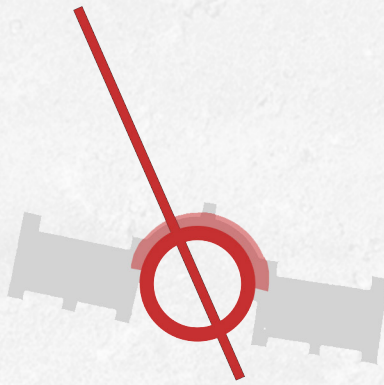


PART THREE

INITIATION SCHOOL



TECHNICAL RESOLUTION

Heritage stance
Technical concept
Materiality
Site conditions and construction process
Sectional exploration
Detail exploration
Passive systems

The chapter discusses the tectonic concept as an extension of the design intentions. This is realised through the exploration of democracy and what it stands for currently and the postulated post democratic ideals

The concept and technical resolution is embedded in place and become an important influence in the making of architecture. Material choice is informed by current site condition and reuses material to mitigate the heavy construction of the design

Heritage stance

The general technical concept was guided by the question of how the proposed intervention and design investigation fits into the continuum of architecture. To appropriate the question more to the project at hand, how can the proposal be able to benefit the existing colonial architecture of the Union Buildings and allow it to read the same language after many years have lapsed, so as to have a meaningful contribution to its host?

Throughout the investigation, the language of the Union Building, as we know it, reads as a Greek influenced piece of architecture, with its Doric columns, the use of the plinth to instigate a temple or a place of Gods. The question then lies how one is able to create an intervention which relates and reads the same as the Union Buildings while still maintaining a sense of newness and difference?

Technical concept

The tectonic concept was the process and extension of the design argument and intentions. The concept is exemplified within the physical structural system and material choice. The passive and active ventilation systems, services and design details will be discussed.

The earth can be understood as a combination of tension and compressive forces which hold up the earth. Compressive forces are apparent while tension forces appear in strain. Architecture as an archive is conceptualised, in an attempt to expose structure, and to expose the earth that is hollowed out. The nature of the space gives opportunity for the spaces to be made light, to create a relationship between the sky and earth.

The tectonic concept can then be defined as the exploration of transparency and secrecy, which ties with the design intentions of attempting to create a liminal space below the Union Buildings that opens up the buildings for public accessibility and for the interaction of the politicians and the public. The notion of transparency and secrecy is played with, to expose 'secretive' spaces to make transparent.

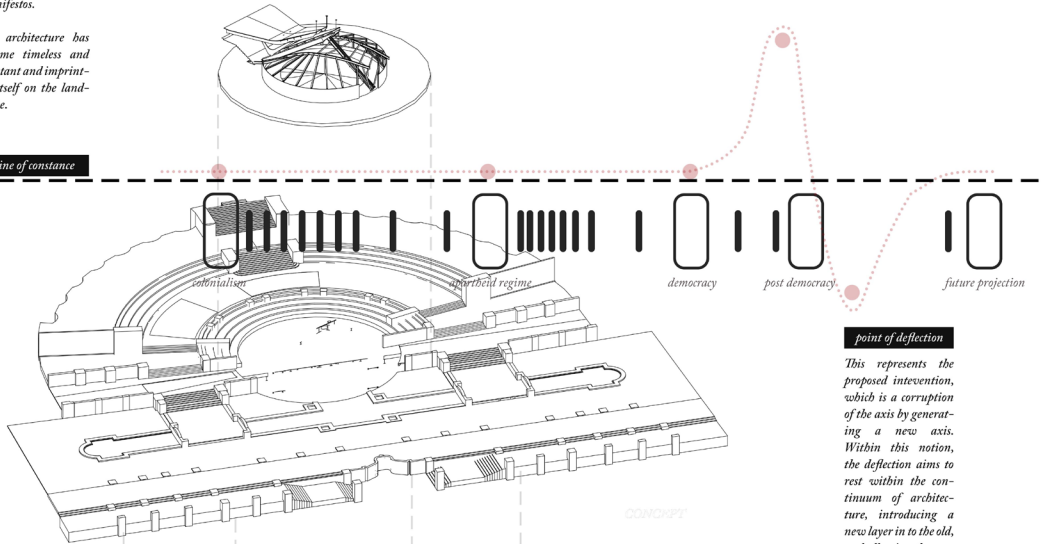
The heritage tectonic concept is line with the tectonic concept which looks at a later future. While the current intervention can cause physical disturbance, the aim is to allow the architecture become timeless and imprint itself on the landscape. The Union Buildings has hosted different political ideologies, and

INITIATION SCHOOL

The line represents the constance in imagery of Union Buildings, unobanged over time despite changes in political ideologies and manifestos.

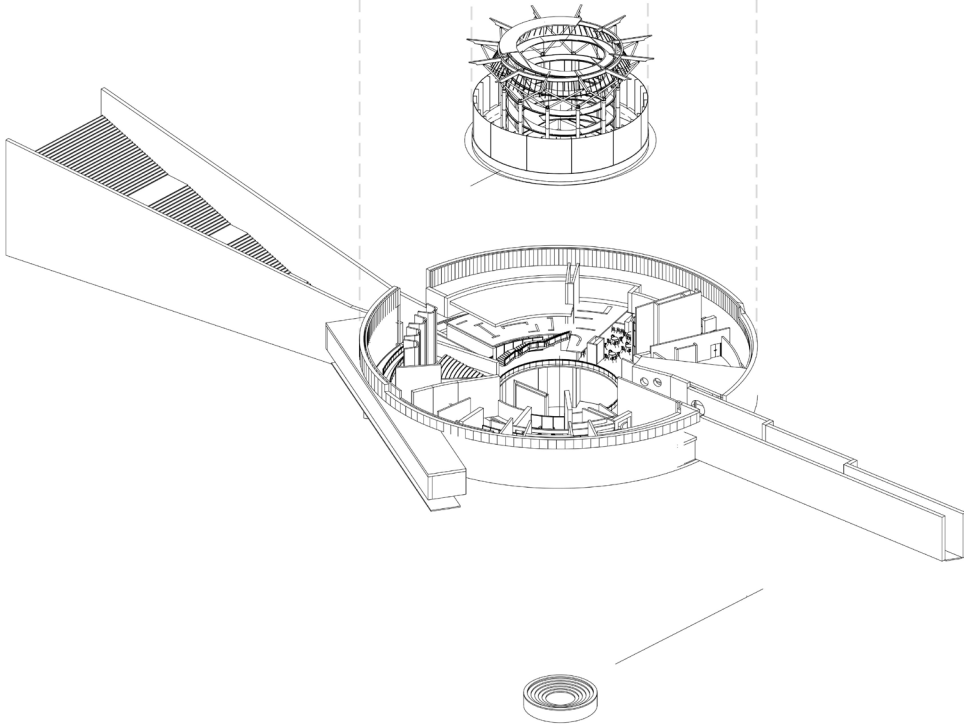
The architecture has become timeless and constant and imprinted itself on the landscape.

line of constance



point of deflection

This represents the proposed intervention, which is a corruption of the axis by generating a new axis. Within this notion, the deflection aims to rest within the continuum of architecture, introducing a new layer in to the old, and allowing the new to merge into its landscape while still maintaining a differentiation between the old and the new. The proposal is thus a process of etching and a process of remoulding. The architecture is a harsh contrast to the existing representative of a harsh past and highlighted through the use of corten steel



one that the project proposes disrupts this by corrupting the axis and generating a new one. The deflection introduces a new layer in to the old, and allowing the new to merge into its landscape. The proposal looks at two approaches; the process of etching and a process of remoulding.

Materiality

The choice of material is aimed to read as the same language as the Union Buildings. The choice of material is from reclaimed sandstone from the demolished parts of the existing Union Buildings. Corten steel is used at conjunctions



Figure 6.2
Material
palette (Author, 2015)

of the old and new structure, to highlight the harsh change from a colonial piece to a democratic space. The deterioration of the Corten steel is symbolic of the disconnection in the change of political ideals. Use of concrete is used for the retaining wall and parts of the structure which require compressive strength to sustain the heavy structure that lies above the submerged level of the political school.

The process of etching is applicable to the top surface structure (Visitor's centre). The design of the seats are made from reclaimed sandstone and corten steel

Site conditions

The site of the Union Buildings consists of slate. Slate is a fine grained metamorphic rocks that is created by the alteration of shale (King, 2015). It is composed mainly of clay minerals. Shales and mudstone in that basin are compressed by minor heating. The forces that occur enable the clay minerals to form shale and mudstone.

Figure 6.1
Tectonic
concept
(Author, 2015) Left



*Figure 6.3
Historical
images of
construction process
(National
archives)*



*Figure 6.4
Central amphitheatre
(National
archives)*

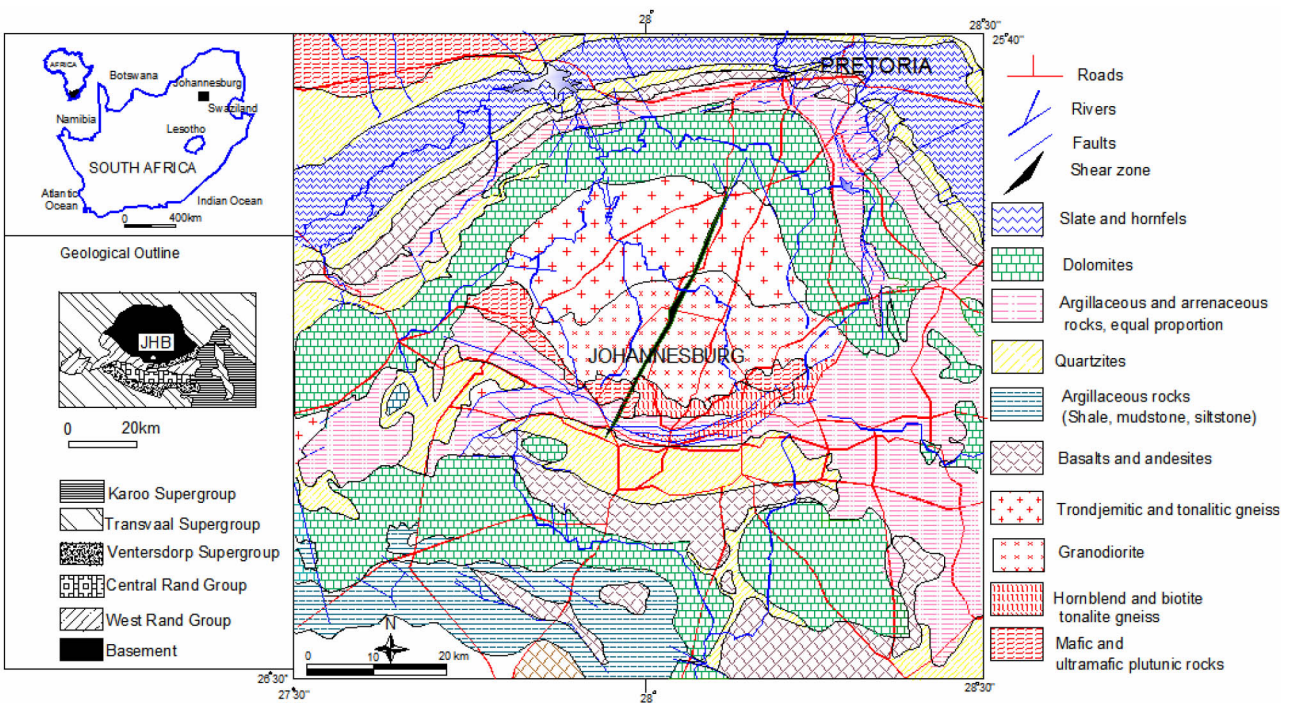


Figure 6.5: Soil Rock condition of Johannesburg (Abiye, Mengistu and Demlie, 2011)

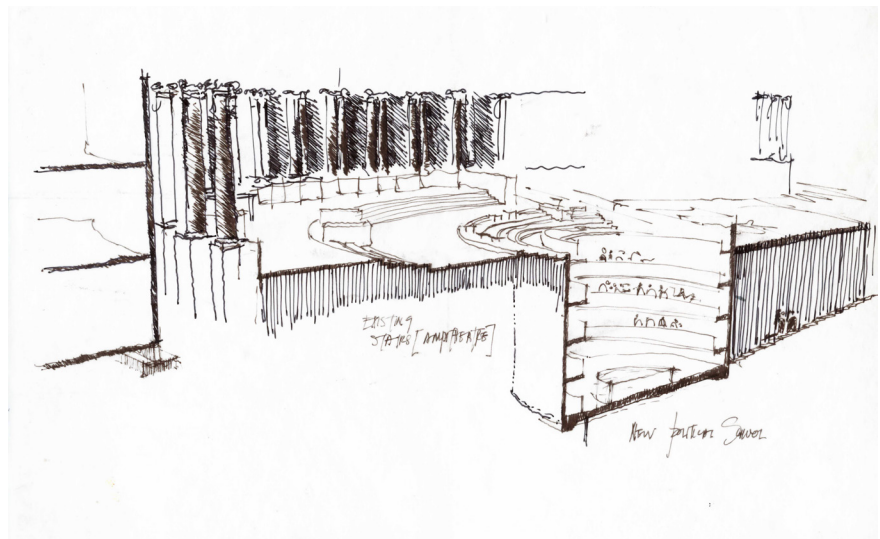


Figure 6.6: Sectional perspective (Author, 2015)

1

Excavation of middle ground. Anchoring the walls and applying shotcrete to uphold the walls

2

Tunneling the pathway to retain the structure above.

3

Creating a service space between shotcrete wall and adobe blocks. Internal walls are constructed to make the architecture

4

Replacing the amphitheatre sandstone

5

Glass walkway panels placed on the existing amphitheatre to bright light into the dark spaces below

6

New roof structure for politicians to access the space below. The roof is designed in accordance with the concept of a linear path

7

Connection points between old and new are characterised by the use of Corten to symbolise the harsh transition between the old and new political ideals

8

Remainder of the structure is built; glass ramps and internal finishes

Construction process

The construction process becomes crucial in the design of the political school for the preservation of the existing Union Buildings structure.

