



CONCLUSION



▲
FIGURE 9.1
CHAUVE-SOURIS D'ÉGYPTE
[BATS OF EGYPT]
(St Hilaire, G. & Bouquet, A. 1809)

CONCLUSION

The dissertation set out to question the current relationship between humankind and nature, investigating an alternative understanding of humankind as part of nature, acknowledging the impact humankind has on the geological make-up of the earth, forming part of our current geological epoch, the Anthropocene. The dissertation, however, challenges the negative connotation of this impact on geology, and investigates how the impact of human beings in landscape might positively contribute to the landscape, thereby becoming an integral part in the workings of the landscape.

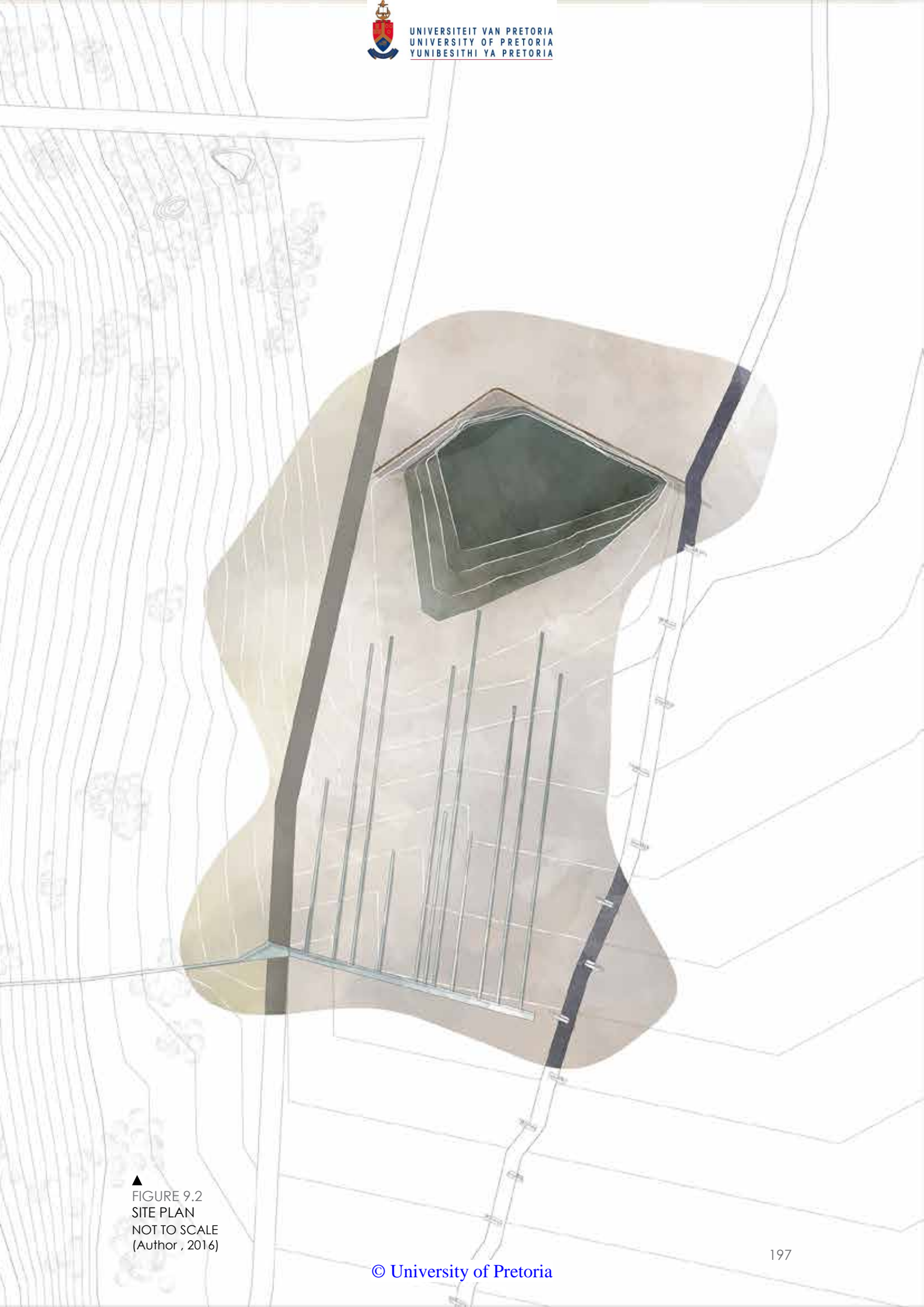
The site was approached through a regenerative lens, taking into account the existing networks of the site in order to build on these networks and to mediate and withstand the threats to this landscape. The programme was developed through the application of regenerative principles, discovering and utilising inherent place-bound potential to inform a new approach to remediation, education, and recreation through architecture. This led to the design of a tourism route, which builds on the social landscape of the Cradle, while protecting the historical and natural landscapes, through the remediation of the destructive impact of the economic landscape. The tourism route introduces visitors to the site through the three layers of

the landscape, and aims to create a take-home experience for the users. The main focus of the programme is a Chiroptera Vivarium, a constructed habitat designed for the purpose of a bat research and visitor centre.

Concepts were drawn from the geological make-up of the landscape, the first being the creation of geology, the second the forming of habitat through the karst system, and the last the idea of the mountain and the grotto, relating to the human experience of a landscape. These three concepts were translated to the three sequential architectural concepts of protecting, creating habitat, and accommodating. Throughout the dissertation the concept of 'revealing the hidden' is carried through, from the larger context of the Cradle of Humankind, to the method through which each building is put together.

The project establishes a precedent for the 21st century tourism industry, moving away from the tourism as commodified experience, to an industry that can contribute to the landscape in which it is situated. The project proposes an architecture that allows for the co-evolution of humankind together with other living beings, creating spaces that are mutually beneficial for all of the components of the living systems.

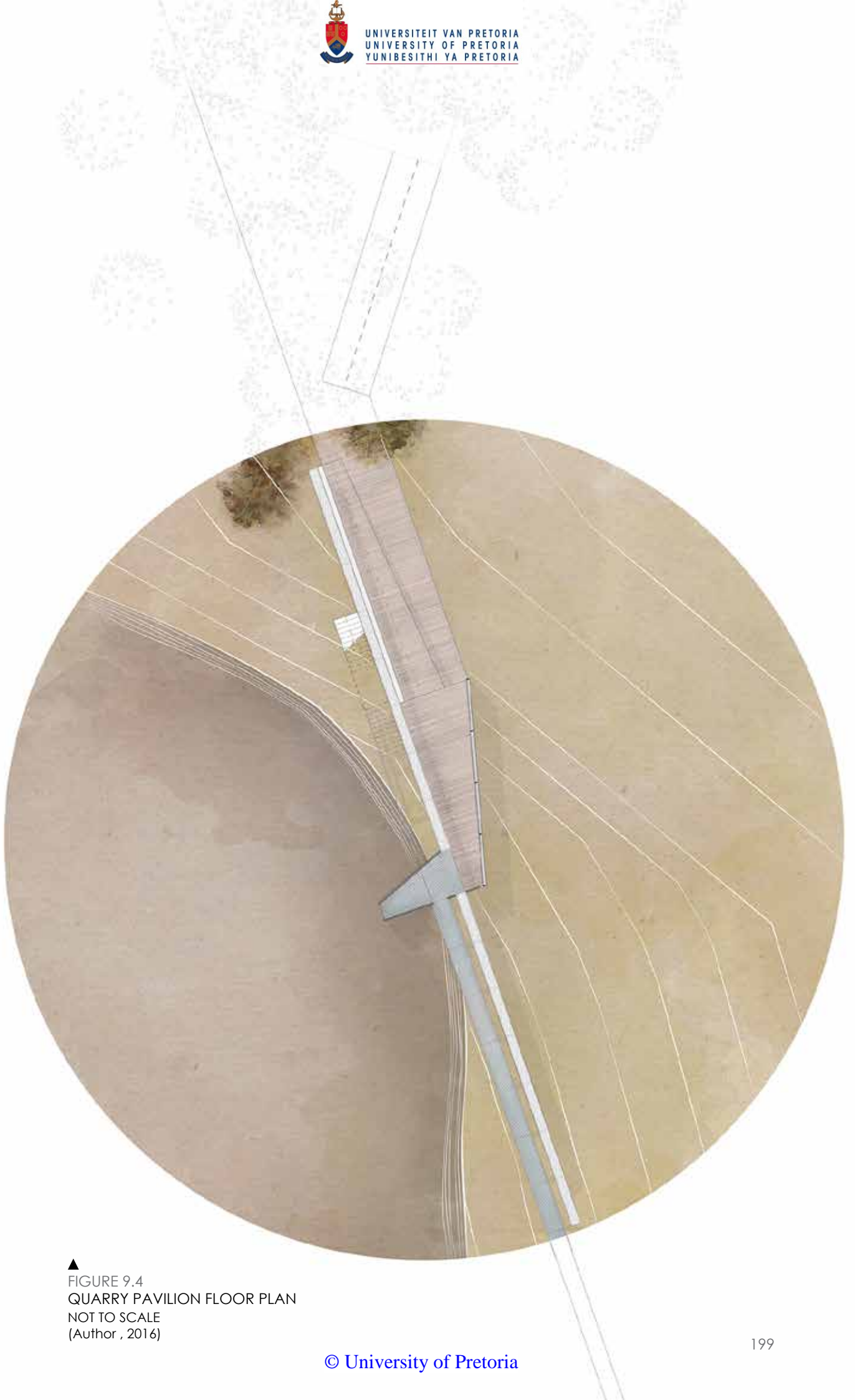




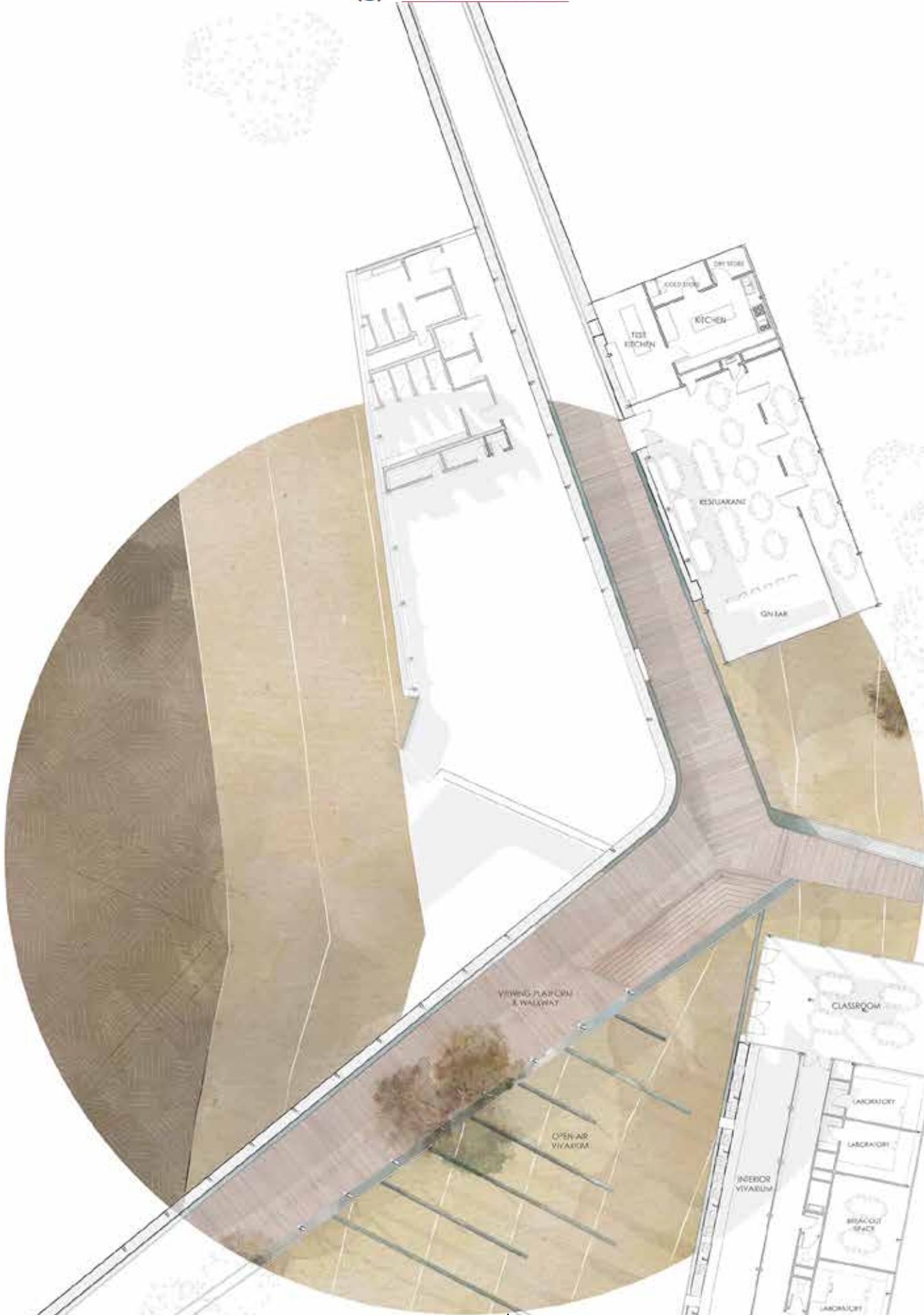
▲ FIGURE 9.2
SITE PLAN
NOT TO SCALE
(Author , 2016)



