

Bangladesh Air Force Museum

By

Md. Nazmus Sakib
14208006

A thesis submitted to the Department of Architecture
in partial fulfillment of the requirements for the degree of
Bachelor of Architecture

Department of Architecture
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Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of help.

Student's Full Name & Signature:

Md. Nazmus Sakib
14208006

Approval

The thesis/project titled “[Bangladesh Air Force Museum]” submitted by
[Md. Nazmus Sakib (14208006)]
Of Fall, 2020 has been accepted as satisfactory in partial fulfillment of the requirement for
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Examining Committee:

Supervisor:
(Member)

Fuad Hassan Mallick, PhD
Professor and Dean,
School of Architecture and Design

Supervisor:
(Member)

Muhammad Faruk, PhD
Associate Professor,
Department of Architecture

Supervisor:
(Member)

Huraera Jabeen, PhD
Associate Professor,
Department of Architecture

Supervisor:
(Member)

Abul Fazal Mahmudun Nobi
Senior Lecturer,
Department of Architecture

Departmental Chairperson:
(Chair)

Zainab Faruqui Ali, PhD
Professor,
Department of Architecture

Abstract

Since its foundation on 28 September 1971, the Bangladesh Air Force has been engaged with different battle and compassionate tasks, from the Bangladesh Liberation War wherein it was conceived, to supporting global endeavors including the Coalition of the Gulf War and United Nations peacekeeping missions. The project aims to conserve the national history affiliated with Bangladesh Air force (BAF). This would enable the present and future generations to acquire knowledge about the historical events. The establishment of a proper museum of BAF would enable the preservation of aircrafts and equipment of BAF involved during the liberation war. Thus, the project would play a vital role in preserving and exhibiting the historical records and artifacts of BAF for the general population, aviation researchers and enthusiasts. Furthermore, the project would contribute as a major public recreational space which resonates with the context, for the need for such a public facility in Dhaka is extremely vital. The project would also be a landmark that would attract visitors and allow for a mesmerizing journey within the free open public outdoor gallery. Such facilities are very essential in allowing the urban population to dive into a green public pocket that is open to all in midst of all the chaos of the city.

Acknowledgement

I would like to thank my course tutors Proffessor Fuad Hassan Mallick, Abul Fazal Mahmudun Nob, Iftekhar Ahmed, Khondaker Hasibul Kabir and Mohammad Zillur Rahman who have dedicated their precious time for us throughout the semester. I would also thank my resource provider from BAF Ashraf Uddin Faroque (Air Cdre). i would also like to thank my parents for their tremendous support.

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List of Acronyms

BAF	Bangladesh Air Force
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Chapter 1: Introduction

1.1 Introduction to the Project

An air force museum or aerospace museum or aviation museum is a museum exhibiting the history and artifacts of aviation. Exhibits can include actual or replica aircraft, photographs, maps, models, dioramas, clothing and equipment used by aviators. These museums vary in sizes from accommodating just one or two aircraft to hundreds. It depends on their collections or the history they are focusing on etc. The existing Bangladesh Air Force Museum in agargaon which is under the BAF was introduced in 1987 to show the pride and sacrifice of BAF in the history of independent war in 1971. At the same time many latest and most up to-date air crafts are increasing the collection, so to accommodate these large number of aircrafts BAF needs a large and well equipped modern museum. Possible beneficiaries of the project are researchers, students, visitors, tourists, BAF guests or any type of general people.

1.2 Aim and Objectives of the Project

The aim of the project is to preserve the rich history of BAF and make a knowledge center for everyone. Moreover, the air force museum will be the only national museum which is mainly dedicated to BAF with a lot of collection of different types of aircrafts, films, photographs, engines, uniforms, medals and artworks. The museum will also provide research and education facilities. In addition to, the museum will also focus on the people who are the pride of BAF – from the early brave aviators of wartime to the service men and women who has contribution in the independence of the country we are living in. This museum will also

play a significant role to light up the patriotism in the heart of new generation. Furthermore, it is a great place for aviation and aircraft researchers and students.

Besides, as a developing city Dhaka has very few urban spaces. By an urban space mean a quality piece of architectural and urban design for a functional, recreational and symbolic use for the people of the city. But still, the city has a great opportunity to create an urban space and museum like this, in which visitors and tourists will get the best possible story telling pleasure and comfort. In addition to, our economy can be benefitted with a limited amount of time and money.

1.3 Project Summary

Name of the Project: Air Force Museum

Implementer of the Project: Bangladesh Air Force

Location: Agargaon, Dhaka

Site area available for the Project Development: 18.26 acres (7,95,405.6 sft)

Proposed built-up area of the Project: 1,65,000 sft

Proposed Program of the Project: administrative office, gallery, library, auditorium, multipurpose hall, cafe

Chapter 2: Literature Review

2.1 Aviation history of Dhaka

In the year 1892, The first recorded flight was arranged by the Dhaka Nawab Family. Jeanette Van Tassel, a young balloonist from the United States, was hired by the Nawab Khwaja Ahsanullah. On 16th March 1892, she set off to fly from the southern bank of the river Buriganga to the roof of Ahsan Manzil. But a strong wind carried her off to the gardens of Shahbag, where her balloon became stuck in a tree. This resulted in the death of the flyer.

2.2 Tejgaon airstrip

Present day flight right now when the British Government of India assembled Royal Indian military airstrip at Tejgaon. They built this airstrip to fly their warplanes towards the combat zones of Kohima (Assam) and Burma. The development of Tejgaon Airstrip began in 1941 at a spot named Dainodda. The Kurmitola Airstrip was also begun simultaneously, as an extra runway for the Tejgaon Airport. The First RIAF light fighter arrived on the under-construction runway of Tejgaon toward the start of 1943. The Tejgaon airstrip assumed a vital job by giving strategic surveillance and broad help to the army. With the Fall of Rangoon the operations in Burma were decreased. Before the end of June 1945 the majority of the Royal Air forces squadrons were withdrawn. At the point when the War was finished, the colonial government chose to build the Tejgaon Airport to address the issues of a Royal Indian Air Force station in Dhaka. After that it became the First civil airport of Bangladesh.

In 1947, after the freedom of India East Pakistan and West Pakistan were shaped. The connection between the capitals of geologically isolated East and West Pakistan was begun with the Orient Airways. The first flight began on 7 June 1954 by DC-3 air conditioning from Karachi to Tejgaon Dhaka. Later Orient Airways converged with the administration's proposed carrier Pakistan International Airlines (PIA). Afterward, PIA had begun working Boeing 707 and Vickers VC10 fly administrations.

The Eastern Pakistan Flying Club was built up in 1948. During the 1962 Sino-Indian War, administrations to East Pakistan were ending up being troublesome; in this manner PIA put their Sikorsky S-61 helicopters on these courses until 1966.

BAF was established on 28 September, 1971 at Dimapur, India. With just 3 airplanes BAF directed 46 operations, only within a 9-days range. during our liberation war alongside our newly formed Bangladesh Air Force, Indian Air Force likewise had broad engagements with the Pakistan Air Force in the sky over Bangladesh. The main engagements was on 22 November over the Salient of Boyra in West Bengal. In the process Tejgaon Airport endured broad damage.

All through 03, 04 and 05 December, IAF attacked by their Canberra bombers, Su-7s, and Mig-21s over Tejgaon airport for PAF airplane on the ground but it failed to make enough harm the PAF resources in well-dispersed and camouflaged locations. On the morning of 06 December four MiG-21s flying from Gauhati hit Tejgaon and scored a few hits on the runway. Repeatedly assaulted by MiG-21s and Hunters be that as it may, kept the runway depressed.

After freedom in 1971, the Bangladesh Air Force got equipments from the Soviet Union and the People's Republic of China; Mikoyan-Gurevich MiG-21 fighters; Antonov An-24 and Antonov An-26 aircraft and Mil Mi-4 helicopters. After that, Bangladesh got 5 Saber Jets for BAF. This proceeded to be a finished aviation based armed forces once empowered with not many Mig-21s, Mi-8 helicopters and A 26 aircrafts.

2.3 Aircrafts

The list of the aircrafts of BAF:

Aircraft	Image	Origin	Role	Notes
MiG-29		Russia	Air superiority	On April 25, 2013 Russian Aviaton published a news that RAC MiG is negotiating with Bangladesh government for upgrading the 8 Mig-29 into Mig-29SMT. ^[1]
F-7		China	Fighter / Interceptor	12 F-7BG with 4 FT-7BG received in early 2006. 16 F-7BGI received in 2013 as stop-gap aircraft till the proposed 4.5 generation fighter procurement

				matures.
Nanchang A-5		China	Ground attack/Close air support	12 Q-5C received in 1989-1990. 2 aircraft lost in accidents.
Aero L-39 Albatros		Czechoslovakia	AJT/LA/AR	A total of 8 aircraft delivered. 1 aircraft crashed in 2012.
Shenyang FT-6		China	OCU	Used as the trainer aircraft of A-5C. Scheduled to be replaced soon. 36 F-6/FT-6 received from China from 1976-1983.
Nanchang PT-6		China	Primary Trainer	One of the aircraft crashed in 2012. 24 aircraft remain out of 40 delivered.
Bell 206 Long Ranger		USA	Rotary Wing Trainer	

Cessna T-37 Tweet		USA	Jet Trainer	Placed in reserve. Scheduled to be replaced with Advanced Turboprop Trainers along with PT-6. The possible replacement might be YAK-152/CJ-7.
K-8		China/Pakistan	Primary Jet Trainer	Arrived on September, 2014. ^[4]
Yak-130		Russia	Lead In Fighter Trainer	Scheduled to be delivered by the end of 2015. ^[5]
Lockheed C-130 Hercules		USA	Special Ops	Former United States Air Force aircraft bought at cost of \$15M each. BAF is negotiating for 4 off the shelf C-130Es under Excess Defense Article (EDA). The package would also include 20 Rolls-Royce T56 engines to be provided plus training and other equipment and services associated with the upgrade.

Antonov An-32		Ukraine	Tactical Transport / Converted Bomber	Bangladesh Air Force received 3 aircraft in late '80s.
Mil Mi- 17V-5		Russia	V.I.P. Trans port helicopter	
Mil Mi- 171		Russia	Battlefield Close Air Support	5 Mi-171sh were ordered in April 2014. ^[6]
Mil Mi- 17		Russia	Air Assault, Me dEvac, Battle field Close Air Support	
Bell 212		USA	Air Assault, Spe cial Ops, SAR,	Bought from US stock.

			MedEvac	
AW139		Italy	Search and rescue	To be delivered by the end of 2015 ^[7]

List of BAF obsolete and retired aircraft:

Aircraft	Image	Origin	Role	Notes
F-7 Air Guard		China	Multirole combat aircraft	Retired in favor of more capable F-7BGI.
Fouga CM.170 Magister		France	Jet Trainer	Retired in favor of more capable Aero L-39 Albatros.
North American F-86 Sabre		USA	Fighter aircraft	Surrendered by Pakistan Air Force.

Douglas Dakota		USA	Military transport aircraft	Ex Indian Air Force.
de Havilland Canada DHC-3 Otter		Canada	Military transport aircraft	Ex Indian Air Force.
Aérospatiale Alouette III		France	Utility helicopter	Ex Indian Air Force.
Mikoyan- Gurevich MiG-21		USSR	Fighter aircraft	
Mil Mi-8		USSR	Transport Helicopter	

Shenyang J-5		China	Interceptor aircraft	
Shenyang JJ-5		China	Interceptor aircraft	
Agusta-Bell 205		Italy	Transport Helicopter	Ex Imperial Iranian Air Force.
Antonov An-24		USSR	Military transport aircraft	V.I.P Transport. Known as Balaka.
Antonov An-26		USSR	Military transport aircraft	
Shenyang J-6		China	Operational conversion unit	

Westland Wessex		United Kingdom	Transport helicopter	Former Royal Navy helicopters donated by the United Kingdom in 1973
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2.3 Museum

A museum is an institution that cares for collections of artifacts and other objects of scientific, artistic, cultural or historical importance and makes them available for public viewing through exhibits that may be permanent or temporary. Most large museums are located in major cities throughout the world and more local ones exist in smaller cities, towns and even the countryside. Museums have varying aims, ranging from serving researchers and specialists to serving the general public. The continuing acceleration in the digitization of information, combined with the increasing capacity of digital information storage, is causing the traditional model of museums to expand to include virtual exhibits and high-resolution images of their collections for perusal, study, and exploration from any place with Internet. The city with the largest number of museums is Mexico City with over 128 museums. According to The World Museum Community, there are more than 55,000 museums in 202 countries.

Types of museum:

Open air museum

Archaeology museum

Science museum

Art museum

Specialized museum

History museum

Natural history museum

Military museum

Aviation museum

Museum purposes vary from institution to institution. Some favor education over conservation, or vice versa. For example, in the 1970s, the Canada Science and Technology Museum favored education over preservation of their objects. They displayed objects as well as their functions. One exhibit featured a historic printing press that a staff member used for visitors to create museum memorabilia.

Most mid-size and large museums employ exhibit design staff for graphic and environmental design projects, including exhibitions. In addition to traditional 2-D and 3-D designers and architects, these staff departments may include audio-visual specialists, software designers, audience research and evaluation specialists, writers, editors or art handlers. These staff specialists may also be charged with supervising contract design or production services. The exhibit design process builds on the interpretive plan for an exhibit, determining the most effective, engaging and appropriate methods of communicating a message or telling a story. The process will often mirror the architectural process or schedule, moving from conceptual plan, through schematic design, design development, contract document, fabrication and installation.

Exhibition design has as multitude of strategies, theories, and methods but two that embody much of the theory and dialogue surrounding exhibition design are the metonymy technique and the use of authentic artifacts to provide the historical narrative.

Having a very prominent history of air force of 42 years makes the modern force more strong and sufficient. The air force has always been an incredible in terms of their activities and sacrifices. So, they feel proud to show their amazing activities to the people by creating a museum like this. In present days, the site is an open air museum which is located at agargaon and open for public.

Chapter 3: Site Appraisal

The site is situated on the western side of runway with the Tejgaon old Airport. The adjacent frontal road is the 150' wide Rokeya Sharoni. On the opposite side there is the weather office called. It consists of barren land with vegetations & rainy season the land collect water. National Assembly Complex at Sher-e-Bangla Nagar is situated on the south western side of the site.

3.1 Site surroundings

At present there are the chandrima uddan on the western side and old airport are the northern side and Porjoton Corporation at the eastern side the Bijoy Swarani Road at the southern side.



