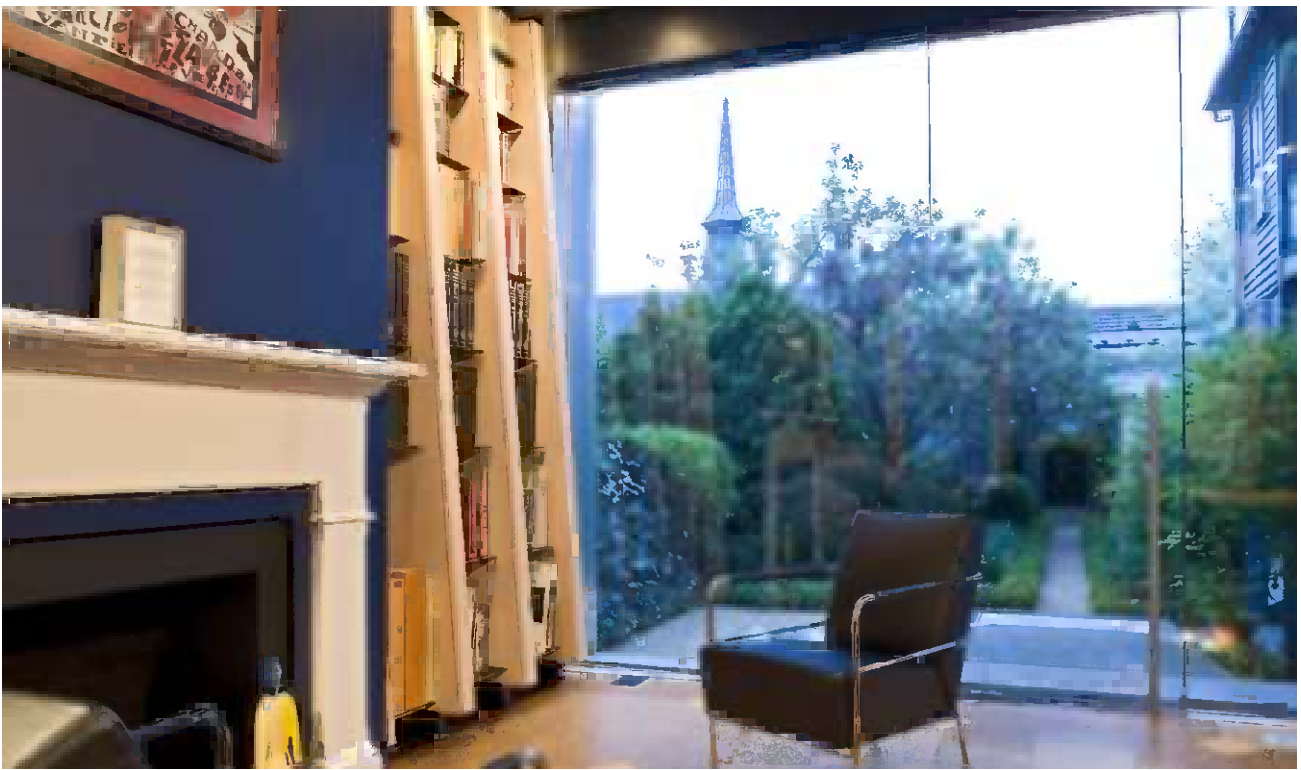


Fig. 3 below right

**The Garden Library** overlooks the Karesansui, Japanese style, garden. The planting (Figs. 5, 8) is irrigated by harvesting rainwater. To the garden side of the room, the wall is fully glazed, flooding the room with natural light, blurring the line between indoor and outdoor. Art deco style glass blocks (Fig. 3) salvaged from a redundant building, allow natural light to fall through into the adjacent kitchen.

The feature fireplace (Fig. 4) is flanked on both sides by custom designed, full height bookcases of modern appearance, disguising traditional elements of library design. The shelving spaces diminish as they rise vertically; accommodating the folio, quarto and octavo book sizes. Cork flooring in the library provides a vintage method of sound absorption. The Garden Library decoration is completed by the owner's eclectic mix of artwork, sculpture and classic modern furniture. The architect's plan (Fig. 7) illustrates the library space, caretaker's apartment and the meticulously manicured garden (Fig. 8).