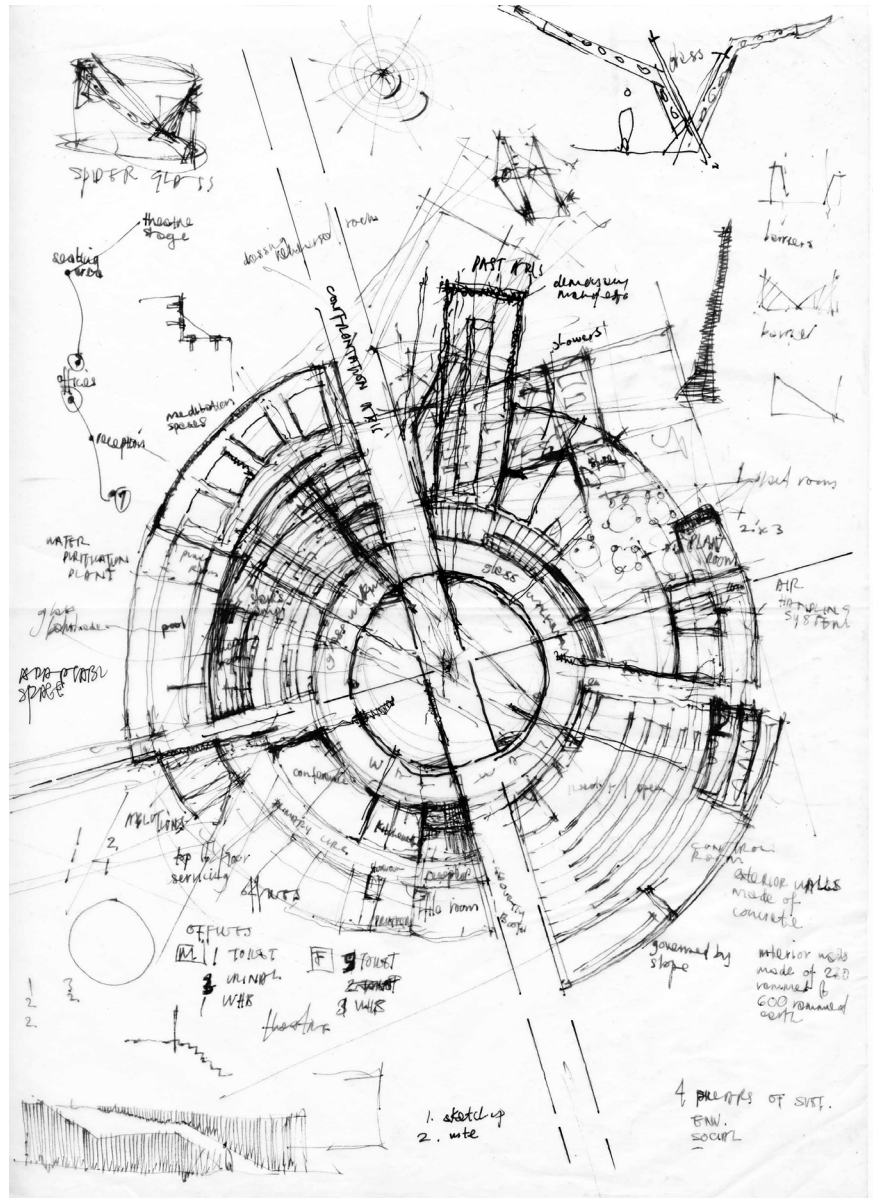
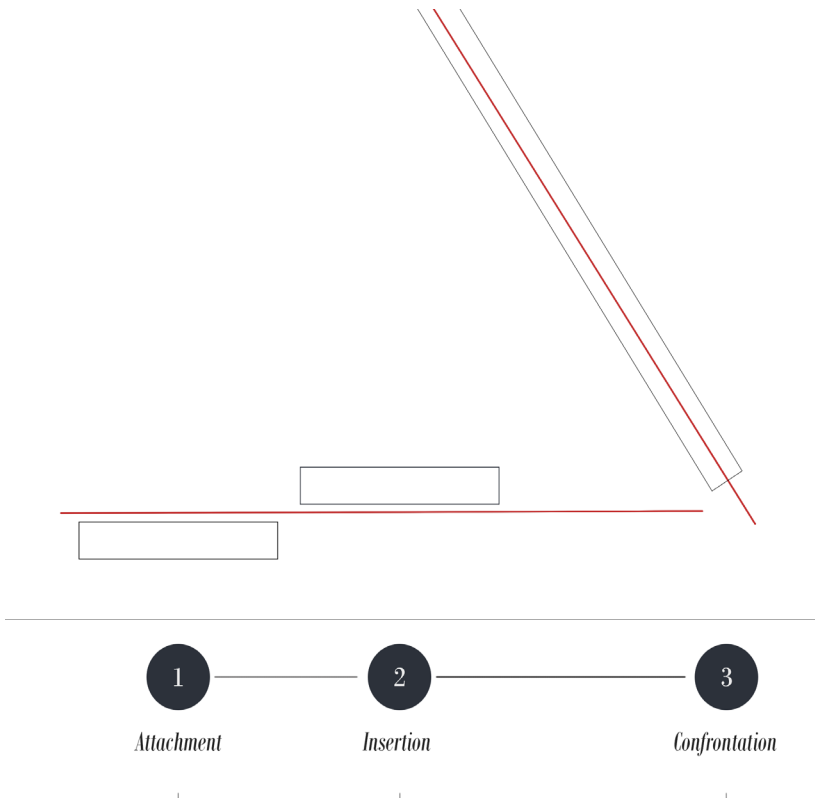
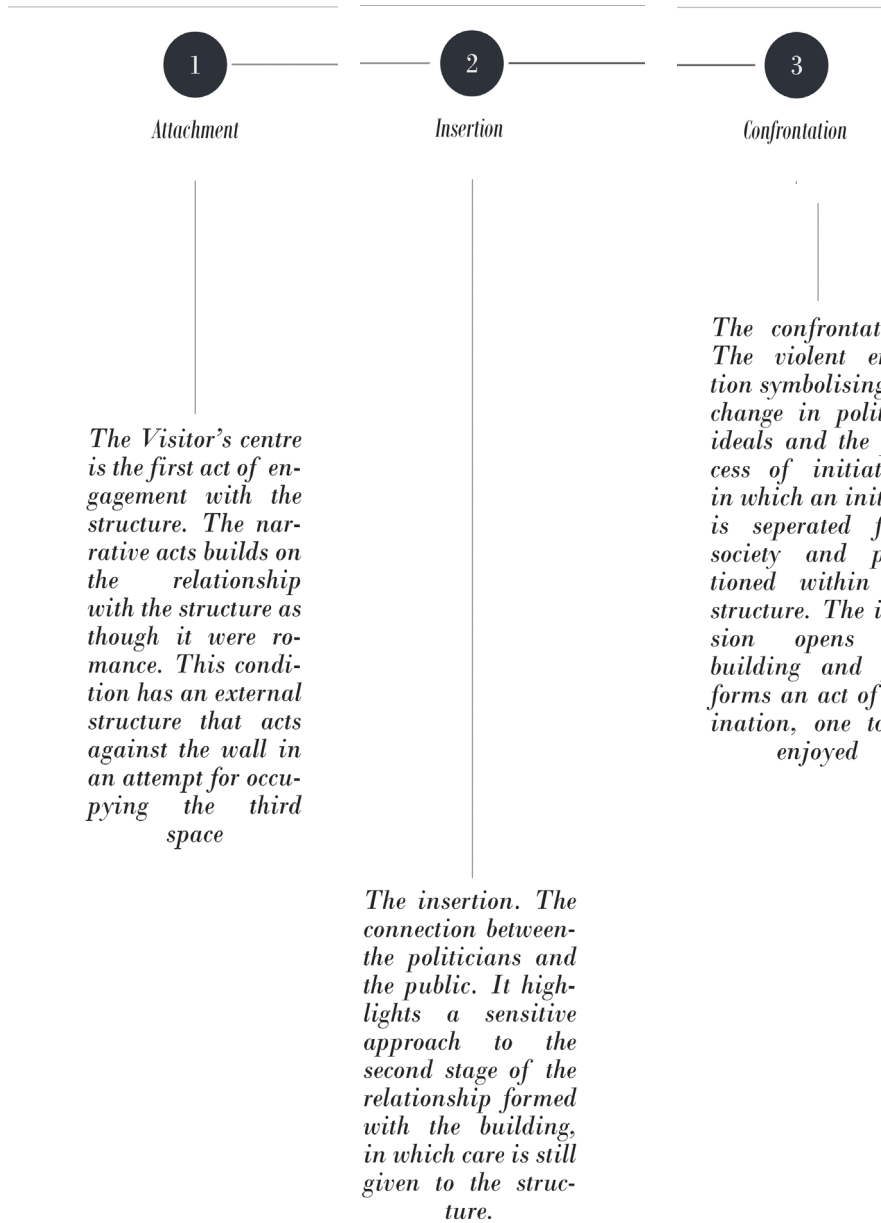


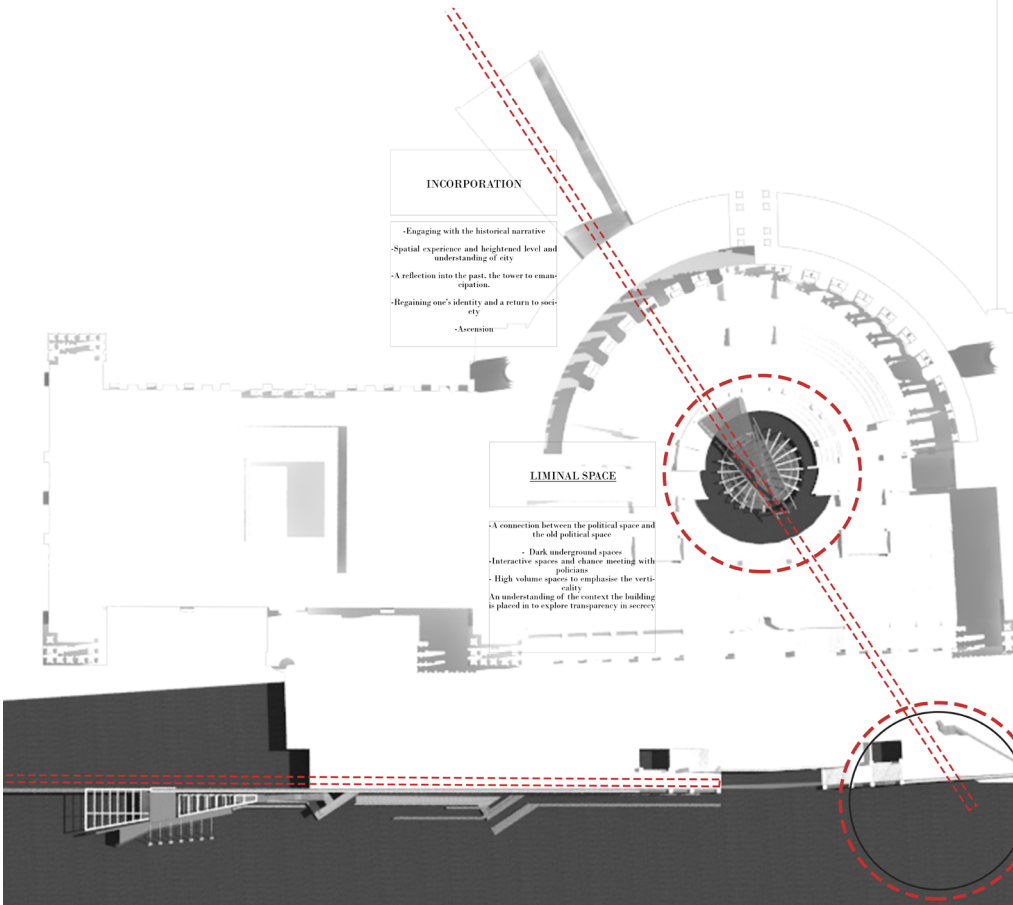
Figure 6.7 Initial plan design. The circle remains balanced while creating chaos within the internal boundary of the circle (Author, 2015)





EXPERIENTIAL ROUTE

Proposal of experiential route



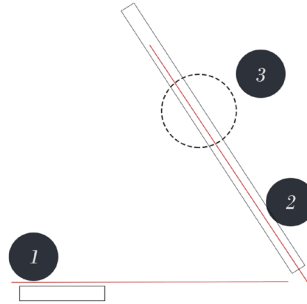
ARRIVAL AND ORIENTATION

- Realisation of the wall and new wall
- Waiting space. The views unlock the path and connect city with wall.

POINT OF SEPERATION

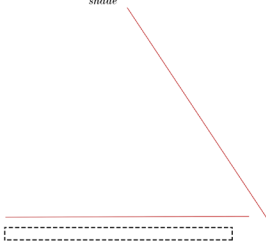
- Abrupt entry into the space
- Gradual descent into the underground space
- Directional movement within a dark contained space
- Small and narrow to highlight individuality and a path walked alone
- Exposure to existing heritage fabric

CONDITIONS



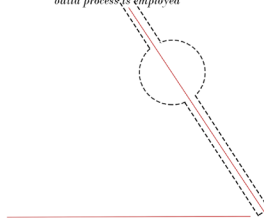
ETCHING

overlay of new intervention with existing. The proposed is a landscaped seating area, providing shade



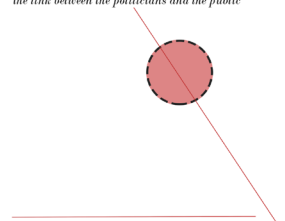
VOID

The excavation process which is required below structures which cannot be removed. A cut and build process is employed



INSERTION

The placement of the new roof structure which brings light in to the underground space and acts as the link between the politicians and the public

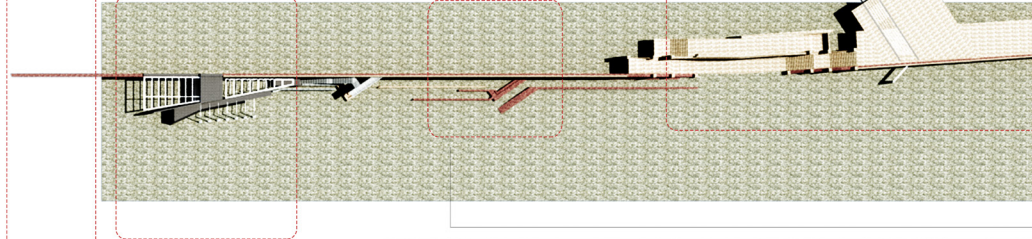


Existing

New vs Old

Juxtaposition

Contestation



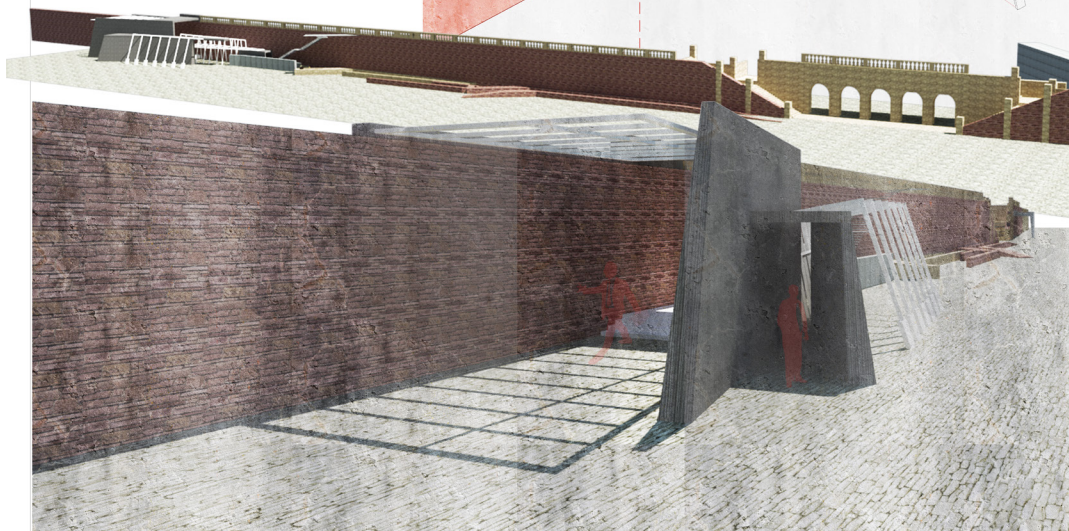
STEEL STRUCTURE

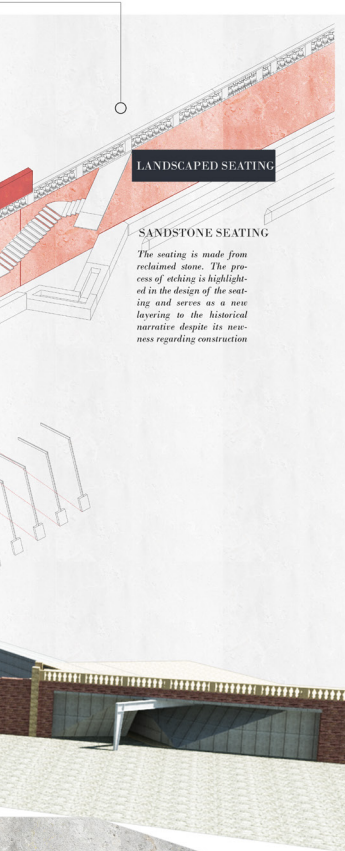
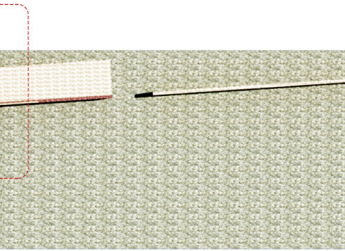
*Structural weathering steel.
Self-protecting steel. The steel reacts with the elements in the atmosphere. The material forms a layer of rust over time which protects the steel from corrosion.*

RAMMED CONCRETE WALL

Layers of reclaimed sandstone are built and mixed with concrete. The finer sediments of the shale are used and mixed with cement mixture to form the structure.

