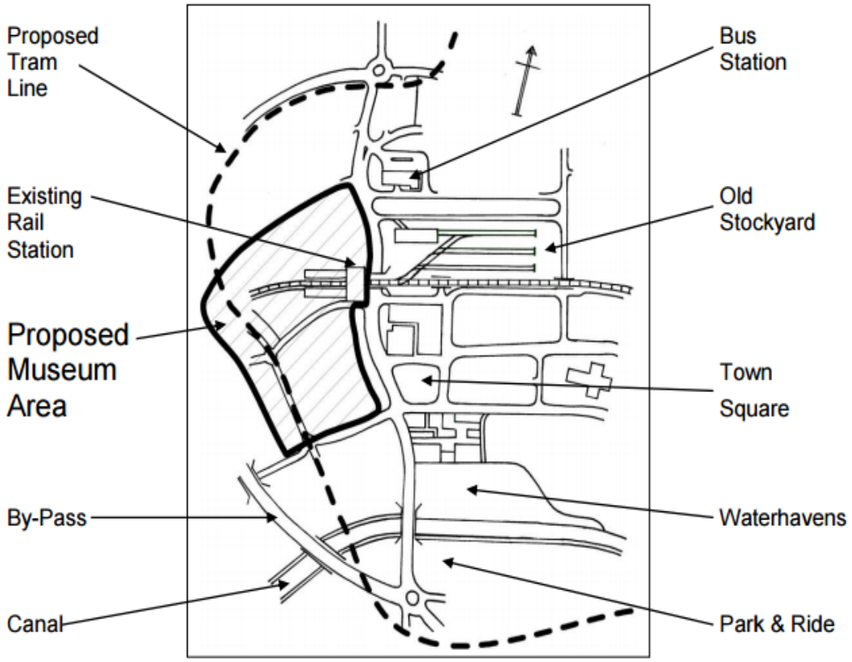
Museum Project

Brief/ Initial spec

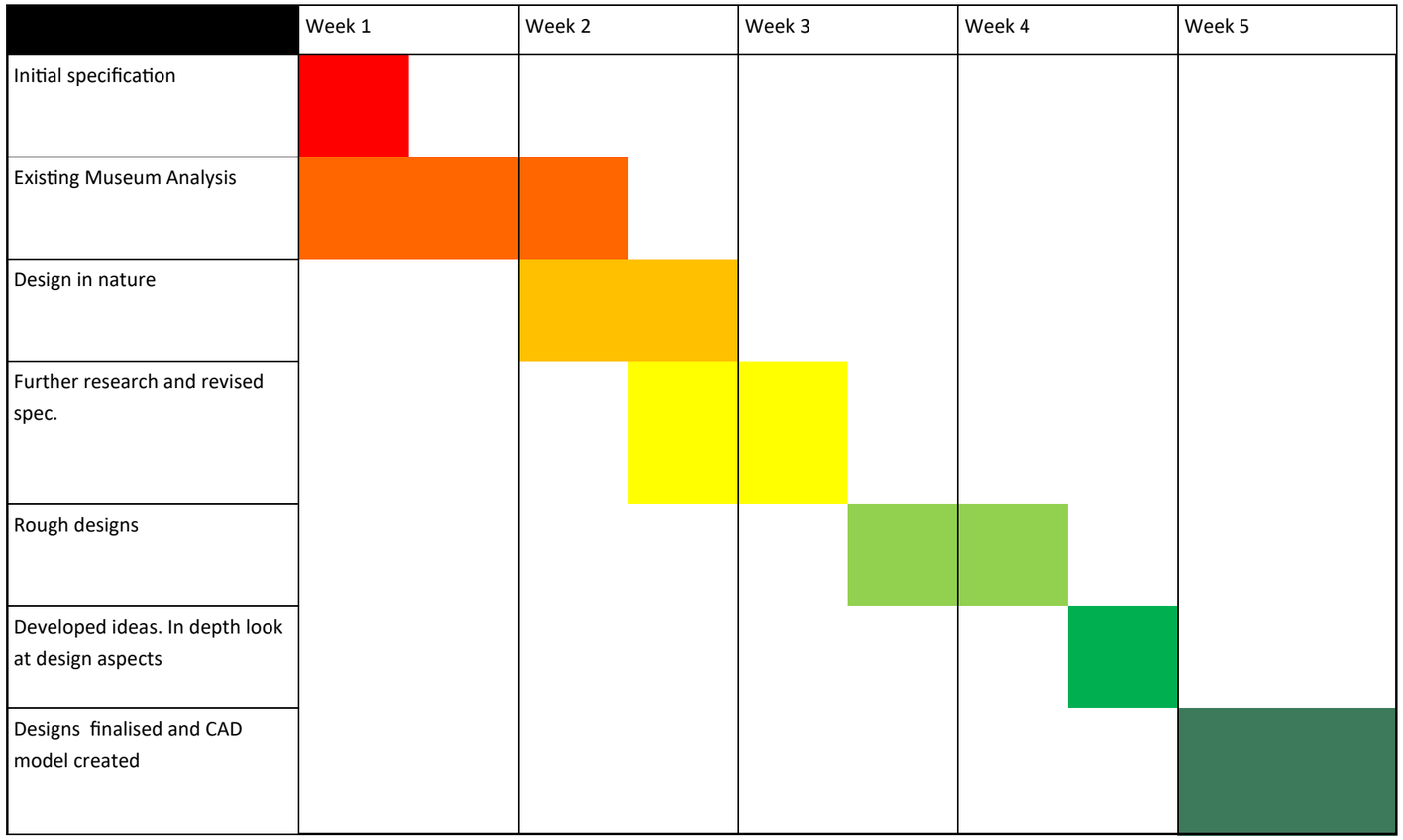
Harchester has just won the bid to restructure and reorganise the counties arts and cultural facilities. This means they will rebuild Harchester's town museum and centralise the counties collections and resources, making the museum not only a new county centre, but also a centre of national importance.

The location for the centre is the land behind the market square shops as well as the railway station

1. Budget of £178.5 Million No going over.
2. Design has to reflect what Harchester is all about
3. Architectural design of the building needs to flow with the surroundings.
4. Museum Design has to cater to the proposed tram line running through.
5. The design will leave enough room for the trams construction.



Gantt Chart



Week 1: - Initial specification must be decided to inform my research properly

- Existing Museum Analysis.

Week 2: - Continue Research on Museums and look at structural design in nature

Week 3: - Finish off all outstanding research including important people in architecture and design in nature. Create a revised specification

- The preliminary stages of designing can begin, of the museum

Week 4:- Finish off rough designs then take a few forward and develop them. Flesh out the idea more.

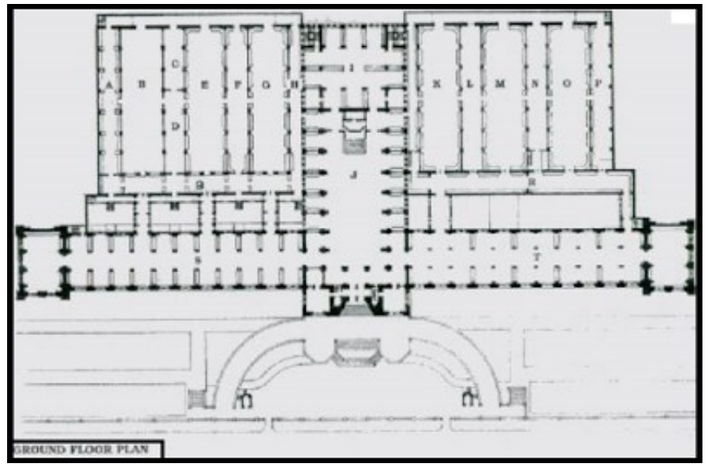
Week 5: - Take forward the most favourable design and finalise the details. A final model will need to be made sketchUp.

NATURAL HISTORY MUSEUM

The Natural History Museum in London is a museum exhibiting a vast range of specimens from various segments of natural history. The museum is home to life and earth science specimens comprising some 80 million items within five main collections: botany, entomology, mineralogy, palaeontology and zoology. The museum is a world-renowned centre of research specialising in taxonomy, identification and conservation. Given the age of the institution, many of the collections have great historical as well as scientific value, such as specimens collected by Charles Darwin.

Planning & Architecture

Land in South Kensington was purchased, and in 1864 a competition was held to design the new museum. The winning entry was submitted by the civil engineer Captain Francis Fowke, who died shortly afterwards. The scheme was taken over by Alfred Waterhouse who substantially revised the agreed plans, and designed the façades in his own idiosyncratic Romanesque style which was inspired by his frequent visits to the Continent.

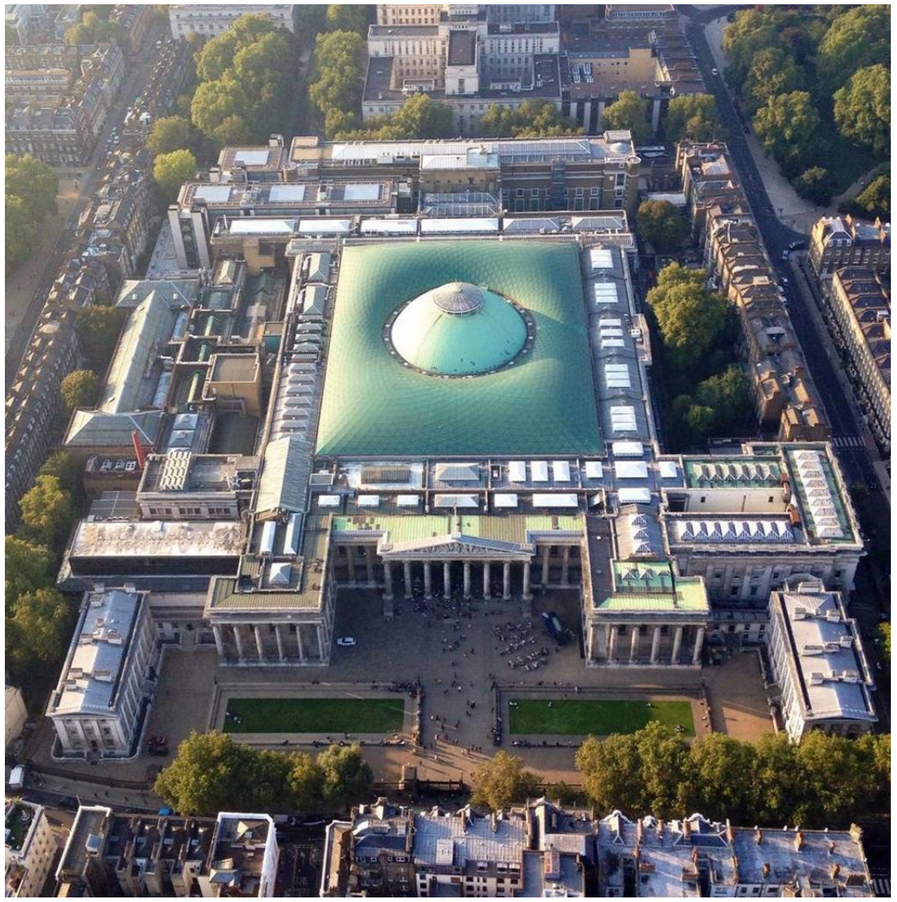


Original Ground Floor Plans Of the Natural History

Close up of the main entrance arch. The rounded arches and grand entrance were inspired by basalt columns at Fingal's Cave in western Scotland. This is one of Britain’s most striking examples of Romanesque architecture.