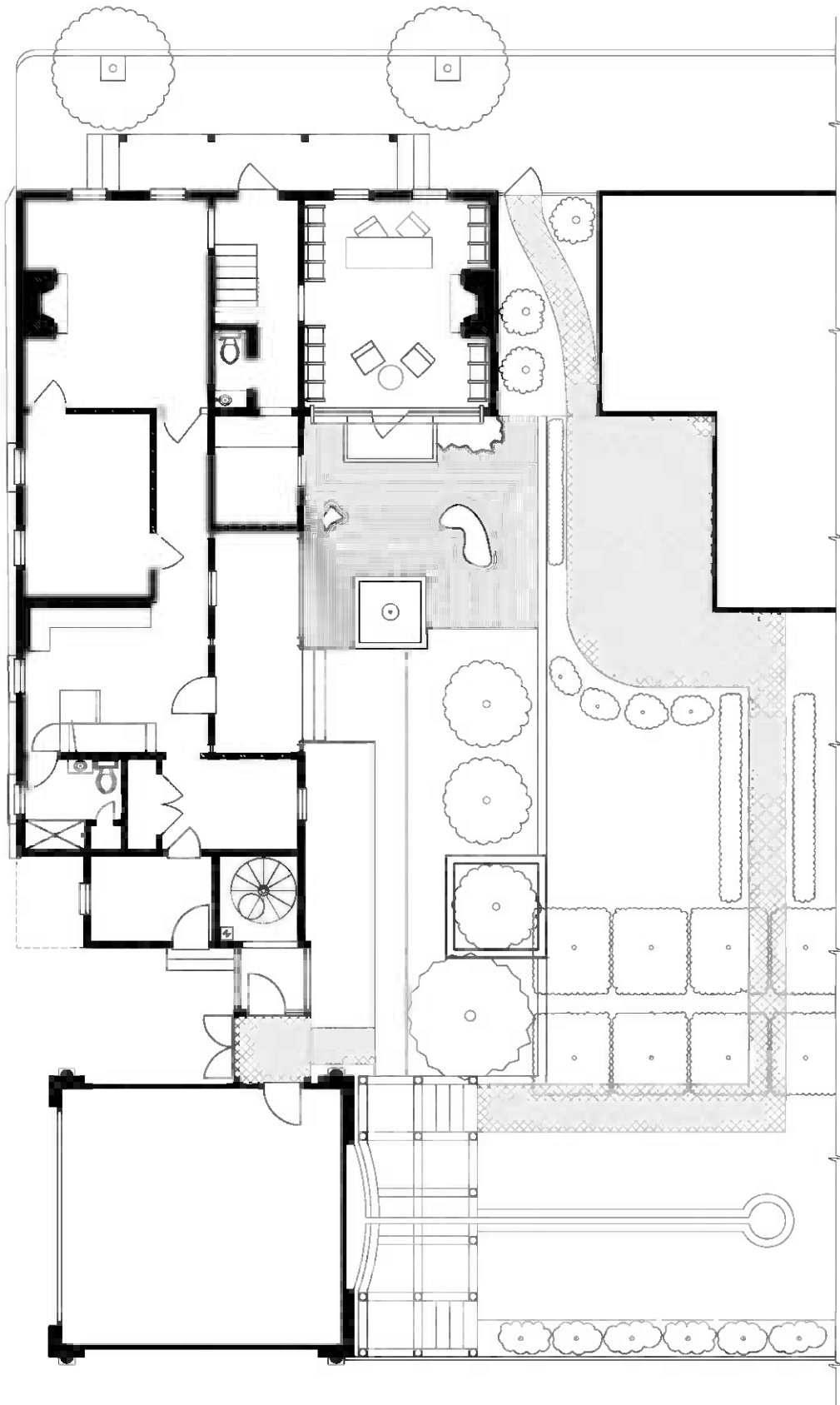




Fig. 9 below right

**The main salon**, located on the upper level, is customised to display Dr. Bullough's collection of specimens from the natural world alongside an array of antique scientific instruments (Figs. 9, 11). The barrel-vaulted room is shaded by a traditional deep veranda with garden views (Figs. 2, 12).

Throughout the design and renovation process the sustainability of the building was prioritised at every stage. Windows were replaced with sealed glazed units fashioned to match the original frames on the historical facade (Fig. 10). The obsolete mechanical system was replaced with a high efficiency unit capable of maintaining constant temperature and humidity settings in the libraries and museum spaces. To compound the investment, the fabric of the building was insulated to contemporary levels and plumbing fittings were upgraded to 'low flow' models to conserve water. Additionally, wood flooring, external lap siding, door hardware and a rolling door, were salvaged from local demolished building stock.



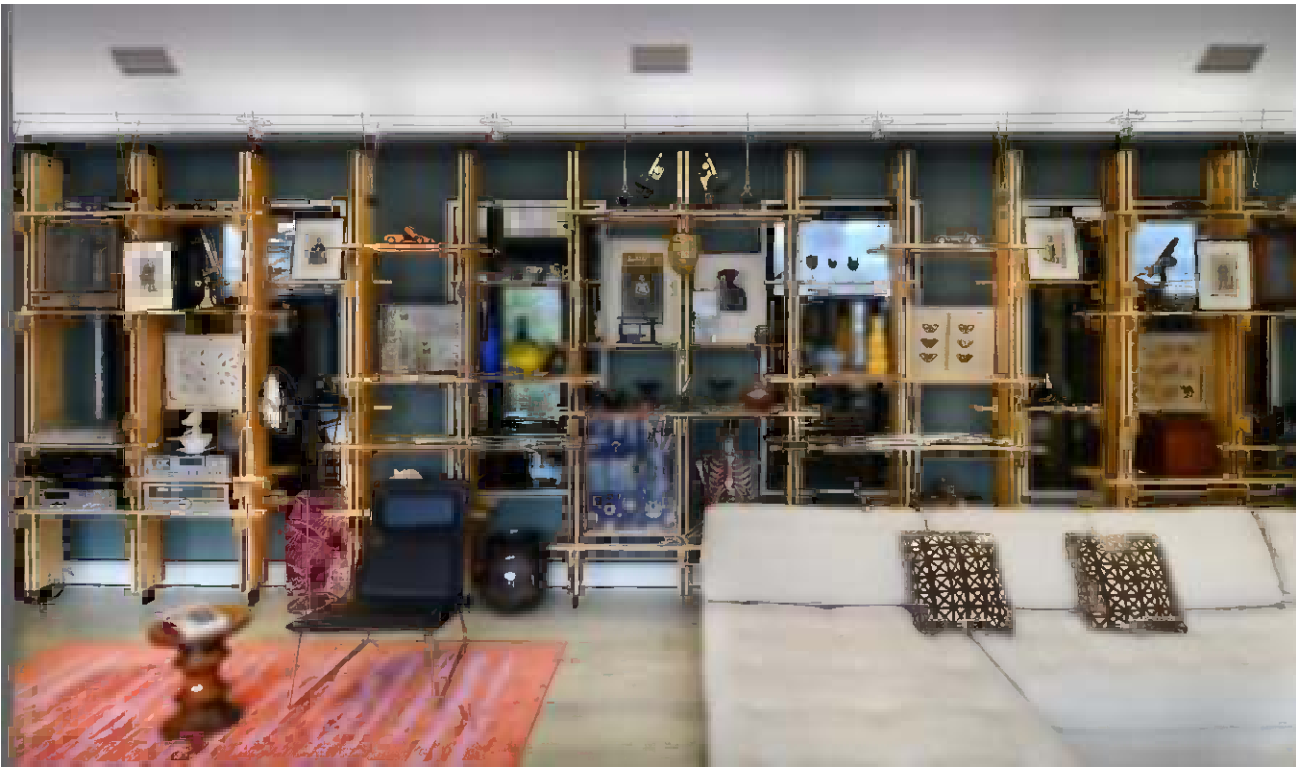
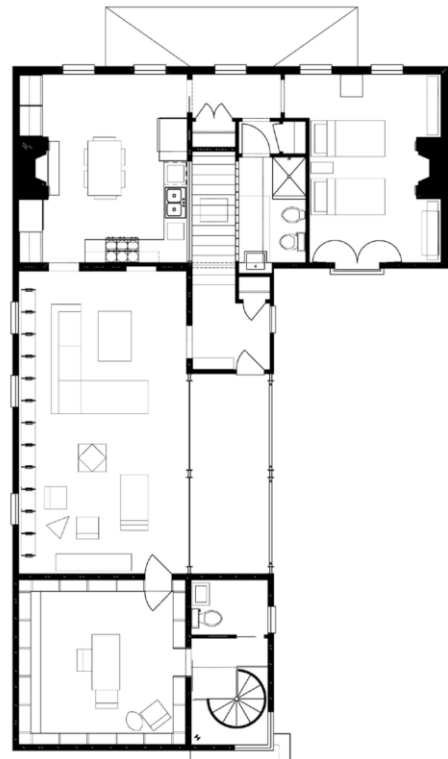




Fig. 13 below right

**A new addition** to the building was the construction of a loft level adjacent to the main salon, accessed by a spiral staircase (Fig. 13). Designed without fenestration, all four internal walls are lined with the bookcases of a 'secret' library. When the concealed door from the salon is closed (Fig. 15) the library ladder can glide around the perimeter track enabling the browsing of up to 4,000 books. The new library is contained in a 13 cubic feet space (Fig. 16).