VISITOR'S CENTRE





LANDSCAPED SEATING

SANDSTONE SEATING

The seating is made from reclaimed stone. The process of etching is highlighted in the design of the seating and serves as a new layering to the historical narrative despite its newness regarding construction

PHASE I- THE WALL

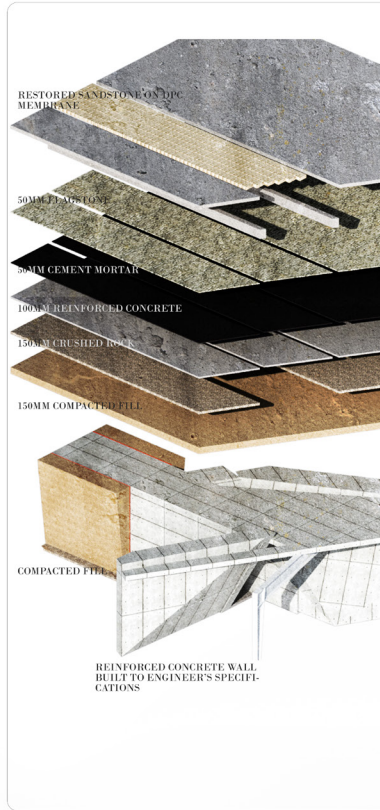
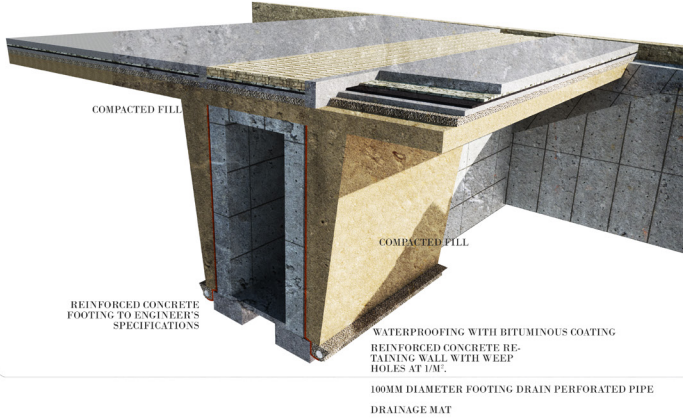
Construction process documenting the structural challenges in constructing the political school. Phase one is addressed in this section and highlights the process that occurs along the boundary wall; the visitor's centre and the new built entrance to the political school

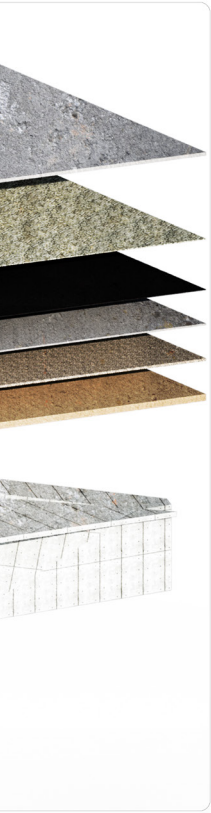


INITIATION SCHOOL

AXONOMETRIC VIEW

SECTIONAL PERSPECTIVE



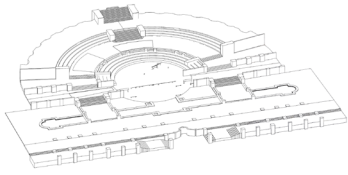


PHASE I-THE WALL *continued*

The contestation documents the entry to the wall. The change in material was crucial in highlighting the change in political thought, as well as to make a discernible structure which separates the existing (old) from the new

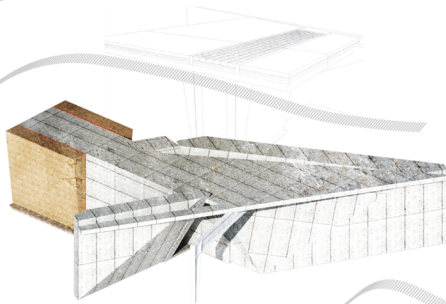


INITIATION SCHOOL



1 The sandstones of the amphitheatre are documented through use of technology and other appropriate software which aids in the preservation of existing Union Buildings. It is crucial that heritage experts be consulted for a further analysis and any damage that may be foreseen through the archiving.

2 The removal of the existing amphitheatre precedes its documentation and analysis. The road (highlighted in green) is removed as the road bears little heritage value. Above surface construction can occur in which concrete is cast in situ.



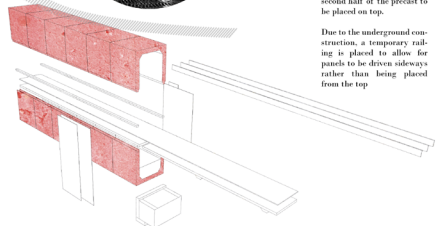
3 The sandstone retaining wall is archived and removed and used for the seating area in the proposal.



4 Microtunneling boring techniques are used to bore out the shale. The precast panels are placed 1700mm below natural ground level to allow for enough height of the second half of the precast to be placed on top.

Due to the underground construction, a temporary railing is placed to allow for panels to be driven sideways rather than being placed from the top.

5 Precast concrete culverts are placed on site in increments of 2500mm. A 2500mm excavation is



MASTIC JOINT SEALANT PLACED ON INSIDE OF GROOVE SECTION

DEBRISUM WATERPROOFING COMPRISING OF ONE LAYER OF CG3 (3MM) AND ONE LAYER OF CG1 (4MM) BONDED BY MEANS OF TORCH FUSION

REINFORCED CAST IN SITU CONCRETE FOOTING

PRECAST BOX CULVERT SECTION WITH TOUGLE AND GROOVE AT ENDS
LAMINATED SALIGNA BEAMS BOLTED TO ANGLE CLEATS BOLTED TO CULVERT SECTION

40MM SCREED

REINFORCED CONCRETE SLAB ON REINFORCED CONCRETE FOOTING

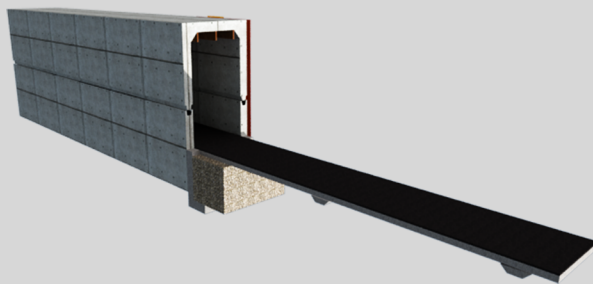
COMPACTED FILL

REINFORCED CAST IN SITU CONCRETE FOOTING

6 Exploded axonometric of construction material

Compacted fill is placed to level the ground to the natural ground level, in situ concrete is poured, and 40mm screed laid above.

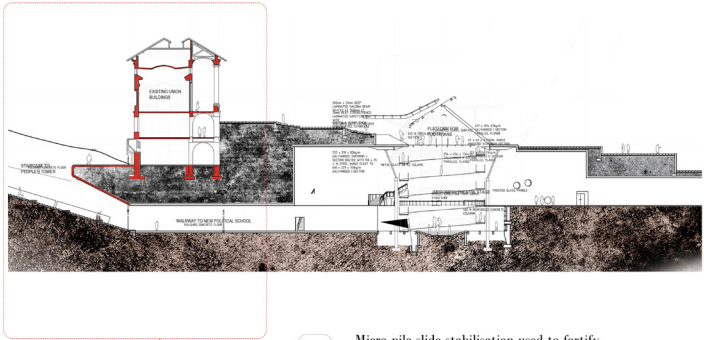
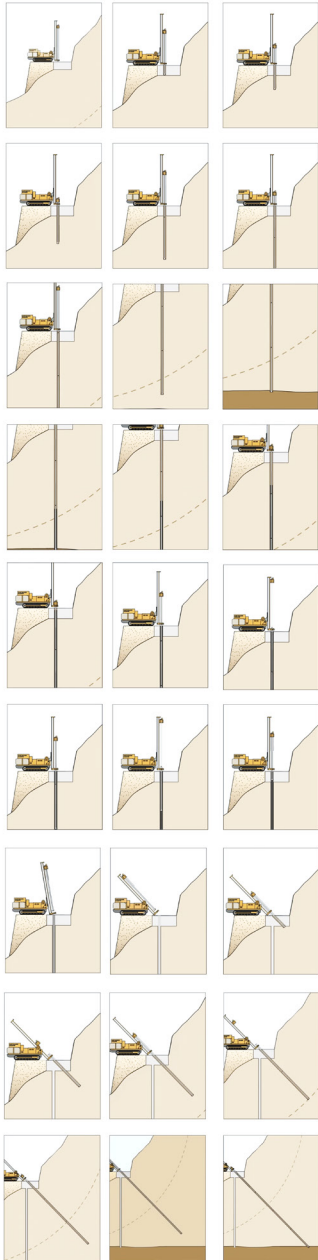
7 Finished product



PHASE II- THE VOID

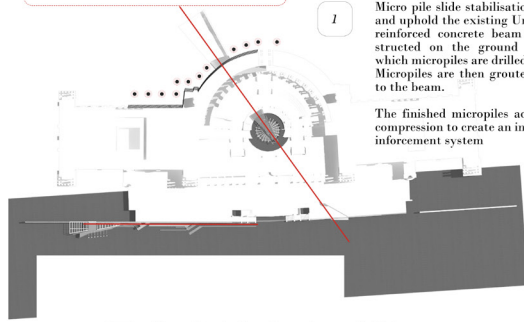
Construction process documenting the structural challenges in constructing the political school. Phase two is addressed in two part- the pathway into the building which involves construction occurring below the Union Buildings and other existing structure which is of heritage significance, which cannot be damaged.

STRUCTURAL STRATEGY

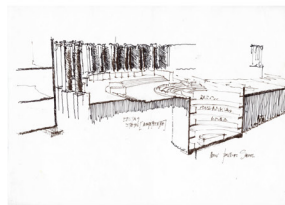
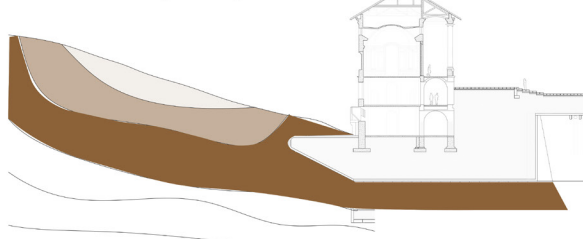


1 Micro pile slide stabilisation used to fortify and uphold the existing Union Buildings. A reinforced concrete beam is initially constructed on the ground surface through which micropiles are drilled into the surface. Micropiles are then grouted and connected to the beam.

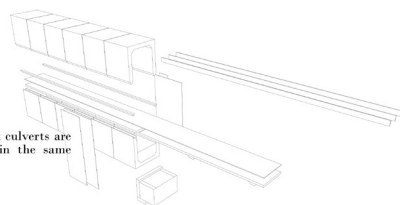
The finished micropiles act in tension and compression to create an integral ground reinforcement system



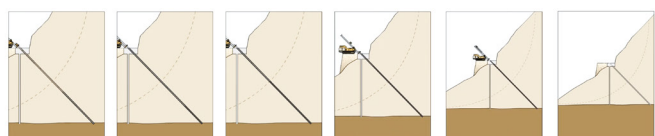
2 Excavation is done to create a path that leads from the outside of the Union Buildings to the People's Tower



3 Precast box culverts are positioned in the same manner



4 The insertion is explored once the process of the void is covered

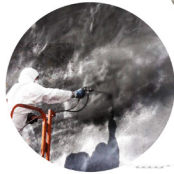
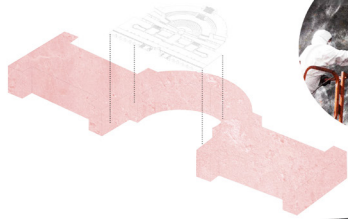
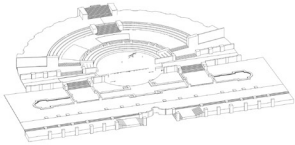


PHASE II- THE VOID *continued*

Construction process documenting the structural challenges in constructing the political school. Phase two is addressed in two part- the pathway into the building which involves construction occurring below the Union Buildings and other existing structure which is of heritage significance, which cannot be damaged.

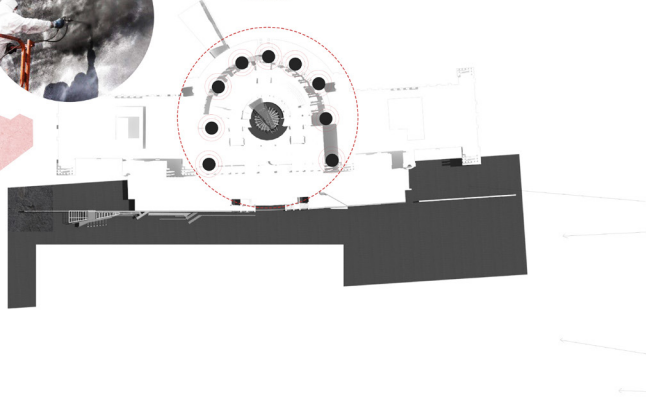
2

The amphitheatre is lifted from the surface



1

The preservation of the existing amphitheatre is crucial. The material below the Union Buildings is made of shale and requires structural attention so as not to allow the amphitheatre to cave in the process of excavation. The process below investigates the process of creating the void. The main internal structure



PHASE III- THE INSERTION

Construction process documenting the structural challenges in constructing the political school. Phase three addressed the making of space, more specifically on the central space. The structural elements are highlighted, through this process systems are instigated and an understanding of the roof structure that lies in the centre of the amphitheatre (existing) are analysed

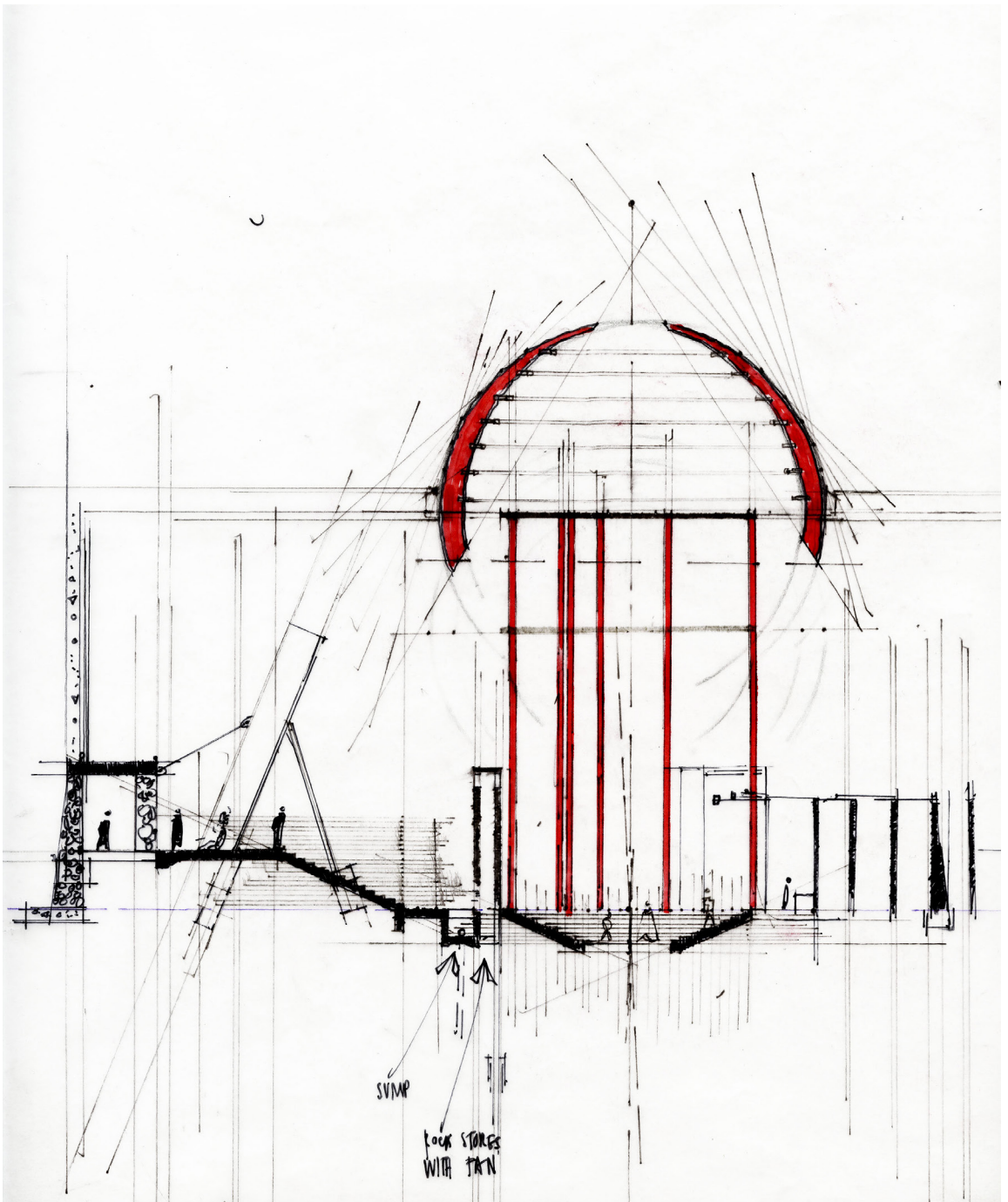


Figure 6.8: Section exploration (September 2015) (Author, 2015)