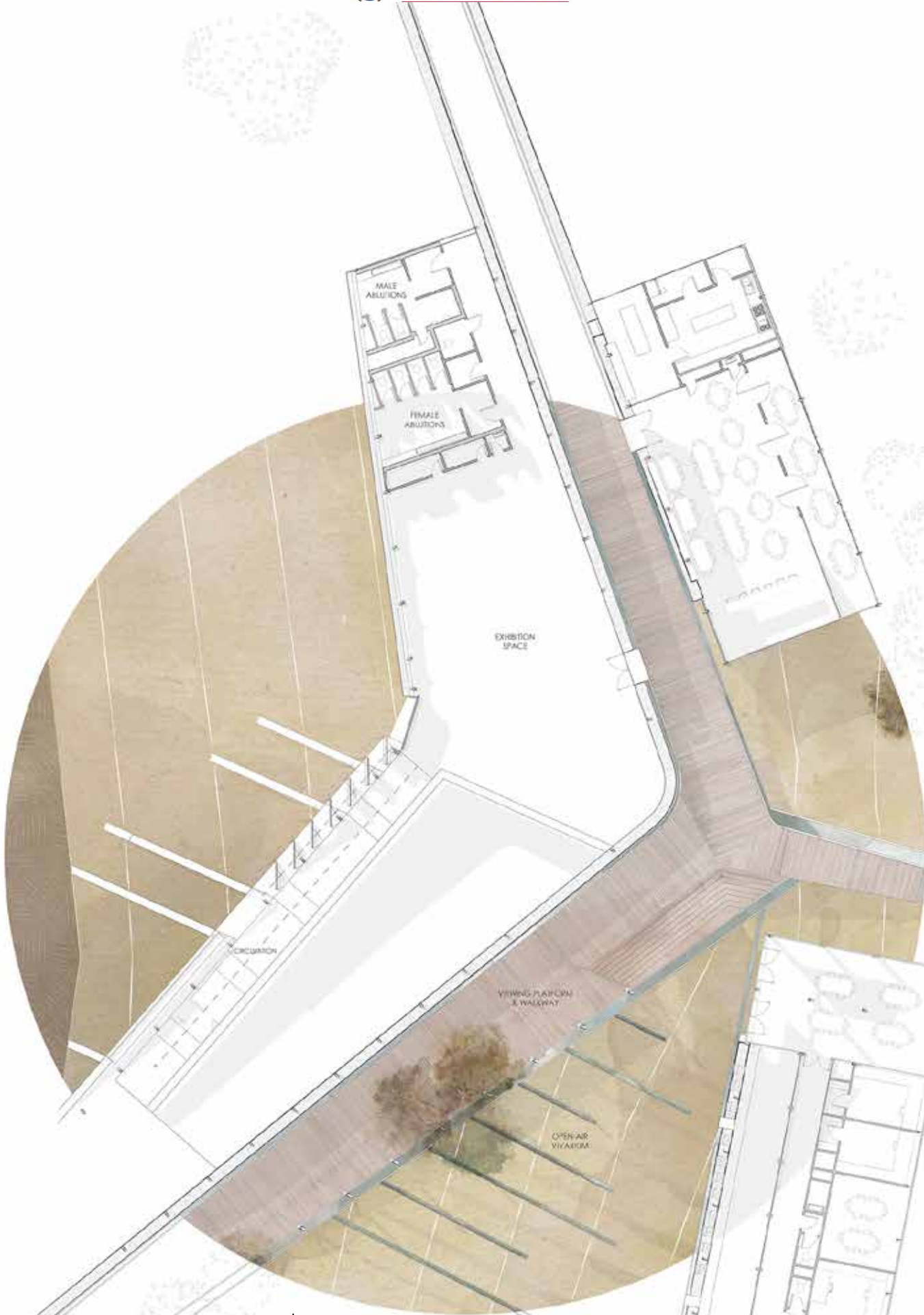
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FIGURE 9.3
TICKET OFFICE FLOOR PLAN
NOT TO SCALE
(Author , 2016)



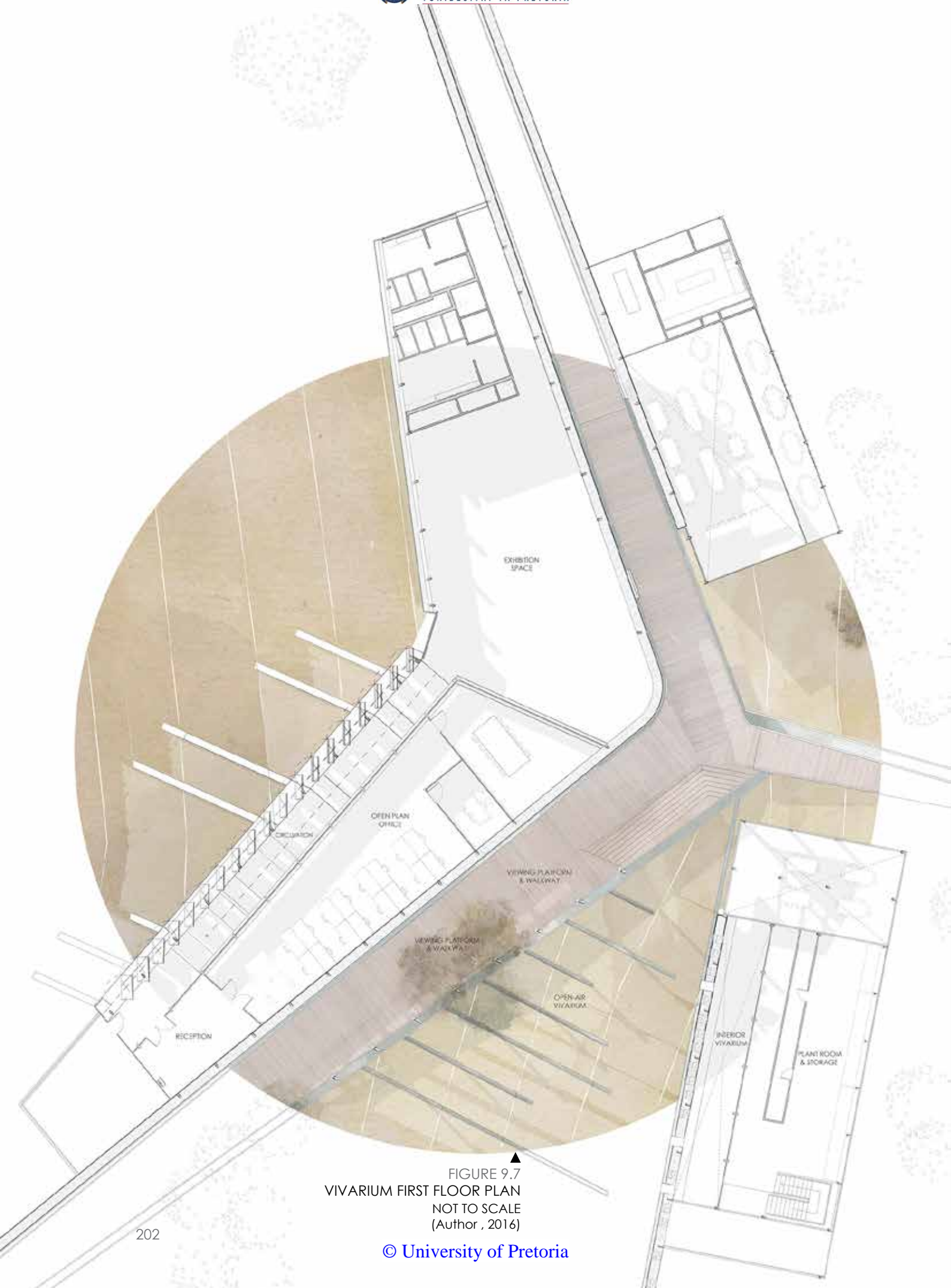
▲ FIGURE 9.4
QUARRY PAVILION FLOOR PLAN
NOT TO SCALE
(Author , 2016)



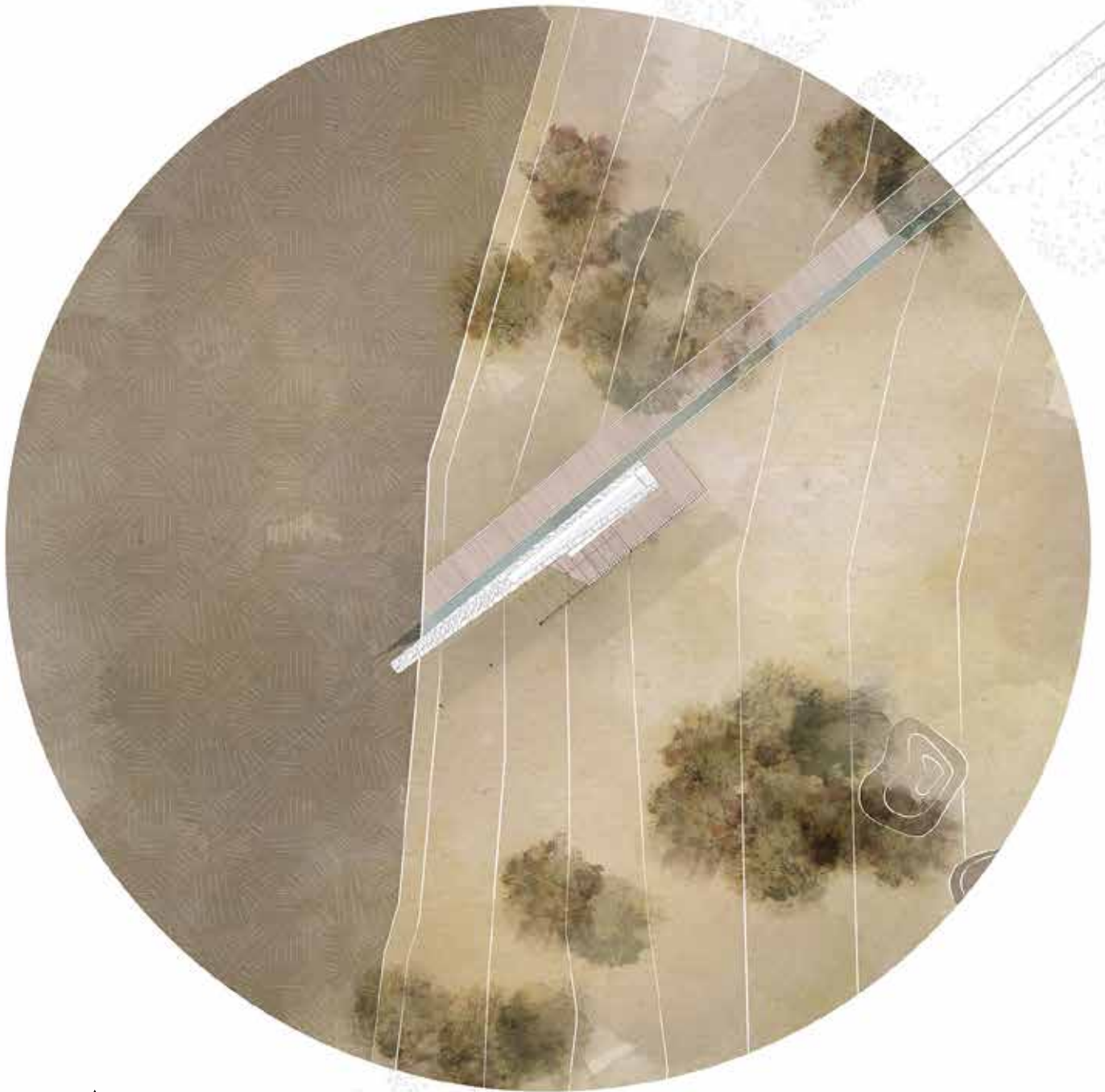
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FIGURE 9.5
VIVARIUM GROUND FLOOR PLAN
NOT TO SCALE
(Author , 2016)



▲ FIGURE 9.6
VIVARIUM MEZZANINE FLOOR PLAN
NOT TO SCALE
(Author , 2016)



▲
FIGURE 9.7
VIVARIUM FIRST FLOOR PLAN
NOT TO SCALE
(Author , 2016)



▲ FIGURE 9.8
FIELDWORK STATION FLOOR PLAN
NOT TO SCALE
(Author , 2016)



ROOF NOTE:

Roof sheeting to be PROTECT Graphite-Grey 0.8mm Rheinzink-Flat Lock tile system on Air-Z structured mat, with concealed fixing to 38x3000mm plywood boarding, screwed to 150x50mm SA pine purlins @ 600mm c.c. screwed to 300x100mm laminated Red Grandis Saligna beam @ 3000mm c.c.