Externally the graphic design of the lap board cladding, and its breathable spire housing the mechanical systems, is inspired by the work of American artist Sol LeWitt (1928 - 2007) providing a departure from the Victorian vernacular. (Fig. 14). Reader & Swartz architects describe the project, not as a restoration, but, in sustainable terms, as a reuse of an old building. The client's brief has been delivered in full by the architects and the local artisans of Lodge Construction. The enigmatic project inspired the creation of The Sir John Soane Personality award by the Virginia AIA.





Library on Cork Street | Winchester | USA | Fig. 16 above 210

# UC Berkeley School of Law

Berkeley, USA

2011

RATCLIFF

[www.ratcliffarch.com](http://www.ratcliffarch.com)

**In 2012** UC Berkeley School of Law celebrated its Centenary. To mark the occasion a series of articles were published in the San Francisco Chronicle's Insight supplement. The Dean of Berkeley, Christopher Edley Jr. referring to the historical ethos of the school, wrote "We want to be excellent with a purpose: to address the most difficult problems facing our society... Our research centre tackles society's toughest challenges including climate change". In another article, Professor Daniel Farber co-director of the School's Environmental Law Program discusses Berkeley's heritage in this field. Professor Farber recalls the role played by faculty member Joe Sax in protecting California's lakes streams and tideland from overdevelopment and pollution by employing in the courts his "public trust doctrine". The article discusses

Sax's achievements alongside those of Berkeley Chancellor Professor Michael Heyman who "fought to protect Lake Tahoe's eco-system through smart land-use planning". Daniel Farber traces the roots of environmental law back to the year 1900 when Professor of Law, William Edward Colby, became secretary of the influential Sierra Club. Colby, was a contemporary of environmental visionary John Muir, and an inspiration for renowned wilderness photographer Ansel Adams. Seven years before the centenary articles appeared, Berkeley Law, mindful of its environmental responsibilities, commissioned a design team under the leadership of Joseph Nicola of Ratcliff Architects to transform the Law School's social and academic hub. The vision of a glass pavilion hovering above a two-level subterranean library was eventually realised in September 2011.

Population | 112, 580

Co-ordinates | 37° 52' 18" N  
122° 16' 22" W

Elevation | 0-400m (0-1,320')

Precipitation | 28.74mm (679.2")

Temperature | Average High:  
67.8 C (19.9 F)  
Average Low:  
48.5 C (9.2 F)

Humidity | 78.69%





**In recognition** of the importance of their role as Client, the School of Law provided Ratcliff Architects with a set of Client Goals as follows:

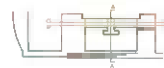
- Develop a new library flexible to changes in research and that accommodates the school's unique collection
- Improve circulation within the school
- Upgrade classrooms
- Improve and expand student and faculty space, including accommodations for the law journal
- Provide shared, common space for students, faculty and staff and create an engaging presence along Bancroft Avenue
- Share the campus' commitment to sustainability and achieving LEED certification;
- Express the nature of the school in quality materials, beautiful architectural expressions, and quality construction and craftsmanship

The architectural success of the project lies primarily in the bold decision to place two thirds of the new building below grade. In doing so the architects have retained Boalt Hall as the dominant profile of the south facade of the school (Figs.

3, 4). The traditional pavilion architectural style is reinterpreted in the south addition providing a seamless integration of new and old. Going underground greatly limited the impact of the new building's potential footprint, maximising the areas retained for valuable outdoor space. A variety of uses were envisaged for the outdoors including dining, teaching and events. This strategy was compounded by the addition of the roof garden protectively overhanging the new glazed pavilion. Drought tolerant planting punctuates the new Bancroft Avenue public facade (Fig. 5). Retaining and waterproofing the 45-foot deep excavation required the implementation of a dewatering scheme to keep the site free of ground water during the construction process. This included 800ft. of 12 inch bore piping to pump the ground water into the storm drain. The retaining walls were lined with CoreFlex, providing a passive thermoplastic membrane in conjunction with an active polymer core.

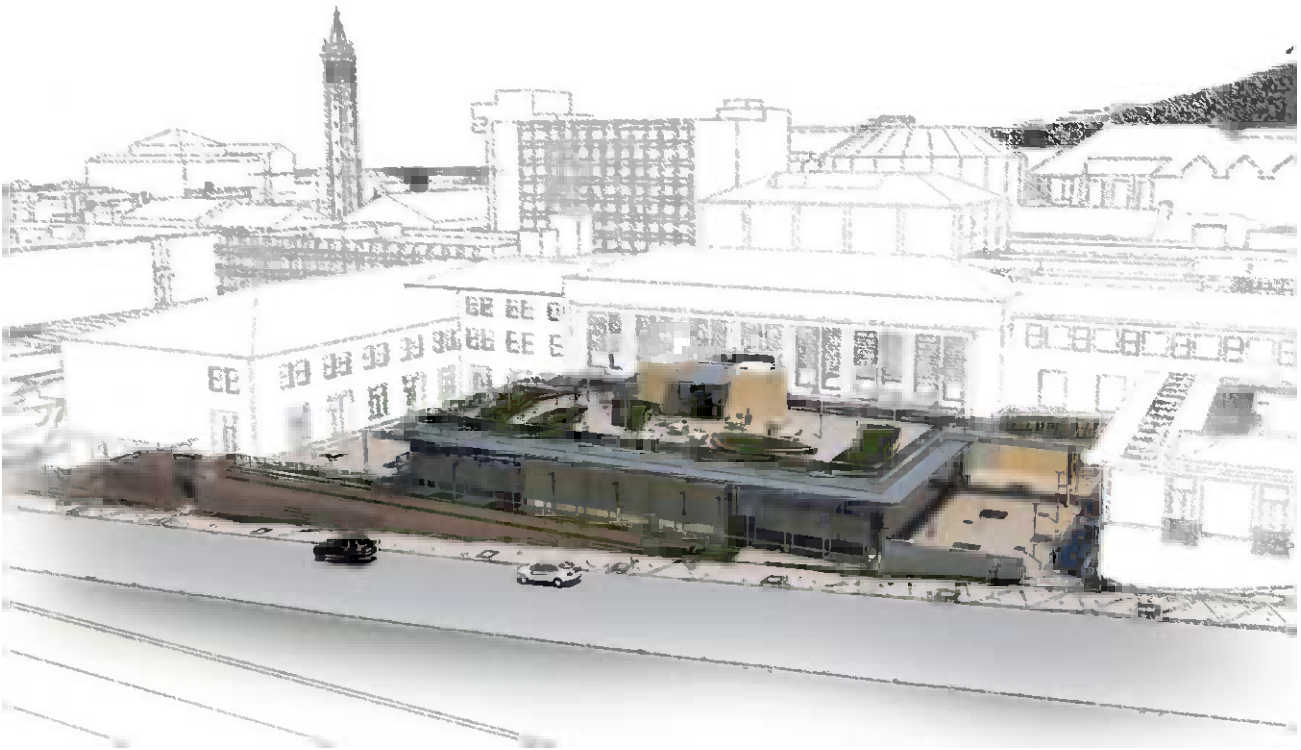
Figure 6. on the next page illustrates the overall site development strategy including details of the rainwater harvesting.