1. Science Museum, 2. Bureau of Statistics. 3. Meteorological Department, 4. Site, 5. BAF Headquarters, 6. Liberation War Museum, 7. LGED, 8. IDB, 9. Trade Fair Field, 10. Bangabandhu International Conference Center, 11. Tejgaon Old Airport, 12. Chandrima Uddan, 13. National Parliament House, 14. Bangladesh Military Museum, 15. Novo Theatre

3.2 Historical Development of the Site

Tejgaon Airport in Dhaka, Bangladesh served as the country's sole international airport prior to the construction of Shahjalal International Airport. Following the transfer of civilian flights to the newly built Shahjalal International Airport in 1981, Tejgaon Airport was taken under the control of the Bangladesh Air Force. The Airport was built by British people before 1947. After that, the Airport was used by PAF before 1971. Later, the designated land was introduced as the Air Force Museum in 1987.

3.3 Geographical Characteristics of the Site

The site is barren land with vegetation. The site itself is a flat land apart from the southern end where is a ditch that collects water in the rainy season. However the ditches is very shallow one and can be filled easily. Apart from bushes and shrubs there are many large tree. It does not have much influence on the over all condition site because irregular orientation are encourage to cut this tree & arrange regular plantation.



Showing the location of vegetation in the site

3.4 Land-use Pattern of the Surroundings



3.5 Accessibility and Connectivity

The main approach to the site can be made from the western side, adjacent to the 150' wide Rokeya Sharoni. Besides, road to the site can be provided from the 150' wide road on the western side as shown on the map attached. The pressure of the traffic in Bijoy Sharoni is very high. It acts as a link road as it connects the Rokeya sharoni with the Old Airport Road. The most positive aspect is that there is a large green island on the road which provide a visual and psychological relief. Rickshaws are not allowed in the road.

3.6 Climatic Conditions

Environmental features and their analysis:

Bangladesh is located in Tropical zone. The general feature of tropical zone are described below:

Climatic Data

Location	tropical zone		
Climate	warm-humid		
Latitude	23 degree, 46.6' North		
Longitude	90 degree, 22.5' East		
Temperature	The mean temperature occasionally rises over 140 deg. F. and lowest in winter rarely goes below 45 deg. F.		
Season	month	maximum	minimum
Dry Summer	March-June	90.6 deg. F.	74.1 deg. F.
	July-Oct	88.2 deg. F.	77.0 deg. F.
	Nov-Feb	80.5 deg. F.	57.0 deg. F.

[Source: Meteorology department]

Micro Climate for Dhaka

Although the wind flow, rainfall, solar angle also are important issue for the design.

3.7 Socio-Cultural and Economic Contexts

Every types of people come here to see the exhibits. The site is maintained and organized by BAF.

3.8 Images of Existing Site Condition



Chapter 4: Case Study Appraisal

4.1 Motat Aviation Display Hall

The Aviation Display Hall is a major new museum facility for the Museum of Transport and Technology (MOTAT)'s collection of historic aircraft. It was designed to extend the existing aviation building on the museum's Meola Road site in Auckland. At 3300m², the extension will enable MOTAT to house all of their aviation exhibits, some of which are the only remaining examples in the world, in a protected environment for the first time.



(Source: archdaily.com)

Architects: Studio Pacific Architecture

Location: Auckland, New Zealand

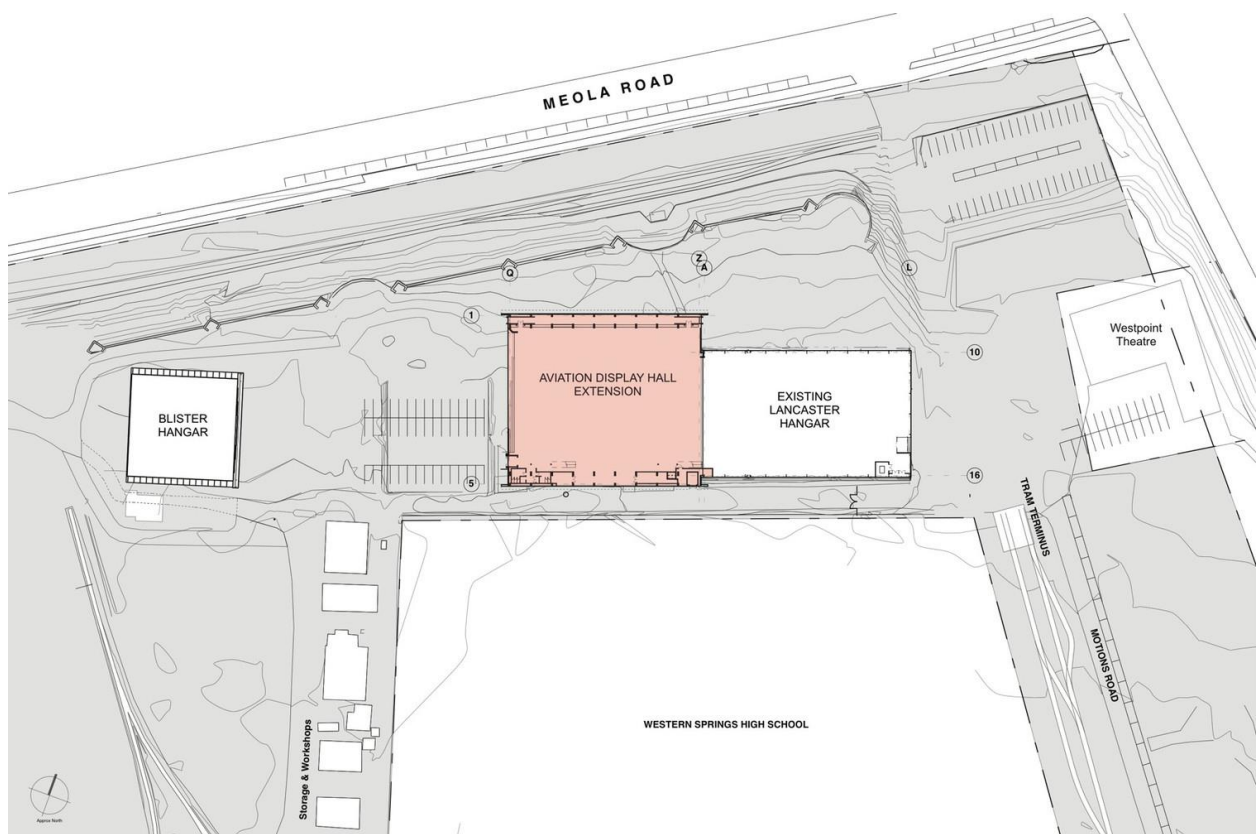
Project Team: Evzen Novak, Marcellus Lilley, Grant Perry, Anna Windsor, Brendan Himona,

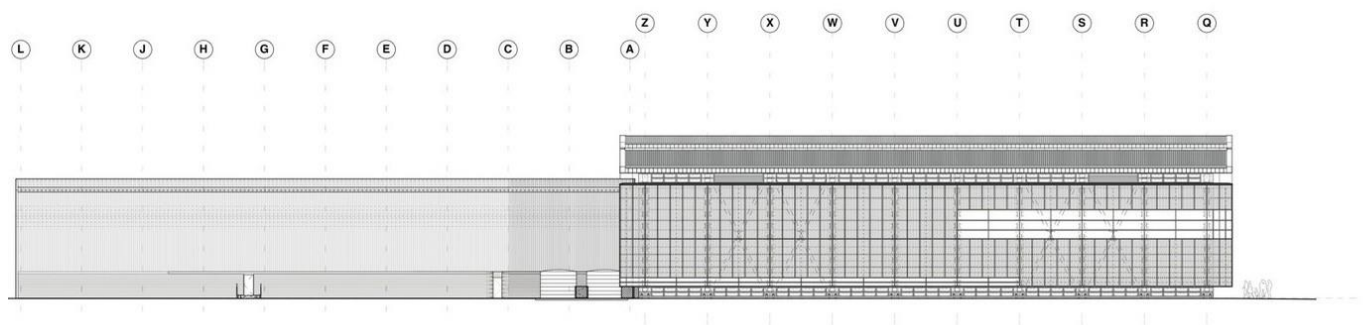
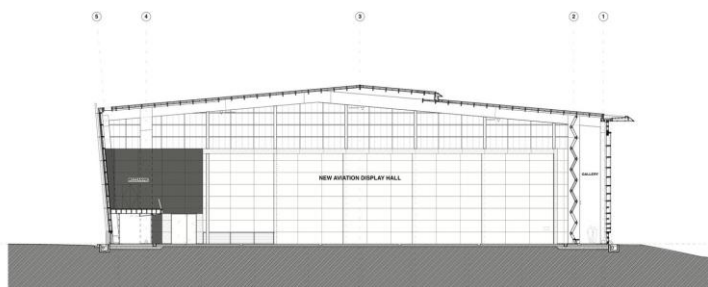
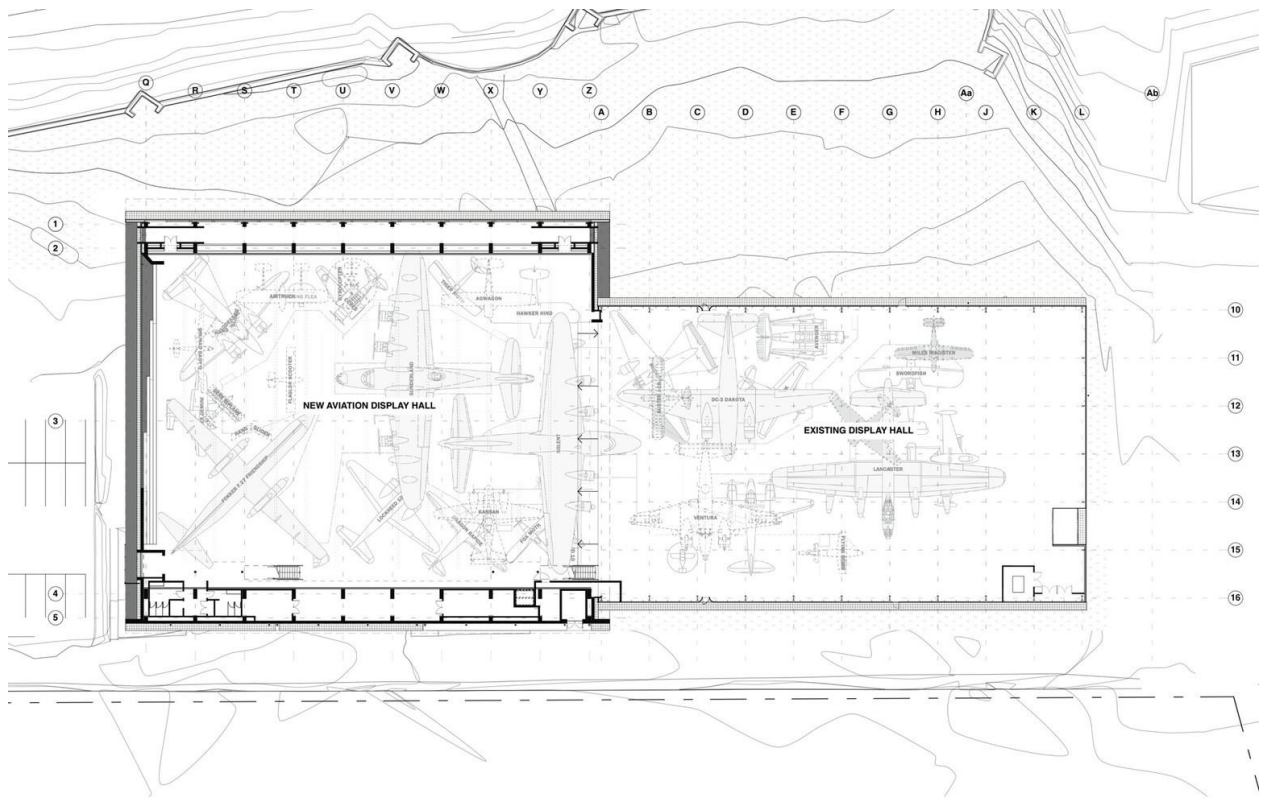
Mark Hadfield

Client: Museum of Transport and Technology (MOTAT)

4.1.1 Form and Function

The building's design has been resolved as a timber interpretation of the hangar form. Unusually for its size, the structure is almost entirely fabricated from Laminated Veneer Lumber (LVL), and uses the unique capacities of LVL portal frames to encompass the large wingspan of the aircraft. At 42 metres internal width, the building has the largest clear span of any LVL timber structure in New Zealand.





(Source: archdaily.com)

Designed to showcase the historic aircraft, the Aviation Display Hall houses an inwardly-focused ‘black box’ exhibition space, while the exterior provides visual expression of the building’s form and contents from the street frontage. The naturally ventilated northern façade glazing, floating beneath the projecting roof, reveals the rhythm of the structure and the gallery wall beyond. The double legged portals are exploited to create a second light-filled gallery space on the north of building that also acts as a 12m high heat chimney, supporting the natural ventilation strategy. On the south of the building these double legs are utilized to locate the mezzanine, classroom and support spaces within the primary exhibition space.



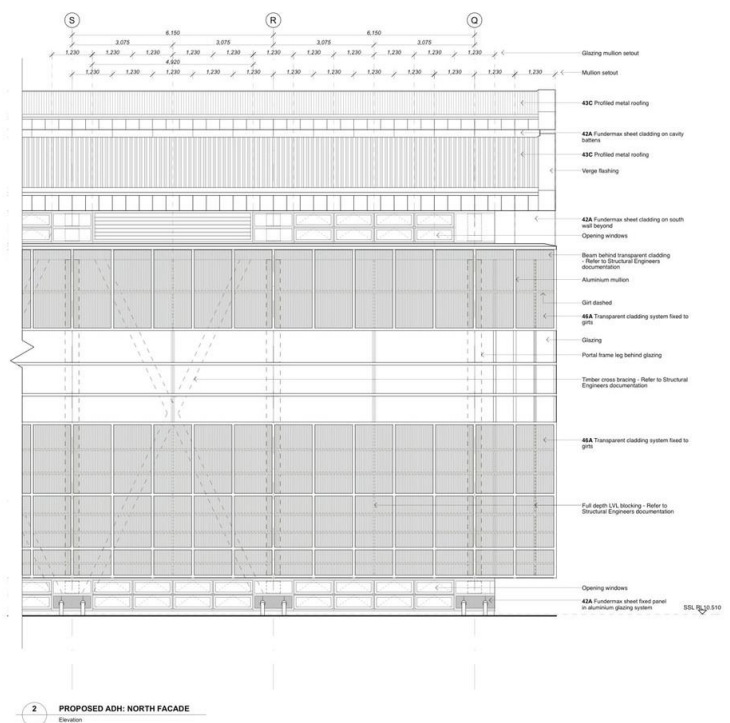
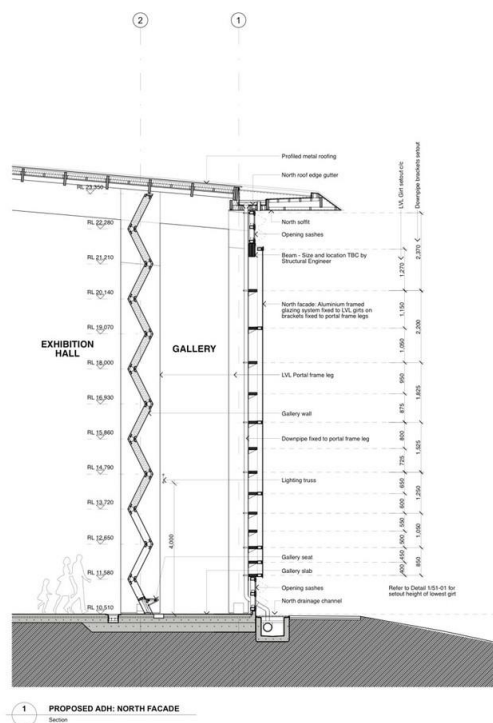
(Source: archdaily.com)

4.1.2 *Site Planning and Landscape detailing*



(Source: archdaily.com)

4.1.3 Structural details



(Source: archdaily.com)

Understanding and analyzing the structural details is also important. For example, large span structures such as Auditoriums use trusses or heavy I-section steel beams and sometimes shell-roofing that involve construction of Ring beams whereas in small span structures, RCC construction is used.