CEILING NOTE:

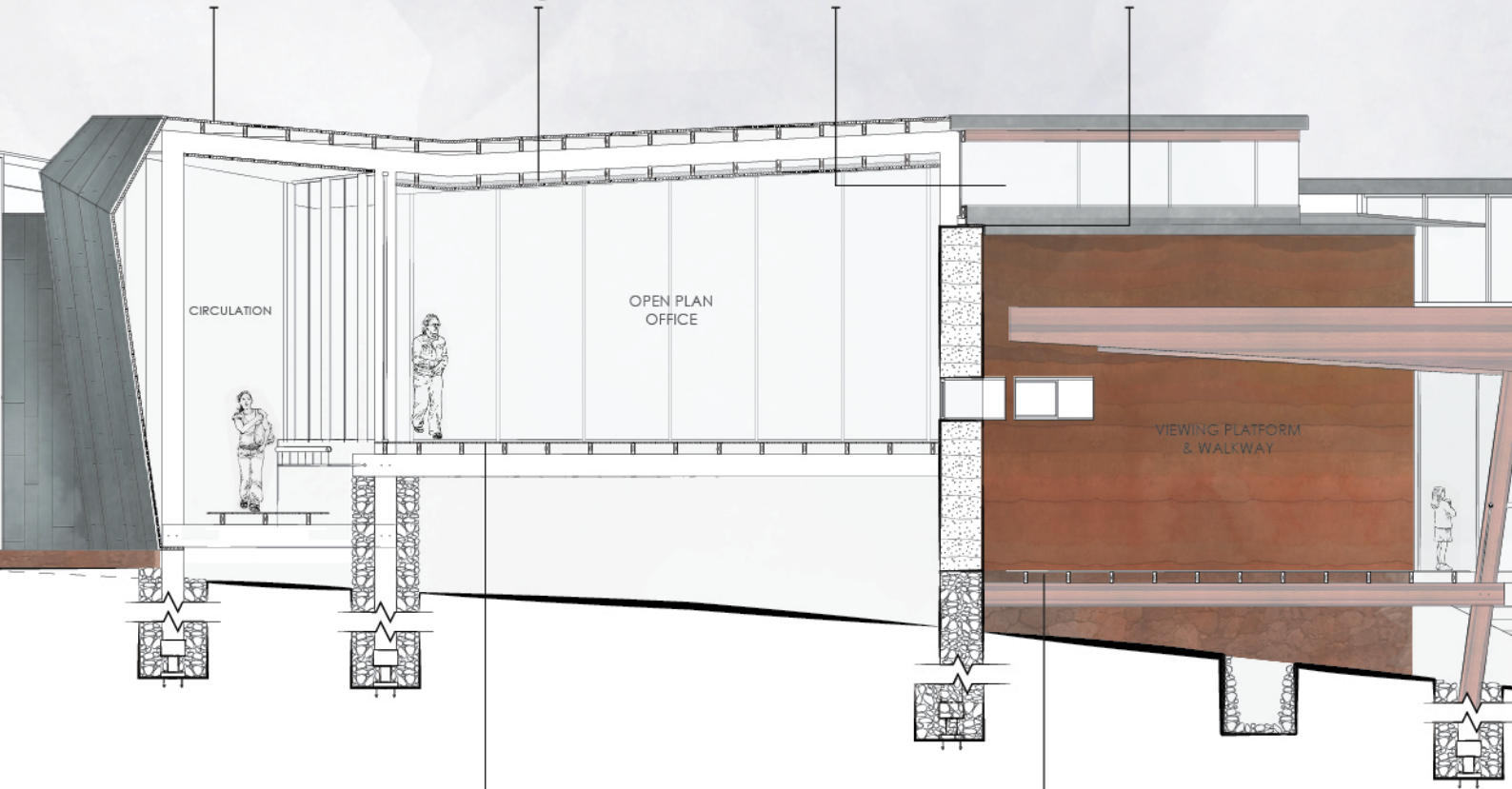
114x38 Saligna slats fixed to 150x50mm SA pine purlins @ 600mm c.c. screwed to 300x100mm laminated Red Grandis Saligna columns @ 3000mm c.c. with 50mm sound absorption panels laid between SA pine purlins on top of Saligna slats.

GLAZING NOTE:

12mm double glazed un-openable aluminium window frame section fixed to interior of 150x50mm SA pine purlins @ 600mm c.c. screwed to 300x100mm laminated Red Grandis Saligna columns @ 3000mm c.c.

COPING NOTE:

Coping to be PROTECT Graphite-Grey 0.8mm Rheinzink-Flat Lock tile system on Vapozink structured underlay, with concealed fixing to 38x300mm angled SA pine insert, fixed with 24mm Ø SA pine dowels @ 750mm c.c. to 600mm lime stabilised earth wall, with 150mm overlap past earth wall, crimped and folded back to external façade of earth wall. Rheinzink sheets not to exceed 700x3000mm sections.

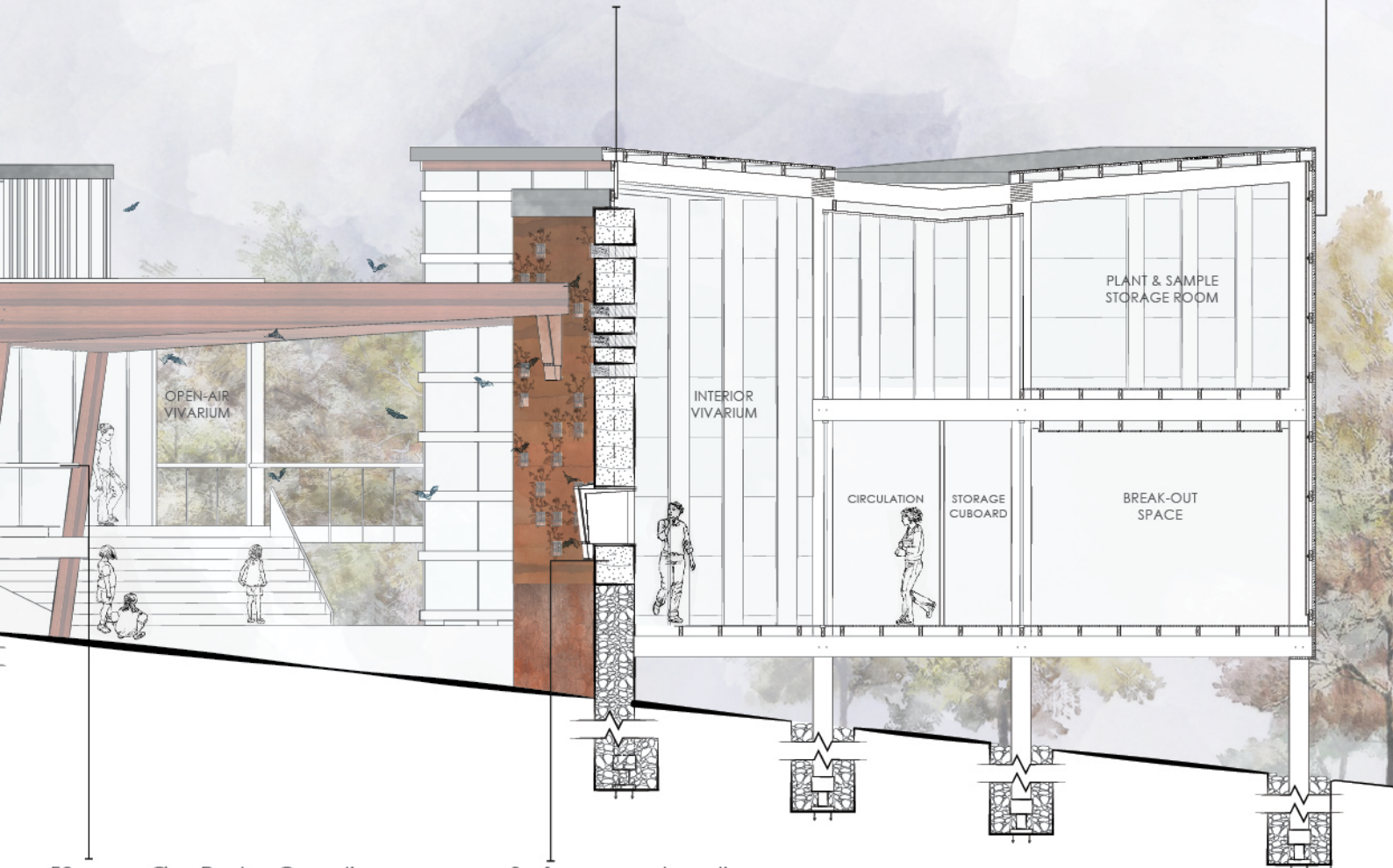


38x114mm Saligna tongue and groove boards conceal fixed to 150x50mm SA pine floor joists @ 600mm c.c. screwed to 300x100mm laminated SA pine bearer @ 3000mm c.c.

Woodoc 35 Exterior Polywax Sealed 100x22mm Saligna open joint decking fixed to 150x50mm Saligna floor joist @ 600mm c.c. screwed to 300x100mm laminated SA pine bearer @ 3000mm c.c. bolted to 300x100mm laminated Red Grandis Saligna columns @ 3000mm c.c.

GLAZING NOTE:
 Opal 12mm celled polycarbonate sheeting fixed to white powder coated aluminium U-channel clip fixed to interior of 150x50mm SA pine purlins @ 600mm c.c. screwed to 300 x 100 mm laminated Red Grandis Saligna columns @ 3000mm c.c.

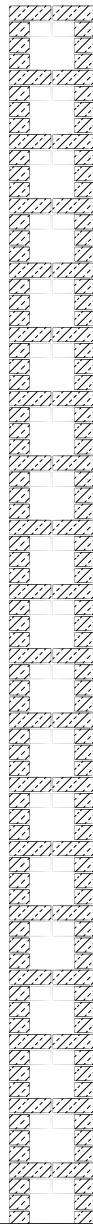
FAÇADE NOTE:
 Façade cladding to be PROTECT Graphite-Grey 0.8mm Rheinzink-Flat Lock tile system on Vapozink structured underlay, with concealed fixing to 38x3000mm plywood boarding, screwed to 150x50mm SA pine purlins @ 600mm c.c. screwed to 300x100mm laminated Red Grandis Saligna columns @ 3000mm c.c.



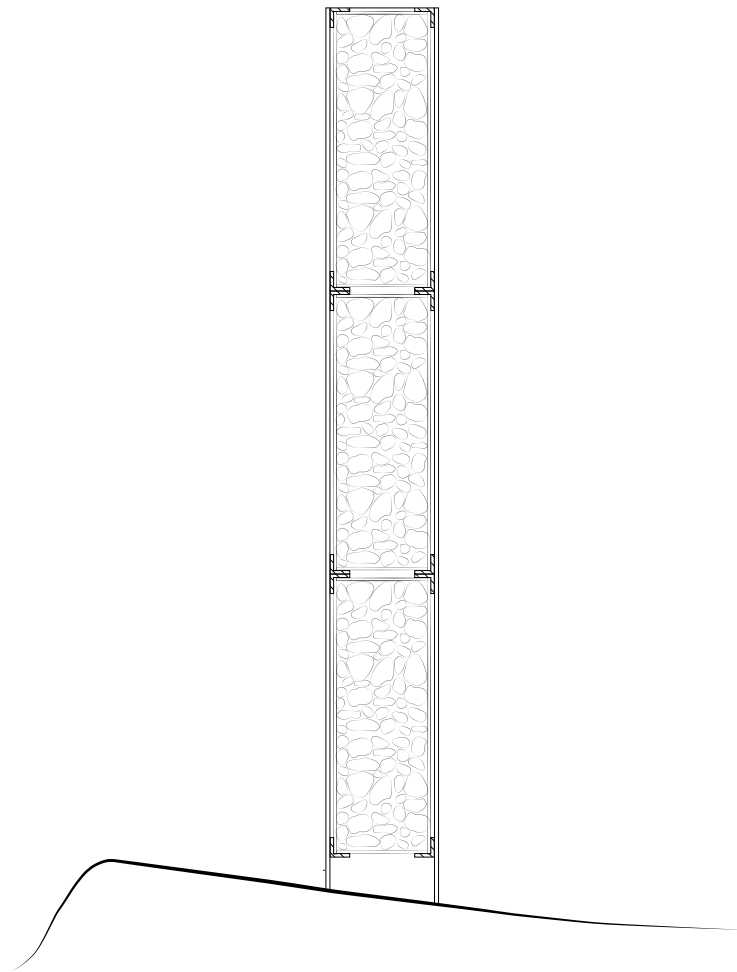
50mm Ø Red Grandis Saligna circular grabrail @ min 900mm fixed with epoxy to 10mm galvanised steel pin connection, fixed to 25mm Ø galvanised steel post, welded to 50x50mm steel baseplate, bolted to 300x100mm laminated SA pine bearer @ 3000mm c.c.