SECTIONS



C-C LONGITUDINAL SECTION

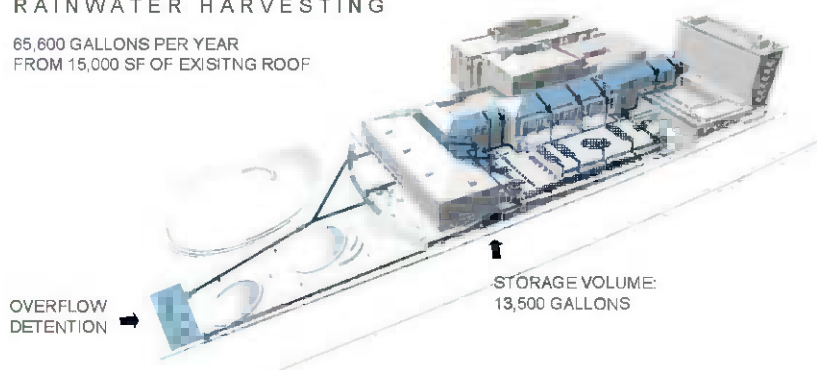




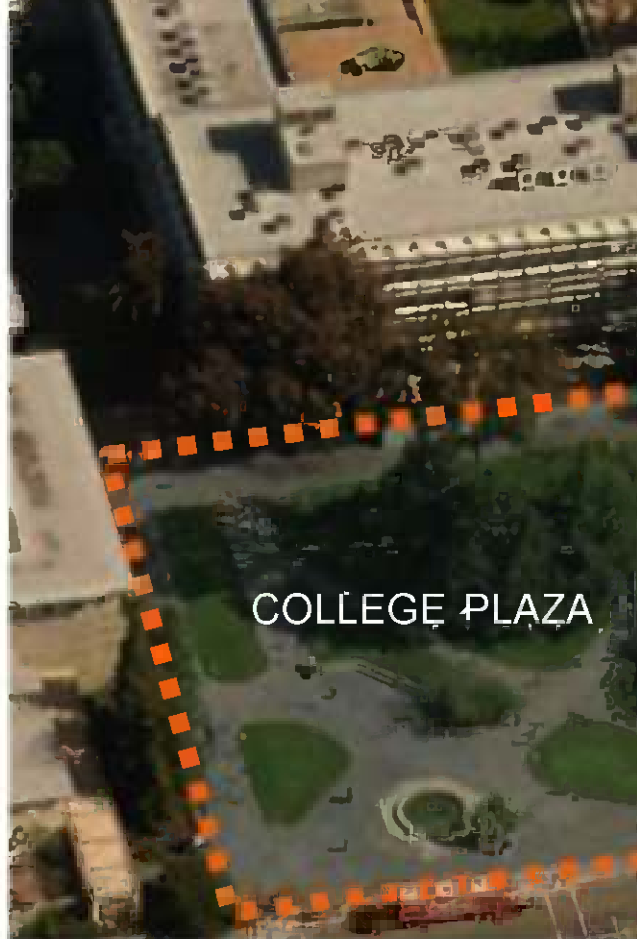
# CONTEXT & SITE PLAN & SUSTAINABLE GOALS

## RAINWATER HARVESTING

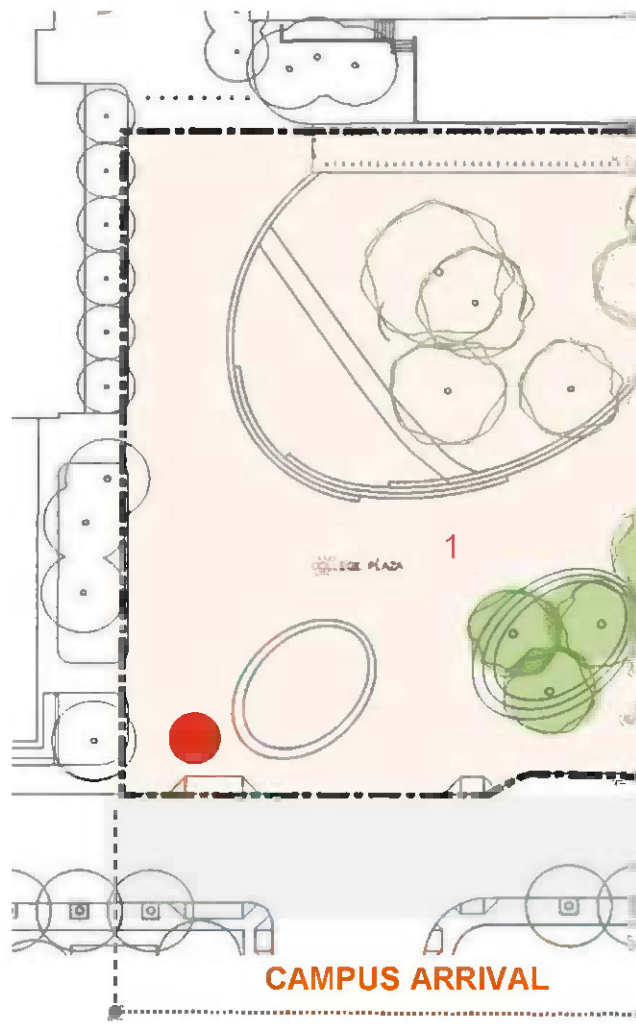
65,600 GALLONS PER YEAR  
FROM 15,000 SF OF EXISTING ROOF