The British Museum

The British Museum is a museum dedicated to human history and culture, located in the Bloomsbury area of London. Its permanent collection, numbering some 8 million works, is among the largest and most comprehensive in existence. and originates from all continents, illustrating and documenting the story of human culture from its beginnings to the present.



Quadrangle building

The core of today's building was designed by the architect Sir Robert Smirke (1780–1867) in 1823. It was a quadrangle with four wings: the north, east, south and west wings.

The building was completed in 1852. It included galleries for classical sculpture and Assyrian antiquities as well as residences for staff.

Smirke designed the building in the Greek Revival style, which emulated classical Greek architecture. Greek features on the building include the columns and pediment at the South entrance.

This style had become increasingly popular since the 1750s when Greece and its ancient sites were 'rediscovered' by western Europeans.

The building was constructed using up-to-the-minute 1820s technology. Built on a concrete floor, the frame of the building was made from cast iron and filled in with London stock brick. The public facing sections of the building were covered in a layer of Portland stone.

In 1853, the quadrangle building won the Royal Institute of British Architects' Gold Medal.

Guggenheim

The Solomon R. Guggenheim Museum, often referred to as The Guggenheim, is an art museum located at 1071 Fifth Avenue on the corner of East 89th Street in the Upper East Side neighbourhood of Manhattan, New York City. It is the permanent home of a renowned and continuously expanding collection of Impressionist, Post-Impressionist, early Modern andcontemporary art and also features special exhibitions throughout the year. The museum was established by the Solomon R. Guggenheim Foundation in 1939 as the Museum of Non-Objective Painting, under the guidance of its first director, the artist Hilla von Rebay. It adopted its current name after the death of its founder, Solomon R. Guggenheim, in 1952. The museum's collection has grown organically, over eight decades, and is founded upon several important private collections, beginning with Solomon R. Guggenheim's original collection. In 2013, nearly 1.2 million people visited the museum, and it hosted the most popular exhibition in New York City.

The Design

From 1943 to early 1944, Frank Lloyd Wright (Architect) produced four different sketches for the initial design. While one of the plans (scheme C) had a hexagonal shape and level floors for the galleries, all the others had circular schemes and used a ramp continuing around the building. His design dispensed with the conventional approach to museum layout, in which visitors are led through a series of interconnected rooms and forced to retrace their steps when exiting. Wright's plan was for the museum guests to ride to the top of the building by elevator, to descend at a leisurely pace along the gentle slope of the continuous ramp, and to view the atrium of the building as the last work of art. The open rotunda afforded viewers the unique possibility of seeing several bays of work on different levels simultaneously and even to interact with guests on other levels. The spiral design recalled a nautilus shell, with continuous spaces flowing freely one into another. Even as it embraced nature, Wright's design also expresses his take on modernist architecture's rigid geometry. Wright ascribed a symbolic meaning to the building's shapes. He explained, "these geometric forms suggest certain human ideas, moods, sentiments – as for instance: the circle, infinity; the triangle, structural unity; the spiral, organic progress; the square, integrity." Forms echo one another throughout: oval-shaped columns, for example, reiterate the geometry of the fountain. Circularity is the leitmotif, from the rotunda to the inlaid design of the terrazzo floors.

The museums atrium

The museum under construction Nov. 12 1957

Imperial War Museum North

The Imperial War Museum North in Manchester is one of five branches of the Imperial War Museum, it explores the impact of modern conflicts on people and society. It is the first branch of the Imperial War Museum to be located in the north of England. The museum occupies a site overlooking the Manchester Ship Canal in Trafford Park, an area which during the Second World War was a key industrial centre and consequently heavily bombed during the Manchester Blitz in 1940. The museum was designed by Polish architect Daniel Libeskind. Dozens of Libeskind's family had suffered badly in WWII and many died in the Holocaust. At the museum's opening, Libeskind said that he sought to "create a building ... which emotionally moved the soul of the visitor toward a sometimes unexpected realization"'. Libeskind envisaged a *'constellation composed of three interlocking shards'* with each shard being a remnant of an imagined globe shattered by conflict.

Architecture and design

An architectural competition for the new museum was held in 1997, with the winning design being that of Berlin-based architect Daniel Libeskind (As mentioned previously.) These shards in turn represented air, earth and water, and each formed a functionally distinct part of the museum. The 55m high air shard, provides the museum's entranceway and a viewing balcony above the Manchester Ship Canal with views of the Manchester skyline. The construction of the tower leaves viewers exposed to the elements and one reviewer considered that it reflected "the aerial perspective of modern warfare and the precariousness of the life below". The earth shard houses the museum's exhibition spaces, while the water shard accommodates a cafe with views of the canal.

Detailed plan view map of the imperial war museum north. The sharp jagged perimeter is similar to shapes seen in some of Picasso's work.

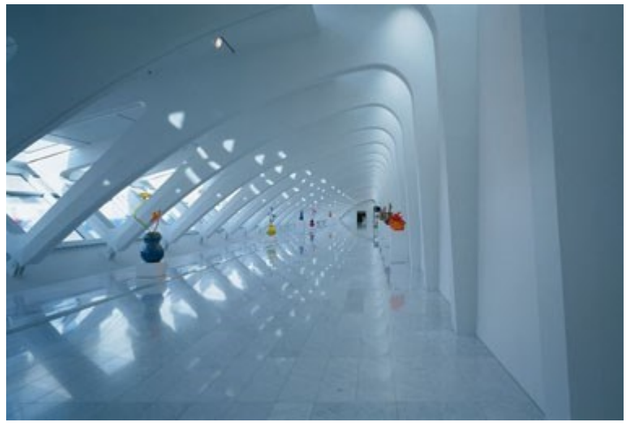
To the left is another view of the museum. The look of the design is a contemporary brutalist revival.

Milwaukee Art Museum

The Milwaukee Art Museum, which overlooks Lake Michigan, was partially housed in a building designed in 1957 by Eero Saarinen as a war memorial. The brief stipulated a new grand entrance, a point of orientation for visitors, and a redefinition of the museum's identity through the creation of a strong image. Calatrava proposed a pavilion-like construction, on axis with Wisconsin Avenue, the main street of central Milwaukee. Conceived as an independent entity, the white steel-and-concrete form is reminiscent of a ship and contrasts the existing ensemble in both geometry and materials.

Being linked directly to Wisconsin Avenue via a cable-stay footbridge, pedestrians may cross busy Lincoln Memorial Drive on the bridge and continue into the pavilion. Drivers enter via an underground vaulted parking garage where pairs of canted concrete columns extend down the center of the garage, forming a skeleton-like series of elements shaped like the letter "V." The pavilion features a spectacular kinetic structure, a brise-soleil with louvers that open and close like the wings of a great bird. When open the shape also becomes a sign, set against the backdrop of the lake, to herald the inauguration of new exhibitions. The pivot line for the slats is based on the axis of a linear mast, inclined at 47 degrees, as a parallel to the adjacent bridge mast.

The design allows for future expansion, offset from but symmetrical to the exhibition facilities, on the other side of the Kahler building. At shore level, the expansion houses the atrium, gallery space for temporary exhibitions, an education center with a 300 seat lecture hall, and a gift shop. The 100 seat restaurant, placed at the focal point of the pavilion, commands panoramic views onto the lake.



Images courtesy of Santiago Calatrava

Design In The Natural World

The progression of scientific understanding and technology is now growing at an exponential rate. As we develop a better grasp of intelligent design, our natural curiosity and ability to reflect on the world around us shapes the way we think. We are the designers, we are the problem solvers, we are the people that use the world around us to enhance quality of life for the greater good. Taking inspiration from the natural world and applying it to a real life scenario is a well regarded skill/ contributing factor that sets apart good and bad design. The reason why such a unique ideological approach to intelligent design works so well is due to Natural form and efficiency. Every non-manmade entity we see existing around us has undergone millions of year of evolution and adaption to reach a desired shape that will enable it to perform what it does in the most optimal way possible. If we take the basis of these ideas, coupled with the implementation of human ingenuity; we can then truly create Intelligent design that represents our ability to harmonise with our planet.