Surface bonding surfactant coated 600mm lime stabilised earth wall compacted in layers of 300mm, on 600mm mosaic stonework wall bedded and joined in class 2 mortar

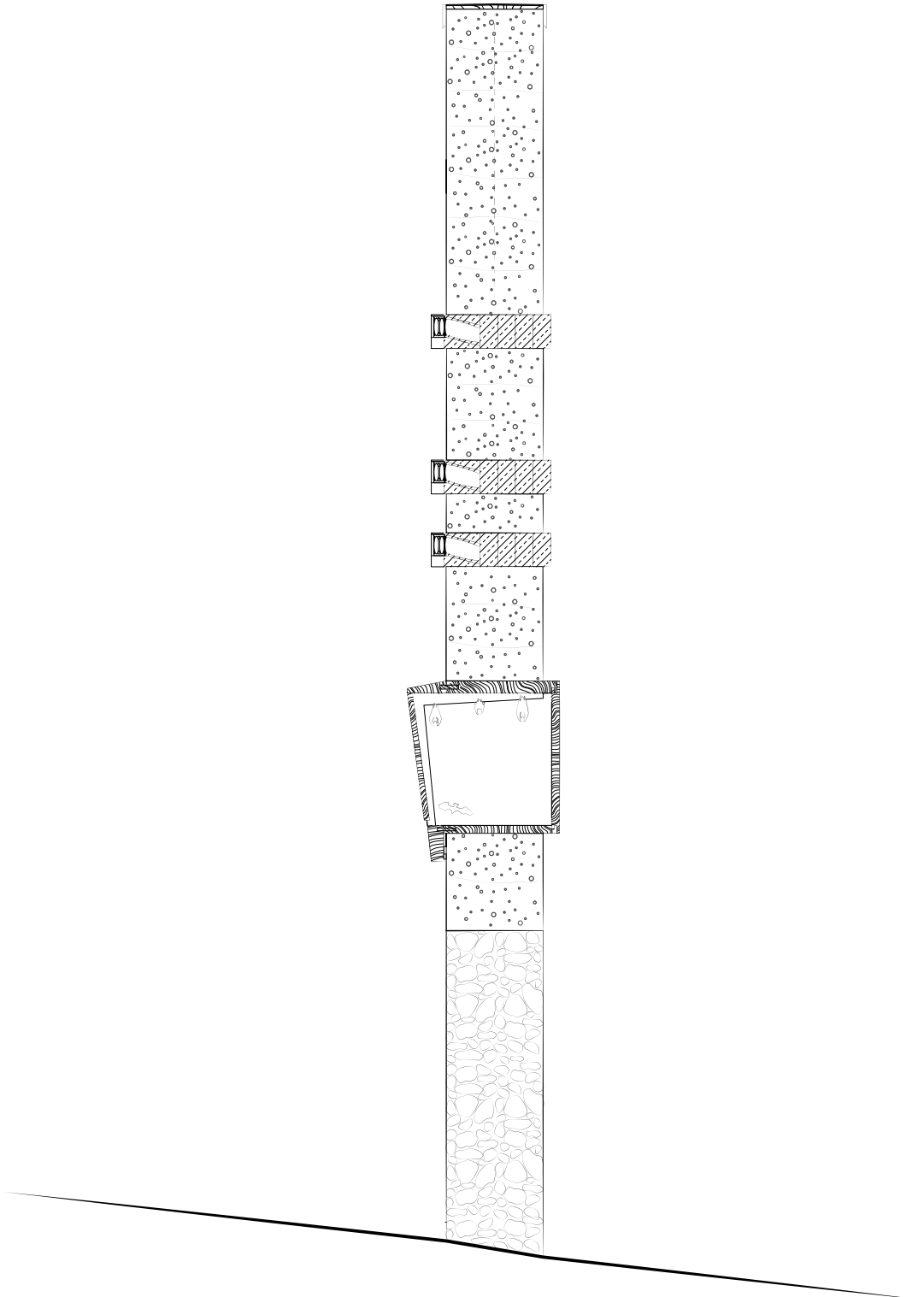
▲ FIGURE 9.9
 VIVARIUM CROSS SECTION
 (Author , 2016)



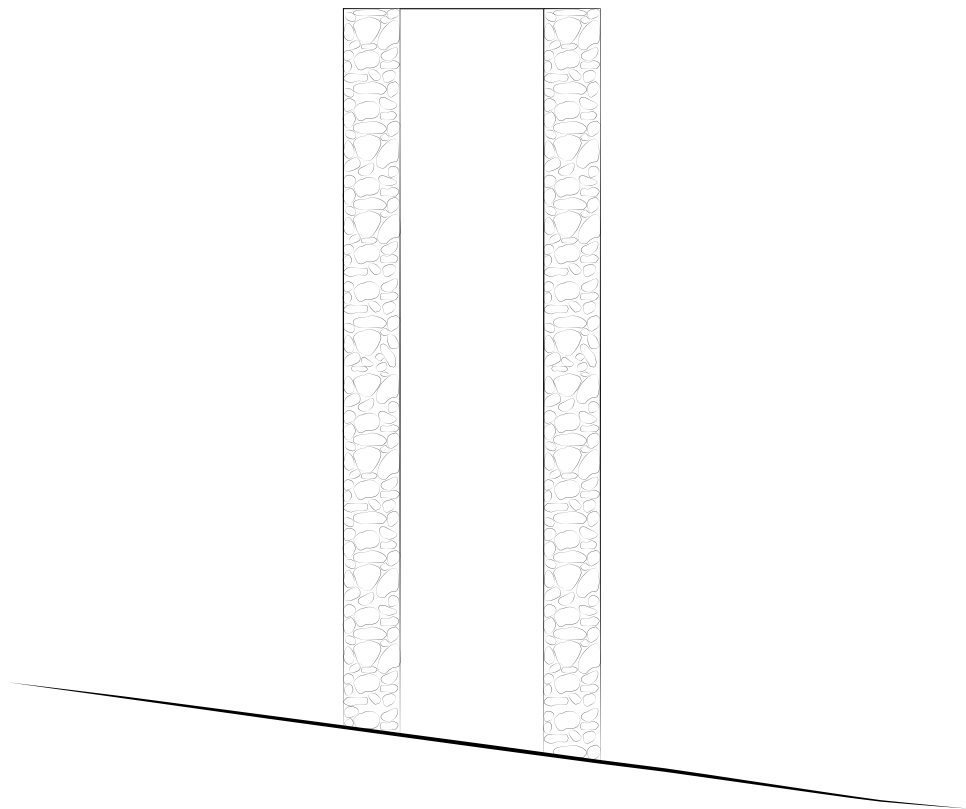
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FIGURE 9.10
TICKET OFFICE MASONRY BRICK
SCREEN WALL SECTION
NOT TO SCALE
(Author , 2016)



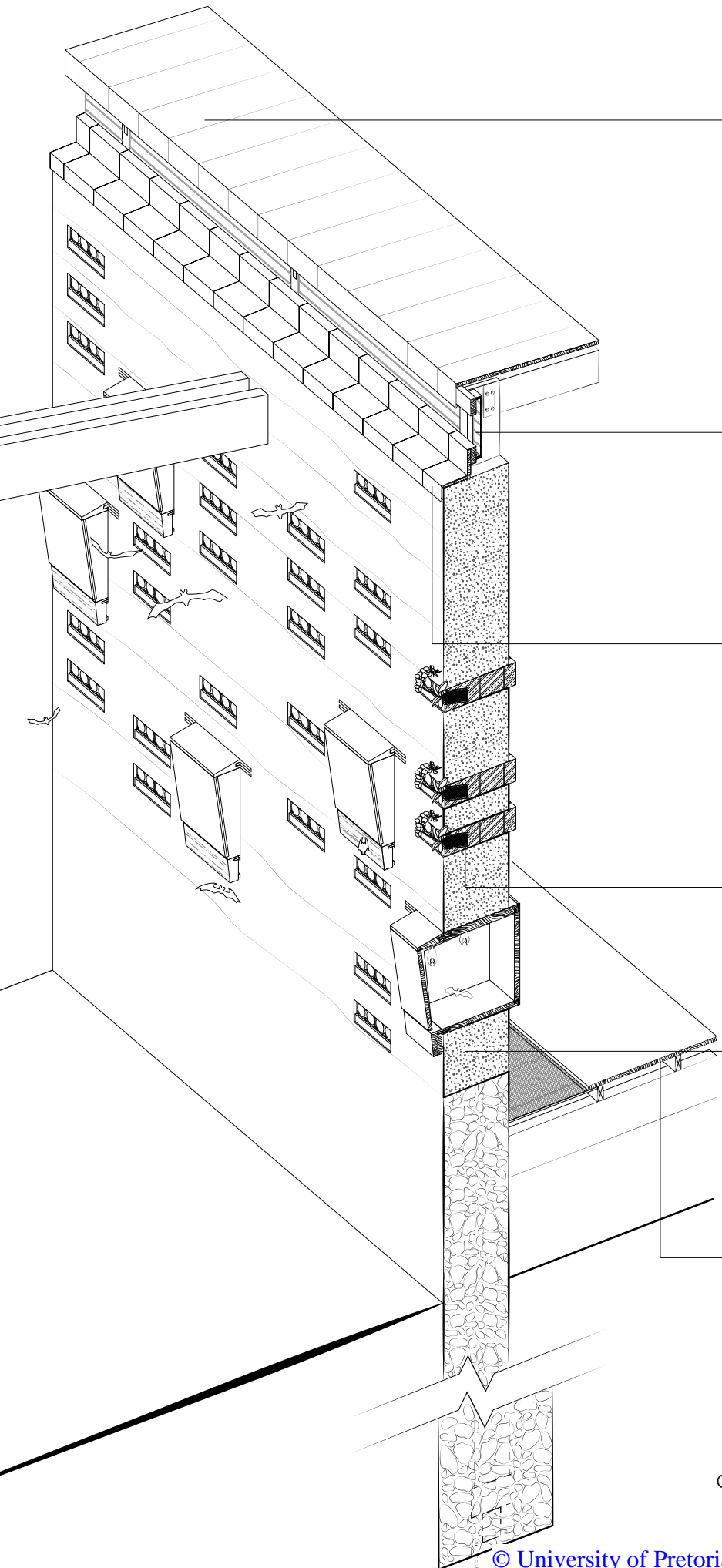
▲
FIGURE 9.11
QUARRY PAVILION WIRE MESH &
STONE WALL SECTION
NOT TO SCALE
(Author , 2016)



▲
FIGURE 9.12
VIVARIUM CHIROPTERA ROOST
STABILISED EARTH WALL SECTION
NOT TO SCALE
(Author , 2016)



▲
FIGURE 9.13
FIELDWORK STATION CAVITY STONE
WALL SECTION
NOT TO SCALE
(Author , 2016)



Roof sheeting to be PROTECT Graphite-Grey 0.8mm Rheinzink-Flat Lock tile system on Air-Z structured mat, with concealed fixing to 38x3000mm plywood boarding, screwed to 150x50mm SA pine purlins @ 600mm c.c. screwed to 300x100mm laminated Red Grandis Saligna beam @ 3000mm c.c.

Opal 12mm celled polycarbonate sheeting fixed to white powder coated aluminium U-channel clip fixed to interior of 150x50mm SA pine purlins @ 600mm c.c. screwed to 300x100mm laminated Red Grandis Saligna columns @ 3000mm c.c.