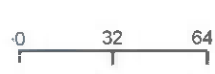
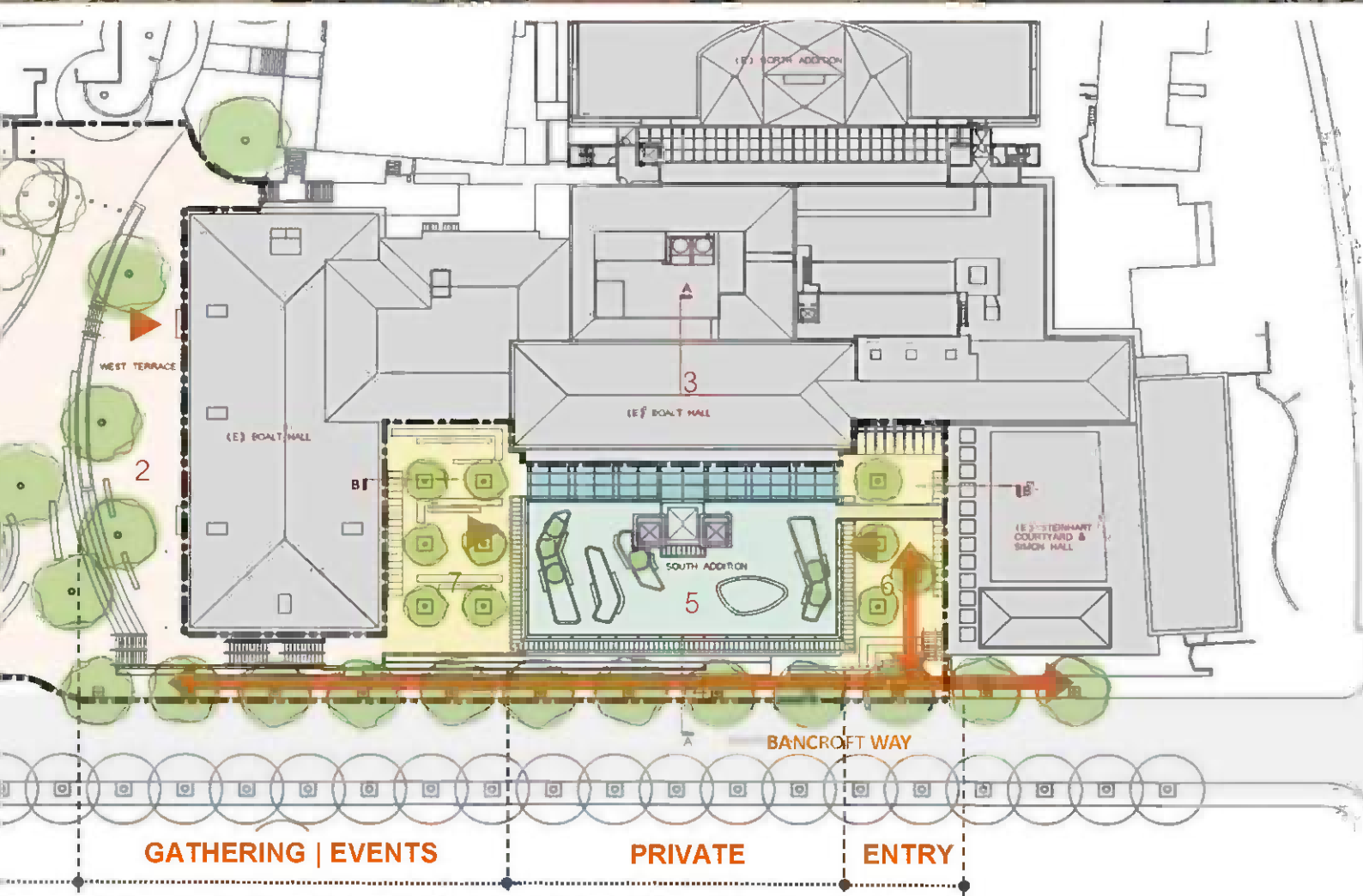


The rainwater from the site is captured by a series of basins, located underneath College Plaza, and reused for landscape irrigation. Species selection and irrigation produce a 70% total water savings, while harvested rainwater meets the remaining demand, giving a 100% potable water savings.



- 1 College Plaza
- 2 West Terrace
- 3 Existing Buildings
- 4 Bancroft Streetscape
- 5 Roof Garden
- 6 East Courtyard
- 7 West Courtyard
- ↔ Main Circulation
- ▶ Main Entrance
- Campus Gateway





SITE PLAN





Fig. 7 below right, service desk

The primary sustainability strategy for Berkeley Law was that of adaptive re-use. Figure 11 illustrates the historic development of the site since Boalt Hall was constructed in 1951. The comprehensive plan for utilisation of existing and new space was inspired by the relocation of the library collection to the lower level of the new south addition (Fig. 10). This, in turn, solved the previous pedestrian traffic jams by allowing the creation of a new circulation spine (Fig. 11). The multi-phased project comprised three phases of strategically planned renovations of existing structures. The fourth phase (new construction and external works) creatively linked old with new, delivering an iconic building on a unified campus. The ability to adaptively re-use all the interconnecting spaces above the library collection and the room for expansion provides the 2012 model of Berkeley School of Law with a projected 50 year life span. Additional design strategies employed in the bid to reduce energy consumption, and gain LEED certification, included daylight modelling of the main reading rooms (Figs. 8, 9).