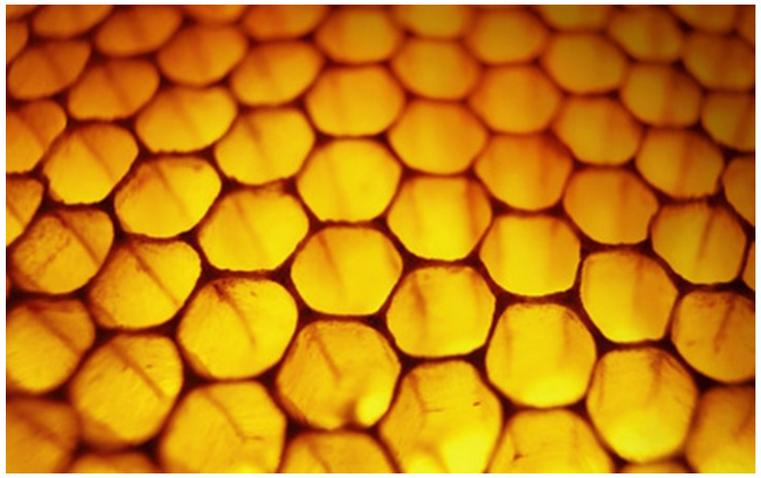
13-Year-old looks at trees, makes solar power breakthrough.

The 13-year-old New York boy is being hailed in scientific circles for his idea on arranging solar panels, which is reportedly 20-30 per cent more efficient than the standard design. Aidan told CNN: '... and it doesn't collect dirt rain and snow as much as the flat panels, and I think it looks a lot nicer. 'Aidan credits the trees for giving him the idea. He told the network: 'One day I was just walking through the woods - well, on a winter hiking trip - and I noticed that the tree branches collect sunlight by going up into the air.

Taking Inspiration From Nature

Architecture group Organic Scapes and Architecture (OS + A) have proposed a mixed-use modern master plan for the Campus International School in Downtown Cleveland. Following Cleveland State University's plan to give the area a makeover, the campus would integrate a safe learning environment with inspirational high design. The organic shape of the campus encourages safety – there are no blind spots or hidden corners for children to get lost in.

The honeycomb structure lies a communal learning area. Some portions of the hexagonal shapes have been converted into skylights, which light the area below. Above, the honeycomb roof is covered in grass, providing a playing field for children that allows the building to blend in with the landscape. OS+A's driving force is to incorporate natural organic landscapes with architectural design.



Taking Inspiration From Nature

The AAMI Park stadium, which features a unique bio-frame roof, was commercially named following a lucrative eight-year sponsorship deal signed by the Australian insurance company. "AAMI Park's innovative bio-frame roof provides a highly efficient structure that is both functional and visually exciting", explains Arup Project Director, Peter Bowtell. The stadium roof is a three dimensional structure with 20 interdependent shells with a single layer of structure, sharing the load through a combination of arching, cantilever and shell action. The resulting structure is considerably lighter and uses less steel than similar sized stadium roofs using traditional construction methods. The bio-frame roof provides 80% coverage for spectators against rain, insulation to ensure patron comfort, and integration with a drainage system designed to collect rainwater. A spinoff take on the original geodesic domes created by Buckminster Fuller, the stadium's design takes inspiration from an insect's compound eye to create intelligent design that shows the correlation between mathematics and nature.

Important People In Architecture

Frank Lloyd Wright 1867-1959

Frank Lloyd Wright (born Frank Lincoln Wright, June 8, 1867 – April 9, 1959) was an American architect, interior designer, writer and educator, who designed more than 1000 structures and completed 532 works. Wright believed in designing structures which were in harmony with humanity and its environment, a philosophy he called organic architecture. This philosophy was best exemplified by his design for Fallingwater (1935), which has been called "the best all-time work of American architecture". Wright was a leader of the Prairie School movement of architecture and developed the concept of the Usonian home, his unique vision for urban planning in the United States.

His work includes original and innovative examples of many different building types, including offices, churches, schools, skyscrapers, hotels, and museums. Wright also designed many of the interior elements of his buildings, such as the furniture and stained glass. Wright authored 20 books and many articles and was a popular lecturer in the United States and in Europe. His colourful personal life often made headlines, most notably for the 1914 fire and murders at his Taliesin studio. Already well known during his lifetime, Wright was recognized in 1991 by the American Institute of Architects as "the greatest American architect of all time."

Richard Rogers 1933

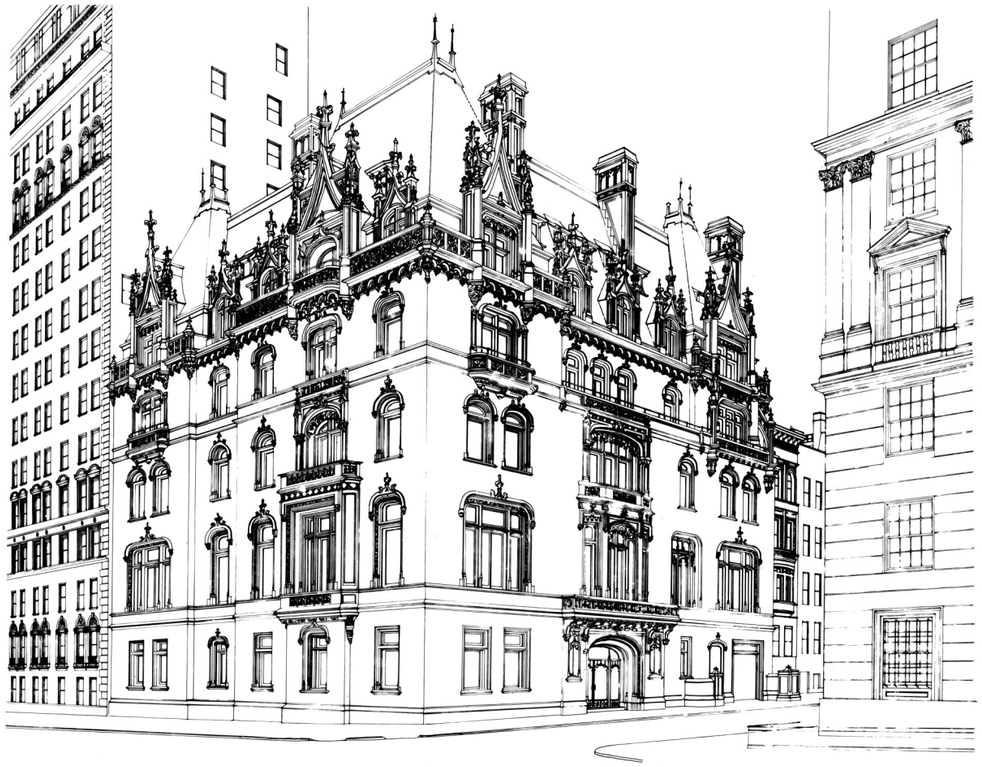
Richard Rogers is perhaps best known for his work on the Pompidou Centre in Paris, the Lloyd's building and Millennium Dome both in London, the Senedd in Cardiff, and the European Court of Human Rights building in Strasbourg. He is a winner of the RIBA Gold Medal, the Thomas Jefferson Medal, the RIBA Stirling Prize, the Minerva Medal and Pritzker Prize.

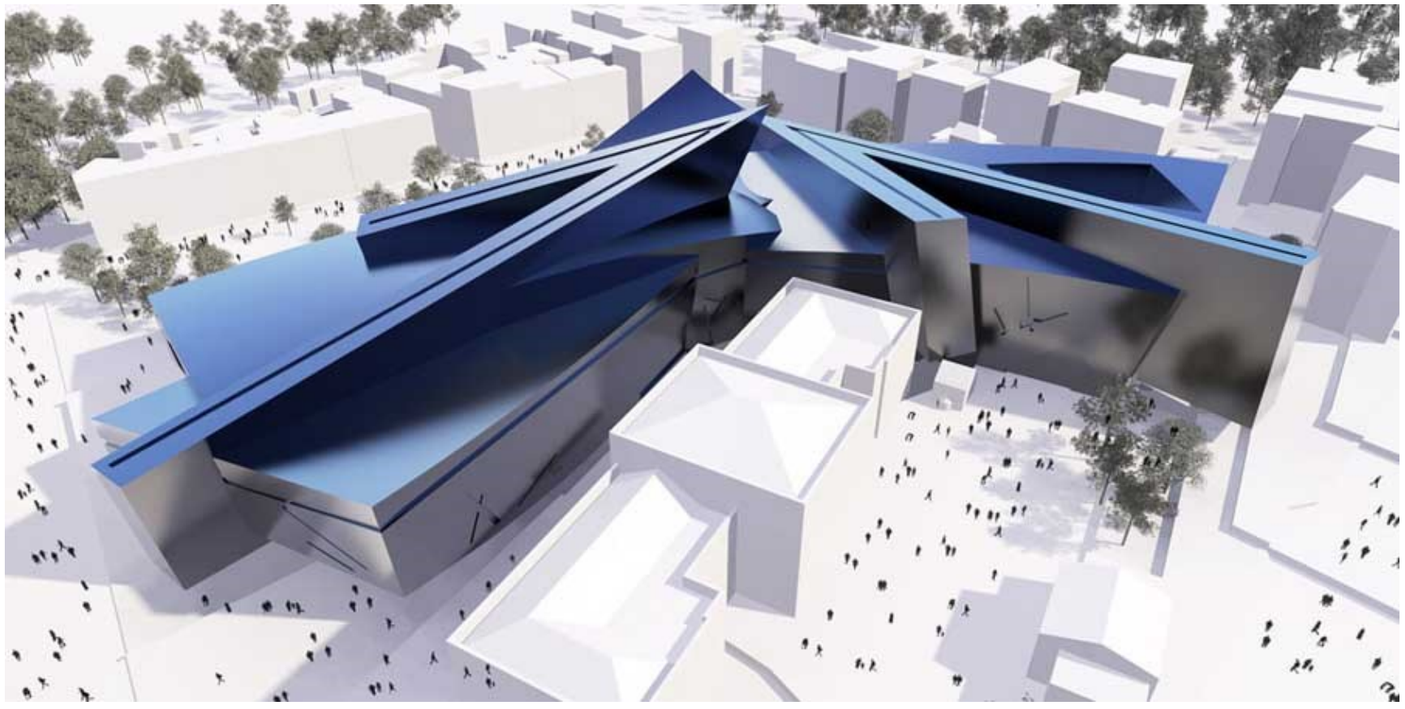
In early 1968 he was commissioned to design a house and studio for Humphrey Spender near Maldon, Essex, a glass cube framed with I-beams. He continued to develop his ideas of prefabrication and structural simplicity to design a Wimbledon house for his parents. This was based on ideas from his conceptual 'Zip Up' house, such as the use of standardised components based on refrigerator panels to make energy-efficient buildings. Rogers subsequently joined forces with Italian architect Renzo Piano, a partnership that was to prove fruitful. His career leapt forward when he, Piano and Gianfranco Franchini won the design competition for the Pompidou Centre in July 1971, alongside a team from Ove Arup that included Irish engineer Peter Rice. Rogers has devoted much of his later career to wider issues surrounding architecture, urbanism, sustainability and the ways in which cities are used.