4.1.4 Design detailing

From the outset, sustainable design measures have been an integral part of the overall design approach, and since its completion, the Aviation Display Hall has won a number of Sustainability awards. Situated on a former landfill, the building effectively makes use of recycled land. High and low level banks of actuator controlled windows and louvres

throughout the building provide natural ventilation, meaning that no mechanical air conditioning is required. Life cycle analysis, including empirical research into relative carbon balance and embodied energy of various structural options, was commissioned prior to structural material selection. This supported the use of LVL in the building. A rainwater harvesting system is employed to service the toilet facilities, and gas management strategies were also implemented in response to prevailing site conditions.



(Source: archdaily.com)

4.2 Muzeum Wojska Polskiego by WXCA

Polish Design Season: young Warsaw architects WXCA have been awarded first prize in a competition to design a new Polish military museum.

The design team members:

ZbigniewWronski, SzczepanWronski, GrzegorzSławinski, Jan Jaworski, KubaKupikowski, RafałKłos, Anna Wójtowicz, ZuzannaBujacz, AleksanderHonca

4.2.1 User behavior and requirements

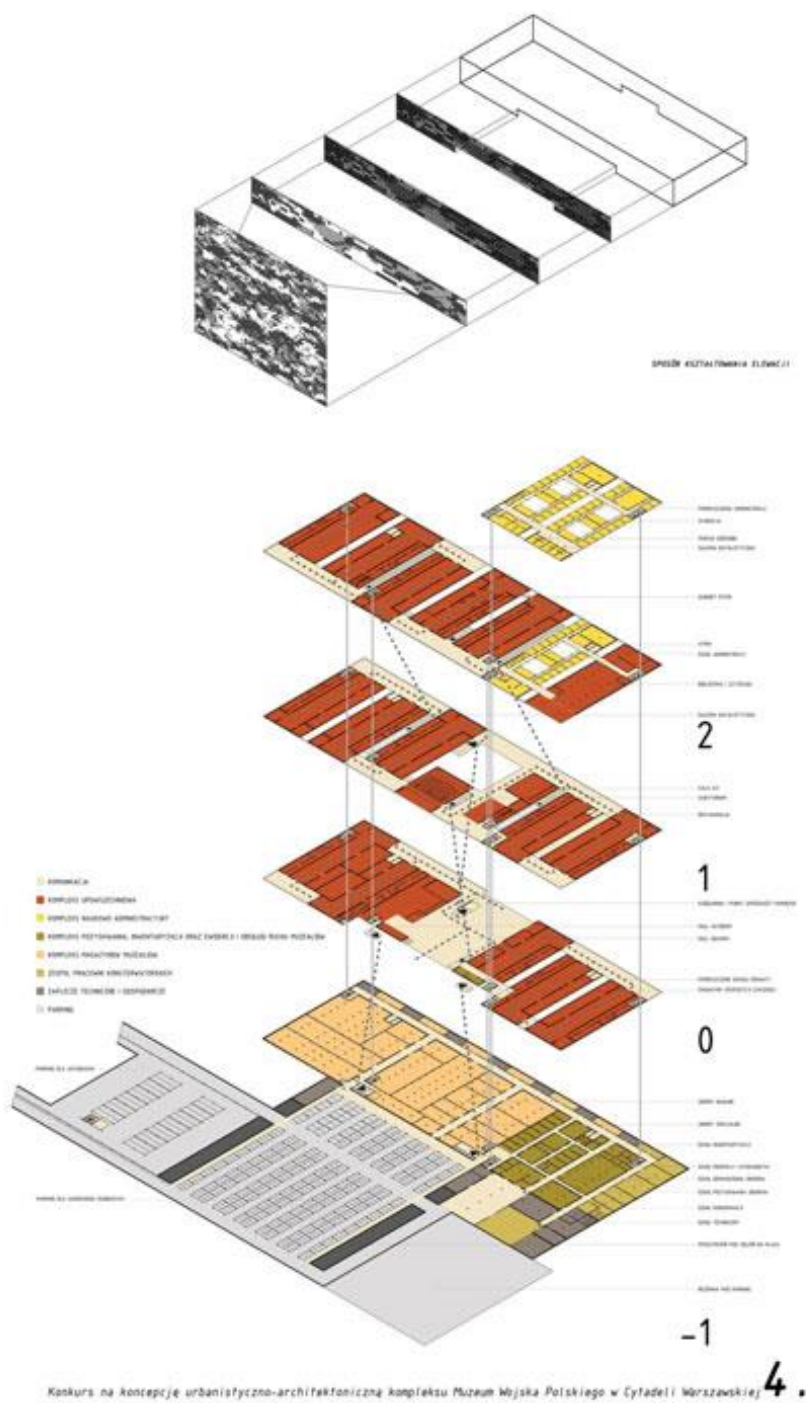


(Source: wxca.pl)

The Muzeum Wojska Polskiego, the master plan comprises a large square leading through to the museum's open-air lobby, an open air exhibition of military vehicles, and restaurants, cafes and clubs to attract more visitors. There are outdoor exhibitions for the visitors with level changing landscapes.

4.2.2 Form and Function

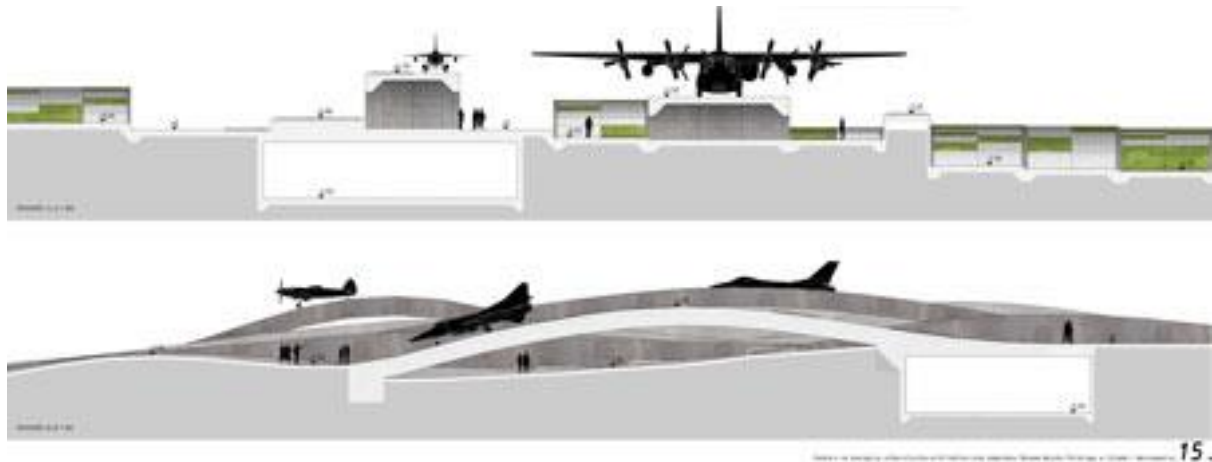
Institutions such as the Polish Army Museum fight for the leisure time of potential visitors with shopping centers and thus, it is important to prepare an interesting and entertaining offer, which would attract families.



(Source: wxca.pl)

Individual development zones, that is the entry zone, the embankments – exhibit of cannons, the central zone with temporal exhibits, the left bastion with food services, the waves –

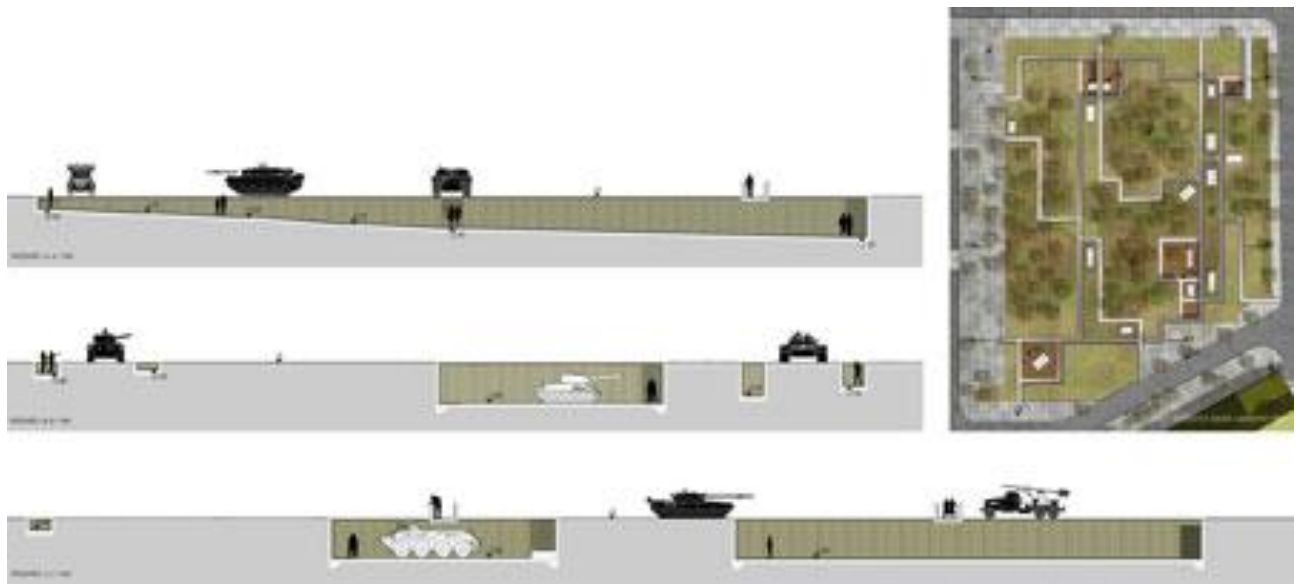
exhibit of airplanes, the right bastion with the exhibit for children, the trenches – exhibit of armored vehicles, an amphitheater, the water exposure at the Execution Gate were all arranged along the communication route.



(Source: wxca.pl)

The sightseeing tour is a sequence of changing landscapes, which consists of several layers: type of weapon, type of battlefield and emotions.

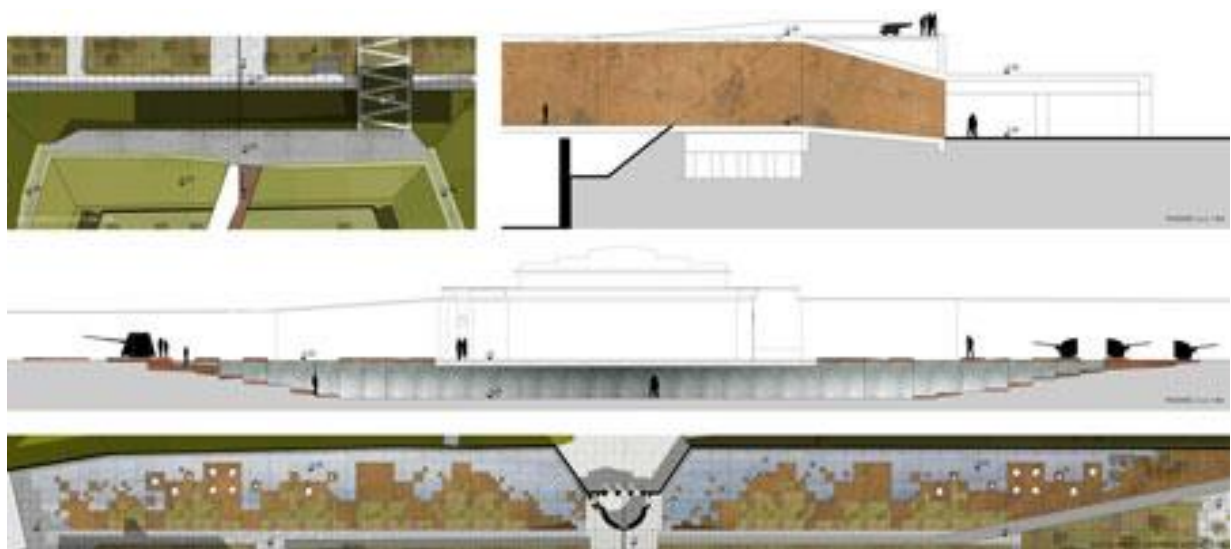
The architectural concept of the museum building itself was created on the basis of functional and spatial analysis of the area in which the object will be located.



(Source: wxca.pl)

Because of the simple form of the building and subtle details will become one with the Citadel tissue, as another missing element in this cluttered by history urban puzzle.