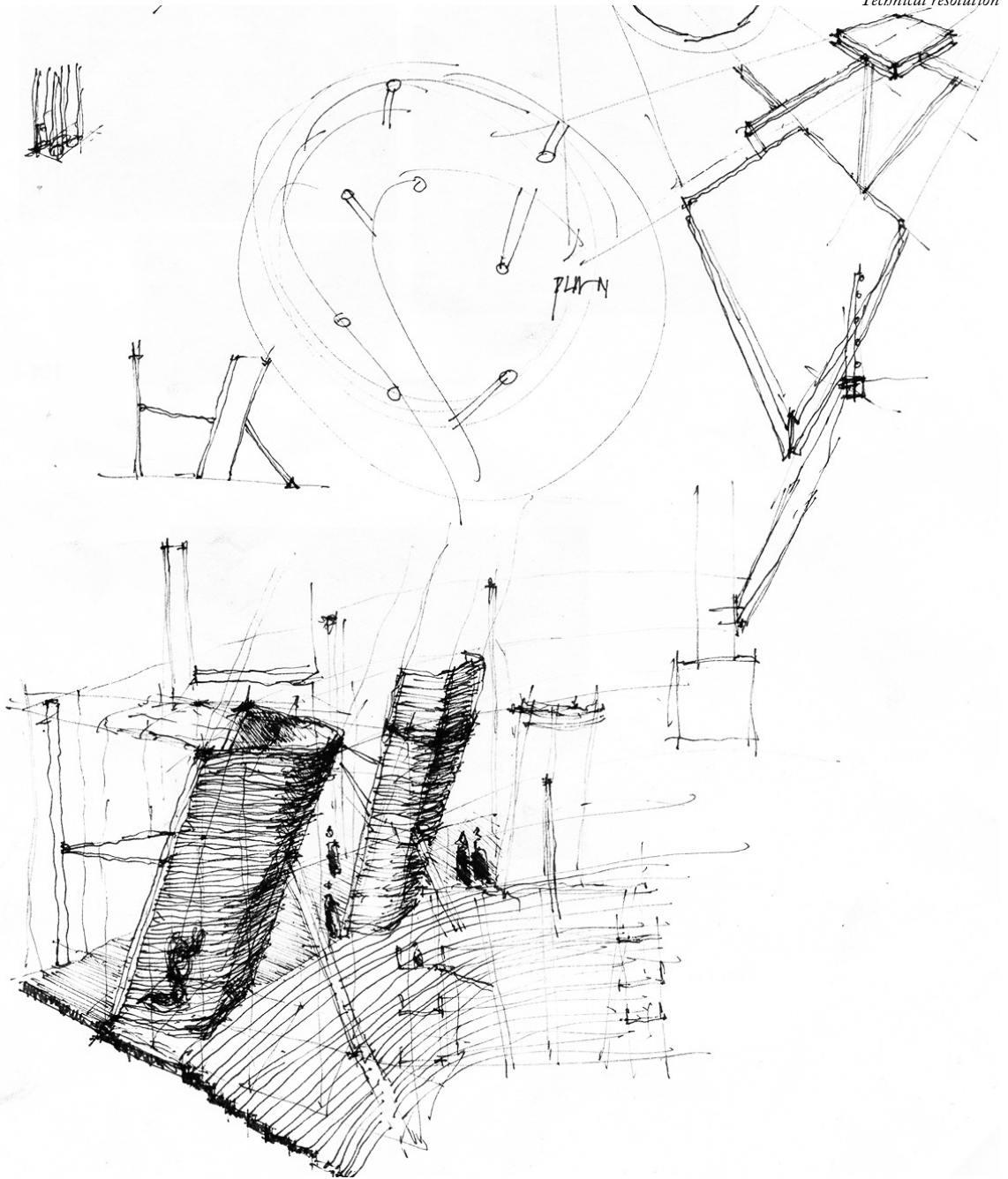
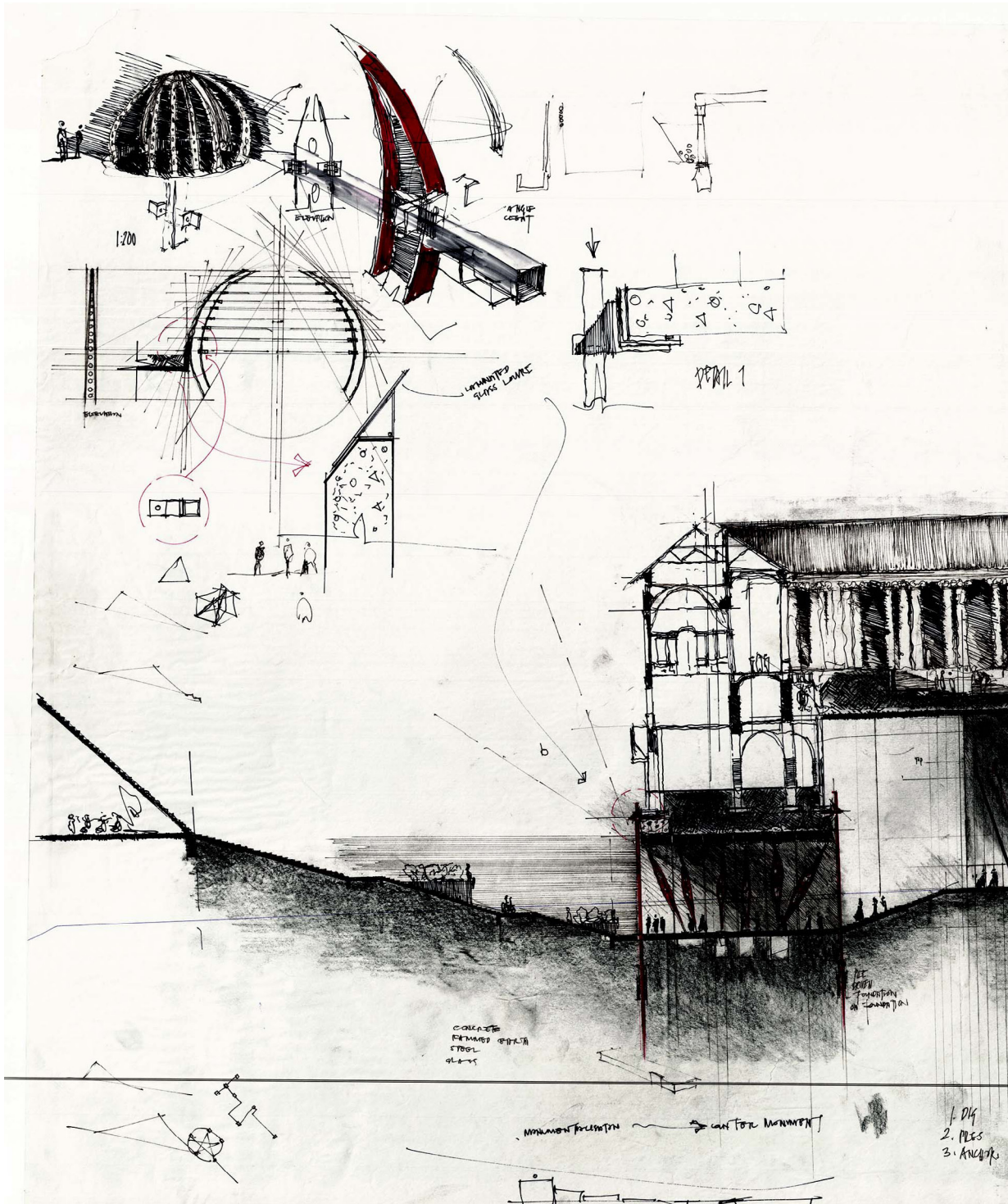


Figure 6.9: Perspective of meditation spaces (prayer spaces) which are held together by compressive and tension forces, highlighting the balance that exists between a spiritual ethereal initiation stage (Author, 2015)

INITIATION SCHOOL



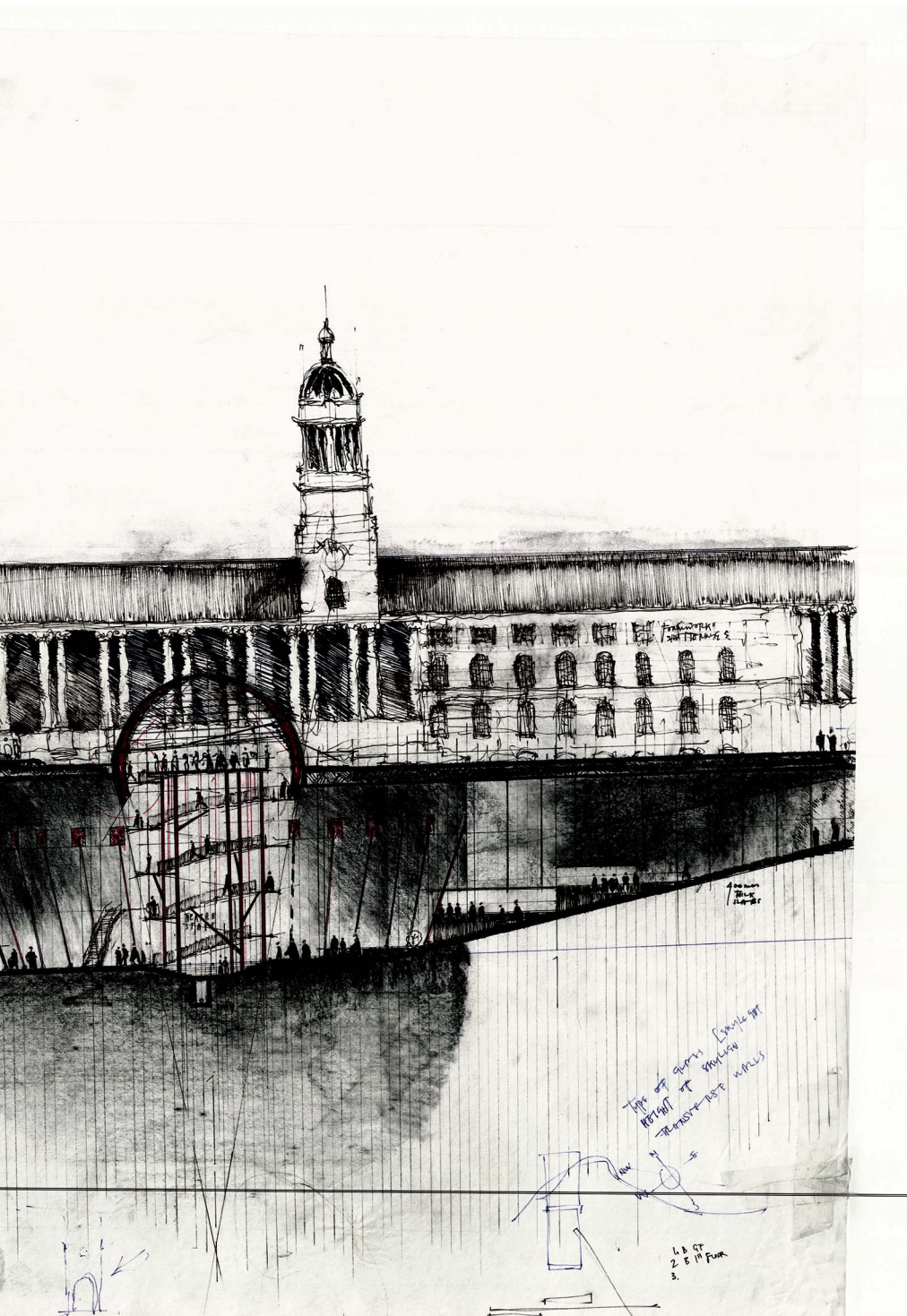
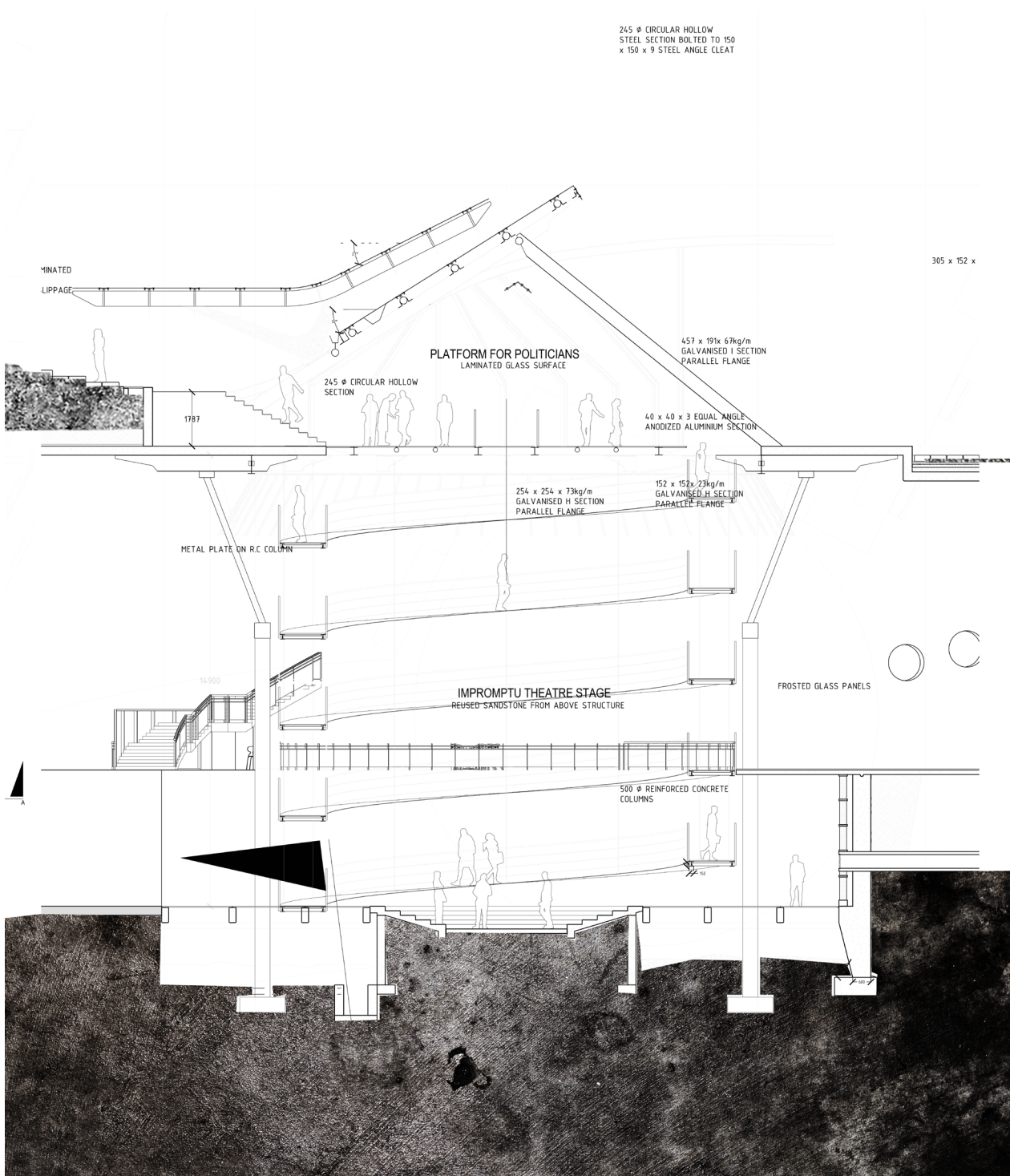


Figure 6.10: Further exploration of structure through section, highlighting the centre amphitheatre and the public space below it. Different structural problems are realised such as holding up the Union Buildings while excavation and tunnelling happens below it. The degree of tunnelling is also questioned, as the heights to the underside of the amphitheatre are too great (Author, 2015).