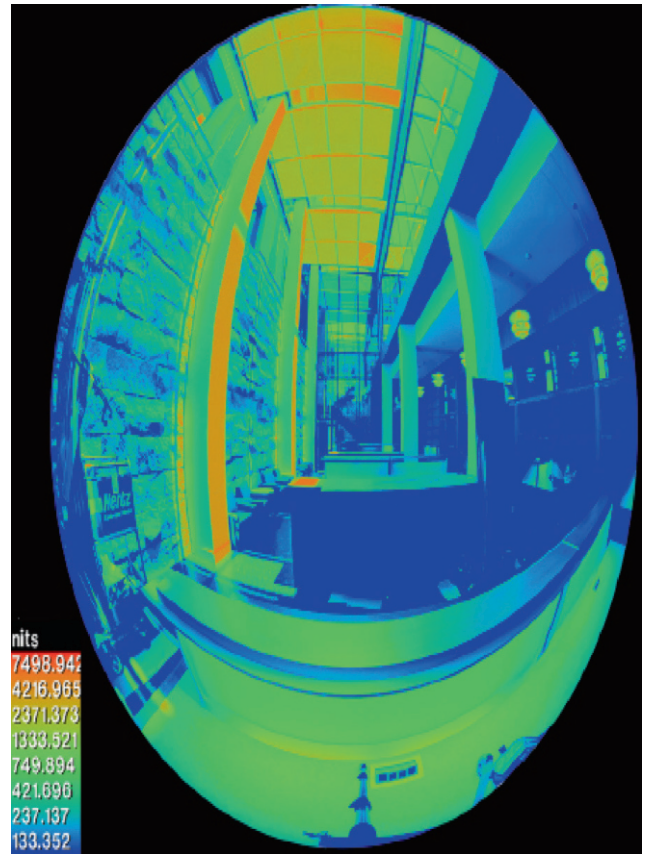
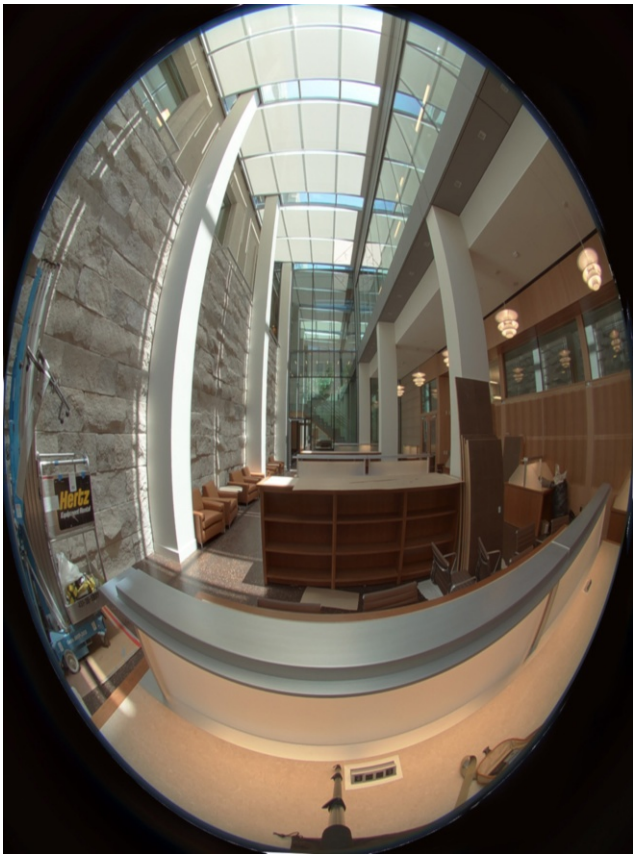