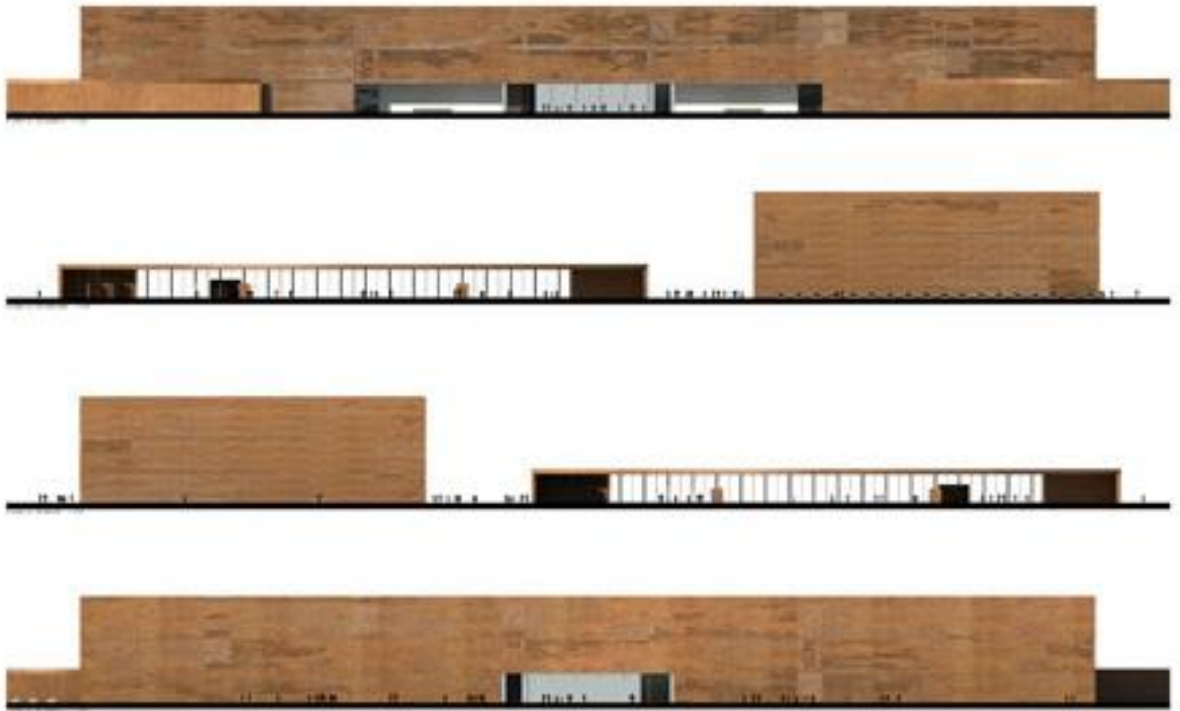
The building is designed of a cubic compact and modular construction.



(Source: wxca.pl)

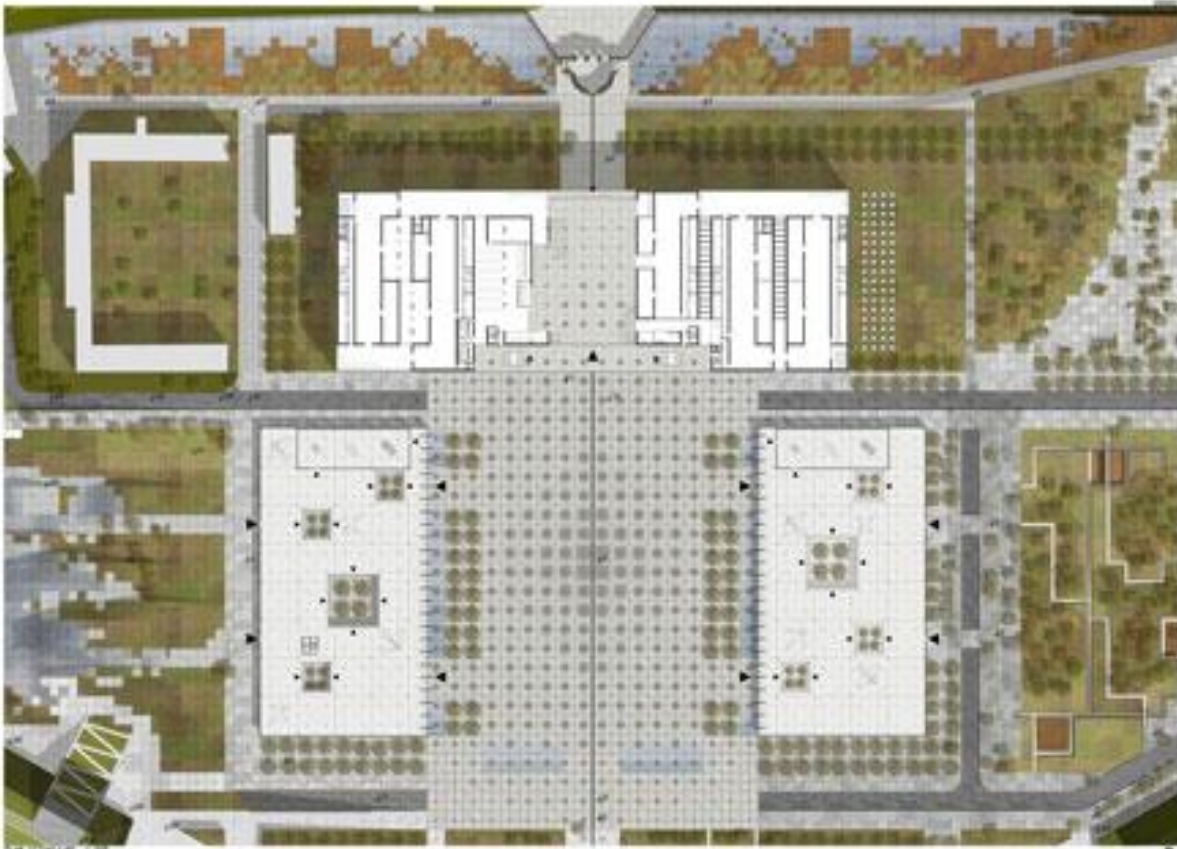
The facade of the building is a set of planes with varying degrees of shutter openings.

Three degrees of shutter openings complete the architectural composition and reflect the functional setting of interiors.

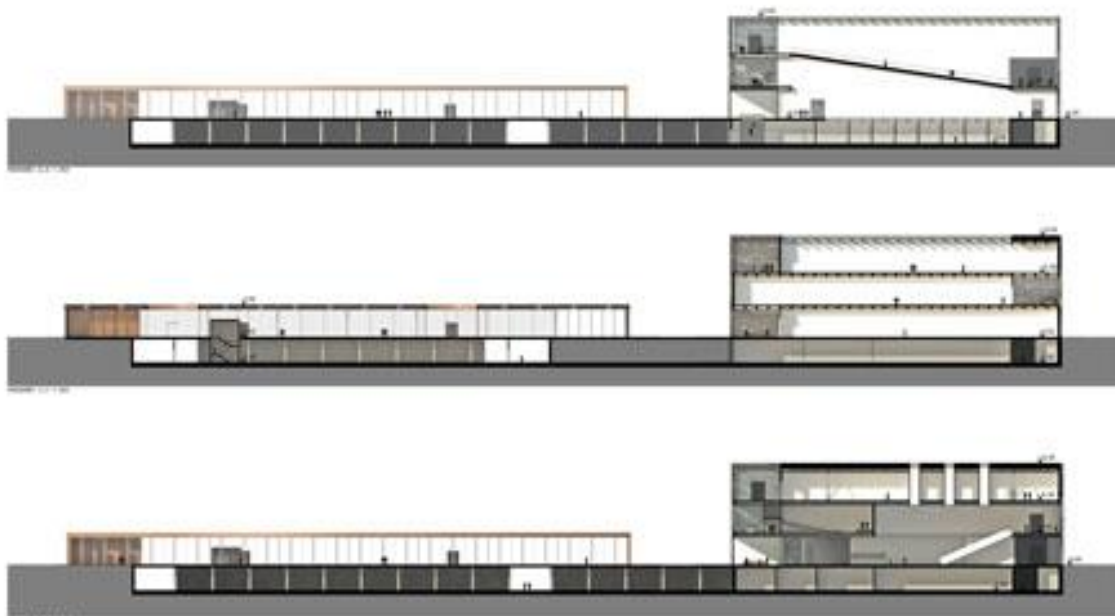


(Source: wxca.pl)

The main principles, working on the functions of the building were clearance, simplicity and



convenience. All rooms were designed in accordance with detailed competition guidelines.



(Source: wxca.pl)

The floorage of the museum building is of approximately 51 320 m². The design of the building is based on the exhibit module (the main function of the museum) of 60×25x5m dimensions.

Historyczne układy zabudowy:
 wieś pawilonów regimentu
 Gwardii Pieszej Koronnej oraz
 dwórki oficera wódt planu Gwardii

1796



000003

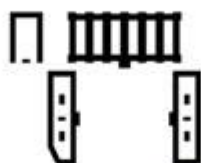
Pawilony III-VIII po
 połączeniu w trzy budynki

1822



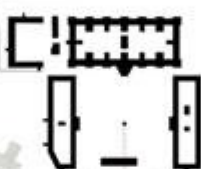
Świąt kościelnych
 powstały przez połączenie
 pawilonów III-IX oraz
 rozbudowę pawilonu I i II

1829

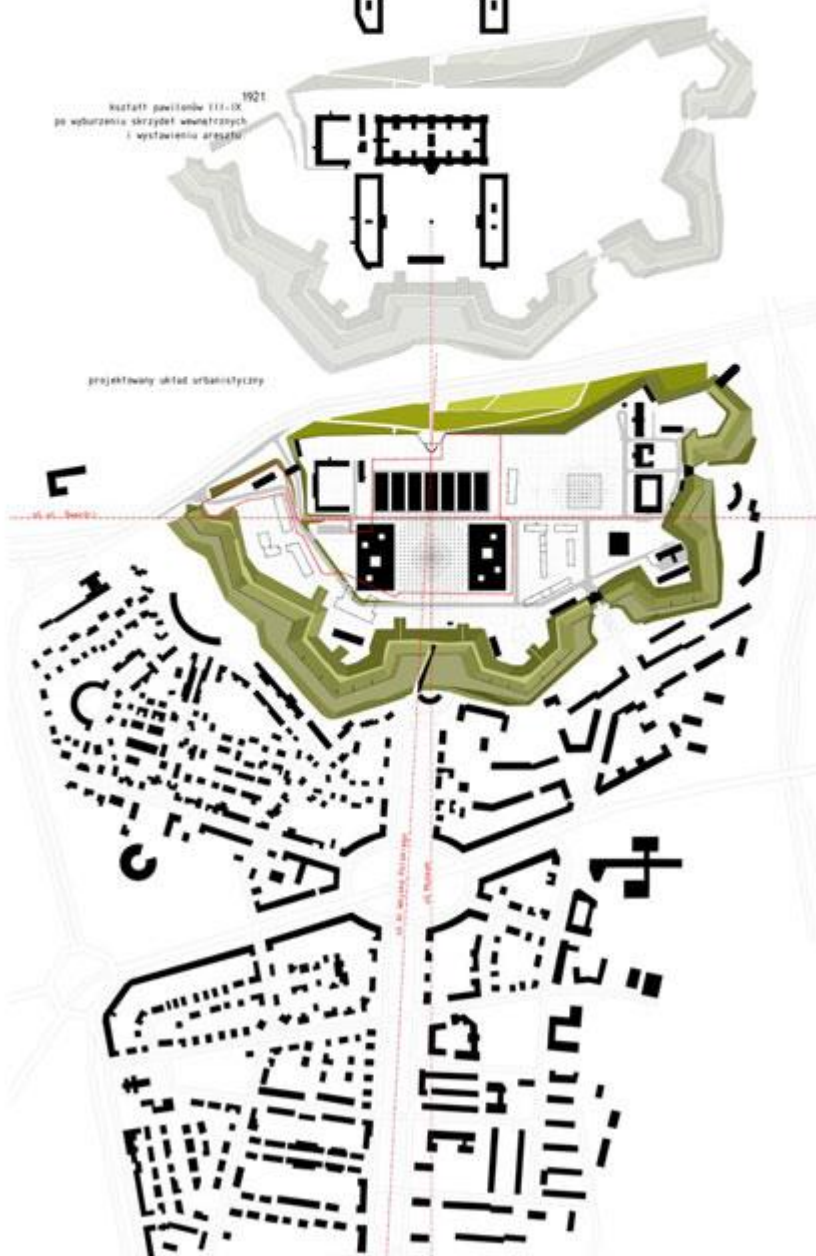


Kształt pawilonów III-IX
 po wyburzeniu skrzydeł wewnętrznych
 i wystawieniu ogrodów

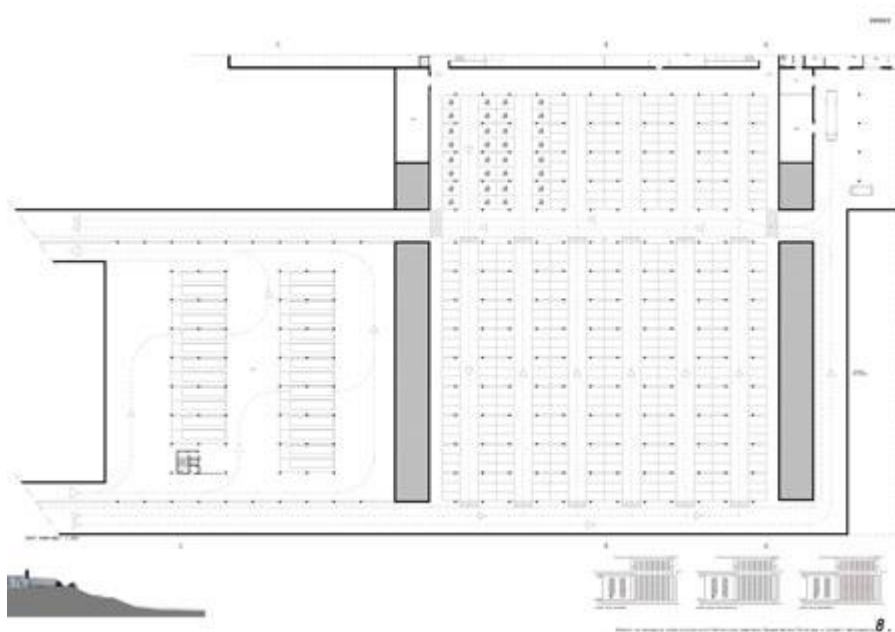
1921



projektowany układ urbanistyczny



The exhibit module of 1 500 m² consists of the main hall, additional annexes, technical corridor and ancillary rooms.



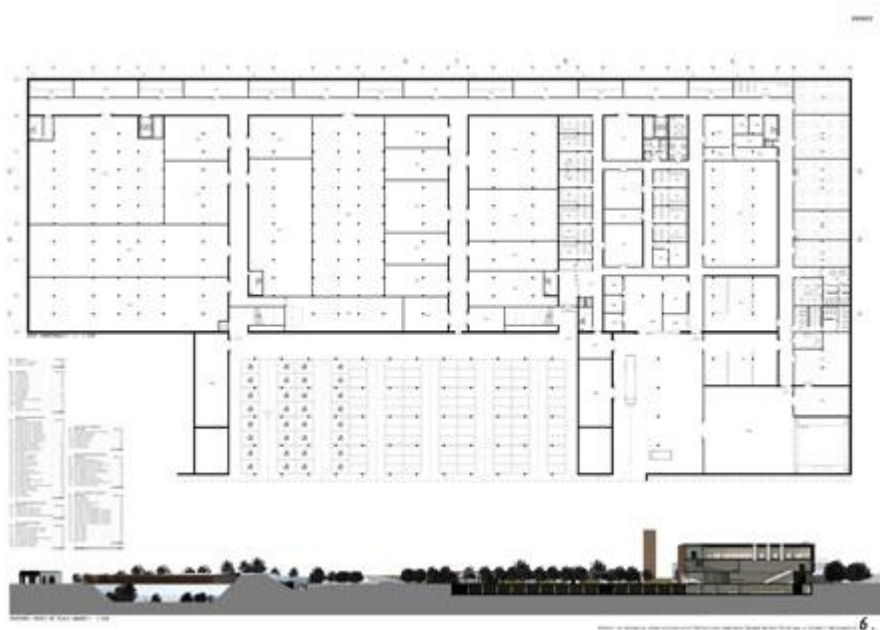
(Source: wxca.pl)

The sightseeing route leads in one direction, starting and ending in the main lobby.