Museum Project

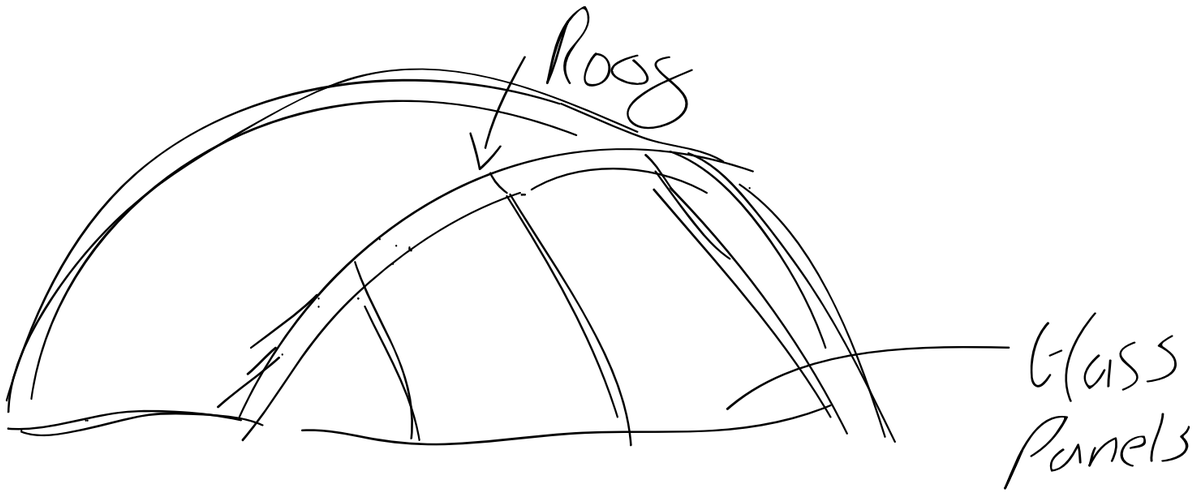
Revised Specification

1. Budget of £178.5 Million No going over.
2. Design has to reflect what Harchester is all about
3. Architectural design of the building needs to flow with the surroundings.
4. Museum Design has to cater to the proposed tram line running through.
5. The design will leave enough room for the trams construction.
6. Design will follow a contemporary post-modern look.
7. Design must have a detailed concept model ready for presentation.

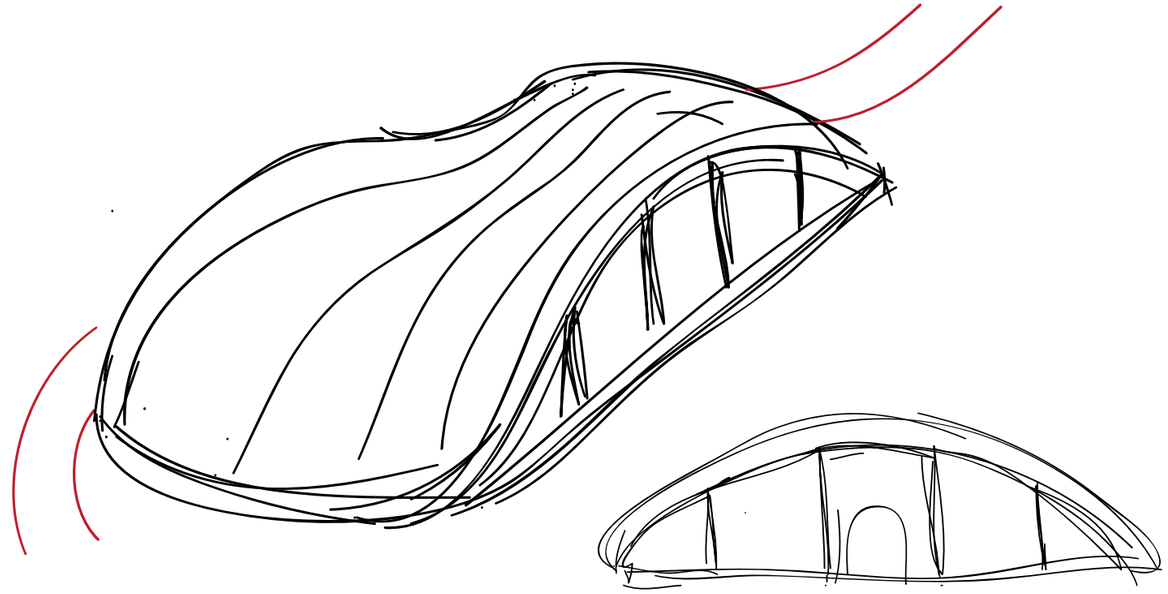




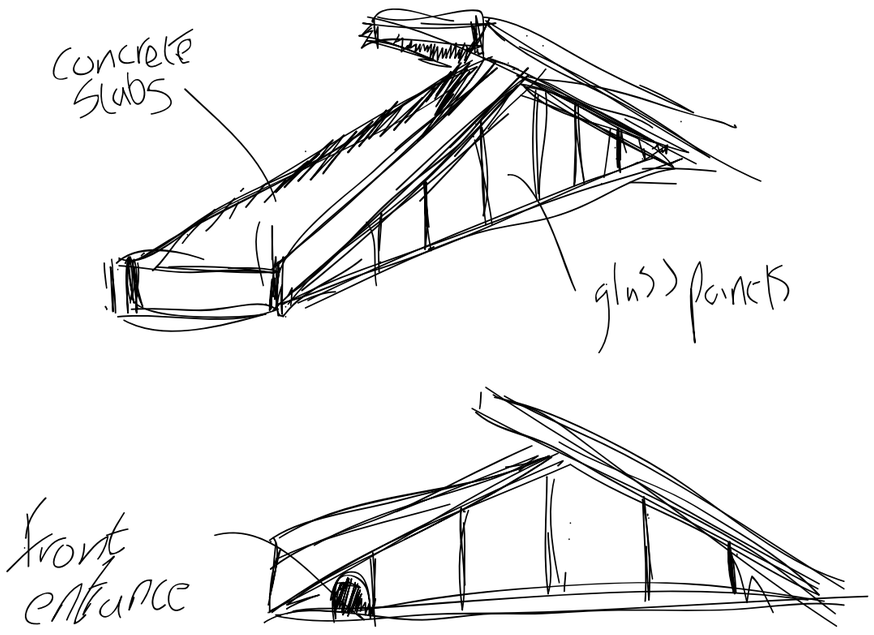
Rough Designs



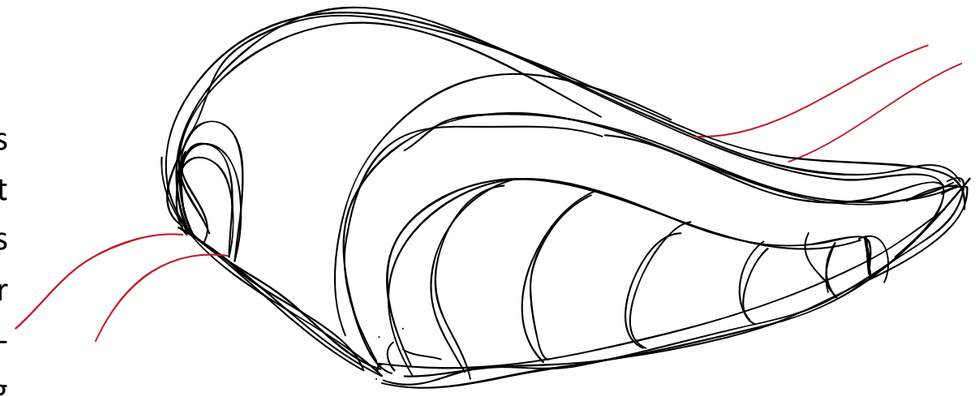
Dome shaped design with a long curvaceous roof that wraps round the large curved glass panels. A contemporary feel will be achieved through use of stainless steel and glass. The big front facing windows will swamp the museum with natural light.



This design centres around curvaceous wave like forms seen for the roof. As the designated area for the new museum is right by a canal I thought I would centre my design around a water theme. The red lines are were the proposed tram line will run. If the design is taken further a tram stop area could be developed. The small archway in the mi9ddle of the glass panel is there the entrance would be.