Fig. 10 below

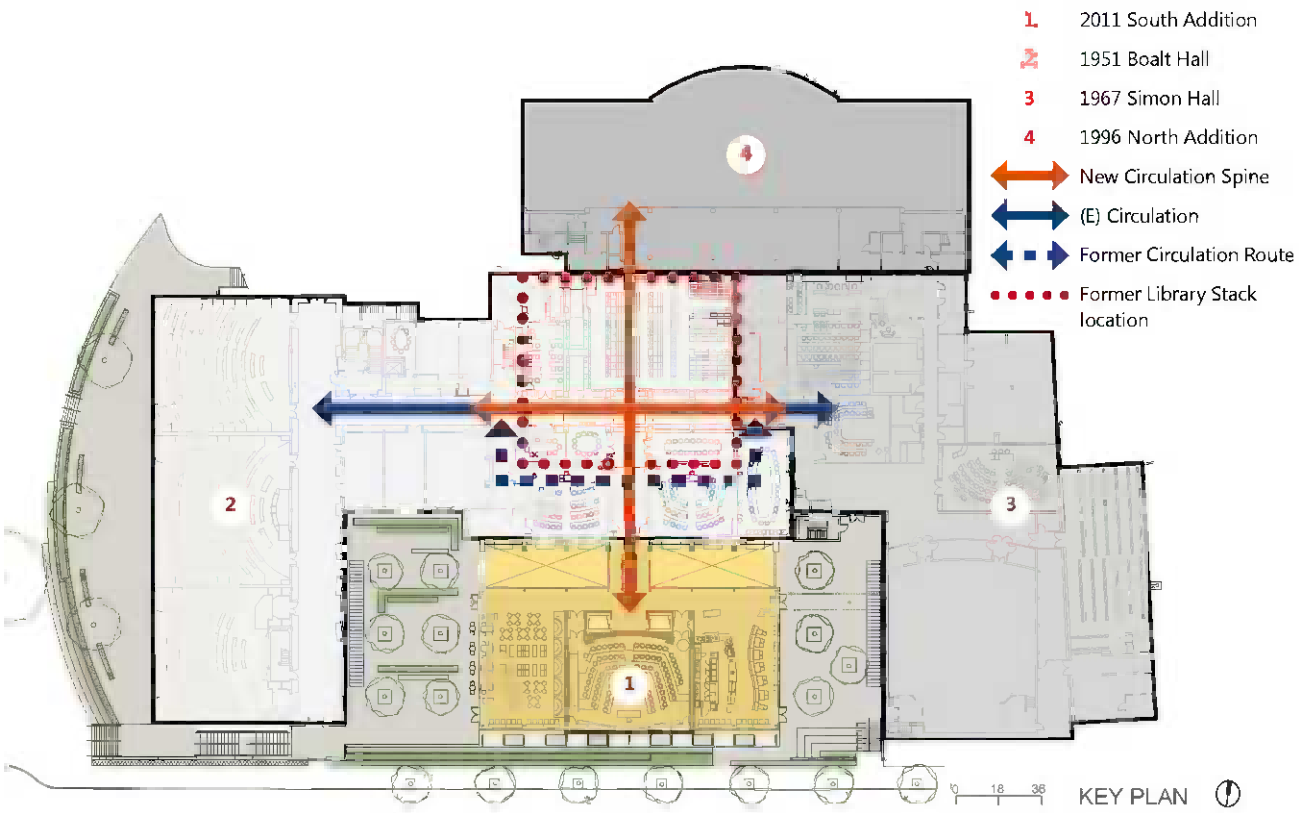
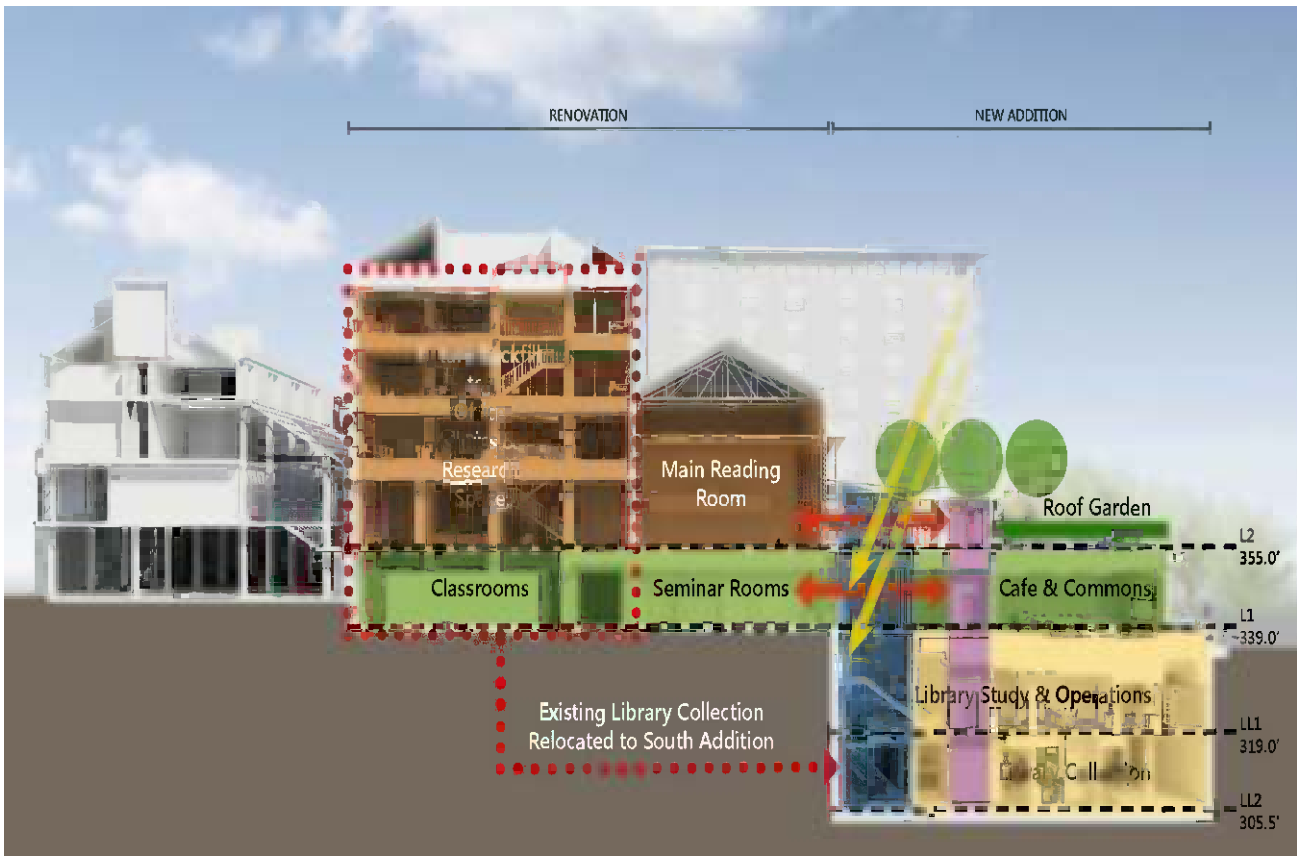
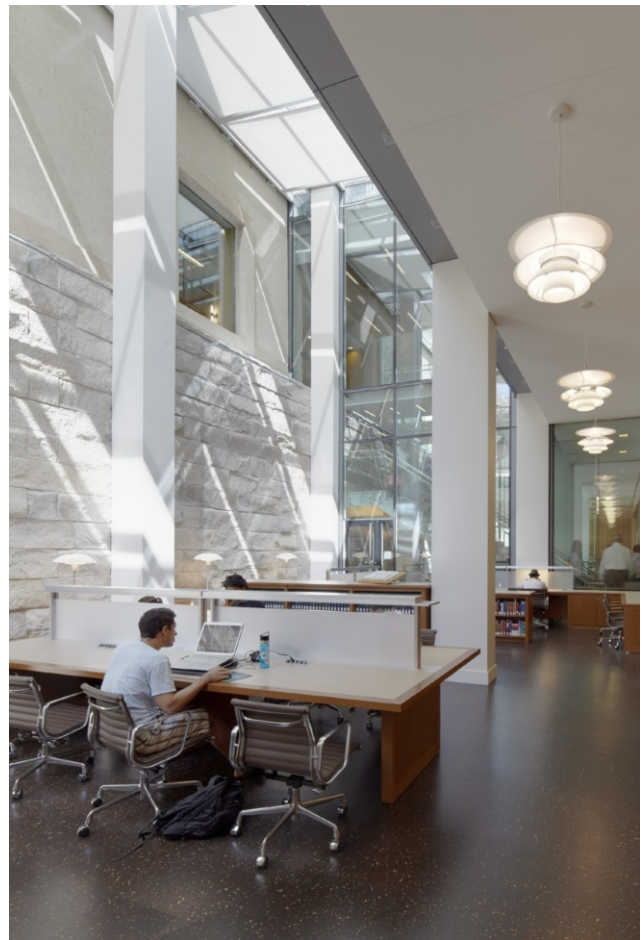
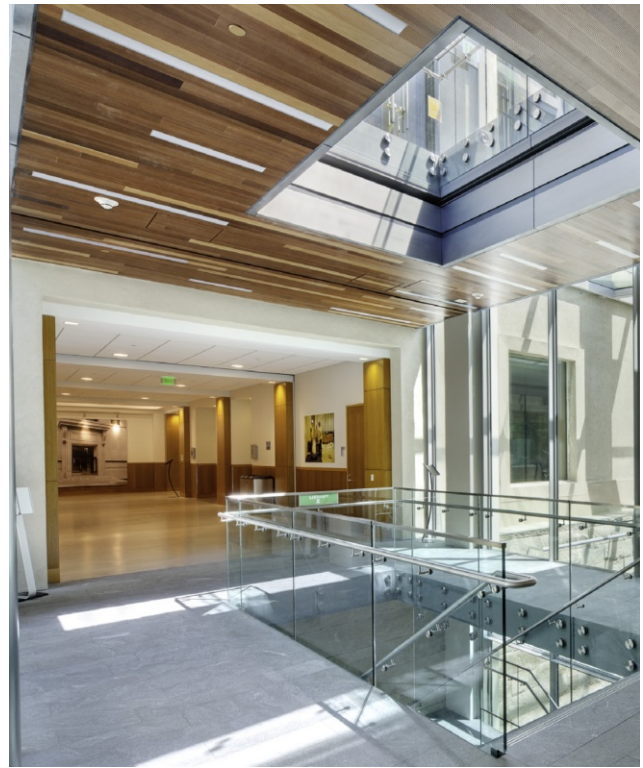


Fig. 12 below right

**The indoor space** is organised from the lowest, most secure level where there is minimal natural light and the majority of the book stacks are located. The next level up borrows daylight via skylights and clerestory windows for the staff offices, service desk, reading rooms, conference space and a student centre. The third level houses classrooms, a lecture hall, lounge and cafe (Fig. 16). Further classrooms, the main reading room and the deans conference room are all located on the fourth level.