(Source: wxca.pl)

Scientific and administrative functions were separated from the sightseeing route, but still remain in good communication with other functions of the museum.



(Source: wxca.pl)

The design of the Museum located in the Warsaw Citadel will properly present rich and glorious history of the Polish Army.



(Source: wxca.pl)

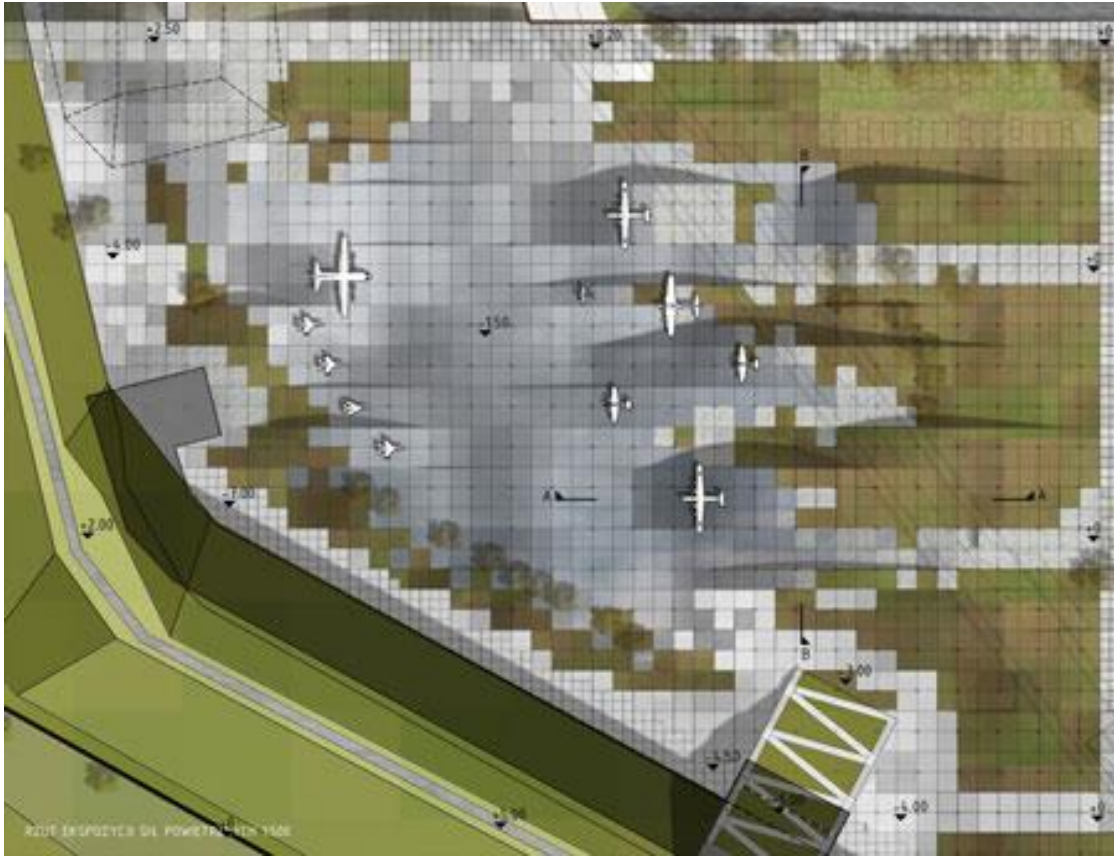
4.2.3 *Site Planning and Landscape detailing*

The movement in the landscape, perspective, texture of materials, weather conditions and the greenery makes the message more clear and emotional.



(Source: wxca.pl)

Seeing the army from many sides may also be observed in the project – introduced to the Citadel's terrain functions not directly related to the museum, such as restaurants, cafes and clubs located on both sides of the entry zone.



(Source: wxca.pl)

Military planes are to be exhibited outdoors on an undulating landscape with armoured vehicles displayed in open-air trenches.

4.2.4 *Design detailing*

The building facade is covered in shutters allowing varying degrees of light to penetrate the interior which represents many stories about war and sacrifice.

The project relates to the initial architectural and urban design of the Citadel. The museum building together with the cubic construction (open-air exposition under roof) is located in the area of the former barracks, which were destroyed during the World War II.



(Source: wxca.pl)

The architectural dominant is the reconstructed Guard square with its representative function. With the help of the uniform floor surface, the square area is integrated with the museum lobby. The adjacent park is also a part of this composition.

Because the building and its surroundings were treated as whole and not as separated places, the history of the Polish Army may be better presented. A museum exhibit operates with items taken from their natural context. It emphasizes on the intellectual message, operates with many details and text. An open-air exhibit gives possibility of bringing closer this missing context.

4.3 JEWISH MUSEUM BERLIN

The Jewish Museum Berlin, which opened to the public in 2001, exhibits the social, political



and cultural history of the Jews in Germany from the 4th century to the present. The museum explicitly presents and integrates, for the first time in postwar Germany, the repercussions of the Holocaust. The new extension is housed on the site of the original Prussian Court of Justice building which was completed in 1735 and renovated in the 1960s to become a museum for the city of Berlin.

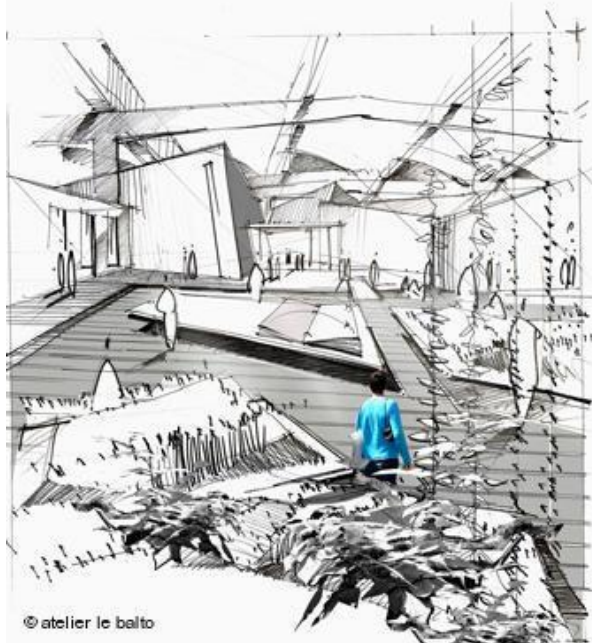
4.3.1 *User behavior and requirements*

The new design, which was created a year before the Berlin Wall came down was based on three conception that formed the museum's foundation: first, the impossibility of understanding the history of Berlin without understanding the enormous intellectual, economic and cultural contribution made by the Jewish citizens of Berlin, second, the

necessity to integrate physically and spiritually the meaning of the Holocaust into the consciousness and memory of the city of Berlin. Third, that only through the acknowledgement and incorporation of this erasure and void of Jewish life in Berlin, can the history of Berlin and Europe have a human future.

4.3.2 Form and Function

The entrance is through the Baroque Kollegienhaus and then into a dramatic entry Void by a stair, which descends under the existing building foundations, crisscrosses underground, and materializes itself as an independent building on the outside. The existing building is tied to the extension underground, preserving the contradictory autonomy of both the old building and the new building on the surface, while binding the two together in the depth of time and space. The descent leads to three underground axial routes, each of which tells a different story. The first, and longest, traces a path leading to the Stair of Continuity, then up to and through the exhibition spaces of the museum, emphasizing the continuum of history. The second leads out of the building and into the Garden of Exile and Emigration, remembering those who were forced to leave Berlin. The third leads to a dead end — the Holocaust Void. The Holocaust Void cuts through the zigzagging plan of the new building and creates a space that embodies absence. It is a straight line whose impenetrability becomes the central focus around which exhibitions are organized. In order to move from one side of the museum to the other, visitors must cross one of the 60 bridges that open onto this void.



(Source: archdaily.com)

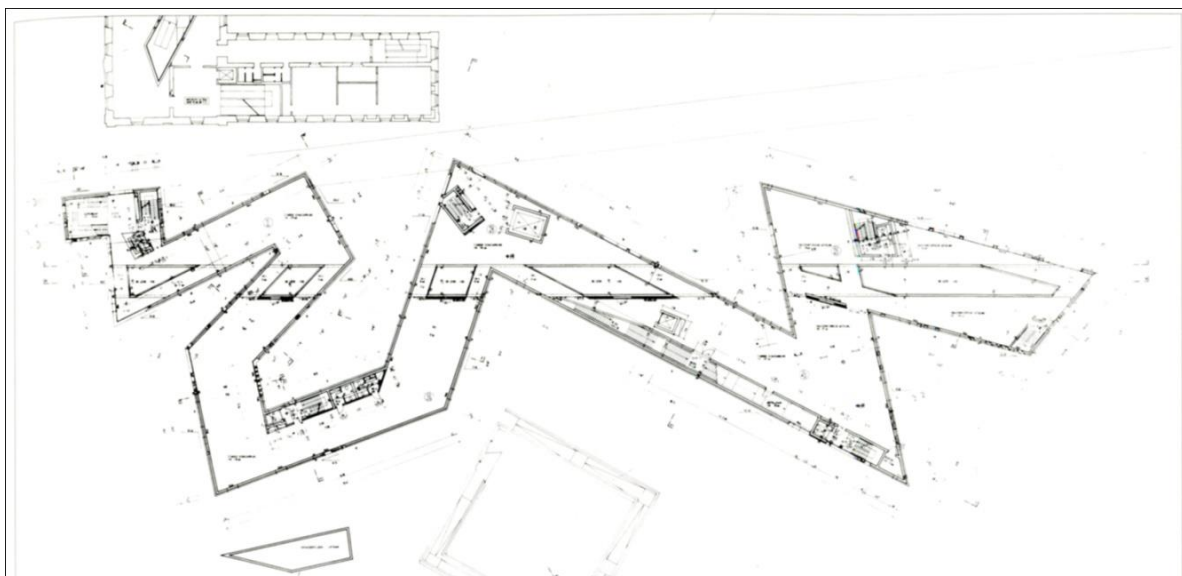
In 2004, the Jewish Museum Berlin commissioned SDL to design a multifunctional space that would provide additional room for the museum's restaurant and extend the lobby to provide event space for lectures, concerts, and dinners. The glass courtyard which was completed in 2007 creates an adaptable space which can be used throughout the year while preserving the open courtyard qualities of the baroque building.

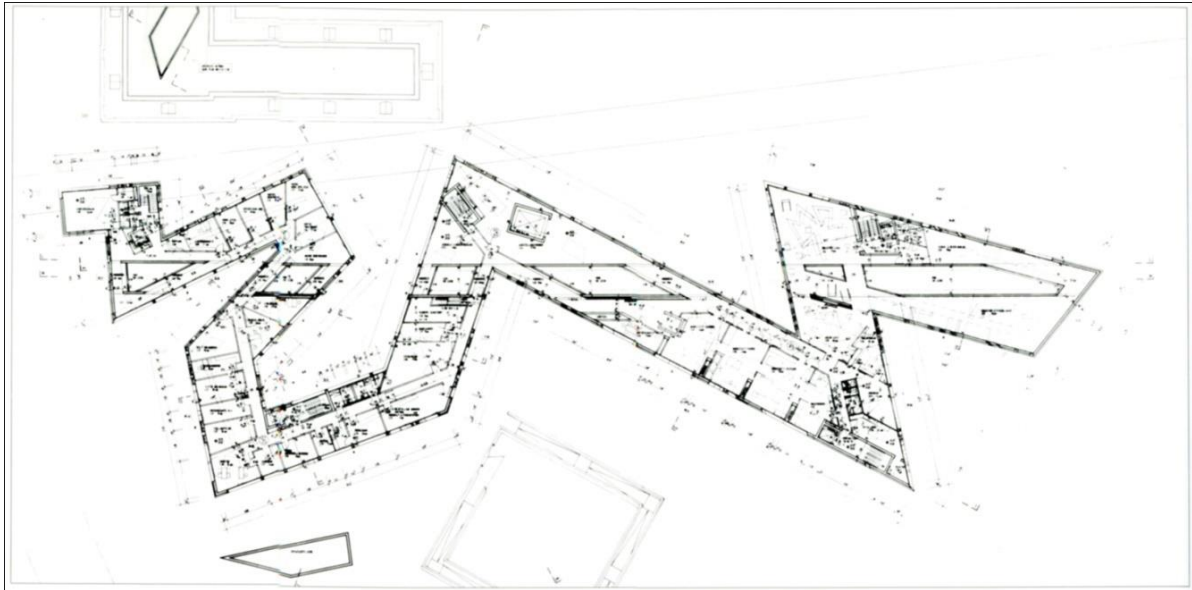
An architectural masterpiece, Daniel Libeskind's spectacular structure has firmly established itself as one of Berlin's most recognizable landmarks. The zinc-paneled building is truly innovative in the connection it creates between the museum's themes and its architecture. Libeskind has dubbed his design *Between the Lines*, a title which reflects the tensions of German-Jewish history. Inscribed within the design of the building, this past takes shape along two lines charting various cultural connections and modes of thought: one is straight, but broken into many fragments; the other is winding and open-ended. The intersection of these lines is marked by voids, empty spaces that cut through the entire museum. Rich in symbolism, the museum's architecture makes German-Jewish history palpable, raises numerous questions, and provokes reflection.

The museum's permanent exhibition provides depictions of 14 historical periods from the Middle Ages to the present paint a vivid portrait of German-Jewish life. Artistic and everyday objects, photos and letters, interactive displays and media stations together convey the history of Jewish culture in Germany and show how tightly Jewish life and German history are interwoven.

Temporary exhibitions on cultural history, contemporary art installations, and special displays – these are a few of the ways in which the museum's special exhibitions draw on a broad range of themes to complement the permanent historical exhibition.

In the basement, visitors first encounter three intersecting, slanting corridors named the “Axes.” Here a similarity to Libeskind's first building – the Felix Nussbaum Haus – is apparent, which is also divided into three areas with different meanings. In Berlin, the three axes symbolize three paths of Jewish life in Germany – continuity in German history, emigration from Germany, and the Holocaust.