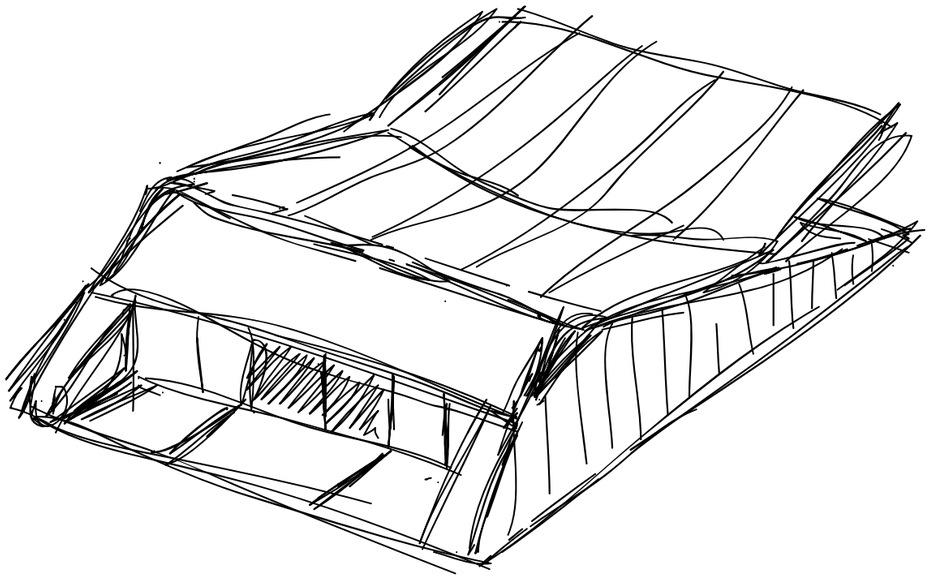


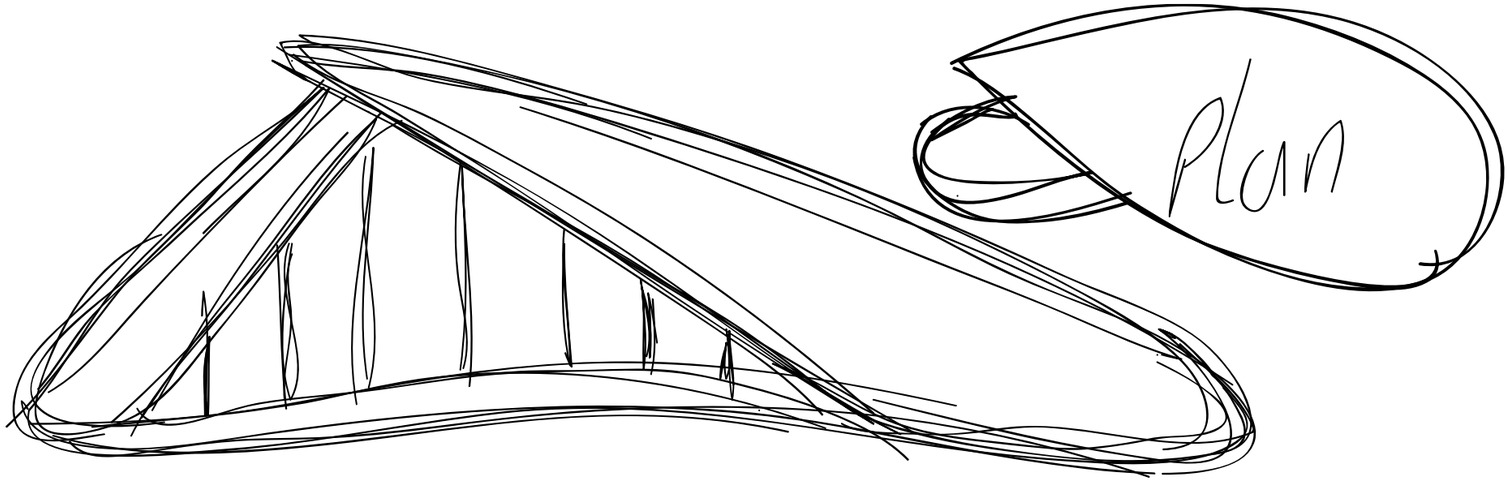
This design to the left follows a similar principle to the first design in using large glass panels to swamp the interior with natural light. The exterior design uses to large long concrete slab to create an abstract apex roof. The floor plan of the museum would be a long rectangle. Materials for this design would use concrete (maybe wood) for the roof with stainless steel structure and safety glass.



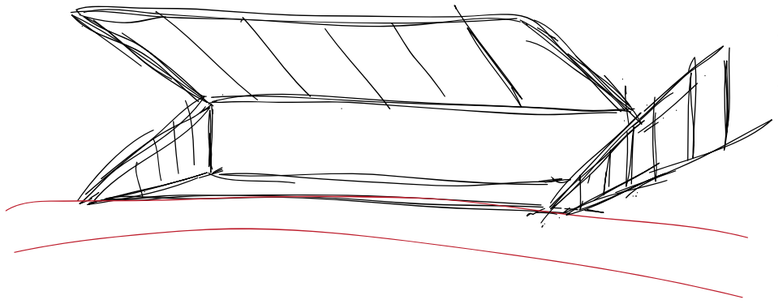
This design uses another water theme like the one above. The exterior has been designed to look like a shell with the tramline actually going through the building. A large glass panelled front with uniquely designed curved steel structure beams. Design allows for lots of natural light. Roof either will either be made from concrete or wood. Both cheap to build with but wood would need weather proofing.

Rough Designs

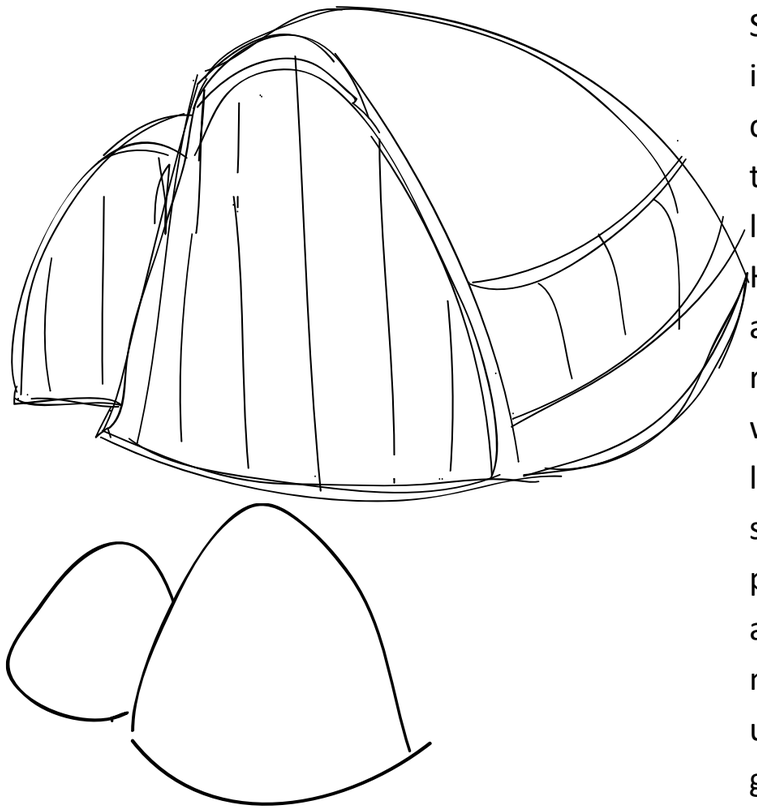




A sleek curvaceous design form using a similar structural support system to a previous design. The two key pieces of the design that form the off angle apex will be made of wood. The shape of the roof resembles two leaves, symbolising the surrounding woodland area of Harchester and an appreciation for the glorious views of our English Countryside. A plan view also shows how the structure would look from above and how the shape of the leaves correspond with each other. The design would be built using a metal frame for the structural integrity. From the outside the illusion of pure glass and wood will remain. The entrance will be under the cover of the big main leaf off to the right. doing so will create a sense of mystery when looking at the building from certain angles.

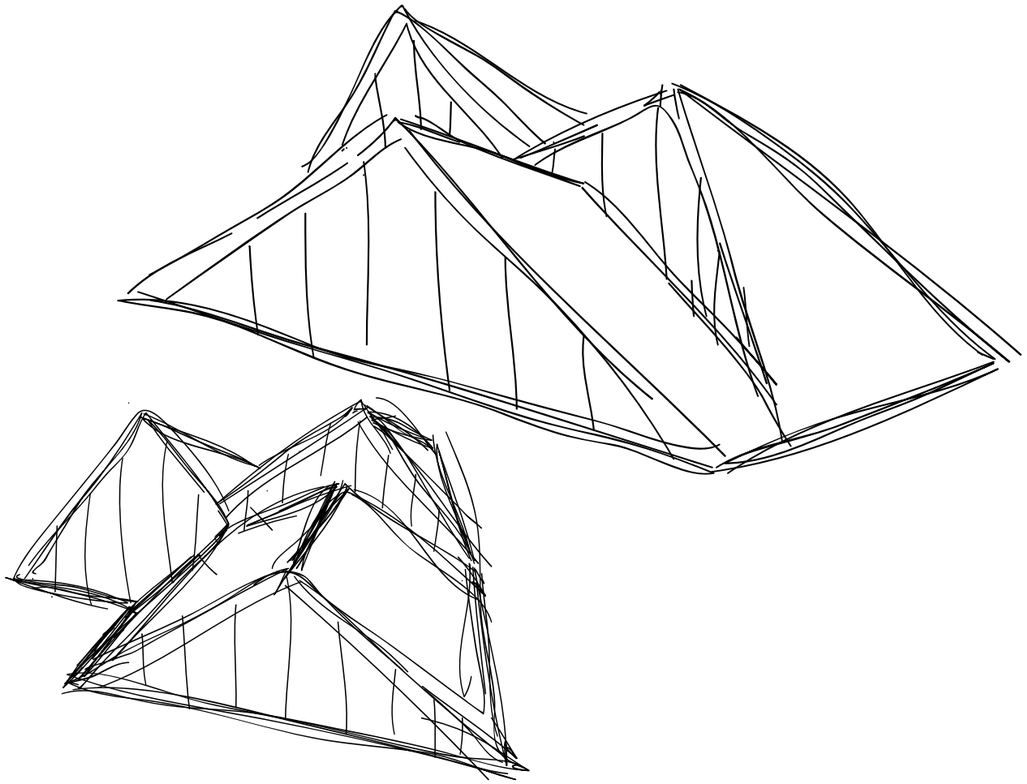


A sleek art deco inspired design with a hard hitting, punctual structure that captures the eye. Both sides will be made up of glass panels a stainless steel roof. Sleek clean metals and lots of high glass panelling will ensure this design is contemporary and with the times. The view of the back end of the museum shows how a tram stop is incorporated into the design. The large apex panelling acts as a shelter for passengers. While letting the sunlight through during days with better weather. Another high angled panel like the one on the back-end of the design could be added to the front for more shelter.