INITIATION SCHOOL



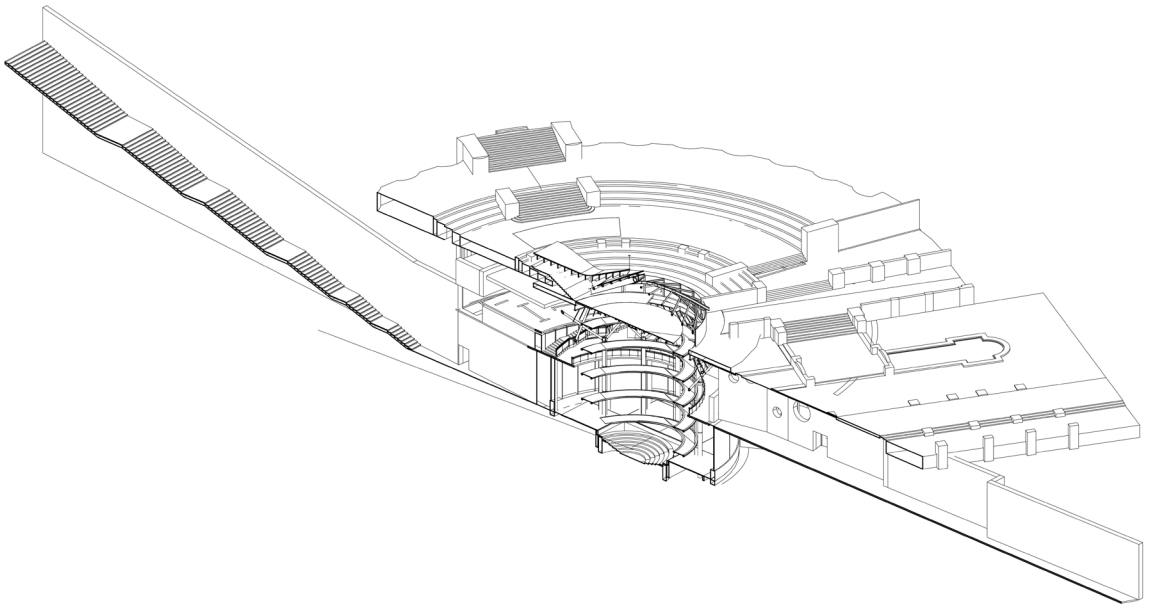


Figure 6.11 Section of the political school with connection to the underneath structure (Author, 2015) Left

Figure 6.12: Sectional perspective showing amphitheatre in relation to the school (Author, 2015)

INITIATION SCHOOL

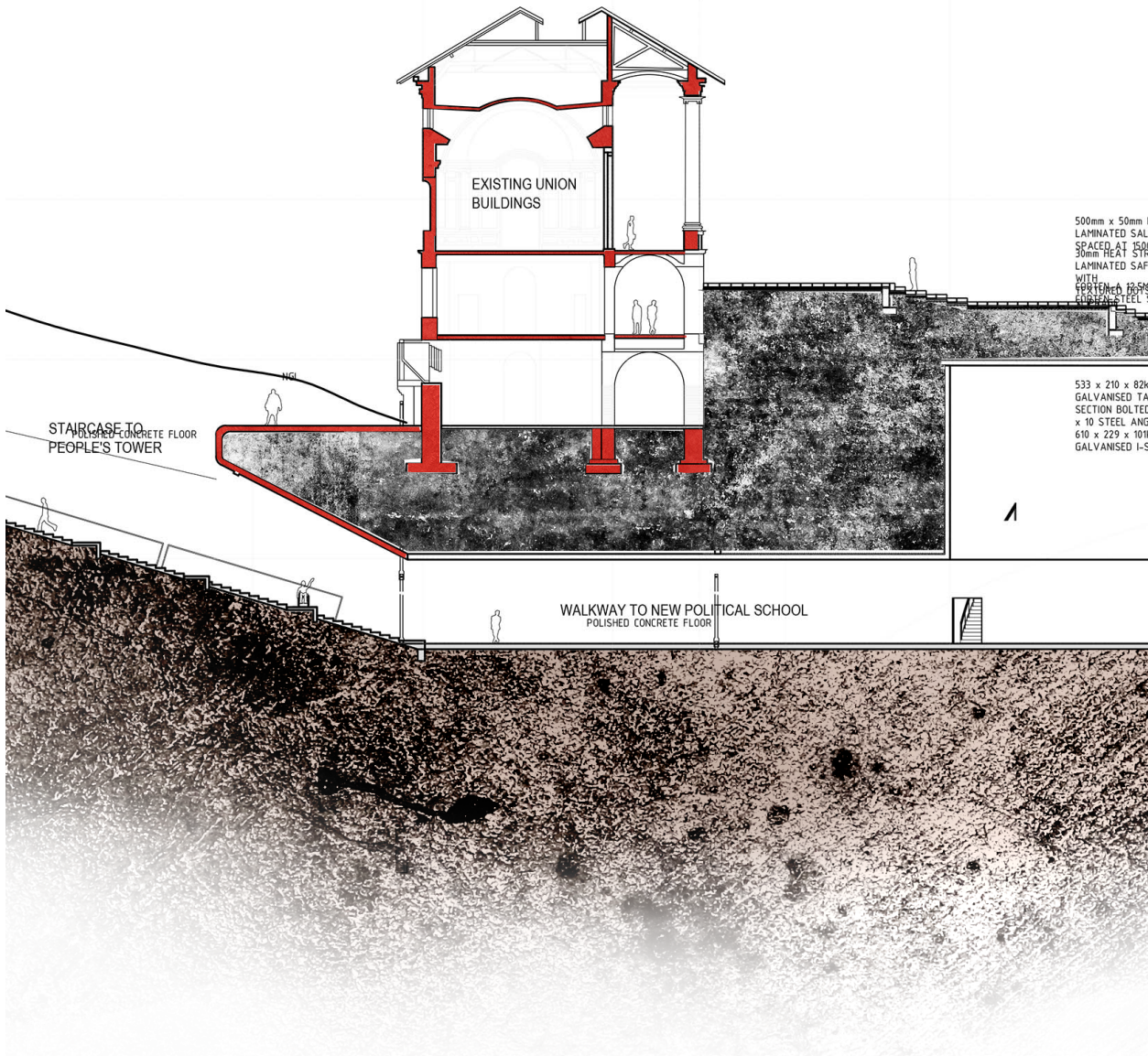
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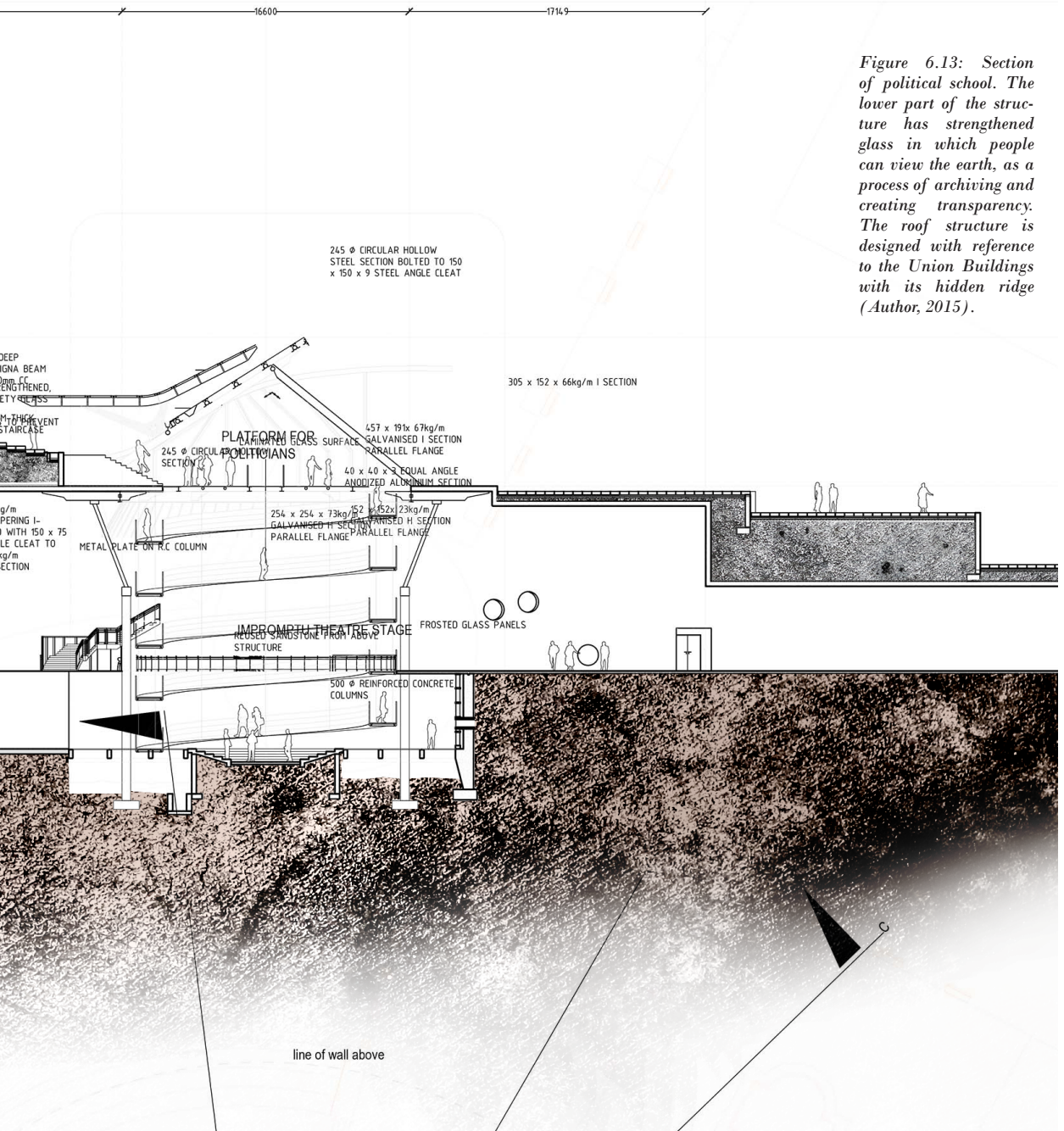
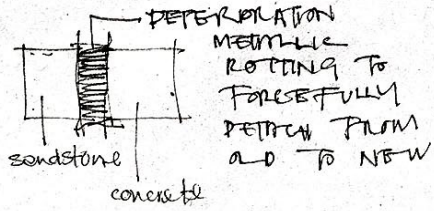
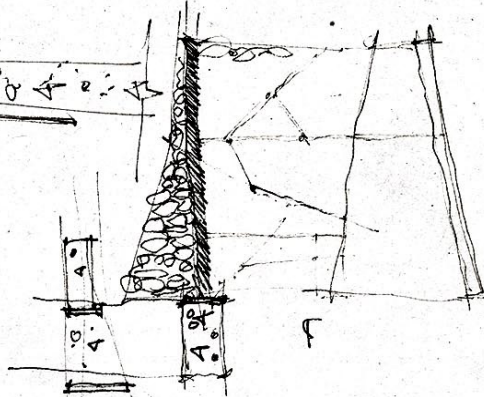
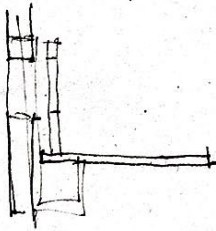


Figure 6.13: Section of political school. The lower part of the structure has strengthened glass in which people can view the earth, as a process of archiving and creating transparency. The roof structure is designed with reference to the Union Buildings with its hidden ridge (Author, 2015).

DETAILS
TOP ROOF / ENTRANCE WALL [FRONT]