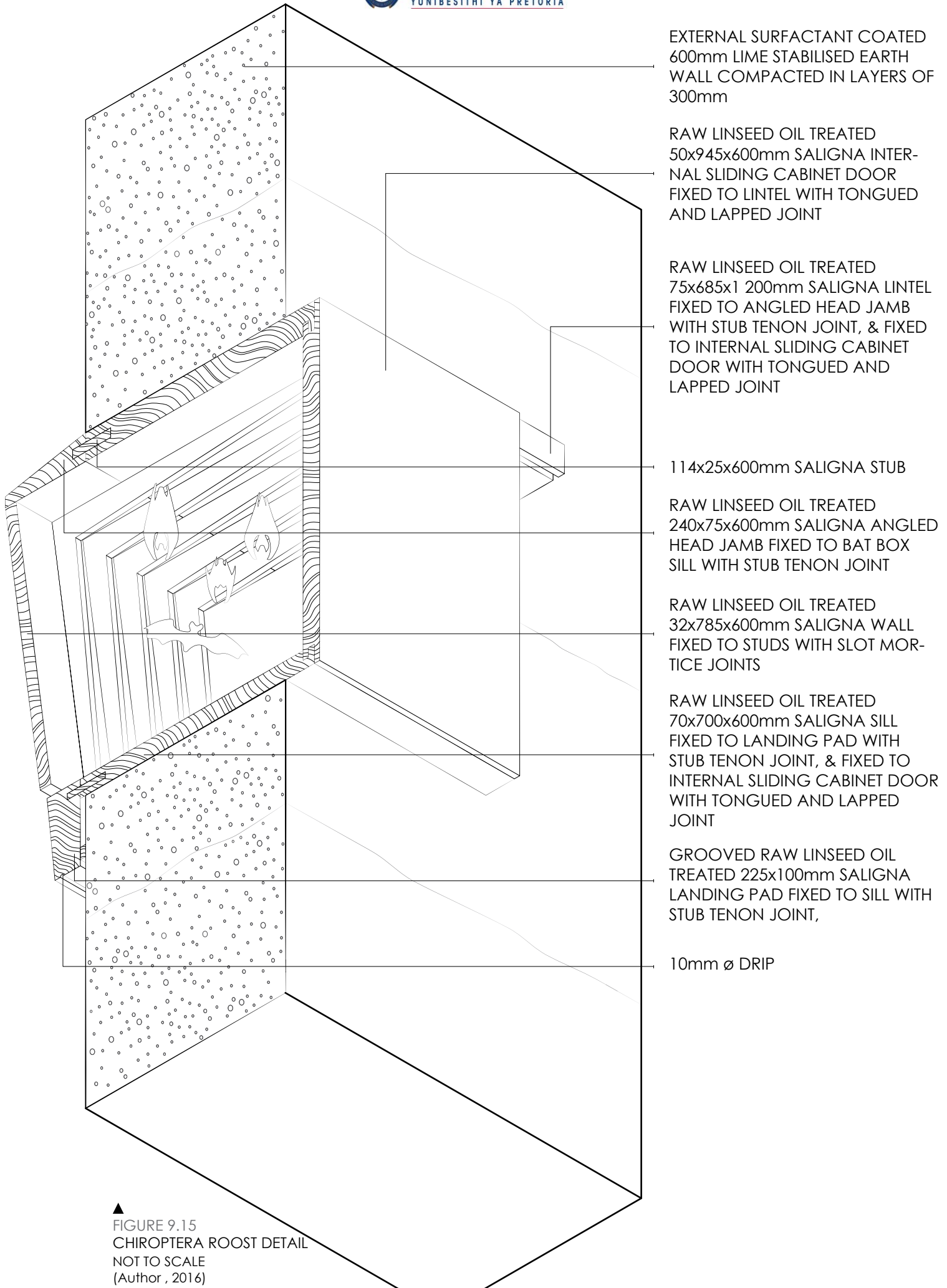
Coping to be PROTECT Graphite-Grey 0.8mm Rheinzink-Flat Lock tile system on Vapozink structured underlay, with concealed fixing to 38x300mm angled SA pine insert, fixed with 24mm Ø SA pine dowels @ 750mm c.c to 600mm lime stabilised earth wall, with 150mm overlap past earth wall, crimped and folded back to external façade of earth wall. Rheinzink sheets not to exceed 700x3000mm sections.

Orchid planters made up of 2x 250x200x185mm 15° extruded terracotta wine rack bricks on 250x215x70mm terracotta wine rack footing. Planters laid next to 5 rows of 4x 210x75x110mm terracotta clay bricks

Surface bonding surfactant coated 600mm lime stabilised earth wall compacted in layers of 300mm, on 600mm mosaic stonework wall bedded and joined in class 2 mortar

38x114mm Saligna tongue and groove boards conceal fixed to 150x50mm SA pine floor joists @ 600mm c.c. screwed to 300x100mm laminated SA pine bearer @ 3000mm c.c.

▲
FIGURE 9.14
CHIROPTERA HABITAT DETAIL SECTION
NOT TO SCALE
(Author , 2016)



EXTERNAL SURFACTANT COATED
600mm LIME STABILISED EARTH
WALL COMPACTED IN LAYERS OF
300mm

RAW LINSEED OIL TREATED
50x945x600mm SALIGNA INTER-
NAL SLIDING CABINET DOOR
FIXED TO LINTEL WITH TONGUED
AND LAPPED JOINT

RAW LINSEED OIL TREATED
75x685x1 200mm SALIGNA LINTEL
FIXED TO ANGLED HEAD JAMB
WITH STUB TENON JOINT, & FIXED
TO INTERNAL SLIDING CABINET
DOOR WITH TONGUED AND
LAPPED JOINT

114x25x600mm SALIGNA STUB

RAW LINSEED OIL TREATED
240x75x600mm SALIGNA ANGLED
HEAD JAMB FIXED TO BAT BOX
SILL WITH STUB TENON JOINT

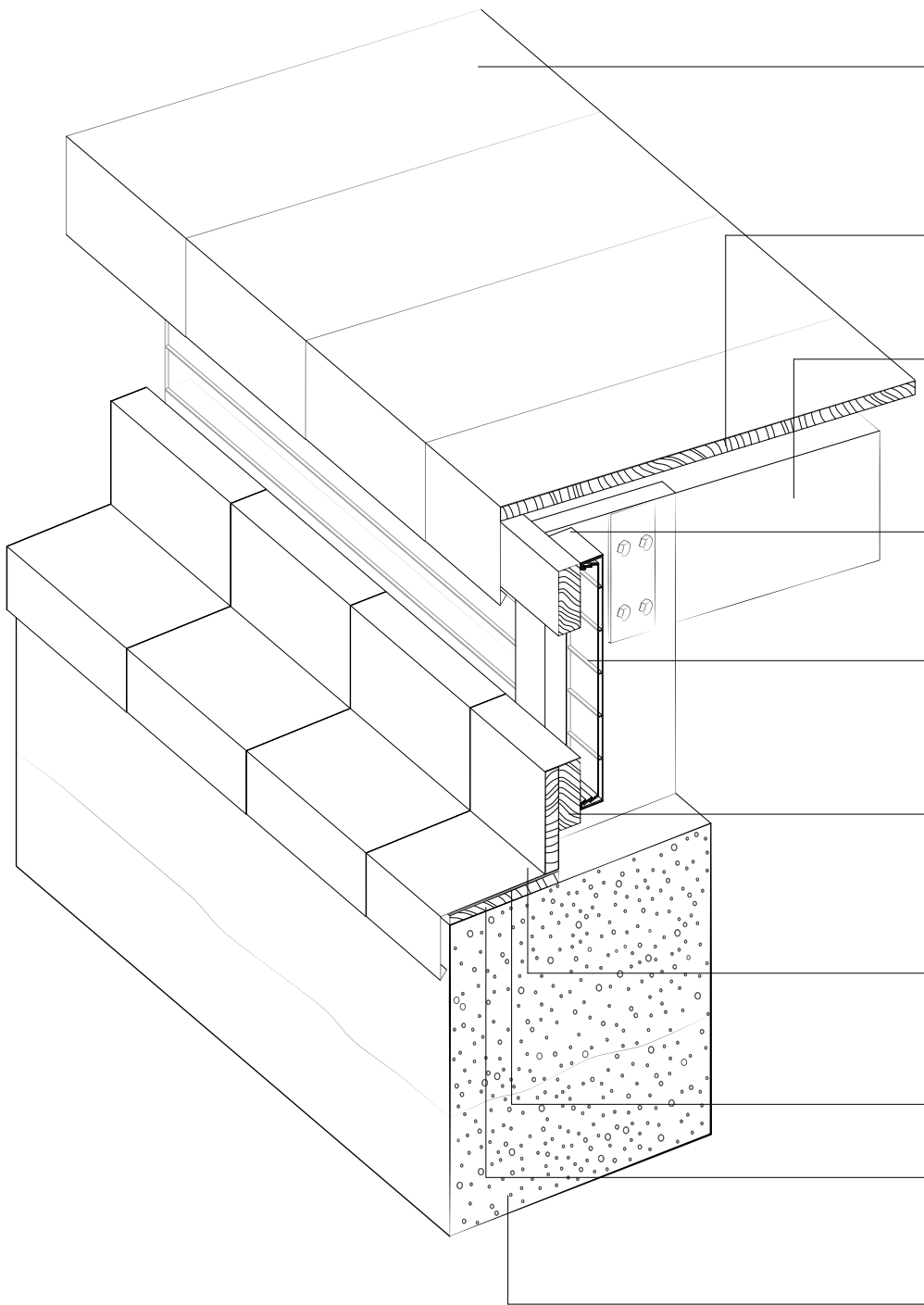
RAW LINSEED OIL TREATED
32x785x600mm SALIGNA WALL
FIXED TO STUDS WITH SLOT MOR-
TICE JOINTS

RAW LINSEED OIL TREATED
70x700x600mm SALIGNA SILL
FIXED TO LANDING PAD WITH
STUB TENON JOINT, & FIXED TO
INTERNAL SLIDING CABINET DOOR
WITH TONGUED AND LAPPED
JOINT

GROOVED RAW LINSEED OIL
TREATED 225x100mm SALIGNA
LANDING PAD FIXED TO SILL WITH
STUB TENON JOINT,

10mm \varnothing DRIP

▲ FIGURE 9.15
CHIROPTERA ROOST DETAIL
NOT TO SCALE
(Author , 2016)



PROTECT GRAPHITE-GREY 0.8mm RHEINZINK-FLAT LOCK TILE SYSTEM OR SIMILAR APPROVED @ 300mm c.c., ON AIR-Z STRUCTURED MAT OR SIMILAR APPROVED, FIXED TO PLYWOOD BOARDING

38x3 000mm PLYWOOD BOARDING SCREWED TO 150x50mm TIMBER PURLINS @ 600mm c.c.

RAW LINSEED OIL TREATED 300x100mm LAMINATED TIMBER PORTAL FRAME @ 3 000mm c.c.

WHITE POWDER COATED ALUMINIUM U-CHANNEL CLIP @ 575mm c.c. AS PER MANUFACTURER'S SPEC.

OPAL OR SIMILAR APROVED 12mm POLYCARBONATE SHEETING FIXED TO ALUMINIUM U-CHANNEL CLIP @ 575mm c.c. AS PER MANUFACTURER'S SPEC.