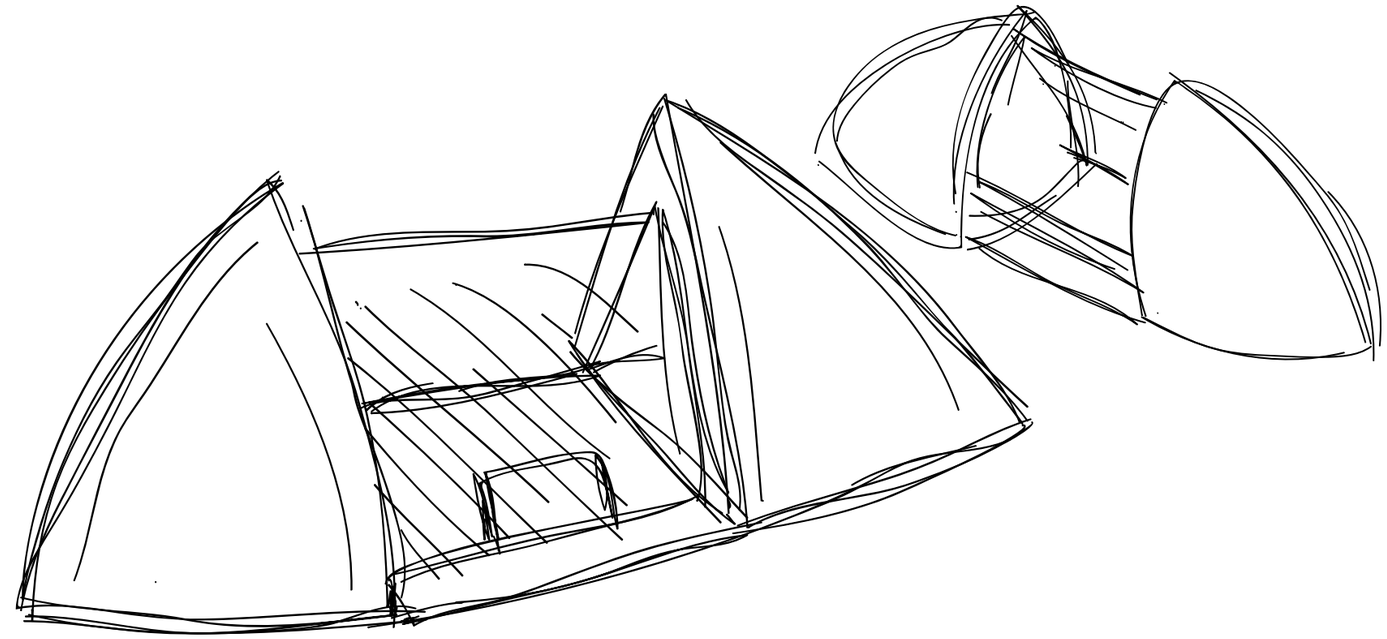


Similar to the dome design seen previously this idea takes on a similar shape. With this idea I decided to follow the woodland theme again this time the exterior of the design represents two large acorns; one smaller connected to the larger. Having the subtle woodland theme incorporated is a great way of linking the design idea to the surrounding area. The exterior would be made from wooden panelling with the front face being the large glass panels. The plan view of the design shows the size difference and shows how a floor plan would look. Wrapped round the large acorn atrium will be more glass panelling to allow extra natural light through. The aesthetics of a light natural grain of wood with the glass will be certain to grab peoples attention.

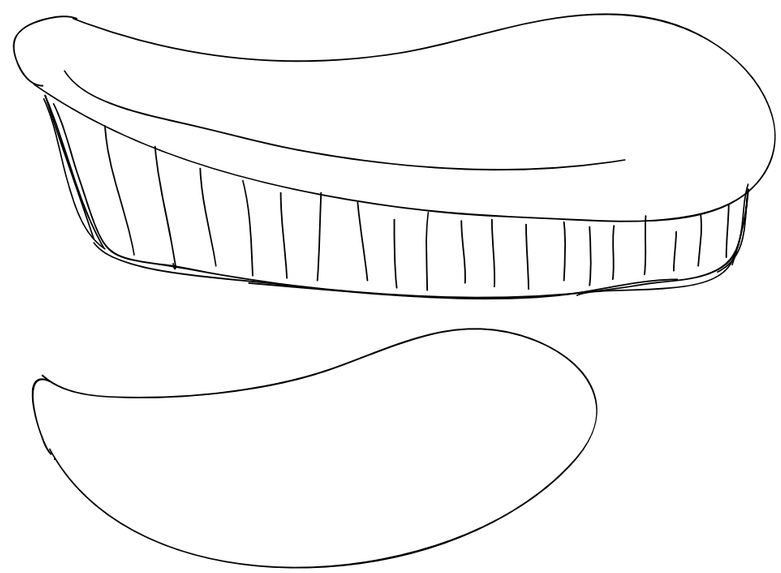
Rough Designs



This design is made up of 3 pyramid like shapes all interconnecting to form one universal body. An abstract design that will stand out and provoke creative thinking yet flow effortlessly with the surrounding environment due to the soft aesthetics. The building exterior needs to have a warming/pleasing tone to compliment the sharp acute angles of the exterior shape. This will be achieved by using wood panelling and large panels of glass. These two materials compliment each other well whilst reflecting a nature/woodland theme. The contemporary look of the museum along with soft looking undertones will be sure to attract visitors.

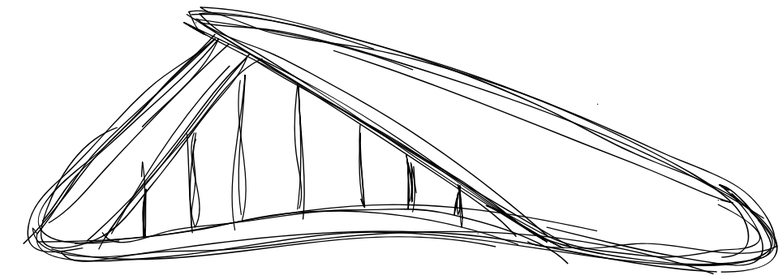


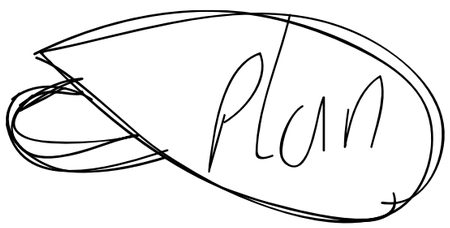
This museum design uses two large curvaceous shapes to hold up a triangular prism made of glass. With this design a contemporary clean look will be achieved and reinforced with a stainless steel/ glass finish. Doing so will breath new life into Harchester and mark the start of progressive change in putting the town back on the map. The glass prism will allow natural light to flood the entrance whilst also providing natural light for the back end of the design where the tram stop will go.

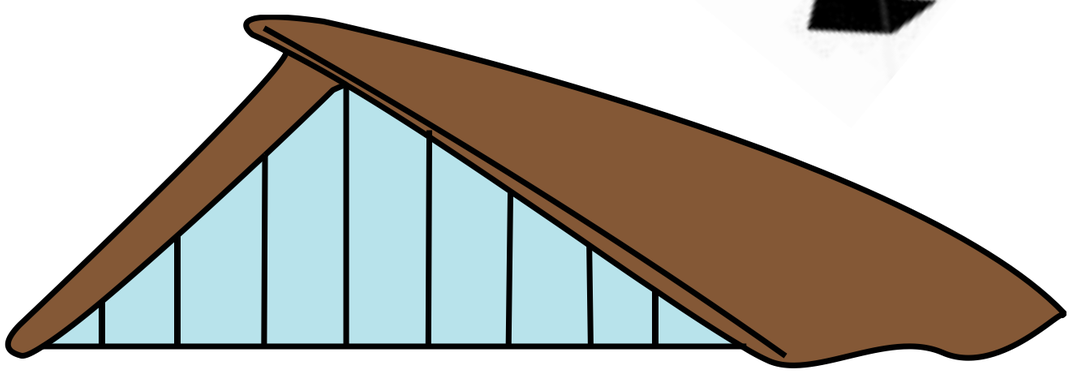


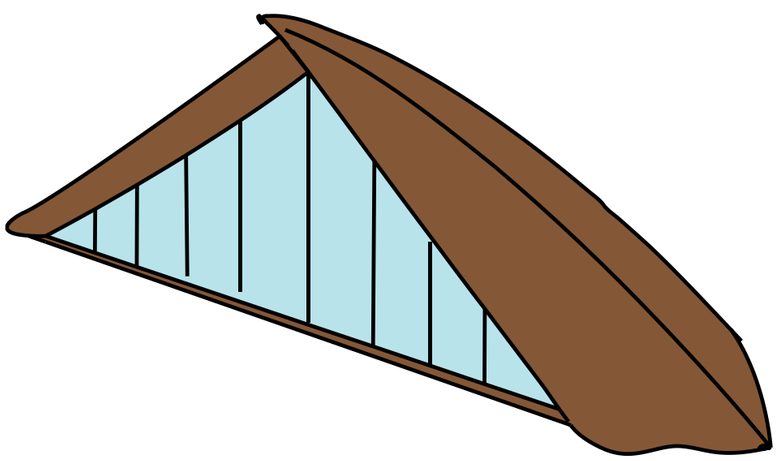
A simple design that takes inspiration from the velodrome built for the 2012 London Olympics. A curved abstract roof that sits a top a complete glass panel perimeter. The all glass perimeter will provide lots of natural light and it will offer visitors a few of Harchester no matter where they are in the museum. The roof will be made from wood panelling to give a soft warming aesthetic. The building cost will be relatively low for such a building.