(Source: archdaily.com)

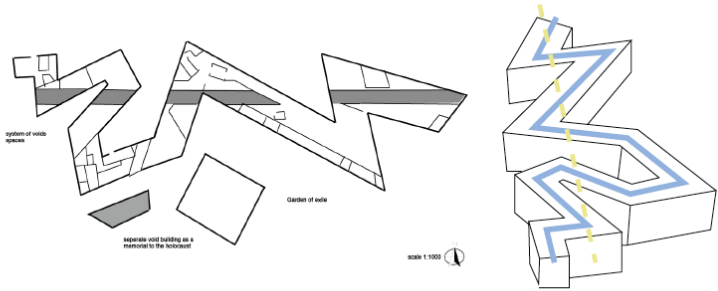
The first axis ends at a long staircase that leads to the permanent exhibition. The second axis connects the Museum proper to the E.T.A. Hoffmann Garden, or The Garden of Exile, whose foundation is tilted. The Garden's oleaster grows out of reach, atop 49 tall pillars. The third axis leads from the Museum to the Holocaust Tower, a 79 foot (24 m) tall empty silo. The bare concrete Tower is neither heated nor cooled, and its only light comes from a small slit in its roof.

The Jewish Museum Berlin was Daniel Libeskind's first major international success.

In recent years, Libeskind has designed two structural extensions: a covering made of glass and steel for the "Kollegienhaus" courtyard (2007), and the Academy of the Jewish Museum in the former flower market hall on the opposite side of the street (2012).

FORM

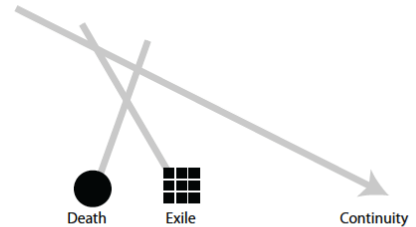
The form of the museum are based on a broken straight and a continuous tortuous line. Libeskind called his project "Between the Lines" since the void and the notion of absence of Jew in Germany represented by empty spaces which are created not by the lines but by those spaces between the lines. The walls are important for they are the borders of those voids and this is the void "Between the Lines". The interesting thing is that no one who enters the building will experience it as a zigzag or a jagged bolt of lightning. There are only its down resemblances as seen from above and will have virtually nothing to do with the volumes of space located inside"



The Jewish Museum has a fearless form which represents a naked reality of its location history. The sharp angles, void lines and a wounded body of zigzag form mirror the violent dark history of Jews.

ENTRANCE

The access of the new building is very deep, around 10 meters under the foundation of Baroque building. There are three accesses inside namely CONTINUITY, EXILE, and DEATH. Only one of the three paths leads to the museum gallery which is the longest one, the continuity. The continuity is a metaphor of the continuity of Jewish presence in Germany. The exile corridor leads to a garden which is somehow thrown of balance and the death road leads to the Holocaust tower which has no entrance



TECHNIQUES

The nature of the museum is all about telling the historical story of Berlin and structure is a part of this narration. Naked concrete walls with sharp angles are not constructed as regular structural components, they go far beyond the physical realm; they are all intended to generate a meaningful conversation between the body and the visitors. The informal geometry stirs emotions, conveys anger, fear, exile, and death. It is impossible to perceive the whole structure as it is visible and this complexity is exactly the structure of a part of Berlin history which is based on invisible presence of Jews.

The electric age we are living in has the ecstasy of communication and conveying message. There is no more boundary between private and public as there are only screens and networks, virtual tours, virtual museum and virtual communication are new experiences. This new world allows everyone to have an unlimited access to everything to convey a message only by a click. But this question is how effective is that? How much it is resistant and what the role of a real experience in such a world is? So Libeskind use no technological tool to move visitors.

Squeezing between tall narrow walls, walking on the iron faces, wading in the exile garden and terrifying in a uncanny dark space are all real experience and this real experience make the museum immortal in visitors' minds.

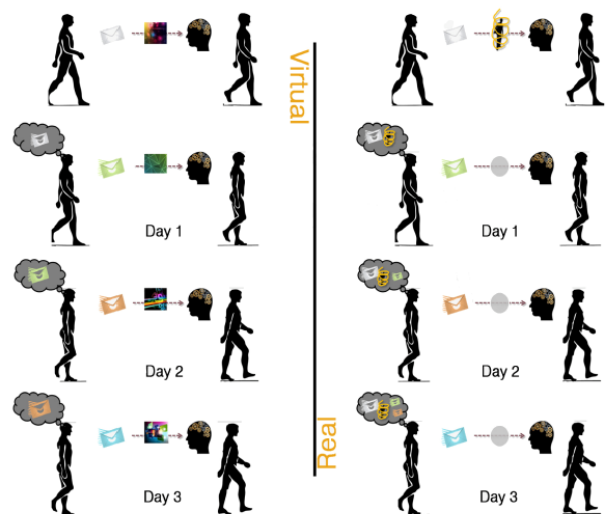
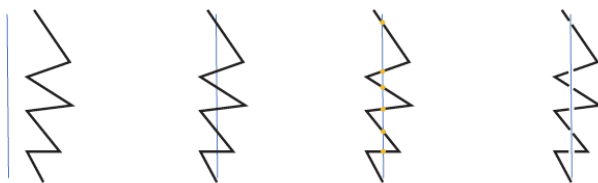


REAL EXPERIENCES

The diagram shows the resistance of memory of a space in people's mind when there is a real experience and when there is a virtual experience. A virtual experience can vanish or replace as another interesting invention arrives, while a real experience will always be in our minds.

VOID SPACE

The first thing we should consider about the museum is the essential role of the voids. The voids are structural ribs of the museum which organize elements. They make discontinuous empty space illustrates the absent present of the Jews. These are the broken backbone of a society which presents cultural history of Berlin. The voids and the emptiness emphasize the disturbing nature of the space. They create a space exist between two lines. One reflects the history of Jews and the other reflects the history of Berlin. The diagram shows how two lines intersect each other creating the absence



In his research for the project, Libeskind read the Gedenkbuch, or Memorial Book, which lists all the Jews murdered in the Holocaust. The report which he filed in the original design competition borrowed the form of the Gedenkbuch.

Libeskind, a musician himself, took inspiration from music and considered the museum the final act of Arnold Schoenberg's unfinished opera, Moses und Aron. Walter Benjamin's One Way Street's 60 sections determined the number of sections that comprise the museum's zigzag section.



(Source: archdaily.com)

Oleaster in the Garden of Exile with the Museum's main building in the background.

4.3.3 *Site Planning and Landscape detailing*

The Jewish Museum Berlin is located in what was West Berlin before the fall of the Wall. Essentially, it consists of two buildings – a baroque old building, the “Kollegienhaus” (that formerly housed the Berlin Museum) and a new, deconstructivist-style building by Daniel Libeskind. The two buildings have no visible connection above ground.

The Libeskind building, consisting of about 161,000 square feet (15,000 square meters), is a twisted zig-zag and is accessible only via an underground passage from the old building. For Libeskind “The new design, which was created a year before the Berlin Wall came down was based on three conception that formed the museum’s foundation: first, the impossibility of understanding the history of Berlin without understanding the enormous intellectual, economic and cultural contribution made by the Jewish citizens of Berlin, second, the necessity to integrate physically and spiritually the meaning of the Holocaust into the consciousness and memory of the city of Berlin. Third, that only through the acknowledgement and incorporation of this erasure and void of Jewish life in Berlin, can the history of Berlin and Europe have a human future.” A line of “Voids,” empty spaces about 66 feet (20 m) tall, slices linearly through the entire building. Such voids represent “That which can never be exhibited when it comes to Jewish Berlin history: Humanity reduced to ashes.”

Chapter 5: Program Appraisal

The proposed air force museum serves both international and the general civilizations. The space requirements are based on the space provided at the existing B A F office and the aviation museum requirements.

5.1 Programs and Area Calculation

Entrance

Space	Area (sft)
Main lobby and ticket counter	1000
Souvenir shop	500
Toilet	500
Total	2000

Administrative Office

Space	no. of user	Area (sft)
Director's room	1	400
Secretary	1	100
Assistant director's room	1	300
General office	10	850
Conference room	20	900
Tea room		100

Security and supervision	15	800
Account section	8	800
Toilet		250
Total		4500

Gallery

Space	Area (sft)
Aviation history	4000
Hanger 1 (Liberation war collection)	58000
Hanger 2	58000
Temporary gallery	4000
Total	124000

Museum maintenance

Space	Area (sft)
Restoration workshop	500
Electrical workshop	400
Machine shop	800
Welding shop	500
Painting shop	500
Overhauling workshop	800
Store	1500
Toilet	250

Total	5250
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Library

Space	No. of user	Area (sft)
Lobby and information		400
Reading space		3000
Archive		700
Librarian	1	150
Book collection		2000
General office	6	550
Toilet		500
Total		7300

Café

Space	Area (sft)
Dining	2500
Kitchen	800
Storage	200
Toilet	500
Total	4000

Space	No. of user	Area (sft)
Auditorium	250	10000
Multipurpose hall	200	8000
Total		18000

Grand total = 165050 sft

Chapter 6: Design Considerations

6.1 Creating a land mark

The museum will be the largest aviation museum in Dhaka and the given site is surrounded by many active urban spaces. So, the first design consideration should be making the museum as a land mark for the city.

6.2 Height restriction

The site is beside and old airport where the airstrips are still active by the BAF. So, the height restriction is another issue which must be considered.

6.3 Zoning

The galleries, library, café, Auditorium and other public spaces are open for all. The spaces for Museum maintenance and other services are restricted for the public.

6.3 Site entry

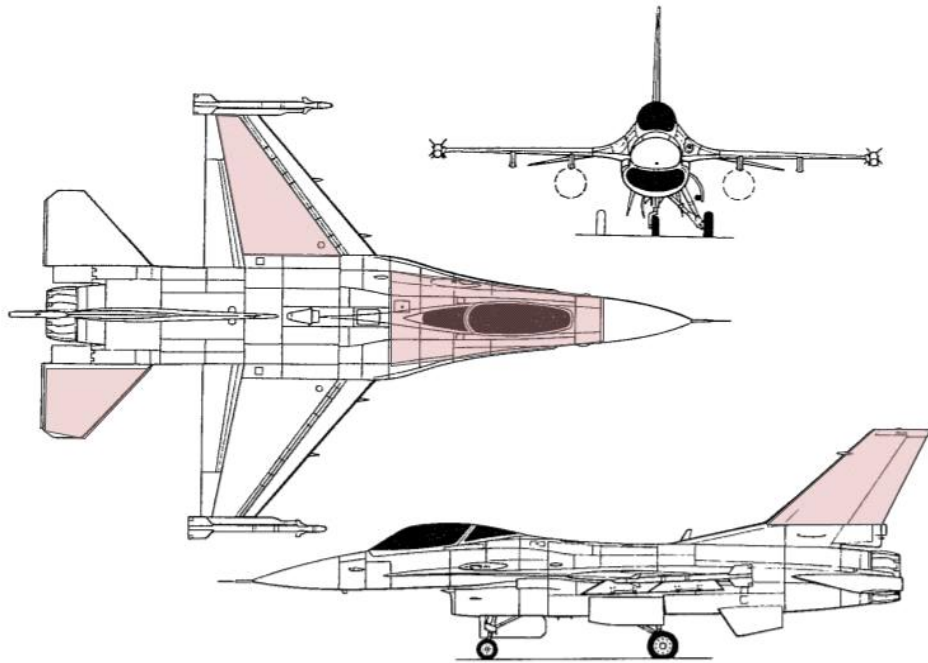
The site entry should be from the bijay sharani road which is the south west side of the site because it is the only side of the site which has road access.

Chapter 7: Design Suggestions

The project aims to conserve the national history affiliated with Bangladesh Air force (BAF). This would enable the present and future generations to acquire knowledge about the historical events. The establishment of a proper museum of BAF would enable the preservation of aircrafts and equipment of BAF involved during the liberation war. Thus, the project would play a vital role in preserving and exhibiting the historical records and artifacts of BAF for the general population, aviation researchers and enthusiasts. Furthermore, the project would contribute as a major public recreational space which resonates with the context, for the need for such a public facility in Dhaka is extremely vital.

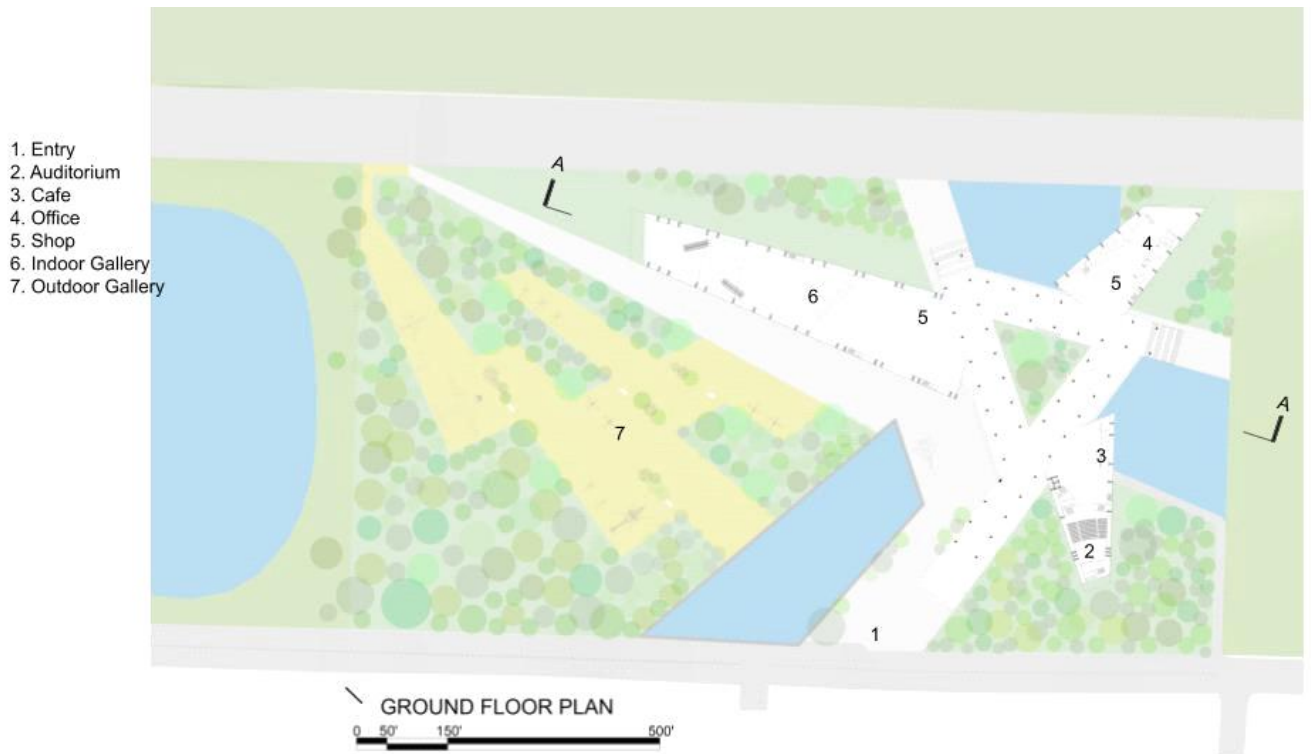
7.1 Concept

The Museum would be a major public space for the public, thus, the primary intention applied in the organization of the project was to create spaces for exhibitions both indoors and outdoors. The forms have been derived through analyzing the shapes and structures of various aircrafts, thus creating a landmark that reflects aircrafts. Furthermore, a large portion of the site have been dedicated for vegetation which would create a green belt and a magnificent microclimate for the public and other animal species.