water issue



part of p
to below

FALL D
INTO
FILTRATION
SYSTEM

PRE
BLOCK

RAMMED
EARTH

TEXTILE
SCREEN
REINFORCED CONCRETE
STEEL

BLANK
WINDOWS

DETAIL
BOUND E DGE

WALL
DESIGN

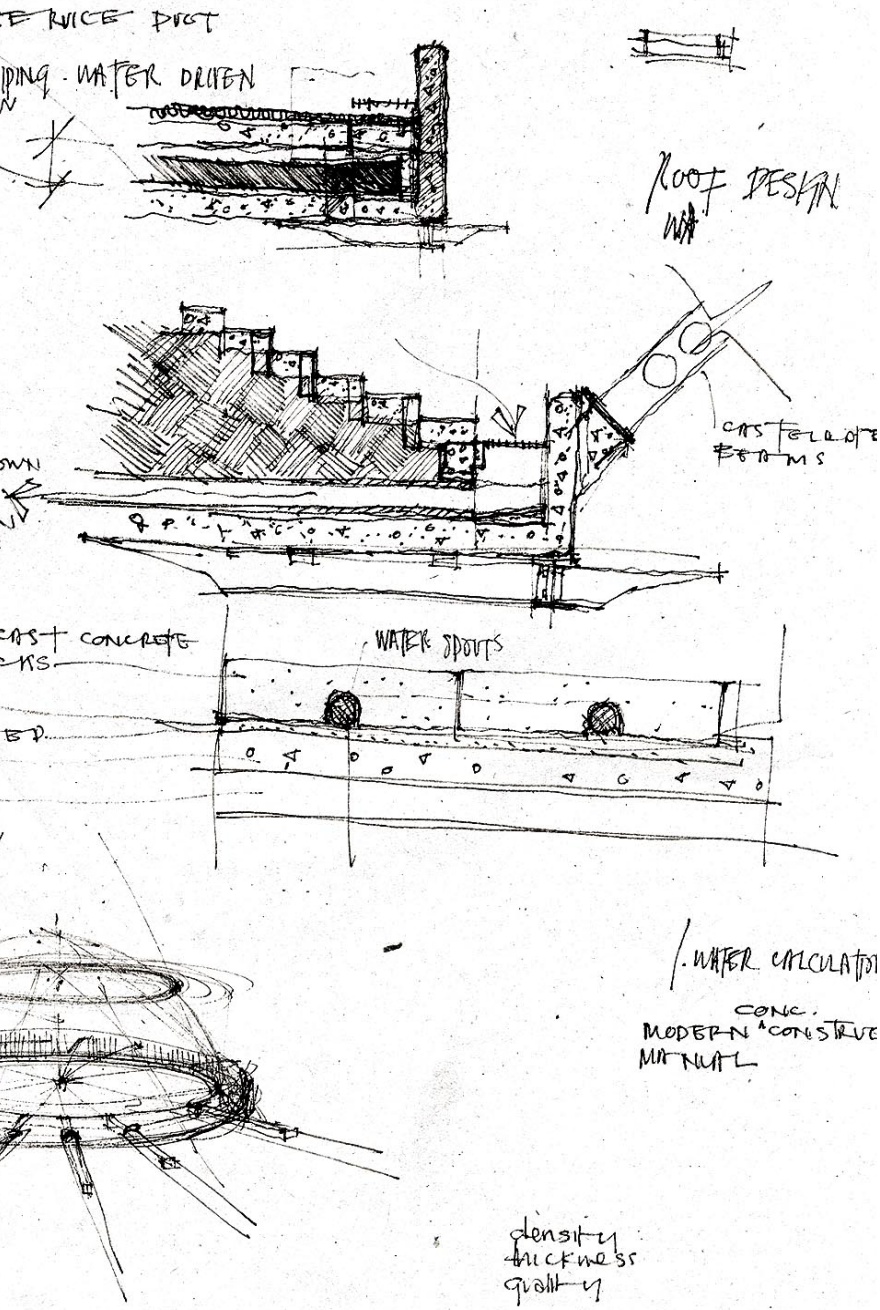
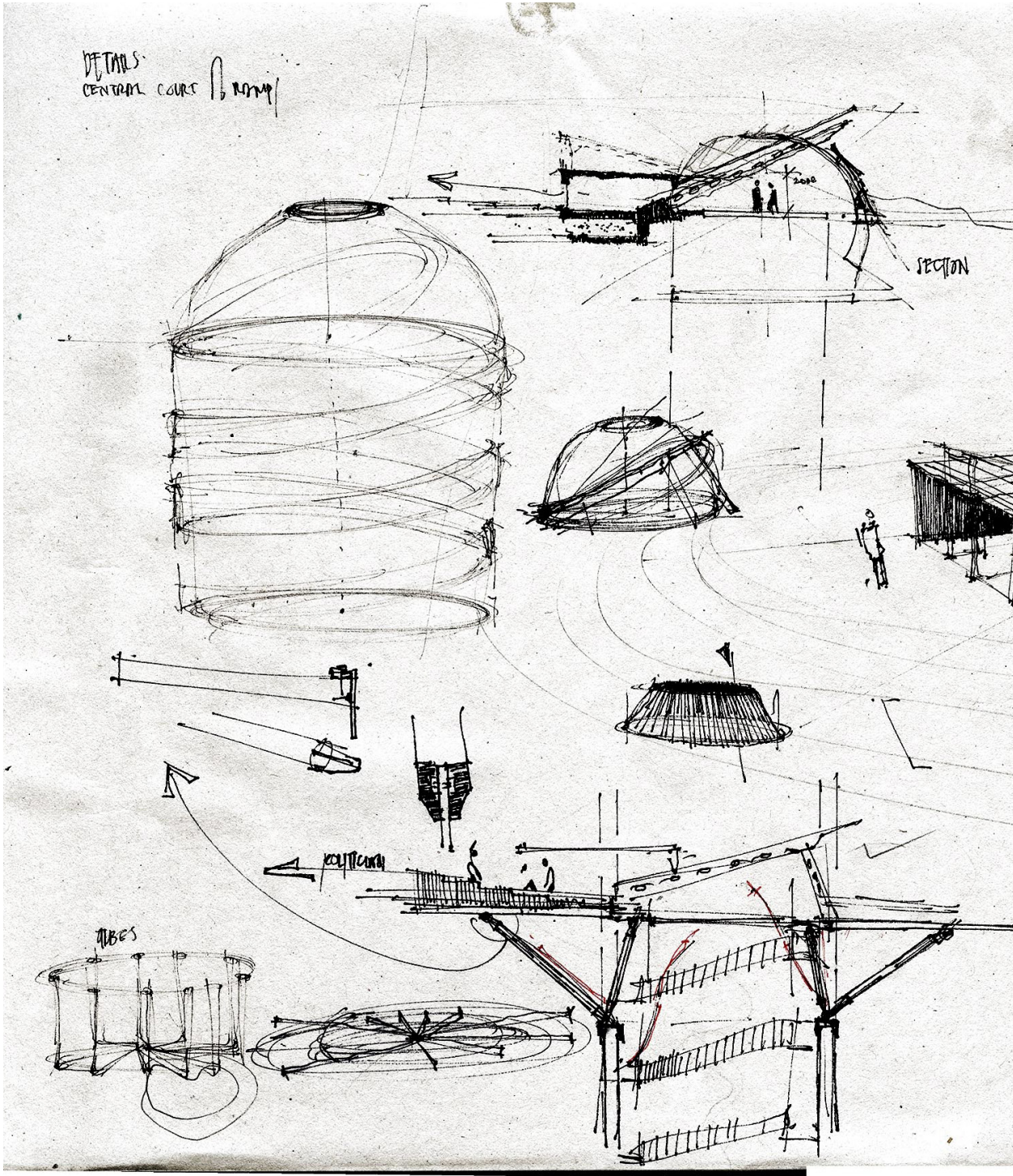


Figure 6.14: Detail exploration_01(-
Author, 2015)



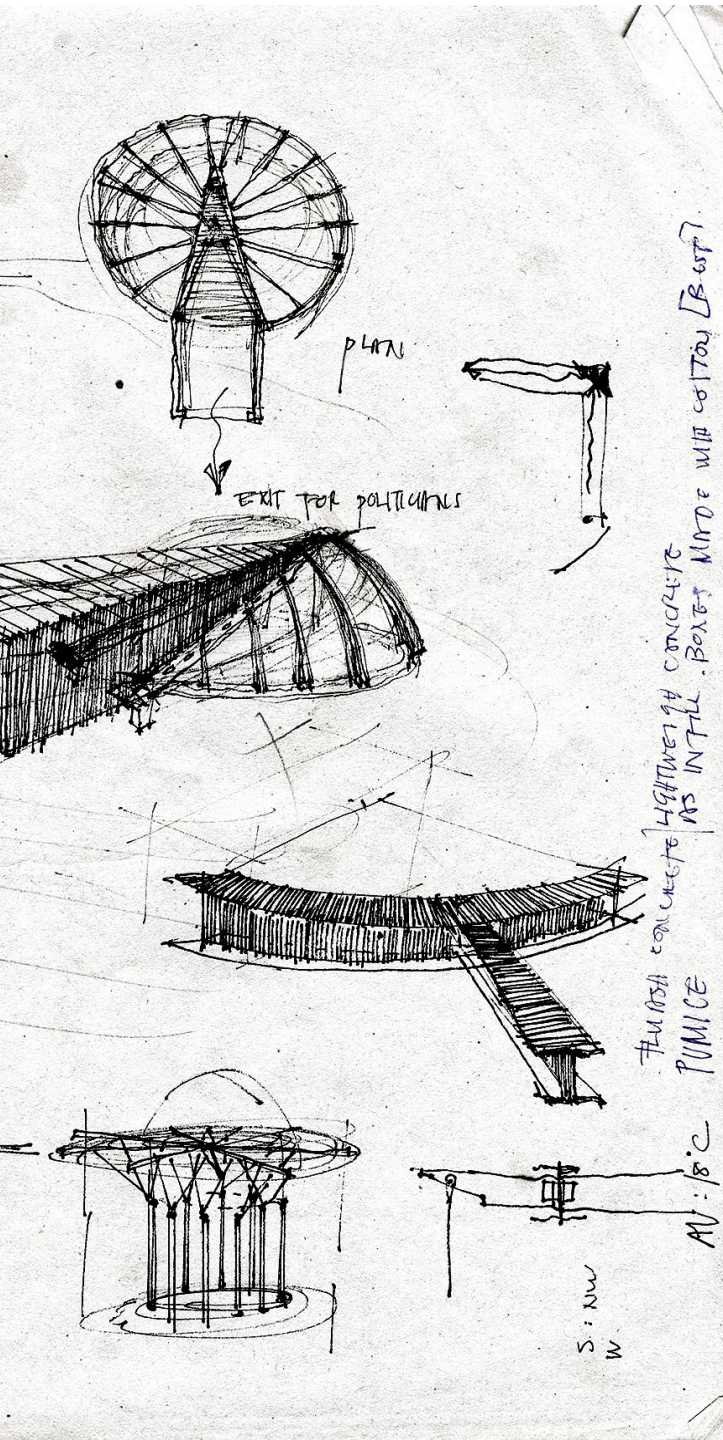
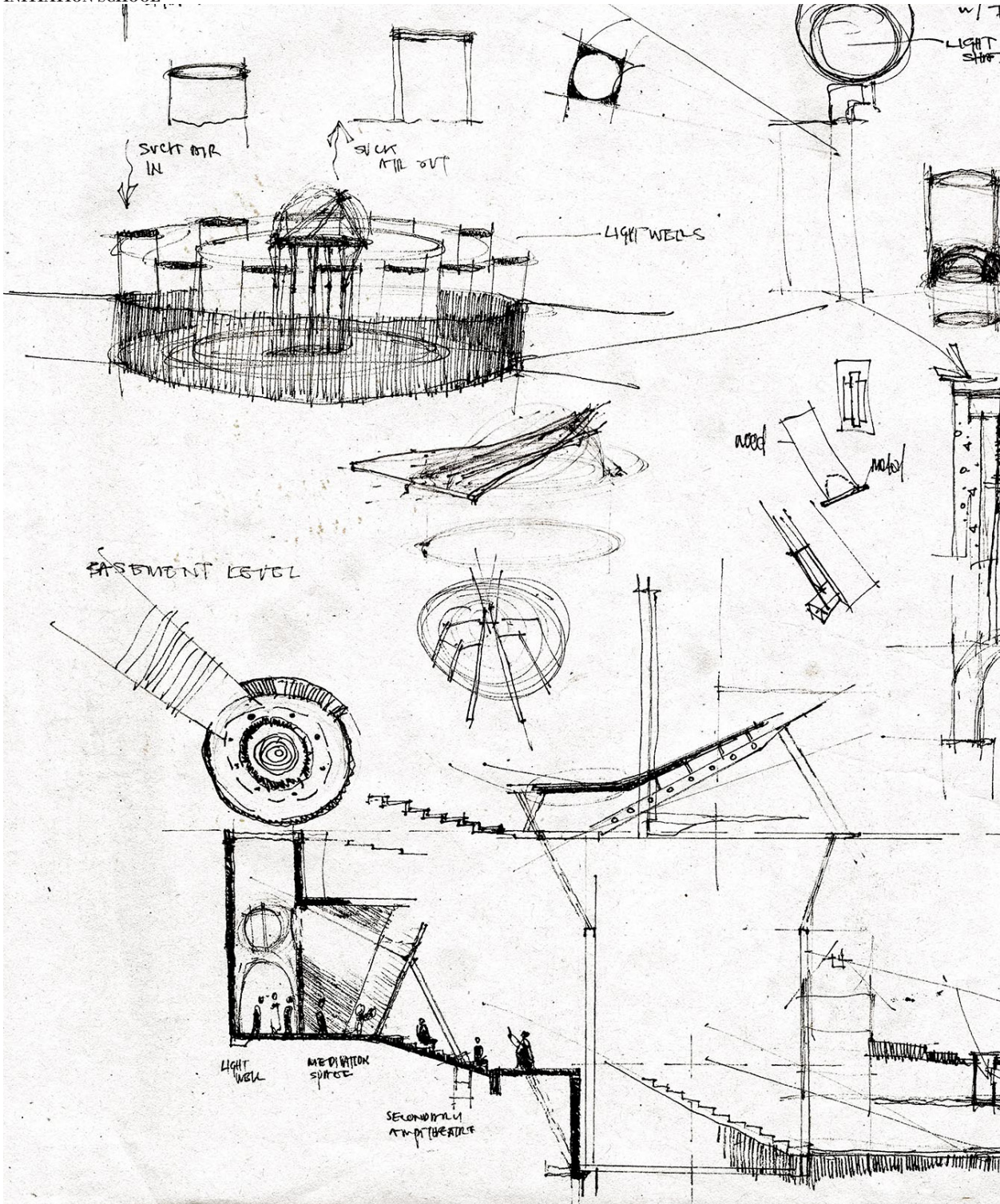


Figure 6.15: Detail exploration_02(-
Author, 2015)

INITIATION SCHOOL



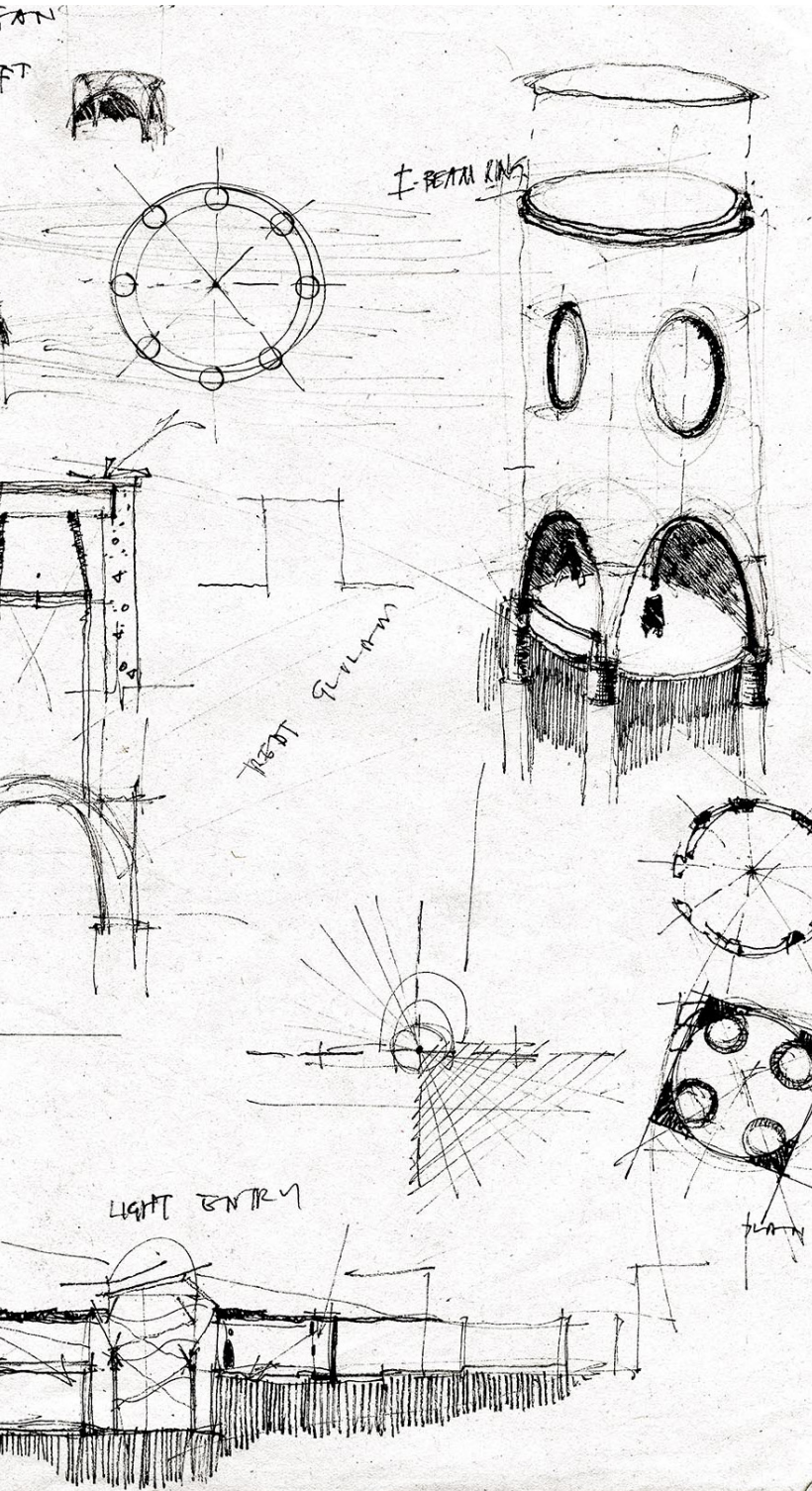
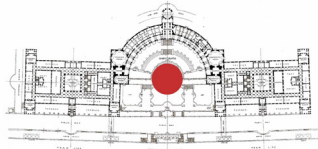


Figure 6.16: Detail exploration_03(-
Author, 2015)

ROOF STRUCTURE

Process of remoulding



BIPV glass roof on laminated curved Saligna beams for entrance way of politicians

Glass panels placed on steel beams to form roof structure

300 Reinforced concrete slab as new surface level with the existing Union Buildings ampitheatre

Glass floor as platform for politicians

Circular galvanised steel beams to support concrete floor above

Metal rods bolted on hinged ends to tapered beams to support lateria movement of glass ramp

Reflective surface support structure to allow light reflected into the interior spaces

Round circular beams with hinged end supports to support steel beams placed on metal plates

500 diameter reinforced concrete column

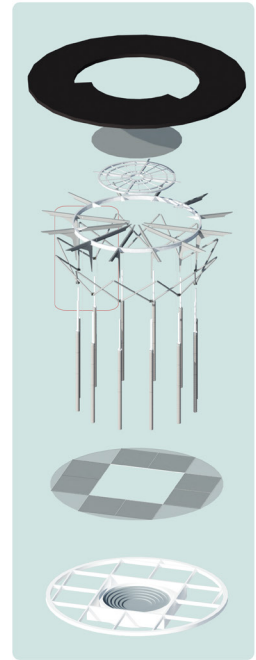
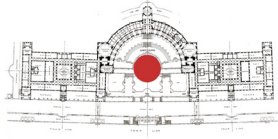
Glass ramp supported on I-beams spanning from the platform to bottom level of political school.