RAW LINSEED OIL TREATED 150x50mm TIMBER NOGGING @ 575mm c.c. SCREWED TO LAMINATED TIMBER PORTAL FRAME

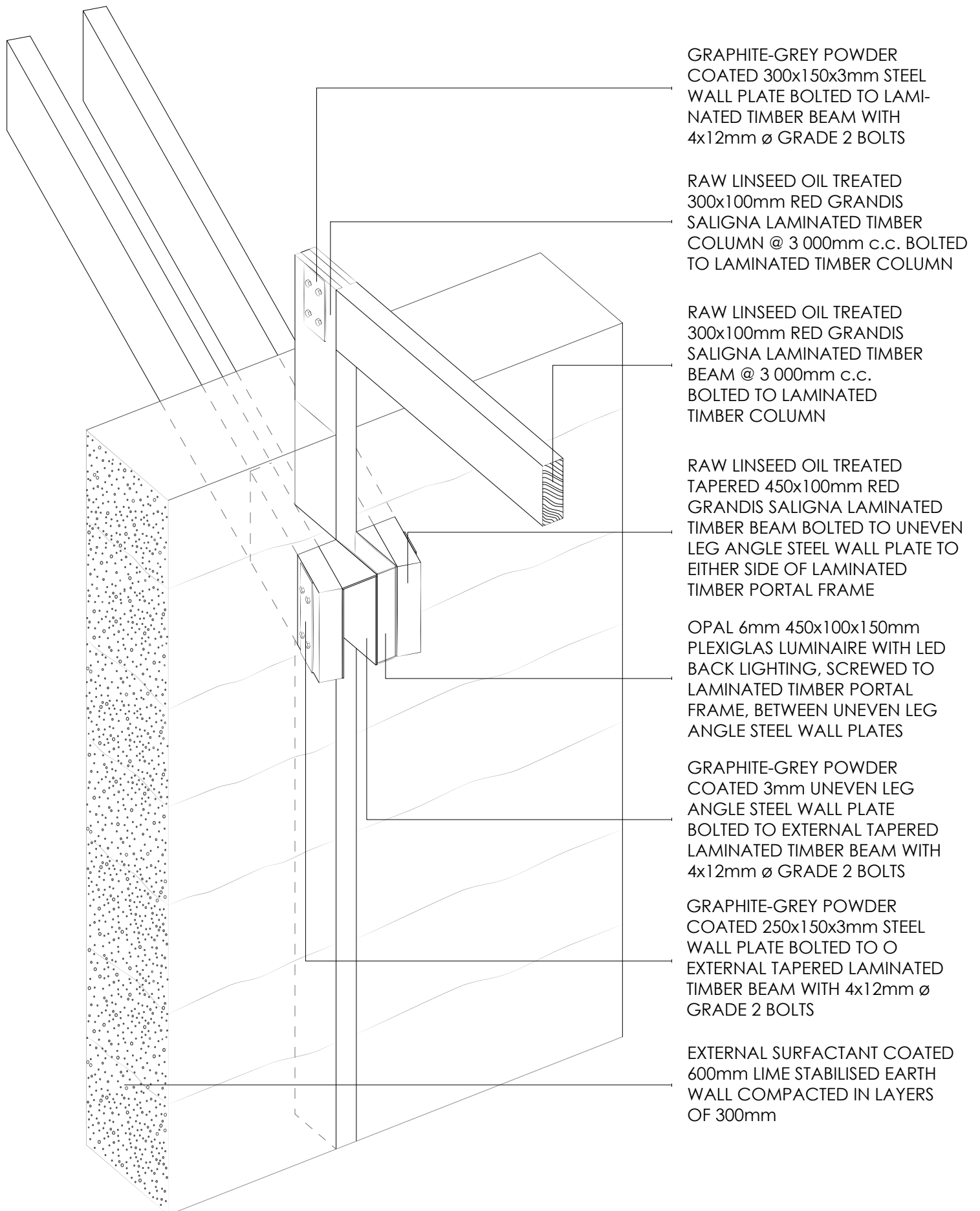
PROTECT GRAPHITE-GREY 0.8mm RHEINZINK-FLAT LOCK TILE SYSTEM OR SIMILAR APPROVED, ON VAPOZINC STRUCTURED UNDERLAY OR SIMILAR APPROVED, FIXED TO ANGLED TIMBER INSERT

VAPOZINC STRUCTURED UNDERLAY

38x300mm ANGLED TIMBER INSERT FIXED TO LIME STABILISED EARTH WALL

EXTERNAL SURFACTANT COATED 600mm LIME STABILISED EARTH WALL COMPACTED IN LAYERS OF 300mm

▲
FIGURE 9.16
CHIROPTERA ROOST WALL DETAIL
NOT TO SCALE
(Author , 2016)



GRAPHITE-GREY POWDER
COATED 300x150x3mm STEEL
WALL PLATE BOLTED TO LAMI-
NATED TIMBER BEAM WITH
4x12mm \varnothing GRADE 2 BOLTS

RAW LINSEED OIL TREATED
300x100mm RED GRANDIS
SALIGNA LAMINATED TIMBER
COLUMN @ 3 000mm c.c. BOLTED
TO LAMINATED TIMBER COLUMN

RAW LINSEED OIL TREATED
300x100mm RED GRANDIS
SALIGNA LAMINATED TIMBER
BEAM @ 3 000mm c.c.
BOLTED TO LAMINATED
TIMBER COLUMN

RAW LINSEED OIL TREATED
TAPERED 450x100mm RED
GRANDIS SALIGNA LAMINATED
TIMBER BEAM BOLTED TO UNEVEN
LEG ANGLE STEEL WALL PLATE TO
EITHER SIDE OF LAMINATED
TIMBER PORTAL FRAME

OPAL 6mm 450x100x150mm
PLEXIGLAS LUMINAIRE WITH LED
BACK LIGHTING, SCREWED TO
LAMINATED TIMBER PORTAL
FRAME, BETWEEN UNEVEN LEG
ANGLE STEEL WALL PLATES

GRAPHITE-GREY POWDER
COATED 3mm UNEVEN LEG
ANGLE STEEL WALL PLATE
BOLTED TO EXTERNAL TAPERED
LAMINATED TIMBER BEAM WITH
4x12mm \varnothing GRADE 2 BOLTS

GRAPHITE-GREY POWDER
COATED 250x150x3mm STEEL
WALL PLATE BOLTED TO
EXTERNAL TAPERED LAMINATED
TIMBER BEAM WITH 4x12mm \varnothing
GRADE 2 BOLTS

EXTERNAL SURFACTANT COATED
600mm LIME STABILISED EARTH
WALL COMPACTED IN LAYERS
OF 300mm

▲ FIGURE 9.17
PERGOLA BEAM & STABILISED
EARTH WALL CONNECTIONS
NOT TO SCALE
(Author , 2016)



▲
FIGURE 9.18
FINAL MODEL
(Author , 2016)





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THANK YOU

To everyone who supported me through the years of architecture school

SPECIAL THANKS TO

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My parents and dearest sisters, for their never-ending support, for their kindness, love and tea,

My best friend, and fellow adventurer, Paul, for site visits, model building, and all the rest.

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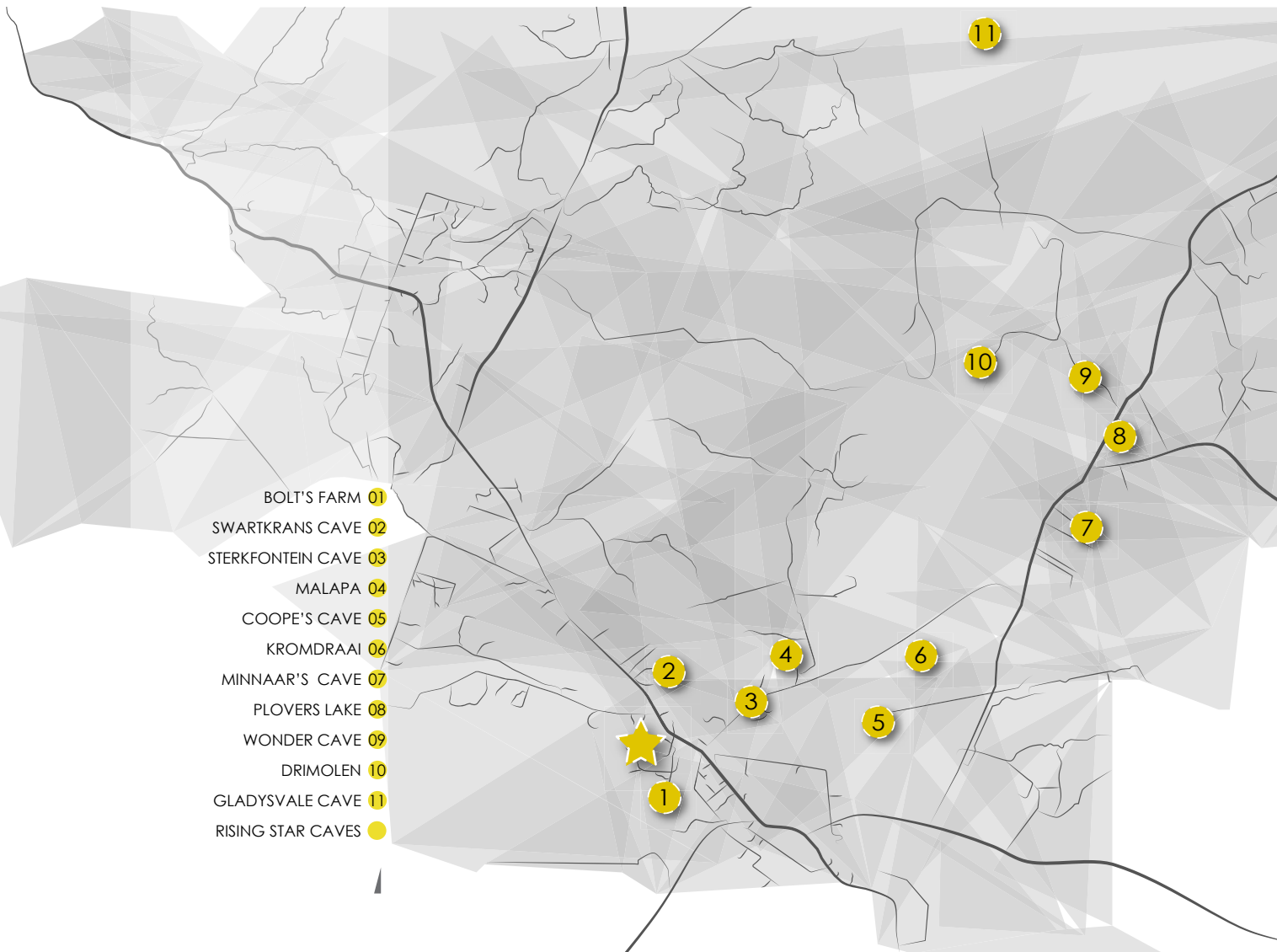
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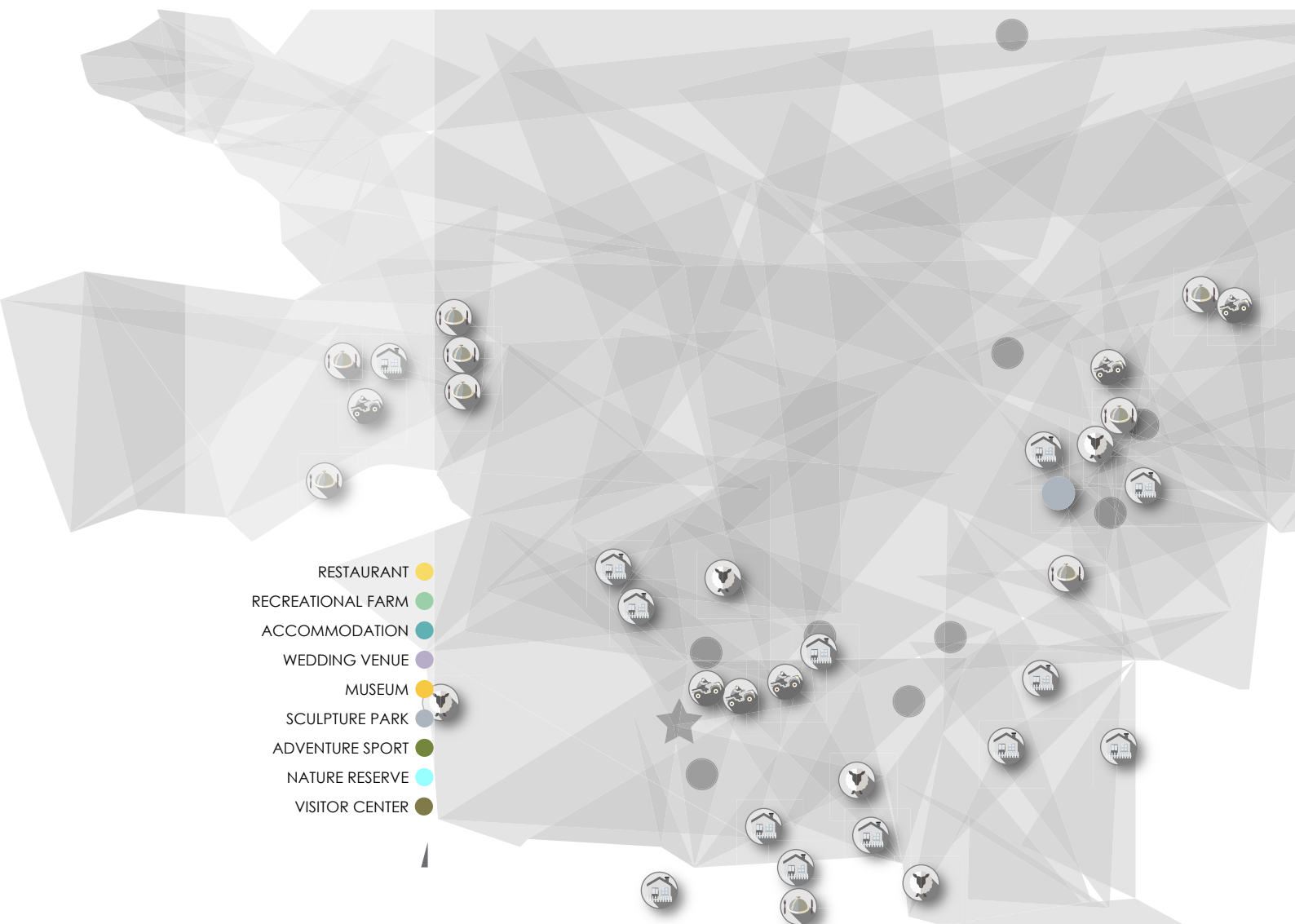