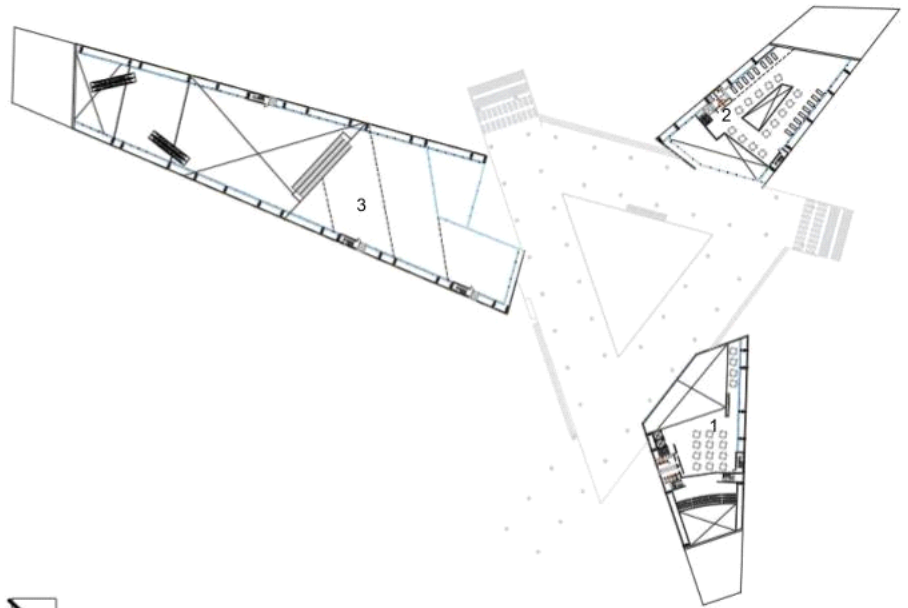


7.2 Design Approach

All major programs were divided into three masses and connected to a central triangular lobby. The lobby is connected to the entry of the site and the building.



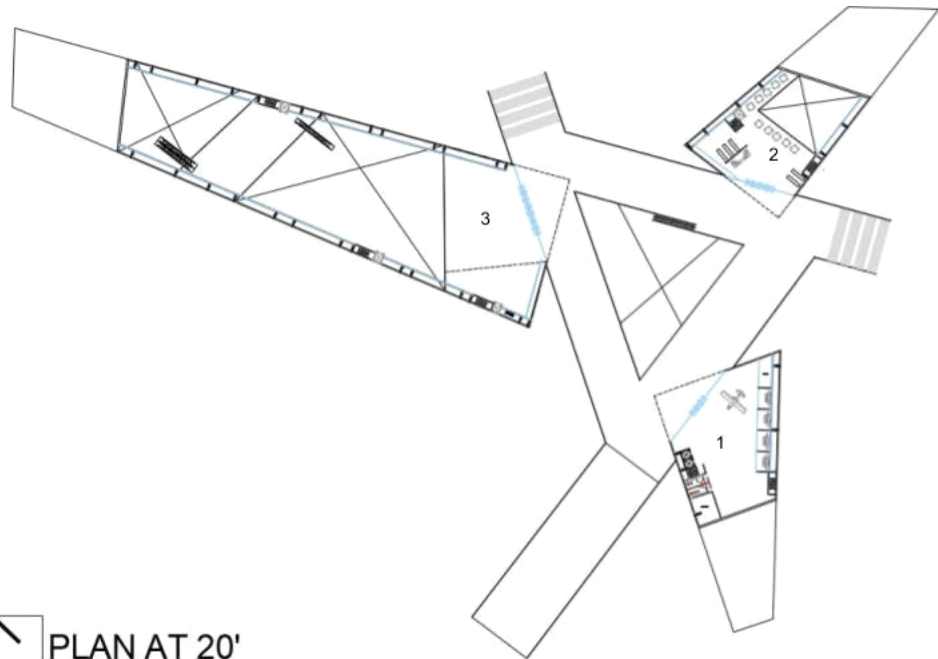
- 1. Cafe
- 2. Library
- 3. Indoor Gallery



PLAN AT 10'

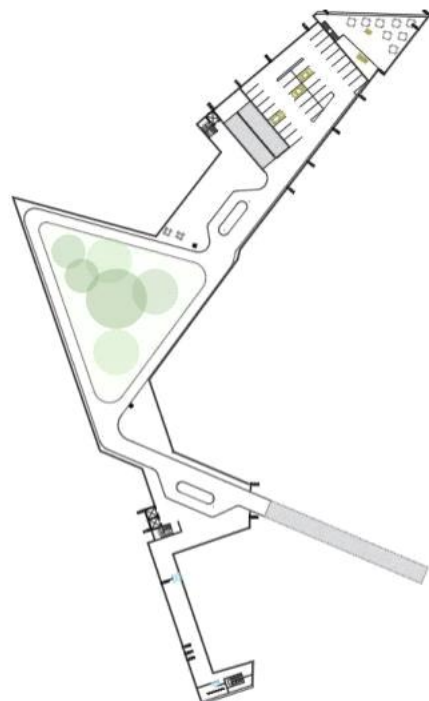
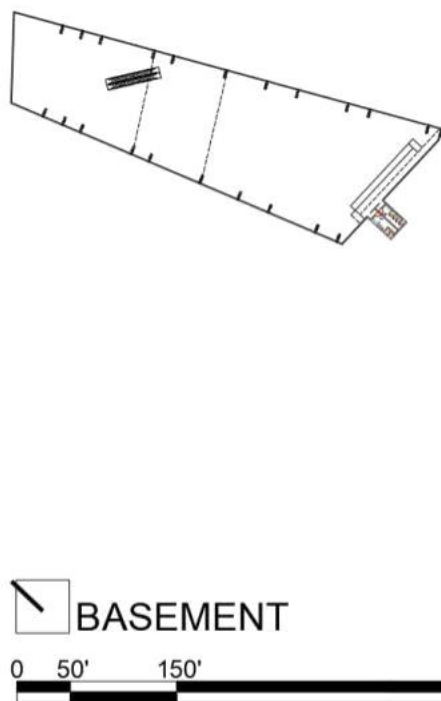
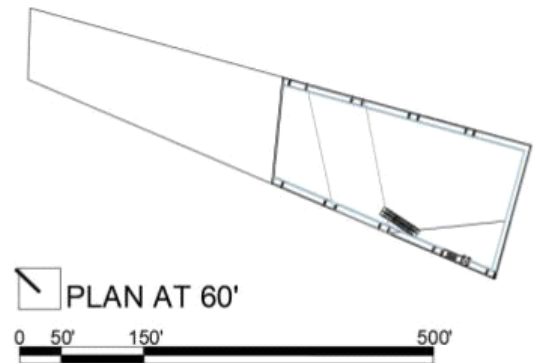
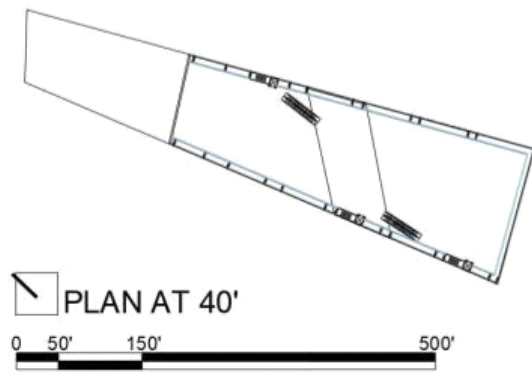
0 50' 150' 500'

- 1. Simulation Rooms
- 2. Library
- 3. Indoor Gallery



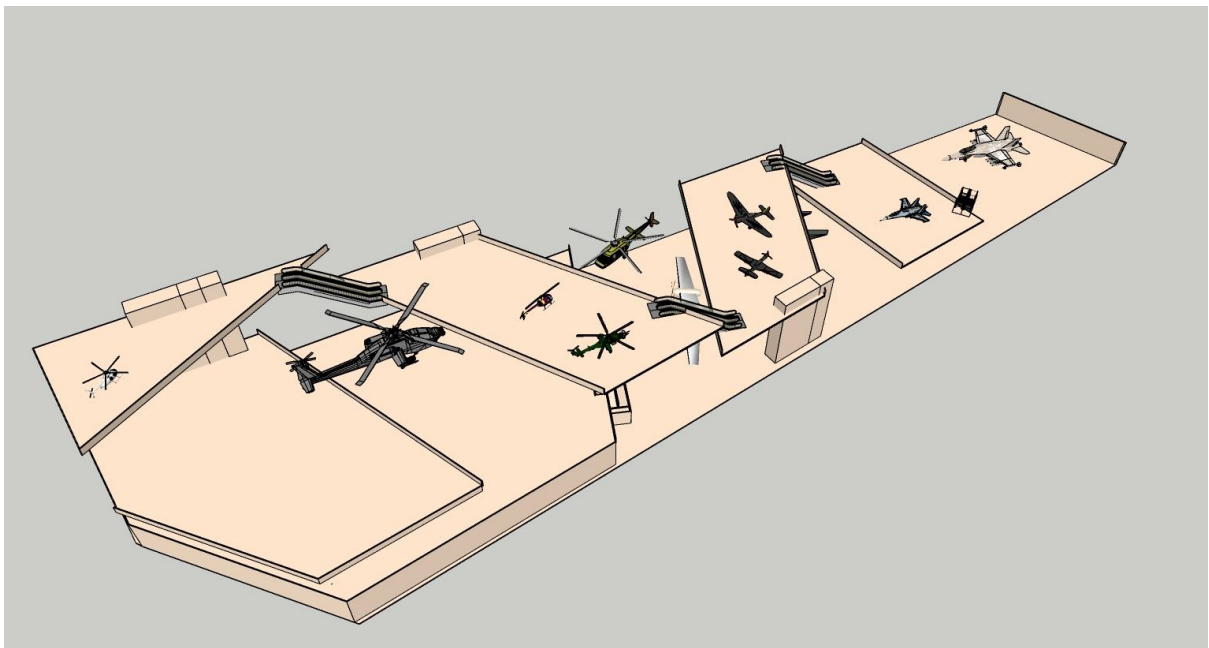
PLAN AT 20'

0 50' 150' 500'

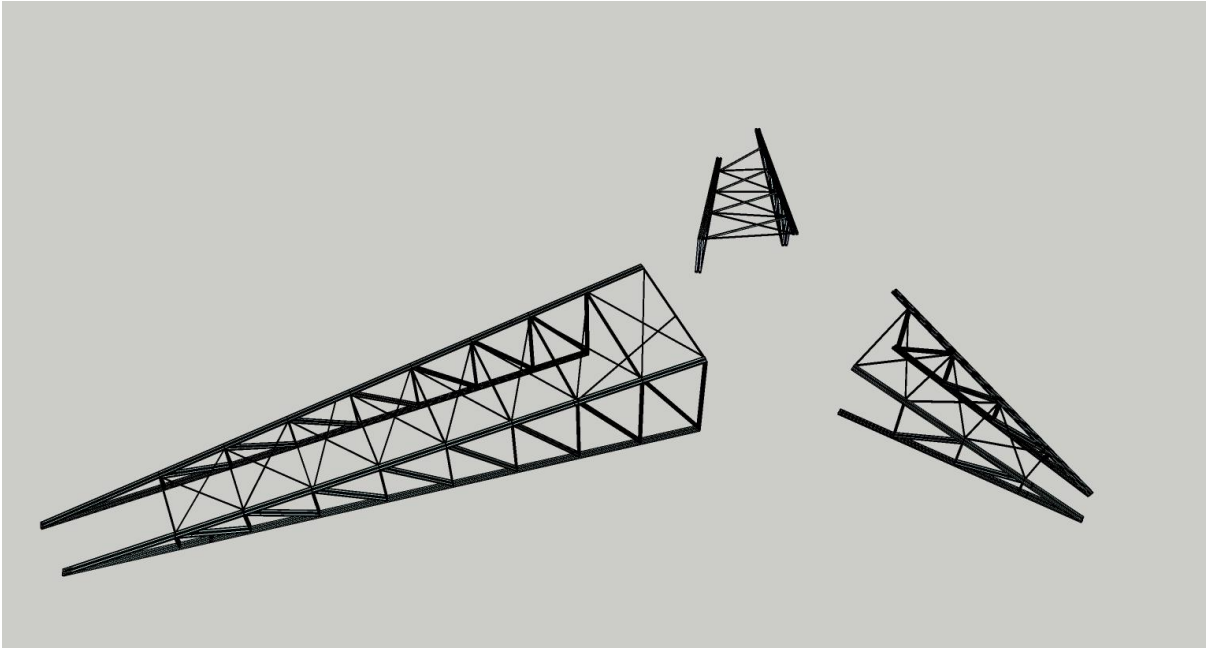




Indoor Gallery:

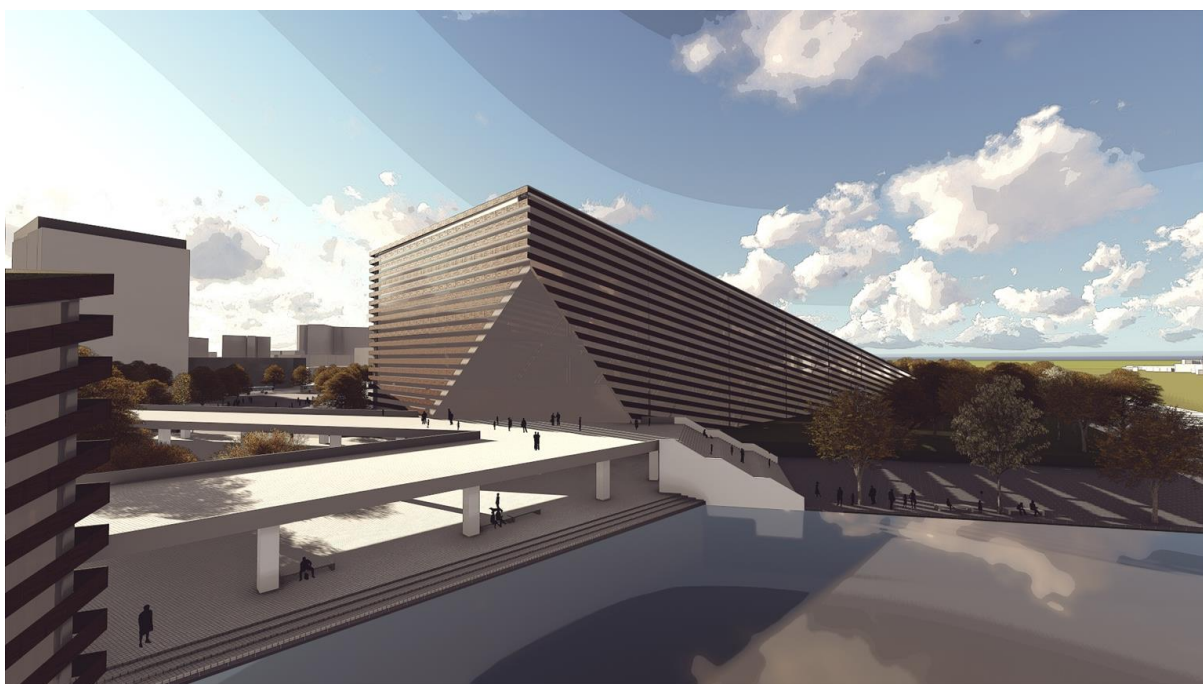
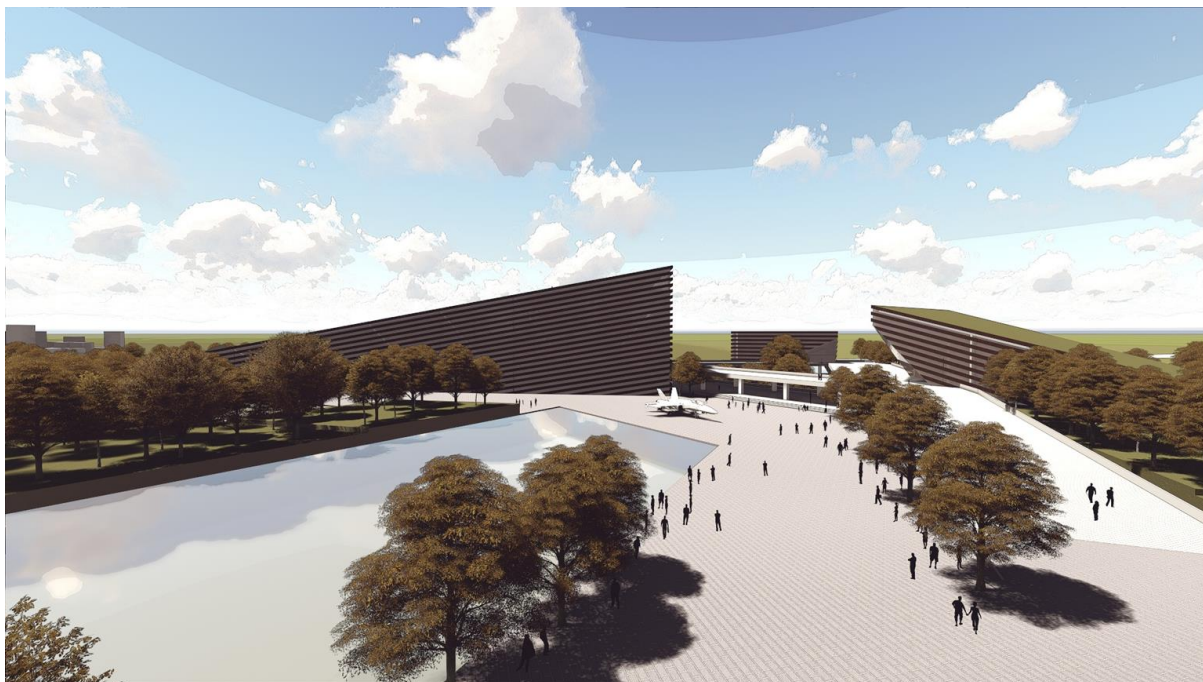


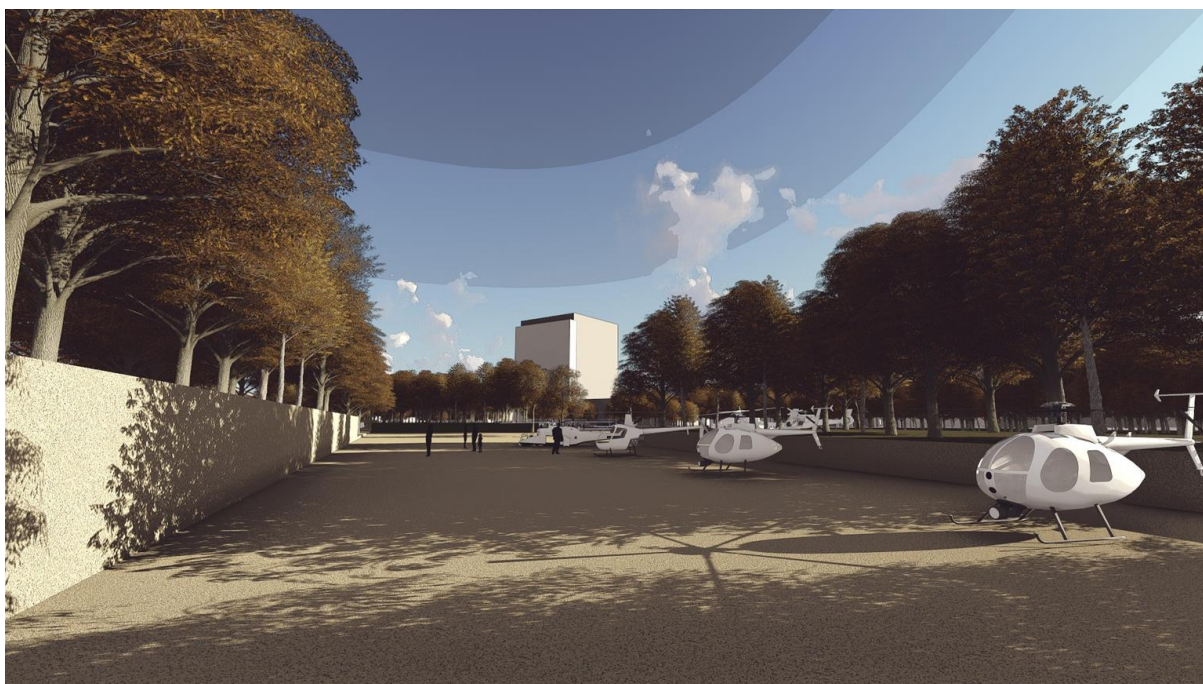
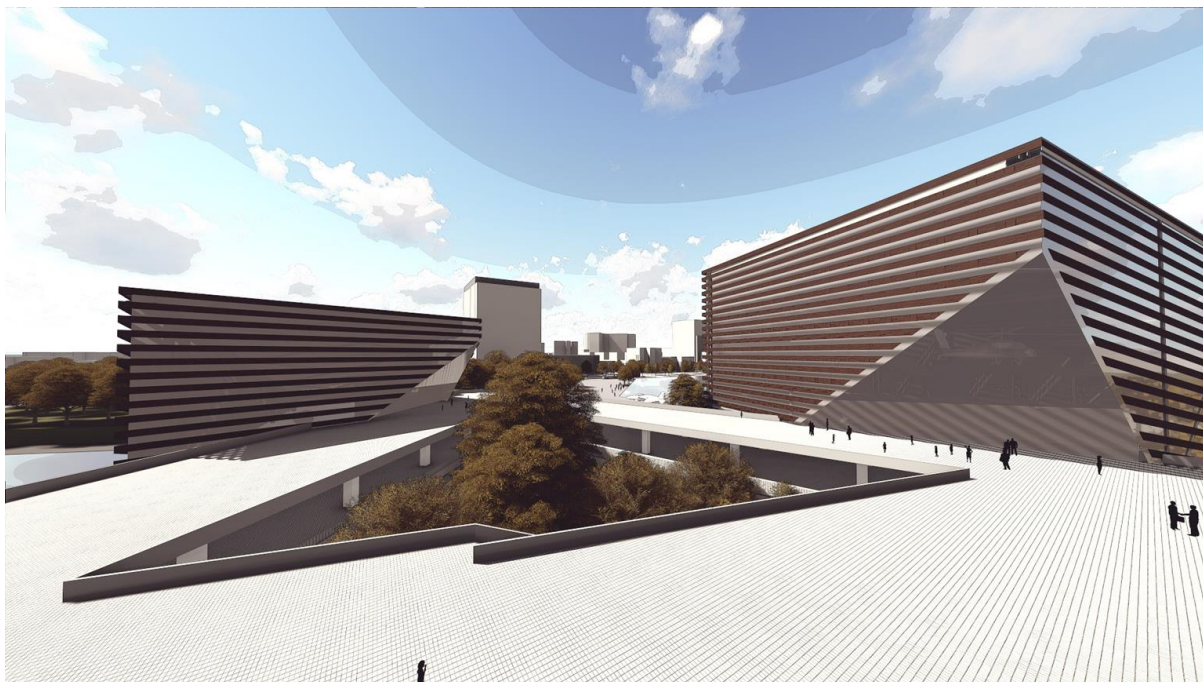
Structure:

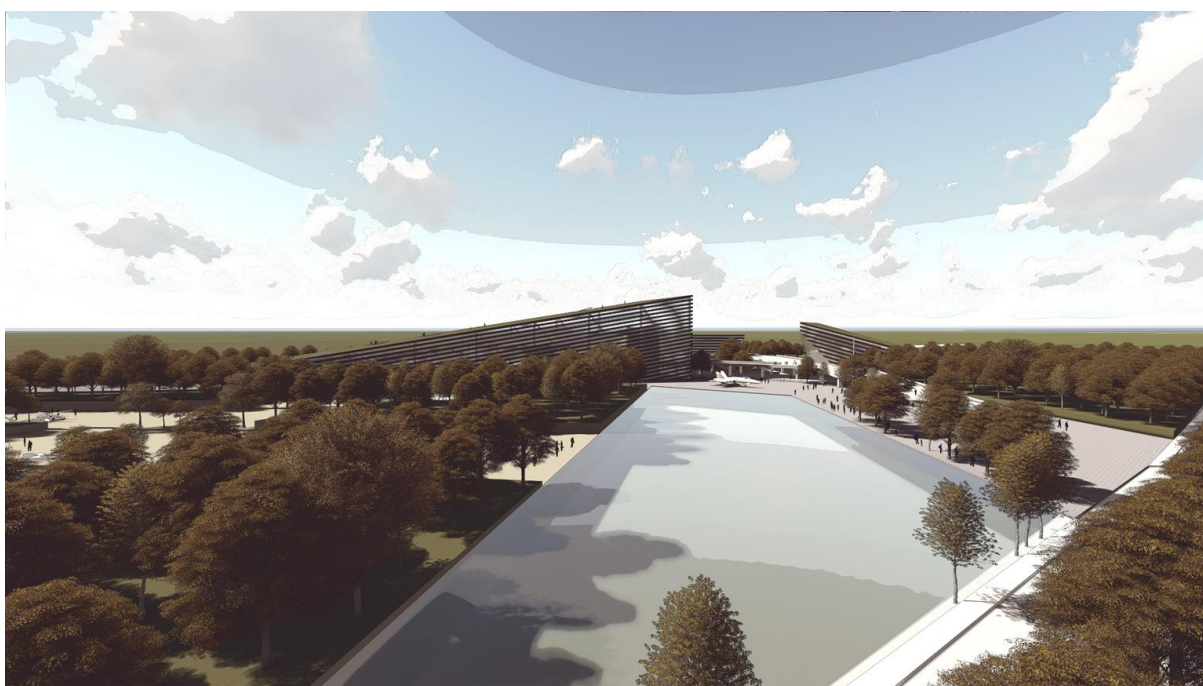
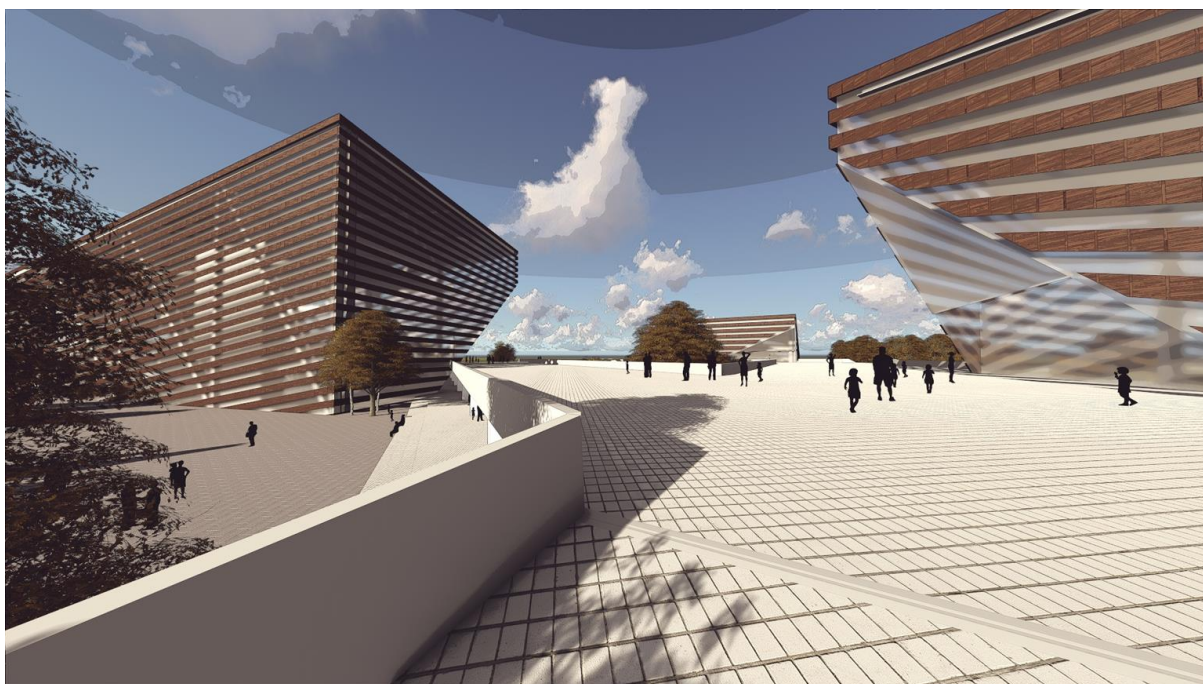


3D views:









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