Level of political school

Figure 6.17:
Extrapolated
roof structure of
the connection
between old and
new (Author,
2015)

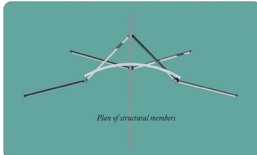
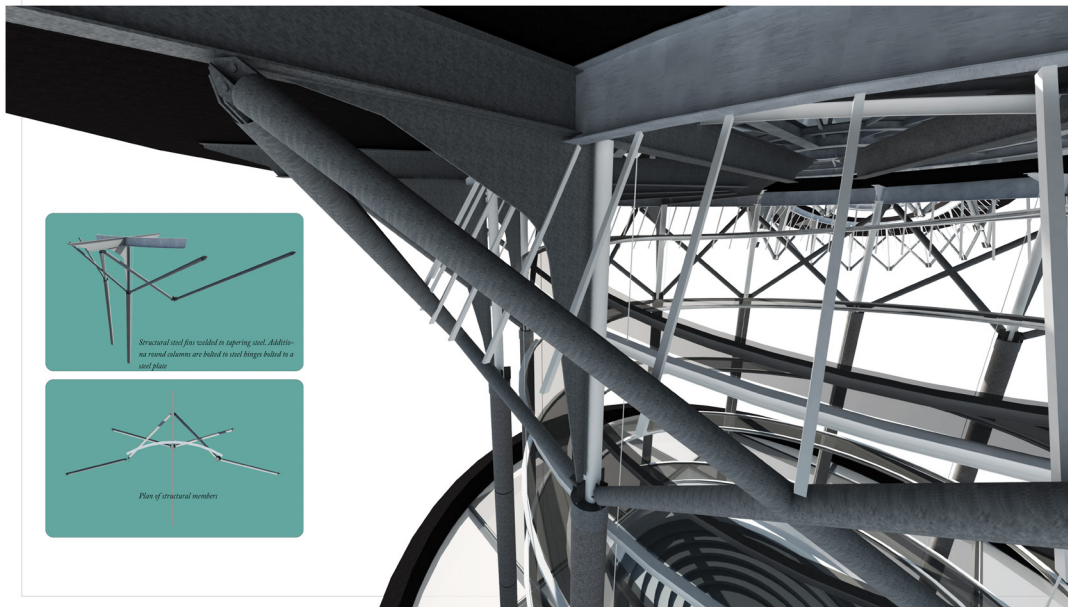
ROOF STRUCTURE

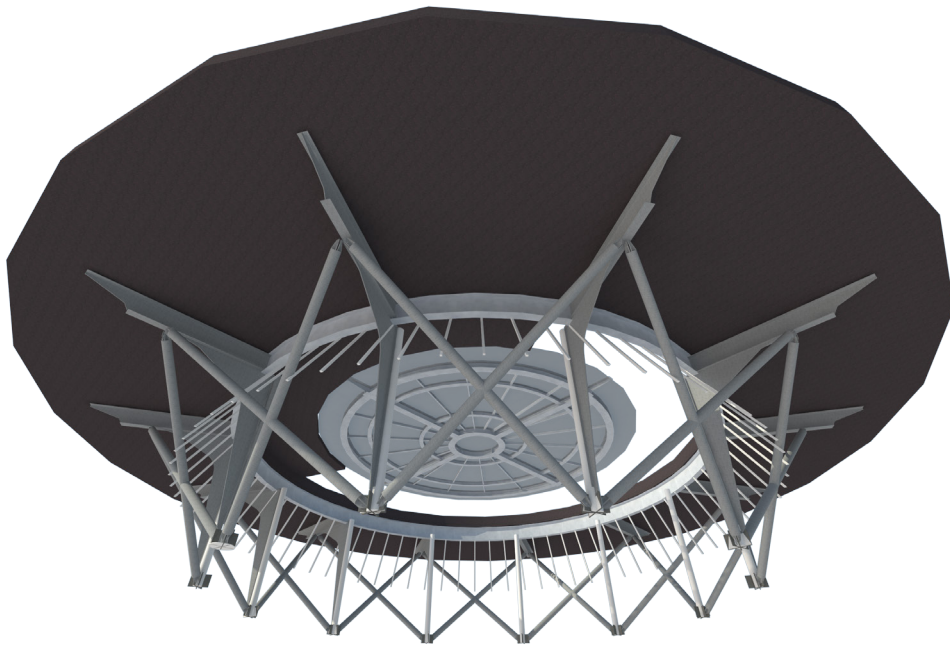
What makes the central space



Roof structure on the level of the amphitheatre

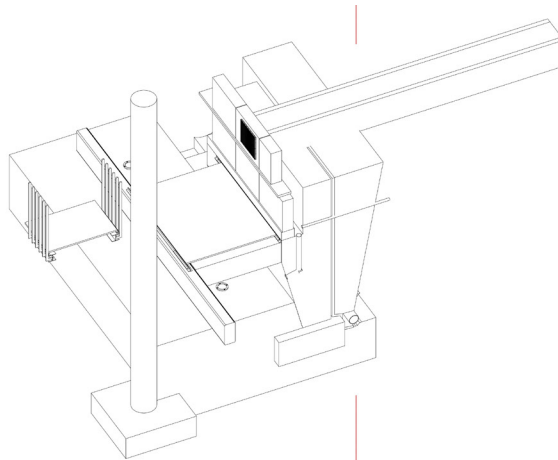
Exploded structure of the central space





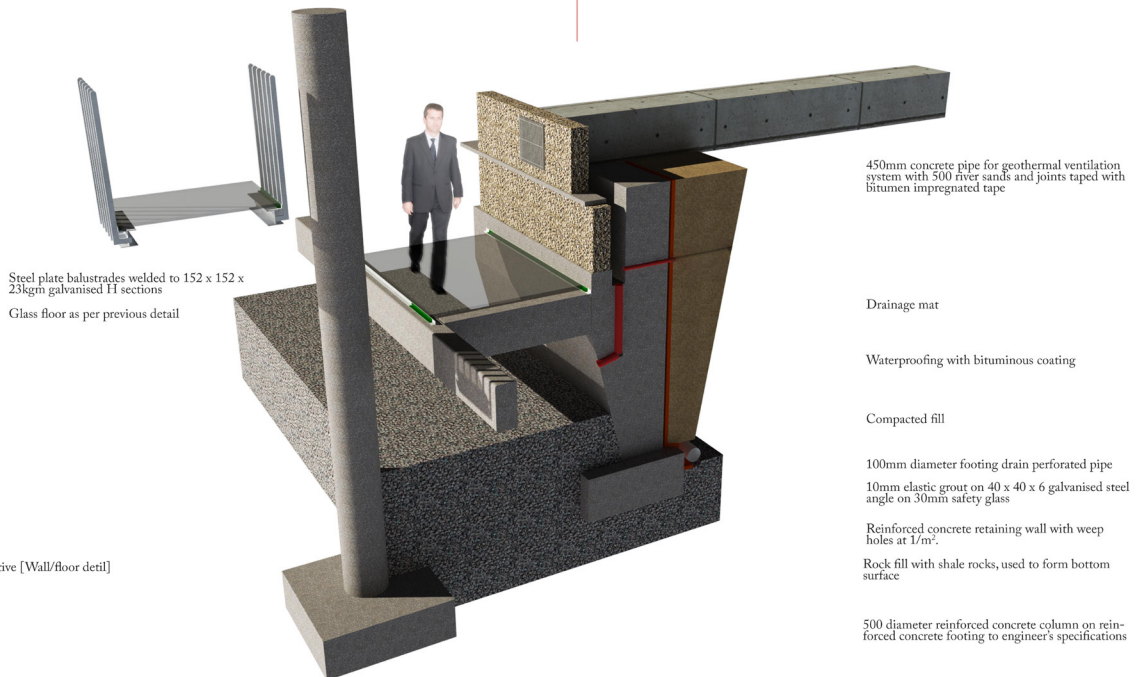
*Figure 6.17.1 and
Figure 6.17.2: Roof
structure and struc-
tural components
(Author, 2015)*

2. Axonometric view



230mm x 1000mm adobe blocks with 50mm reinforced concrete bed between blocks to increase strength and longevity of blocks
Mentis grating fixed to concrete pipe

3. Sectional perspective [Wall/floor detail]



Steel plate balustrades welded to 152 x 152 x 23kgm galvanised H sections
Glass floor as per previous detail

450mm concrete pipe for geothermal ventilation system with 500 river sands and joints taped with bitumen impregnated tape

Drainage mat

Waterproofing with bituminous coating

Compacted fill

100mm diameter footing drain perforated pipe
10mm elastic grout on 40 x 40 x 6 galvanised steel angle on 30mm safety glass

Reinforced concrete retaining wall with weep holes at 1/m².

Rock fill with shale rocks, used to form bottom surface

500 diameter reinforced concrete column on reinforced concrete footing to engineer's specifications

Figure 6.18: Detail: Wall meets ground (Author, 2015)

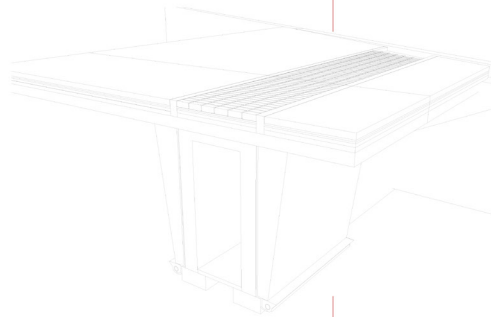
INITIATION SCHOOL

WALL (ENTRANCE TO POLITICIAN SCHOOL)

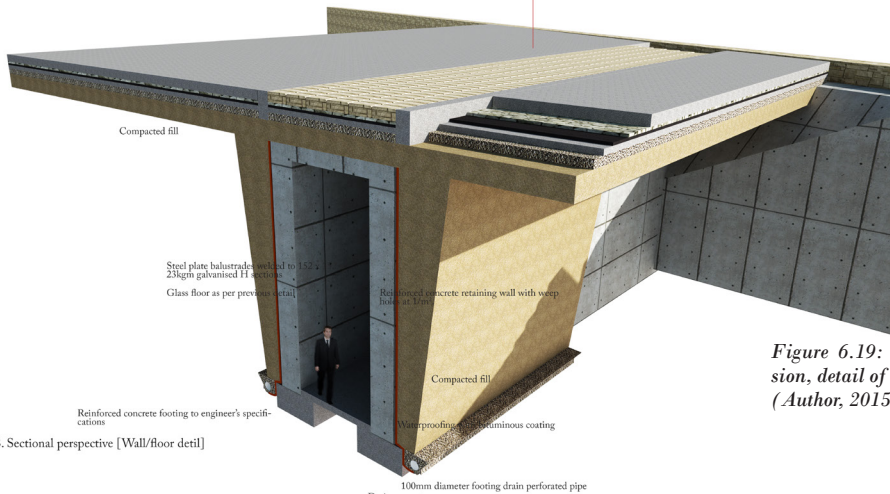
Process of remoulding



1. Perspective

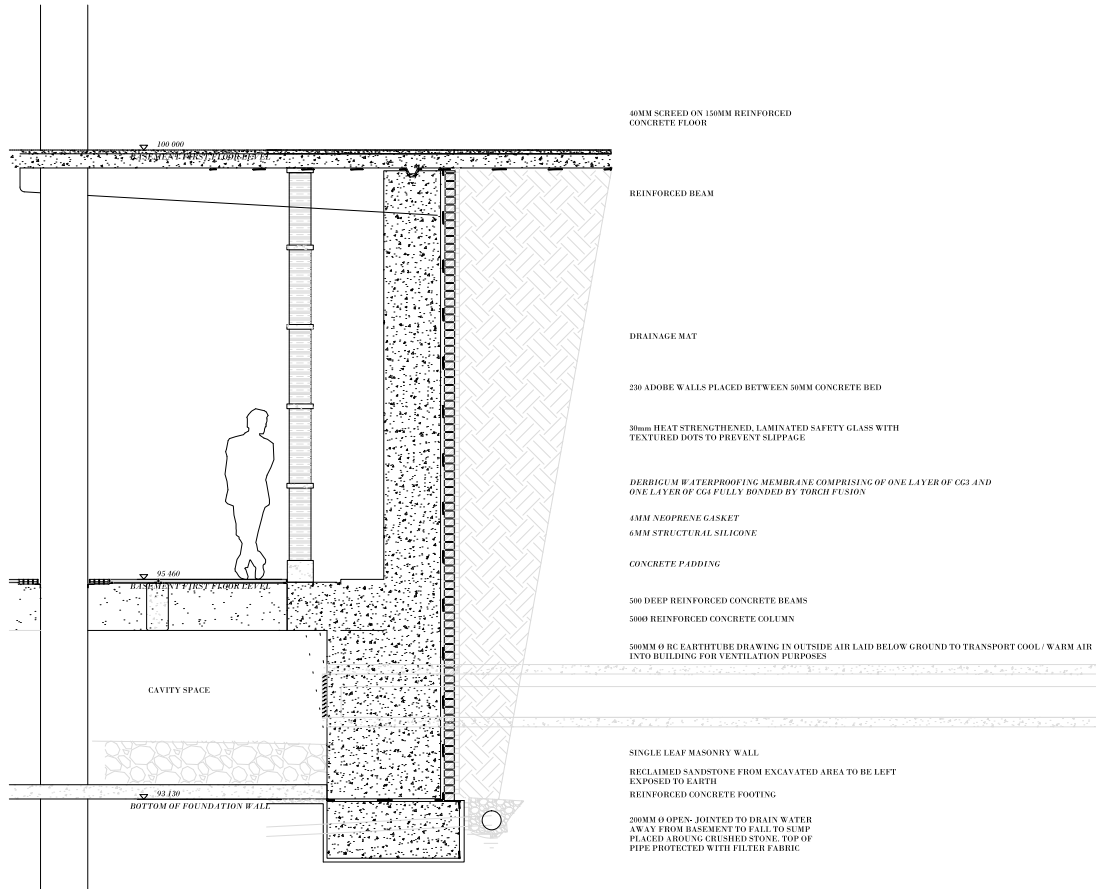


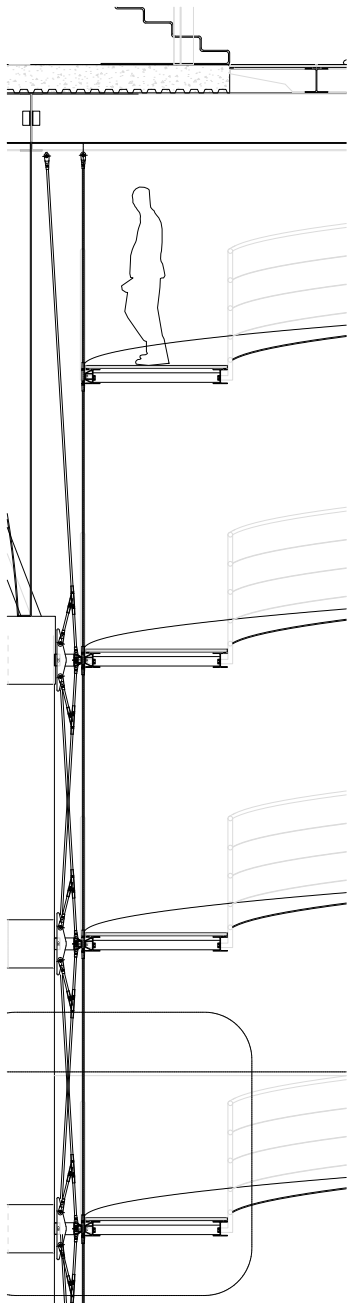
2. Axonometric view



3. Sectional perspective [Wall/floor detail]

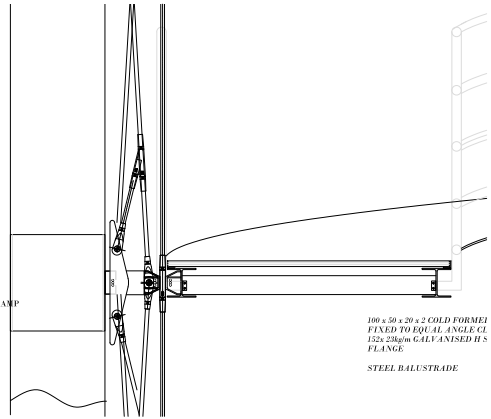
Figure 6.19: Perspective of wall incision, detail of walkway into the incision (Author, 2015)