ANNEXURE A

PERI-URBAN FRAMEWORK



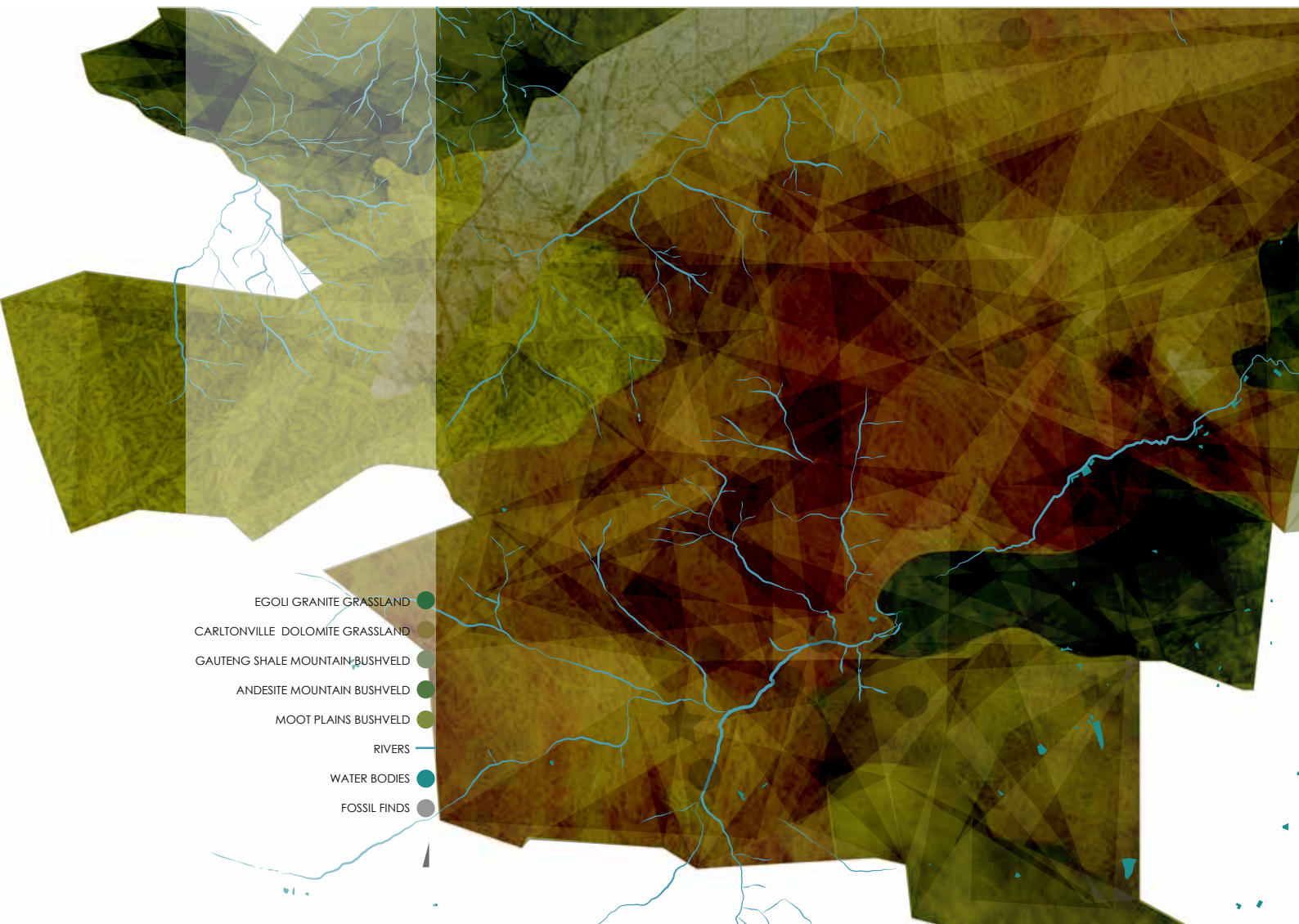
▲
FIGURE AA.1
CRADLE OF HUMANKIND
FOSSIL FINDS
(Author , 2016)



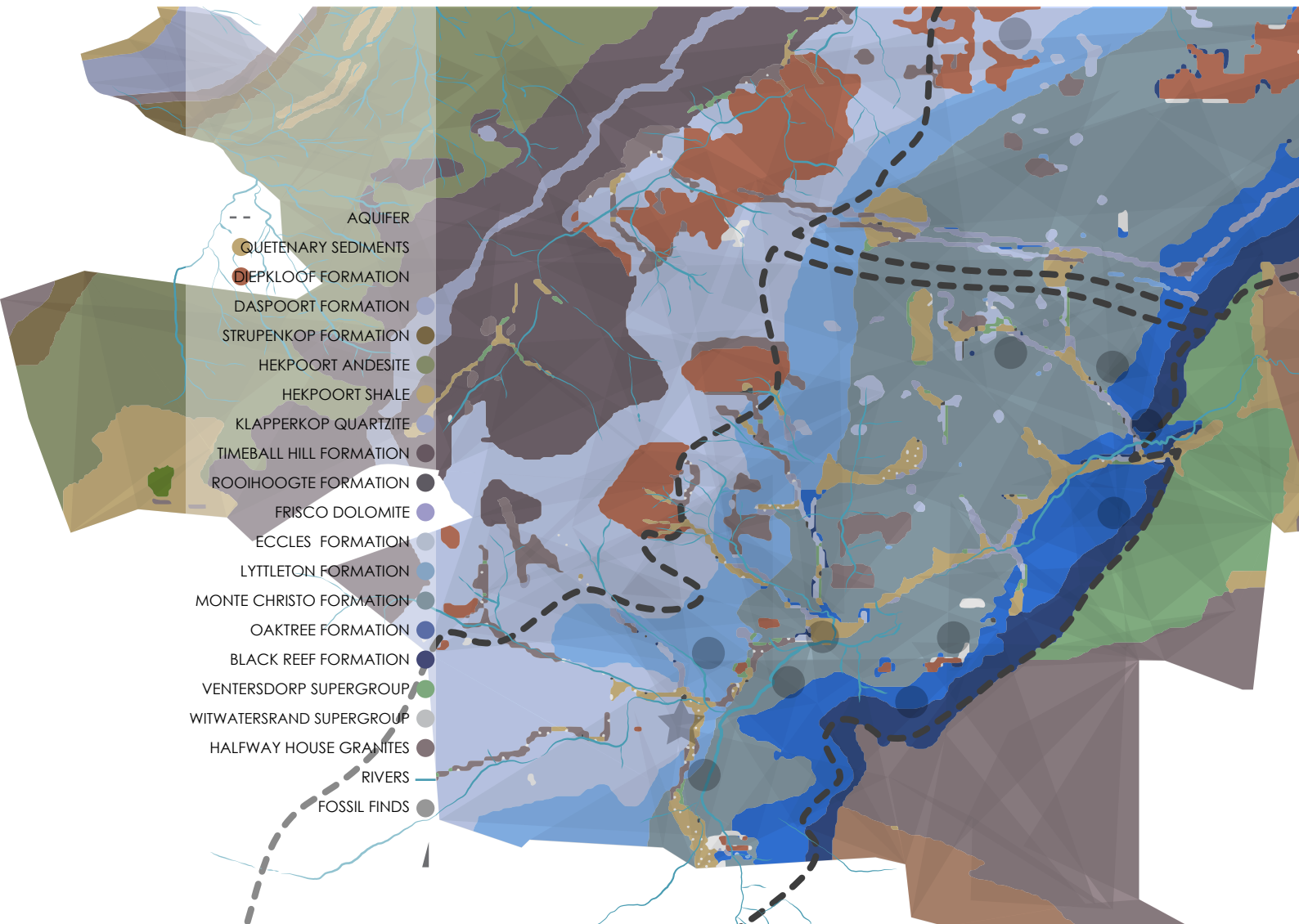
▲ FIGURE AA.2
CRADLE OF HUMANKIND
TOURISM ATTRACTIONS
(Author , 2016)



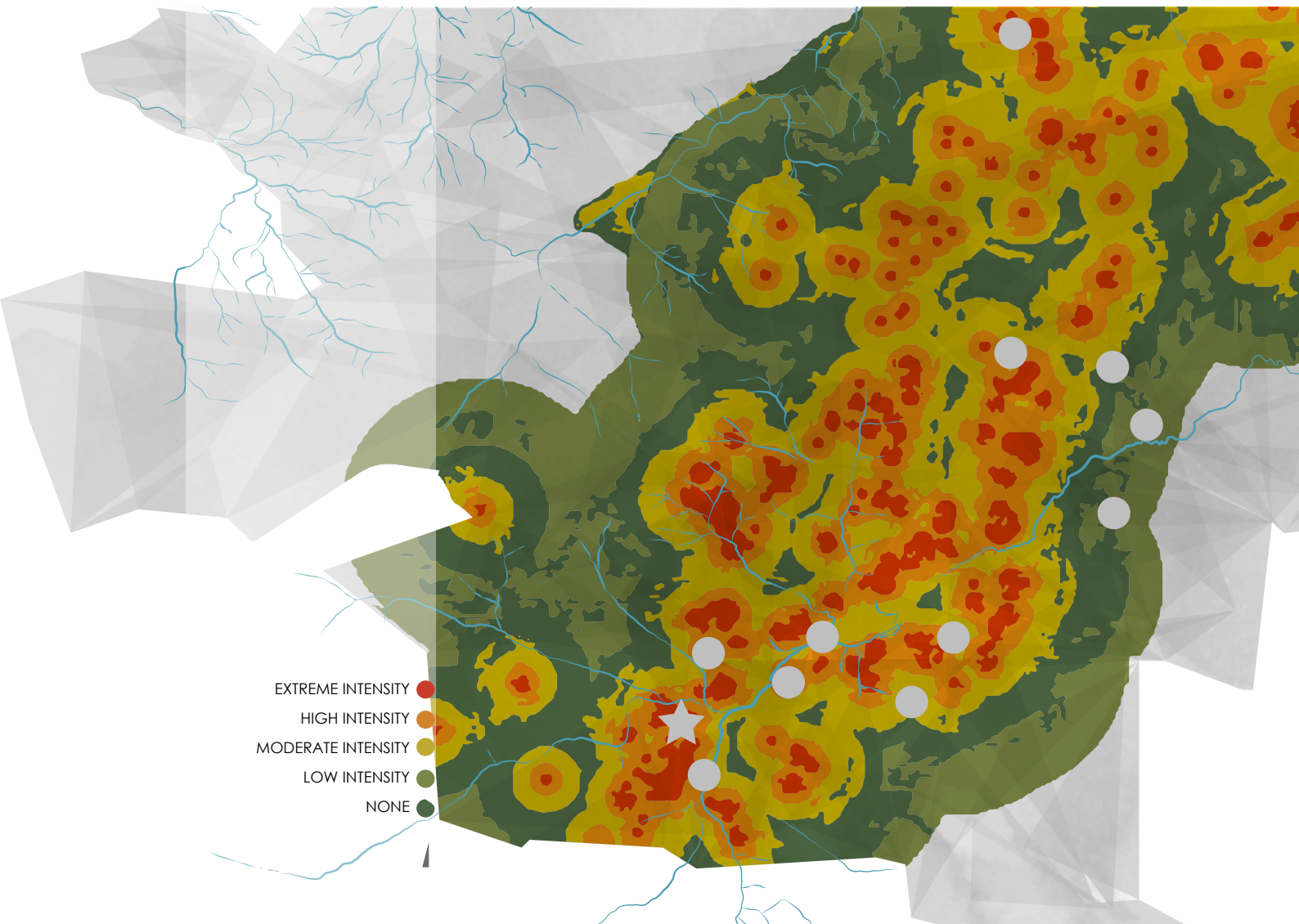
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FIGURE AA.3
CRADLE OF HUMANKIND
RIVERS & WATER BODIES
(Eloff 2010:19)