Developing Ideas - Idea 1



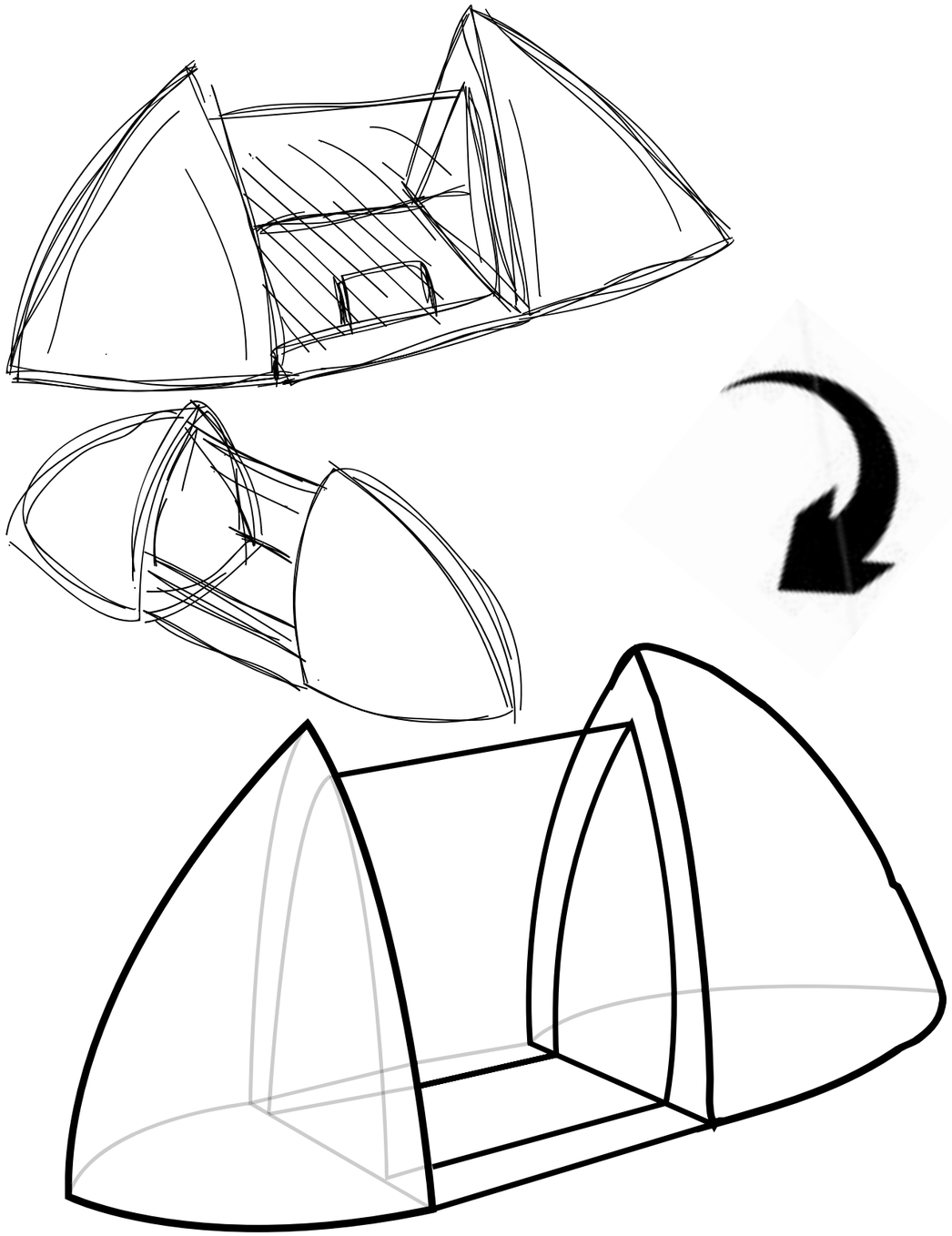






I have decided to take this rough design forward first and develop the idea into a more well rounded design. The reason for this idea being chosen was the beauty of the curved shaped roof and the underlying theme that is implied. I wanted to keep this design simple therefore the design is completely symmetrical on the horizontal axis. Be it your viewing the Museum from the front or back the view of the exterior will be identical. The shape of the roof resembles two leaves, symbolising the surrounding woodland area of Harchester and an appreciation for the glorious views of our English Countryside. The design would be built using a metal frame for the structural integrity. From the outside the illusion of pure glass and wood will remain. The entrance will be under the cover of the big main leaf off to the right. doing so will create a sense of mystery when looking at the building from certain angles. If I was to take this design further then I would look into processes of making wood weatherproof. This will be a very important aspect on the success of this idea. If the wood isn't weatherproofed properly then the cost to repair can be very high.

Developing Ideas - Idea 2

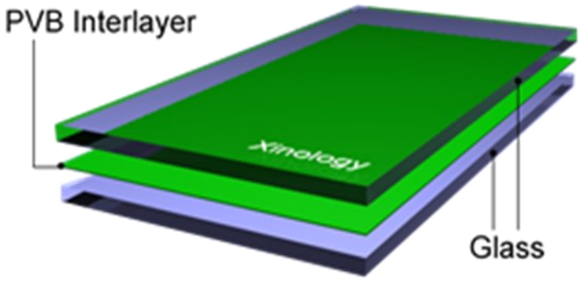


This is the second design that I have chosen to redevelop. Unlike the previous design that I have chosen to develop this one does not have a underlying theme. Instead, this idea was selected to be put forward because I felt there was a fine balance in contrast of shape and form. The two semi-dome like shapes have been made a little taller and a little thinner to give a greater sense of height and power. The glass panelled mid section shape has also been changed from a triangular shape to more of an arrow. This was done to better suit the change in shape of the two domes at either side. The edge of the glass mid section hugs the perimeter creating a stylised finish that is less taxing on the eye. In the developed drawing I have also included some lines that would normally be obstructed by the view. Doing so creates a wireframe in which the true shape and proportion of the design can be visualised. Again, like the last design the materials for this idea will be mainly wood and glass. The inner structure frame will of course be made from a high strength metal. The outside semi domes will have an outer wood cladding which will need to be weatherproof. The contrast between the glass and the wood will create a warming aesthetic and a calming environment.

Material Research

An important aspect of industrial design is the materials that are used in the construction process. Having sufficient knowledge of a wide array of substances that can be used to make a design a reality is good practice that has many useful applications.
It allows us to make informed choices that can further reinforce the success of the final product.
Ive developed some of my rough ideas and now is a great time to gather some research on materials that I will want to use.
I will focus on looking at key information and the properties of materials such as Stainless Steel and glass. This information will help refine and aid the development procedure in turn, giving a final solution that meets the brief .

Stainless steel does not readily corrode, rust or stain with water as ordinary steel does, but despite the name it is not fully stain-proof, most notably under low-oxygen, high-salinity, or poor-circulation environments. Stainless steel's resistance to corrosion and staining, low maintenance and familiar lustre make it an ideal material for many applications. There are over 150 grades of stainless steel, of which fifteen are most commonly used.

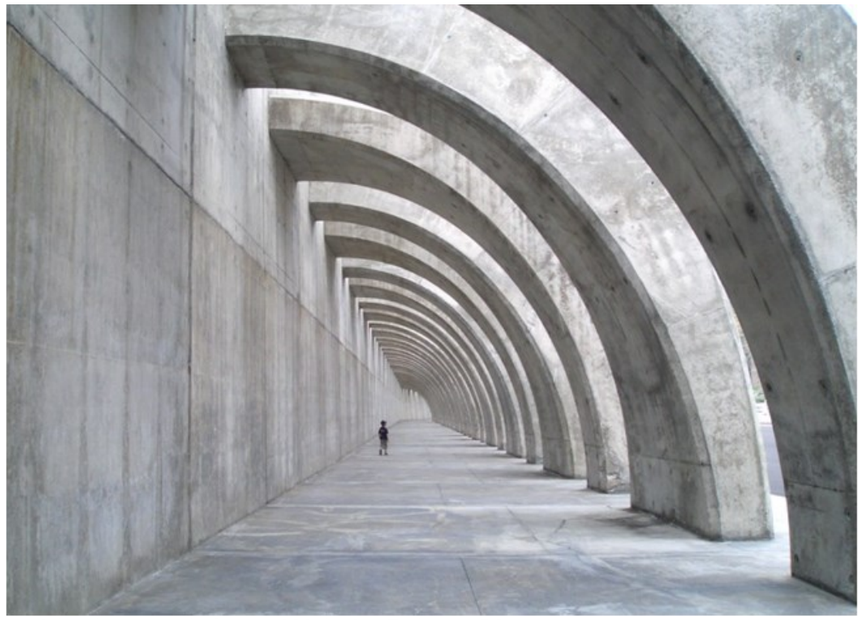


Laminated glass is a type of safety glass that holds together when shattered. In the event of breaking, it is held in place by an interlayer, typically of polyvinyl butyral (PVB), between its two or more layers of glass. Laminated glass is normally used when there is a possibility of human impact or where the glass could fall if shattered. A typical laminated would be 2.5 mm glass / 0.38 mm interlayer / 2.5 mm glass. This gives a final product that would be referred to as 5.38 laminated glass.

Aluminium is remarkable for the metal's low density and for its ability to resist corrosion due to the phenomenon of passivation. Structural components made from aluminium and its alloys are important in areas of transportation and structural materials. Aluminium is a relatively soft, durable, lightweight, ductile and malleable metal with appearance ranging from silvery to dull grey, depending on the surface roughness.

Material Research: Concrete

A few tons of bagged cement. This amount represents about two minutes of output from a 10,000 ton cement kiln.



Inside the sea defense Wall, La Palma, CA.

Boston City hall, voted world's ugliest building 2008. Composed of mainly concrete, a classic example of brutalist architecture.