500 Ø REINFORCED CONCRETE COLUMN
GUSSET PLATE
STRUCTURAL STEEL RODS TO SUPPORT RAMP

500 Ø REINFORCED CONCRETE COLUMN



100 x 50 x 20 x 2 COLD FORMED
FIXED TO RHP-41 ANGLE CL
152 x 238 g/m GALVANISED H S
FLANGE
STEEL BALUSTRADE

Environmental systems

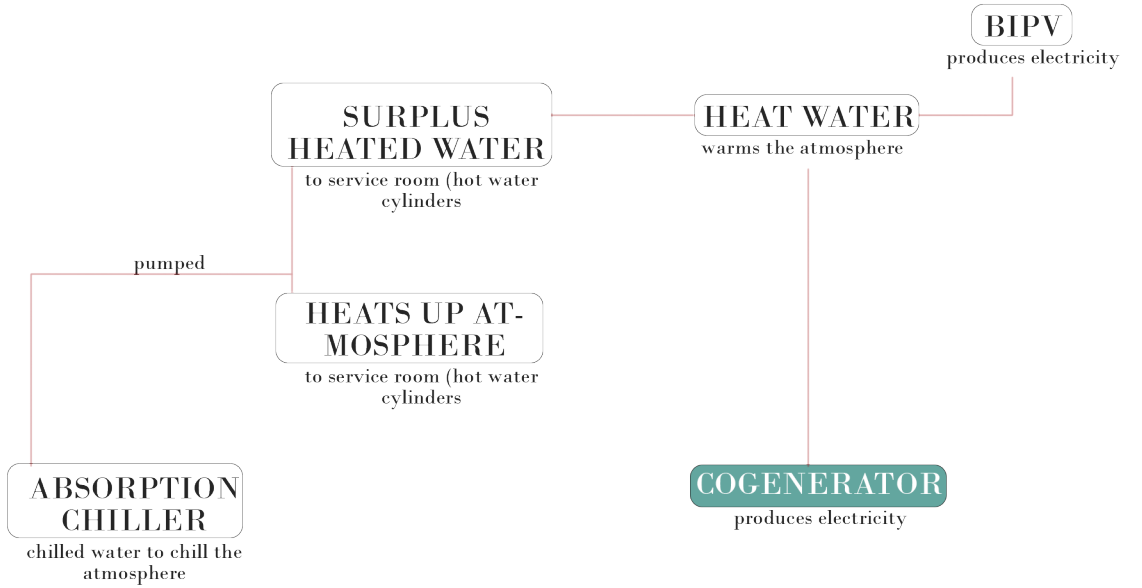
The exploration of the building systems expands on the tectonic concept of architecture becoming an archived space. The systems incorporated mitigates the high cost excavation process and give users the experience of being in an underground space. The location of the political school makes an ideal situation for such a programme and lessens heating energy requirements thus allowing the building to self sustain itself over a long period. Heating and cooling methods have been explored using passive and active systems so as to create a hybrid system that proves beneficial to the longevity of the structure.

The design of the political school will be explored in terms of its heating and cooling techniques, ventilation strategies, lighting strategies and water strategies, which become an integral part of the design.

Heating and cooling

The nature of subterranean spaces and its connection to the amphitheatre brings about many possibilities for heating and cooling strategies. According to literature, buildings placed 3 metres below ground level have stable temperatures which do not have high fluctuation rates like the ground level. The ground level is exposed to diurnal temperatures which fluctuate with the temperatures on the outside. As much as the spaces below would not require excessive heating or cooling, the occupancy rate of people would greatly increase the temperature of the political school. The glass roof structure at the amphitheatre level makes for an ideal situation for a chimney effect to occur, or stack effect. The sun that shines on the glass roof structure allows for high heat from the northern sun to create heat build up. The cool surfaces at the bottom ground drive the cool air from its surface and creates bouyancy. The difference in temperatures in temperatures drives the heat build up from occupancy and direct it through the glass roof.

Built in photovoltaic panels



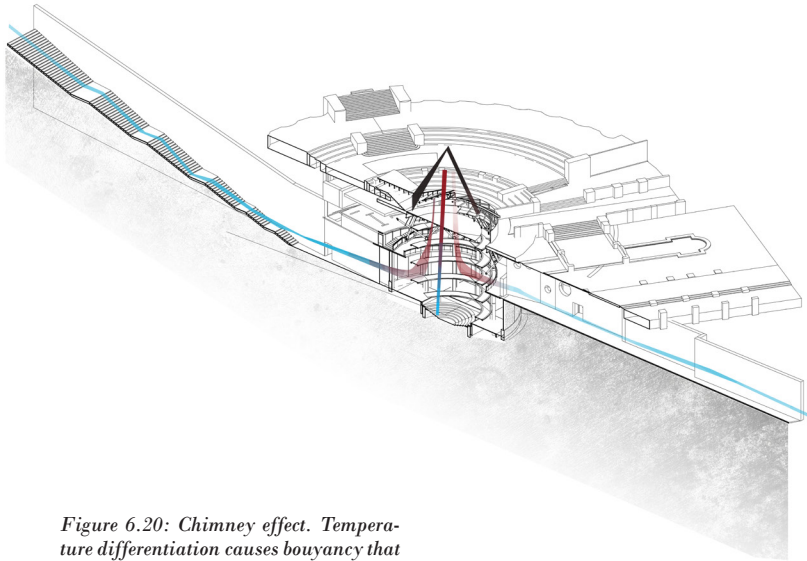


Figure 6.20: Chimney effect. Temperature differentiation causes buoyancy that drives the hot air out (Author, 2015)

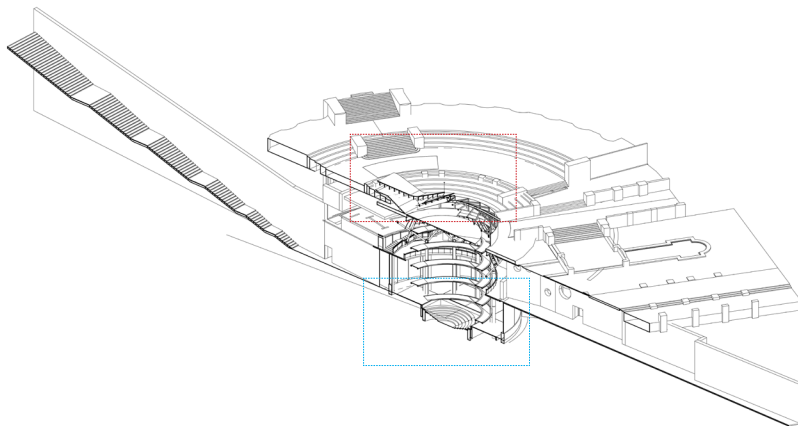


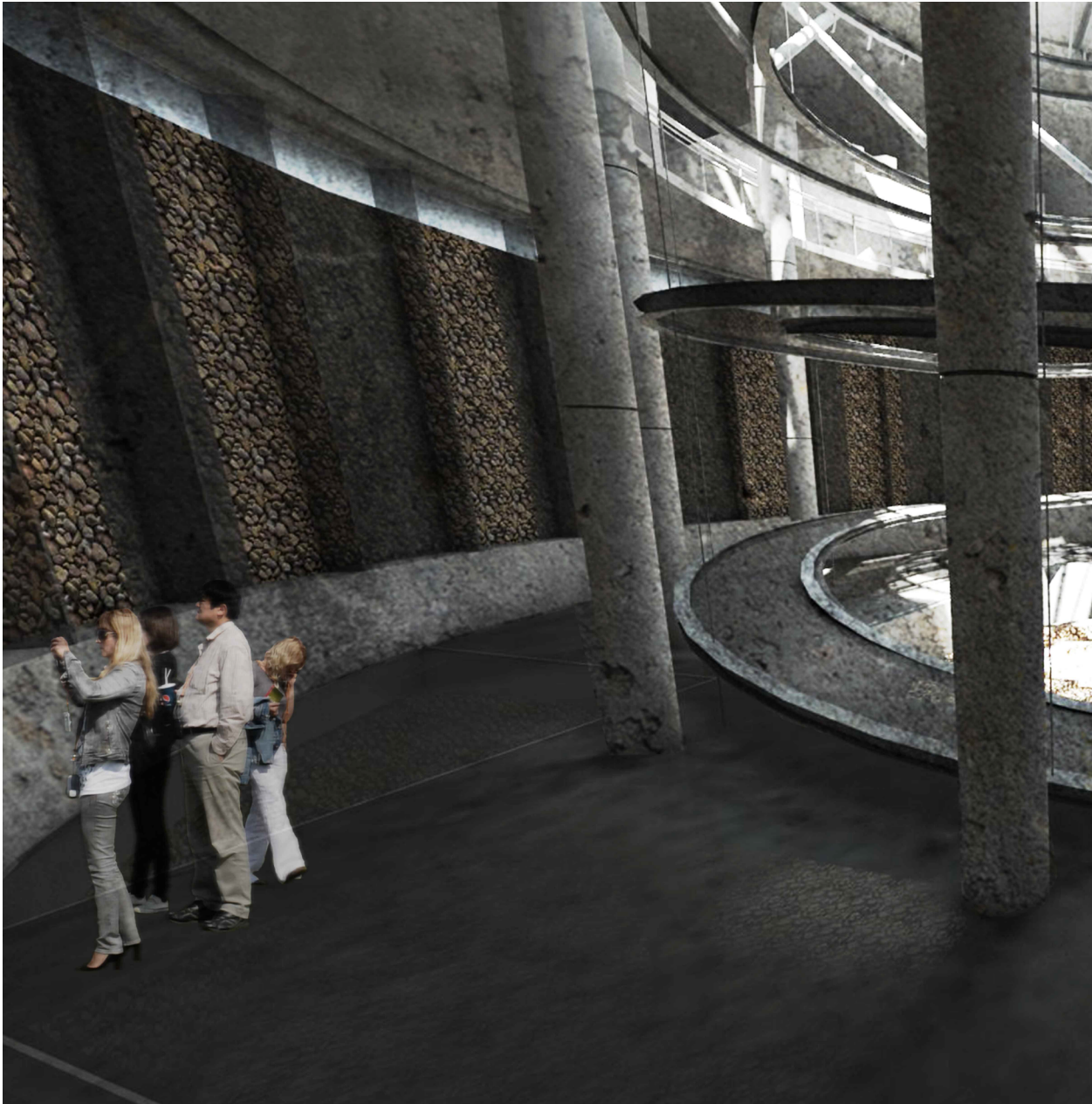
Figure 6.21: Hot air from roof, cool air from the bottom (Author, 2015)





Figure 6.22: Perspective of confrontation spaces in interior space (Author, 2015)

INITIATION SCHOOL



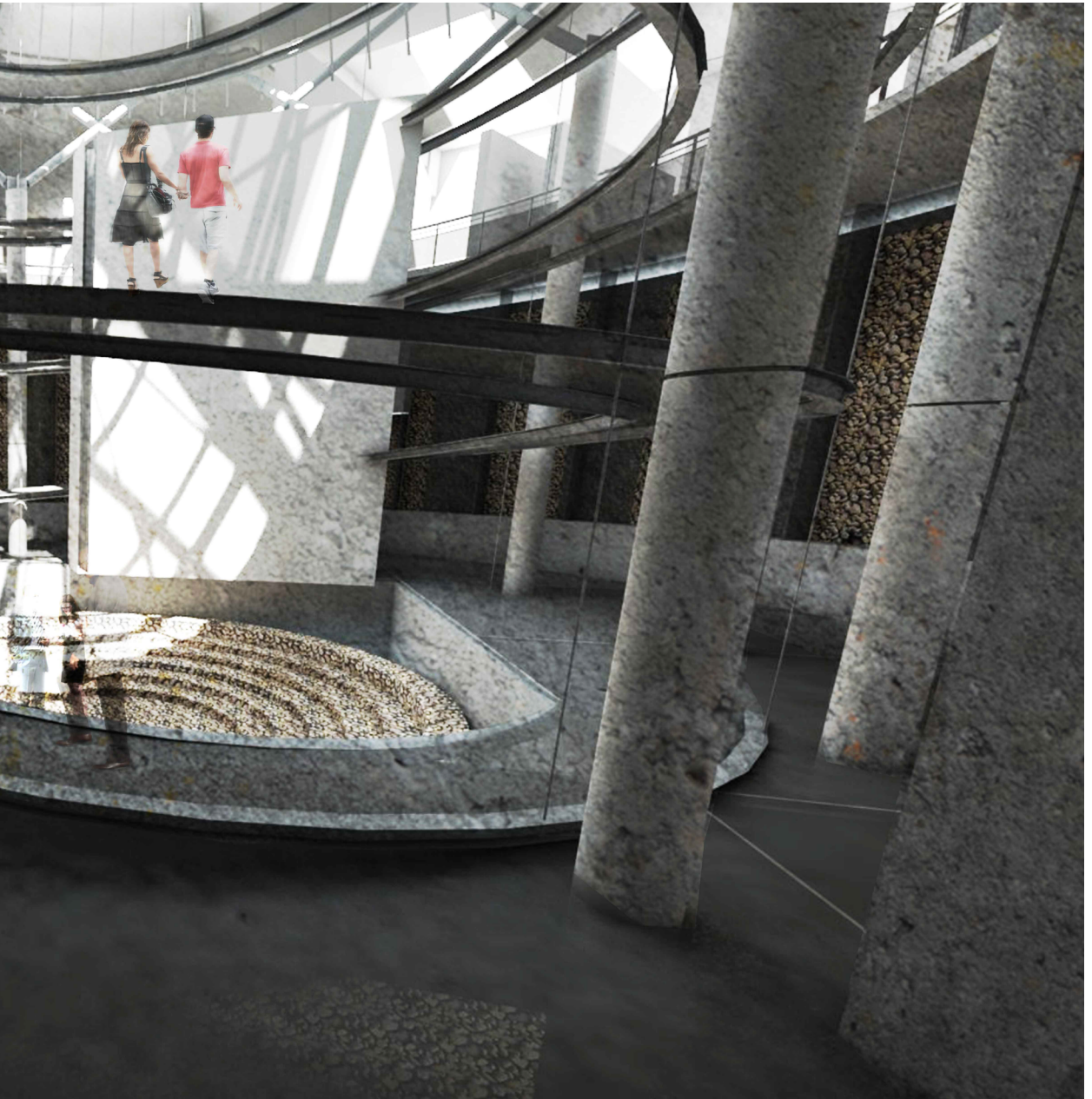


Figure 6.23: Perspective of impromptu theatre stage (Author, 2015)

Figure 6.24: Perspective of roof on the existing amphitheatre. Politicians access way (Author, 2015)

UNION BUILDINGS

POLITICAL 'INITIATION' SCHOOL