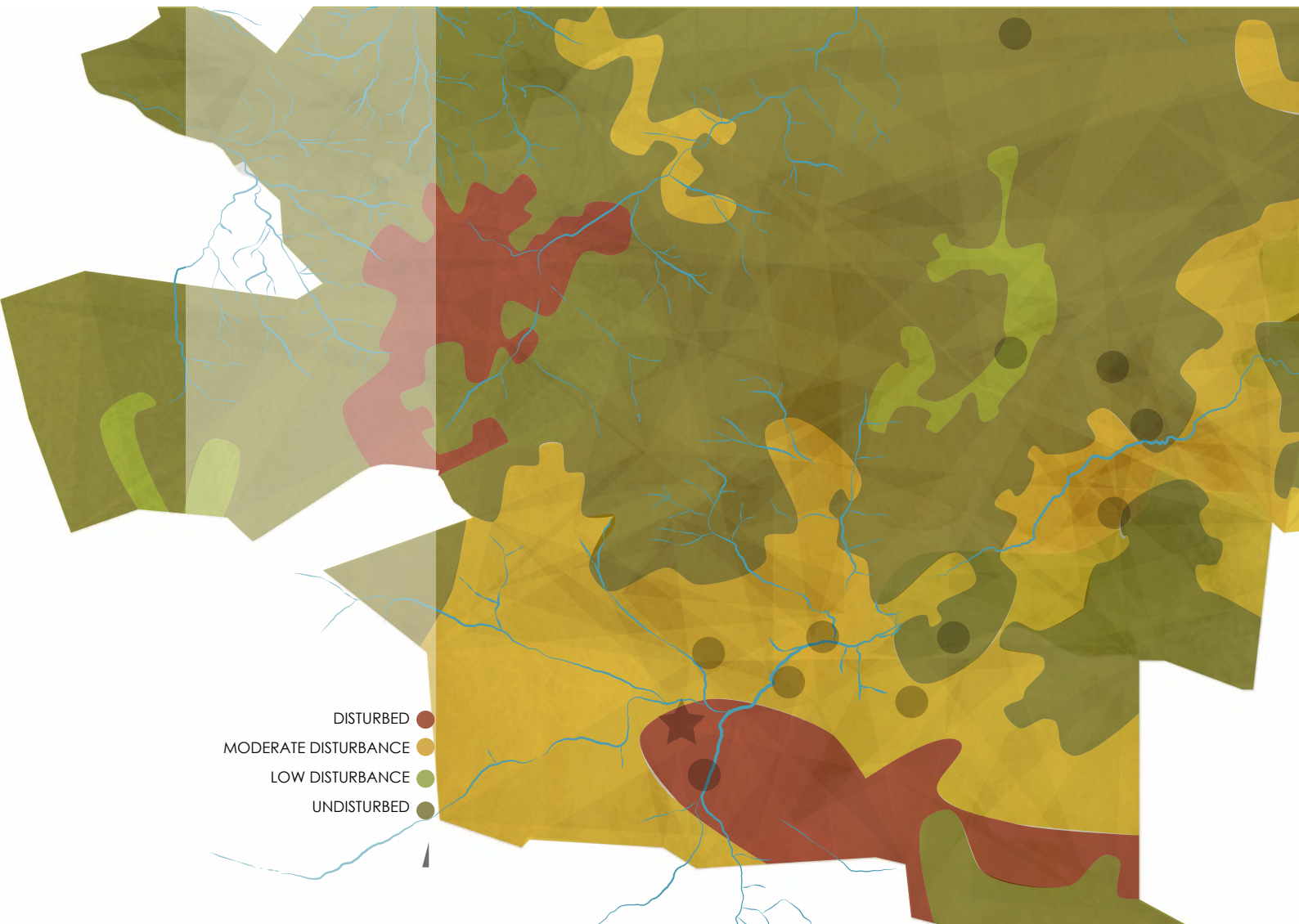
▲ FIGURE AA.4
CRADLE OF HUMANKIND
VEGETATION
(Eloff 2010:19)



▲
FIGURE AA.5
CRADLE OF HUMANKIND
GEOLOGY
(Leyland 2008:67)



▲ FIGURE AA.6
CRADLE OF HUMANKIND CONCENTRATION
OF SURFACE WATER FLOW
(Eloff 2010:19)



▲
FIGURE AA.7
CRADLE OF HUMANKIND
ENVIRONMENTAL INTEGRITY
(Eloff 2010:19)



▲ FIGURE AA.8
CRADLE OF HUMANKIND
ACCESS ROUTES
(Eloff 2010:19)



ANNEXURE B

PRESSURES & RISKS TO BOLT'S FARM

TABLE 1: MANAGEMENT AND MONITORING TASK FOR BOLT'S FARM FOSSIL SITE

ISSUES	THREATS OR RISKS	DESIRED OUTCOMES	MANAGEMENT MEASURES	PRIORITY
Surface environment				
Access- legal access to property	<ul style="list-style-type: none"> • Pedestrian access is a sensitive issue 	Maintenance of cordial relations with landowners regarding access		Necessary
Unauthorised access	<ul style="list-style-type: none"> • Removal of rock, fossils and artefacts • Removal of edible and medicinal plants • Theft of moveable property (when researchers are working on site) 	Access to fossil sites controlled	<ul style="list-style-type: none"> • Landowner to maintain surveillance • Researchers and field staff to maintain surveillance 	Desirable
Rangeland condition	<ul style="list-style-type: none"> • Deterioration of rangeland due to overstocking, overgrazing or too frequent fires 	Rangeland in optimum condition	<ul style="list-style-type: none"> • GDACE can advise • Plan for acquiring baseline data against can be assessed • Plant species list required noting edible, medicinal, toxic and economically significant species 	Desirable



Retention of topsoil, surface drainage, surface erosion	<ul style="list-style-type: none">• Loss and dispersal of topsoil makes revegetation difficult	Fossil site free of erosion	<ul style="list-style-type: none">• Check all tracks and pathways for erosion• Check for surface drainage and distribution of runoff over surface• Implement erosion control as suggested in general management plan operation guidelines	Necessary
Fire Management	<ul style="list-style-type: none">• Too frequent fires have a negative effect on vegetation• Blackened areas are unsightly• Fire is a threat to moveable property	Proper fire regime for Bakenveld maintained, site free from fire hazards	<ul style="list-style-type: none">• Implement a fire management policy which includes firebreaks• Record fire frequency and intensity• Take precautionary measures to contain domestic fires started on site• Brief residents on what to do in such a situation• Ensure that suitable beaters for research staff and farm workers are available	Desirable



Red data species, rare and economically significant plants	<ul style="list-style-type: none"> Loss of edible and medicinal plants, and botanical information Many important plant species are not on RED DATA list 	Preservation of biodiversity	<ul style="list-style-type: none"> Surveillance of indigenous plant use Drawn up a species list of medicinal, poisonous, edible and economically significant species Map occurrence and preferred microhabitats Monitor collection and utilization 	Desirable
Invasive alien plant species	<ul style="list-style-type: none"> Invasion of avens and other habitats by alien species Loss of biodiversity Unattractive landscape Inaccessible breccias Obscures deposits and makes them difficult to access 	Fossil site free of invasive alien species	<ul style="list-style-type: none"> Make a list of all invasive plant species Map and prioritise infestations Determine best eradication or control programme Implement control and clearance programme 	Desirable
Weeds and shrub growth in excavation site	<ul style="list-style-type: none"> Roots destabilise breccias in time Plants reduce visibility of noteworthy sections 	Weed-free fossil site	<ul style="list-style-type: none"> Pull weeds by hand, or "skoffel" Destroy in a manner that does not spread seed further 	Desirable
Development in "viewshed"	<ul style="list-style-type: none"> Negative visual impact 	Preservation of sense of place and natural qualities of viewshed	<ul style="list-style-type: none"> COH WHS to monitor all new development plans 	Desirable
Habitat protection: removal of stromatolites	<ul style="list-style-type: none"> Loss of heritage material and site significance Loss of micro-habitats 	Preservation of Pelindaba stone, stromatolites and associated microhabitats	<ul style="list-style-type: none"> Landowner, research scientists and field staff to maintain surveillance Heritage monitors to be alerted 	Desirable



Subterranean Environment				
Presence of breeding colonies of bats	<ul style="list-style-type: none"> Loss of colony- sensitive to human interference Species involved (miniopteris natalensis) is declining in numbers 	Preservation of breeding colonies of <i>Miniopteris natalensis</i>	<ul style="list-style-type: none"> Take care when extending excavations into cave and aven entrances to underground systems Ensure that excavations only takes place when risk of disturbing breeding season is low Ensure that bats have free access into and out of caves and avens 	Future concern
Porcupine lairs and owl roosts	<ul style="list-style-type: none"> Disturbance and displacement of animals Porcupine lairs and owl roosts are important as modern analogues for taphonomic processes of the past 	Preservation of porcupine lairs and owl roosts of actualistic studies	<ul style="list-style-type: none"> Protect any porcupine lairs and roosts on site Encourage that their behaviour and lair contents are studied without disturbing animals 	Desirable
Infrastructure				
Ablutions	<ul style="list-style-type: none"> Lack of ablutions is problematic to research scientists 	Site free from pollution	<ul style="list-style-type: none"> VIP or Environloo to be installed in time Management is required to ensure that this would not burn down in frequent fires 	Necessary



Waste management and disposal	<ul style="list-style-type: none"> Litter Cattle and wild animals die from ingesting plastic bags 	Site free from litter	<ul style="list-style-type: none"> Provide litter bins or holders Collect and remove all litter regularly Best practice would require sorting and recycling litter 	Necessary
Signage adequacy	<ul style="list-style-type: none"> Poor tourist/visitor experience if site adequately interpreted 	Appropriate site interpretative signage	<ul style="list-style-type: none"> Site not open to general public at current time, specialist tour operator and permitted scientist provide site interpretation 	Future concern
Visitor impacts	<ul style="list-style-type: none"> Littering Pollution Erosion of pathways Disturbance of excavations Theft of fossils Graffiti 	Mitigation or elimination of visitor impacts (future)	<ul style="list-style-type: none"> Potential impacts not present at current time 	Future concern
Infrastructure: water	<ul style="list-style-type: none"> All has to be carried by hand Inadequate water supply inhibits excavation Water needed for drinking and ablutions Water needed to control dust 	Provision of sufficient water to enable research	<ul style="list-style-type: none"> It is extremely difficult to solve the water problem on site 	Necessary

(Gauteng Provincial Government n.d)

TABLE 2: IDENTIFIED HAZARDS A& ASSOCIATED WEIGHTING VALUES FOR THE COH WHS

NO.	HAZARD DISCRIPTION	WEIGHTING VALUE
1.1.2	Urbanization without sewer systems	70
1.1.3a	Detached houses without sewer systems	45
1.1.3b	Semi-informal housing	55
1.1.3c	Informal housing	60
1.1.4	Septic tank, cesspool, latrine	45
1.3.6a	Petrol station	60
1.3.6b	Car workshops	50
1.4.1	Road, unsecured	40
1.4.4	Car parking area (incl. boat, and airplane storage)	35
1.4.9	Runway	35
1.5.1	Tourist urbanization	30
1.6.4	Transformer station (incl. cell towers)	30
2.2.3	Quarry	25
2.4.7	Rubber & tyre industry (& asphalt plants)	65
2.4.11	Light industries	40
3.1.1	Animal barn (shed, cote, sty)	30
3.1.2	Feedlot	30
3.1.3	Factory farm	30
3.1.4	Manure heap	45
3.2.1	Open silage	25
3.2.2	Closed silage	20
3.2.3	Stockpiles of fertilisers & pesticides	40

(Hobbs 2011:182)



ANNEXURE C

FLORA OF THE CRADLE OF HUMANKIND

TABLE 1: FLORA IDENTIFIED ON BOLT'S FARM

NAME	STATUS	EDIBLE/MEDICINAL
Pineapple Flower (<i>Eucomis autumnalis</i>)	Not Evaluated	Medicinal
Botterblom (<i>Gazania krebsiana</i>)	Least Concern	Edible & medicinal
Wild Hibiscus (<i>Hibiscus microcarpus</i>)	Least Concern	Edible & medicinal
Bitterwortel (<i>Pachycarpus schinzianus</i>)	Least Concern	Edible & medicinal
Bobbejaanuintjie (<i>Babiana hypogea</i>)	Near Threatened	none
Platvoetaasblom (<i>Brachystelma barberiae</i>)	Least Concern	Edible & medicinal
Birdcage Flower (<i>Brachystelma circinatum</i>)	Least concern	Edible
Wild Sweetpea (<i>Sphenostylis angustifolia</i>)	Least concern	none
Patrysuintjie (<i>Gladeolus permeabilis</i>)	Least concern	Edible bulbs
Swartteebossie (<i>Gerbera piloselloides</i>)	Least concern	none
Slymuintjie (<i>Albuca setosa</i>)	Least concern	Medicinal
Rooi-opslag (<i>Hermannia depressa</i>)	Least concern	Medicinal
Bloutulp (<i>Moraea thomsonii</i>)	Least concern	none