The interior design is characterised by its transparency, due in large part to the glazed stairwell balustrades, which allow transmittal of natural light from upper to lower levels (Figs. 12, 13).

A high-recycled content is present in the cork flooring, acoustical wood ceilings and wall panels. White limestone, retaining walls, with a rugged surface finish combined with smooth finished structural columns emphasise the building's relationship with light and shade (Fig. 14).





The progression from the sedentary lower levels to the animated, light filled, upper levels culminates in a pedestrian bridge crossing to a roof garden (Figs. 17, 19).

The outdoor courtyards and terraces are regarded as a vital element of the integrated campus. Meticulously planted, maintained and irrigated with the rainwater collected on the site, these spaces form the backdrop to the outdoor California lifestyle enjoyed by Berkeley's students and faculty. The transitional spaces would not be out of place in an episode of the television series, *The O.C.*, in which actor Peter Gallagher plays Sandy Cohen, a public defender and former Boalt Hall alumni. Other fictional Berkeley graduates include Matthew Perry's character, Associate White House Counsel Joe Quincy, in Aaron Sorkin's *The West Wing*. However Boalt Hall has many distinguished alumni who featured in real-life *West Wing* dramas, including Dean Rusk, who was President John F. Kennedy's Secretary of State during the Cuban missile crisis.

The New Construction element of the project earned Leed Gold Certification from the U.S. Green Building Council. Additionally, the Commercial Interior received LEED Silver certification, an important part of fulfilling the client's brief.



Fig. 17 above, East Courtyard | Fig. 18 below, West Courtyard





Fig. 19 above, Roof Garden | Fig. 20 below, Building Composition



# Photo Credits

## New Build

- 3 Amsterdam Public Library, Amsterdam, Netherlands  
*Arjen Schmitz*: 3, 4, 5-6, 7 bottom, 9 bottom left, 9 bottom right, 10 top, 10 bottom, 12, 13-14, 15, 16  
*JCAU JO COENAN ARCHITECTS AND URBANISTS*: 7 top, 8 top, 8 bottom, 11
- 17 Ballard Library and Neighborhood Service Centre, Seattle, USA  
*Bohlin Cywinski Jackson*: 17, 20 bottom, 21, 22 top, 22 bottom, 23  
*Nic Lehoux*: v left, 18, 19 top, 19 bottom, 20 top, 24, 25 top, 25 bottom left, 25 bottom right, 26, 27 bottom left, 27-28 top, 27-28 bottom
- 29 Centro Culturale Elsa Morante, Rome, Italy  
*face2face Studio Abbrescia Santinelli*: 29, 33, 35 top, 35 bottom, 36 top, 36 bottom  
*LCA Luciano Cupelloni Architettura*: 30, 31, 32 top, 32 bottom, 34 top, 34 bottom
- 37 Gando School and Library, Gando, Burkina Faso  
*Jan Erik Ouwkerk*: 37, 38, 40 top right, 41 bottom, 42 bottom, 43 bottom, 44 bottom  
*Diébédo Francis Kéré · Architect*: 39-40, 41 top, 42 top, 43 top, 44 top
- 45 King Abdullah University of Science and Technology, Thuwal, Saudi Arabia  
*Sam Fentress*: Cover, v right, 45, 46, 47 left, 52 right, 53 top, 53 bottom, 54 top  
*J.B. Picoulet*: 51-52, 54 bottom  
*HOK*: 47-48, 49-50
- 55 Liyuan Library, Huairou, China  
*Li Xiaodong*: 55, 56, 57, 58, 59 top, 59 bottom, 60 top, 60 bottom, 61-62, 63 top, 63 bottom, 64 top, 64 bottom
- 65 Oak Park Public Library, Oak Park, USA  
*nagle hartray | architects*: 65, 67 top, 67 bottom, 68 top  
*Scott McDonald©Hedrich Blessing*: 66, 68 bottom, 69 top, 69 bottom, 70 top, 70 bottom, 72  
*Richard Lanenga Photography*: 71
- 73 The Open-Air-Library, Salbke, Germany  
*KARO\**: 73, 74, 75-76 top, 75-76 bottom, 77-78, 79 top, 79 bottom, 80 top, 80 bottom, 81, 82
- 83 Phoenix Central Library, Phoenix, USA  
*Will Bruder + Partners*: 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94
- 95 Traverwood Branch Library, Ann Arbor, USA  
*Jame Haefner Photography*: 95, 104 top, 105, 106  
*Justin Maconochie Photography*: Flap left, 96, 97 bottom right, 99, 104 bottom  
*inFORM studio*: 97 top, 98, 100, 101, 102, 103 top, 103 bottom, 107, 108
- 109 University of Aberdeen New Library, Aberdeen, UK  
*Adam Mork*: 1, 109, 110, 111-112, 115 top, 115 bottom left, 115 bottom right, 116, 117-118, 118 top right  
*schmidt hammer lassen architects*: 113, 114 top, 114 bottom
- 119 University of Arizona Poetry Center, Tucson, USA  
*Jared Logue*: 119, 120  
*Line and Space, LLC*: 121, 127, 128 top, 128 bottom  
*Robert Reck*: 122 top, 122 bottom, 123-124, 125 top, 125 bottom, 126

## Adaptive Re-Use

- 129 City of Sydney Library Customs House, Sydney, Australia  
*Paul Gosney: Flap centre, 129, 130, 131 top, 131 bottom, 133 top, 133 bottom, 134, 135 top, 136 top, 136 bottom*  
*LACOSTE+STEVENSON ARCHITECTS: 132, 135 bottom*
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