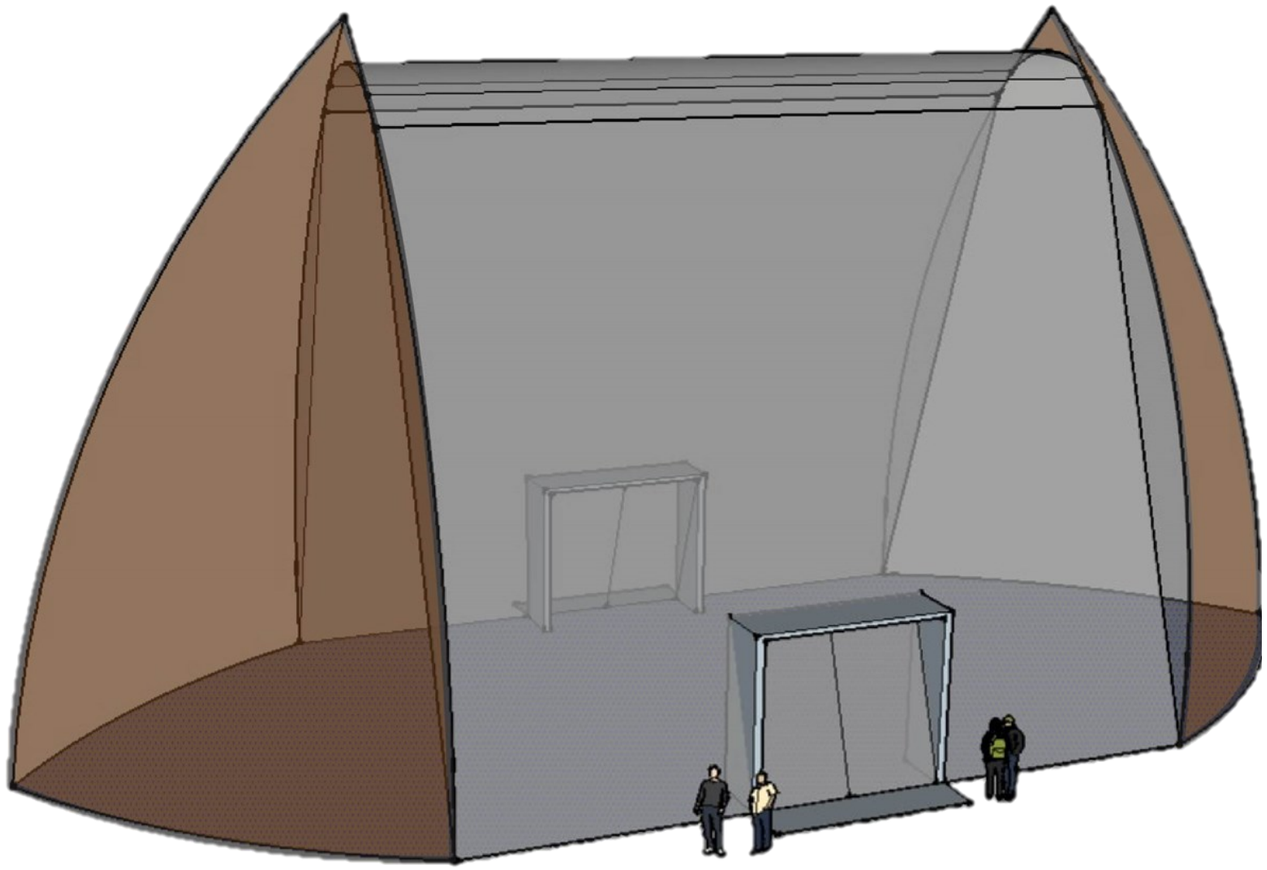
Concrete is a composite material composed of water, coarse granular material (the fine and coarse aggregate or filler) embedded in a hard matrix of material (the cement or binder) that fills the space among the aggregate particles and glues them together.

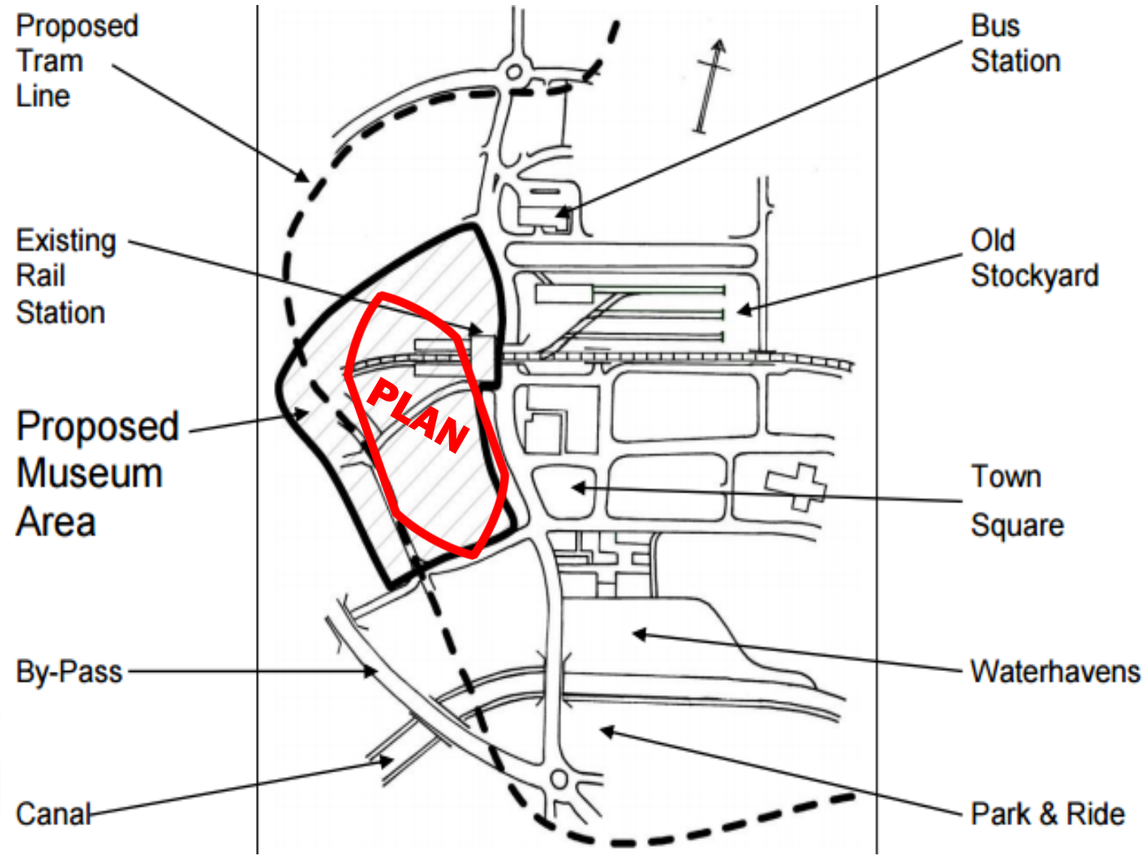
The earliest large-scale users of concrete technology were the ancient Romans, after the Roman Empire collapsed, use of concrete became rare until the technology was re-pioneered in the mid-18th century. Today, concrete is the most widely used man-made material. Concrete is strong in compression, it is weak in tension as the cement holding the aggregate in place can crack, allowing the structure to fail.

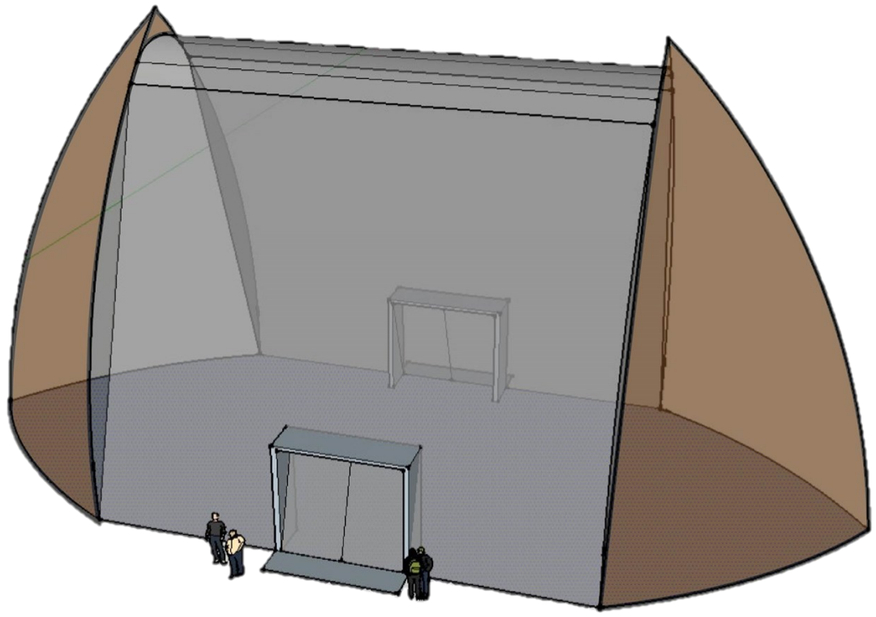
Reinforced concrete adds either steel reinforcing bars, steel fibers, glass fiber, or plastic fiber/cross linking polymer to carry tensile loads. Concrete has a very low coefficient of thermal expansion and shrinks as it matures. All concrete structures crack to some extent, due to shrinkage and tension. Concrete that is subjected to long-duration forces is prone to creep. Concrete can be damaged by many processes, such as the expansion of corrosion products of the steel reinforcement bars, freezing of trapped water, fire, sea water effects, bacterial corrosion, leaching, erosion by fast-flowing water, physical damage and chemical damage. Concrete is usually dull and grey, with the use of form liner, concrete can be cast and molded into different textures and used for decorative concrete applications.

Different strengths of concrete are used for different purposes. Very low-strength (2000 psi or less) concrete may be used when the concrete must be lightweight. Lightweight concrete is often achieved by adding air, foams, or lightweight aggregates, with the side effect that the strength is reduced. For most routine uses, 3000-psi to 4000-psi concrete is often used. 5000-psi concrete is readily commercially available as a more durable, although more expensive, option. 5000-psi concrete is often used for larger civil projects. Strengths above 5000 psi are often used for specific building elements. Bridges may use long beams of 10,000 psi concrete to lower the number of spans required. If a structure must be very rigid, concrete of very high strength may be used. Strengths as high as 19,000 psi have been seen

Final design







Here are a couple of different angled snapshots from my SketchUp CAD Model. I chose to create the model in SketchUp as it's great for developing an idea quickly. Limitations of the program can sometimes take an effect on the design however, for example I found the lack of a Bezier curve feature troublesome and I had to improvise. In the pictures the parts that will have wooden cladding are coloured brown but with high opacity as to not hinder a view of the form and shape of the design. Overall I'm happy with the final outcome. In future I would look to use a CAD program with higher quality features. Doing so would give a better final outcome and better overall build quality.