# PROJECT BACKGROUND AND CONCEPT

## BACKGROUND FROM RESEARCH THESIS

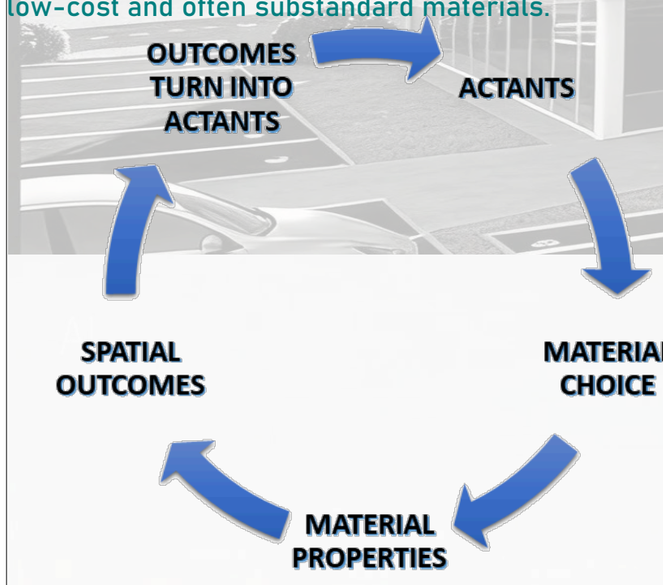
**What is the project about?** Transforming Thika's metal works Juakali spaces into safer, more productive engines of local growth. This is through first understanding the relationship between spatial outcomes and material logic, Specifically in Kigandaini, the main metal works juakali zone. Thereafter, appling the suitable logic in material selection to achieve the desired spatial outcomes

**The problem?** The existing metal works spaces face various issues like:

- Poor ventilation, lighting and thermal comfort.
- Difficulty in expansion leading to obstruction and encroachment on pedestrian and vehicular paths
- Safety risks like cuts and injuries sustained from the existing materials
- Security risk especially for raw materials and finished goods.
- Poor structural stability
- Water ingress into space
- Poor aesthetic quality

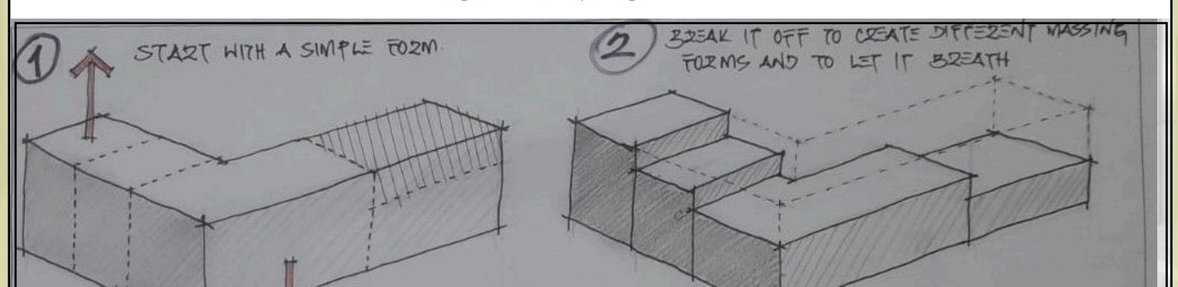
Images showing the various problems in kigandaini metal works workshops. source- Maria Gicheha 2025

**Why solve it?** The Juakali metalwork sector in Kigandaini, Thika and kenya at large plays a vital role in the local economy through employment, affordable production, and creative problem-solving, yet its potential is limited by unstructured spaces shaped by the use of low-cost and often substandard materials.

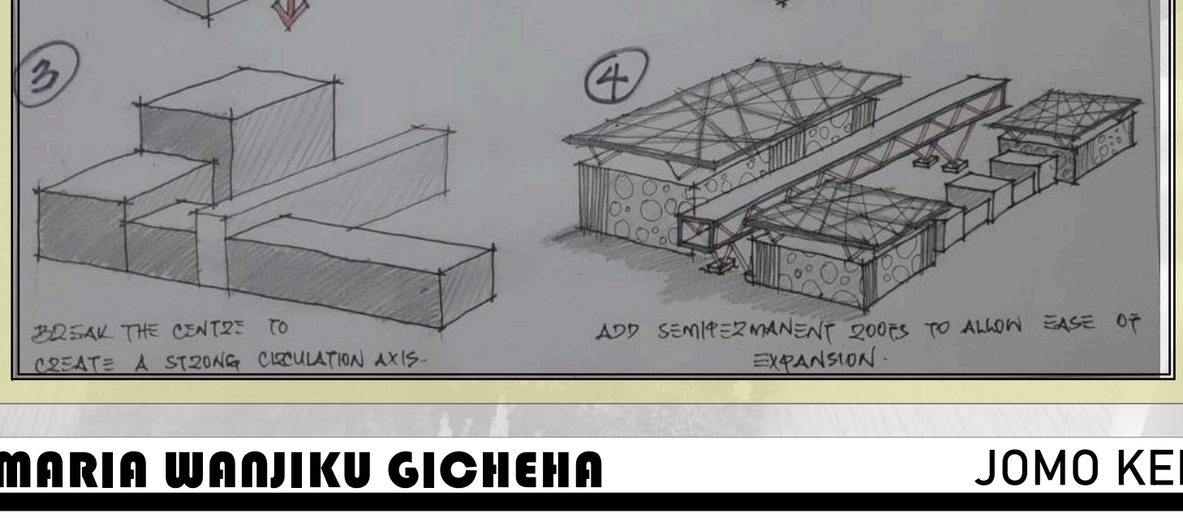



WHEN DESIRED SPATIAL OUTCOMES ARE NOT TURNED INTO ACTANTS DURING INCEPTION, THE VICIOUS CYCLE OF SPATIAL NEGLECT TURNS INTO A LOOP.
TACTICS OF THE MARGINALISED BECOMING AGENTS OF MARGINALISATION

## SITE LOCATION



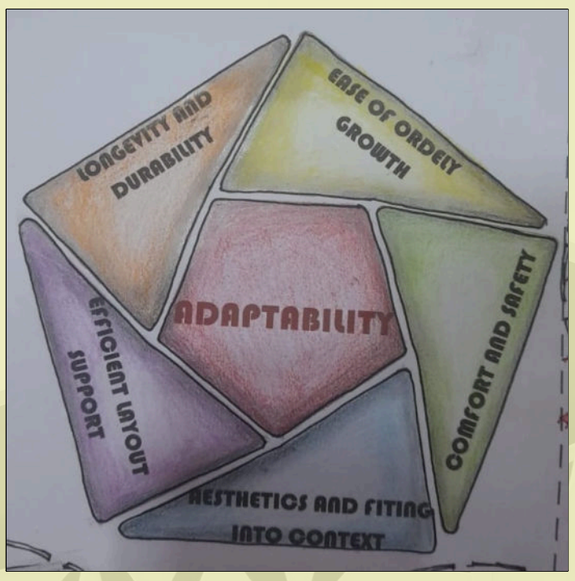

## ZONNING AND SPACE PLANNING




## FORM DEVELOPMENT




## CONCEPT: ADAPTABILITY




**CONCEPT PHILOSOPHY: ADAPTABILITY, JUAKALIS AS A BECOMING THROUGH FUSION OF TACTICS AND STRATEGIES**

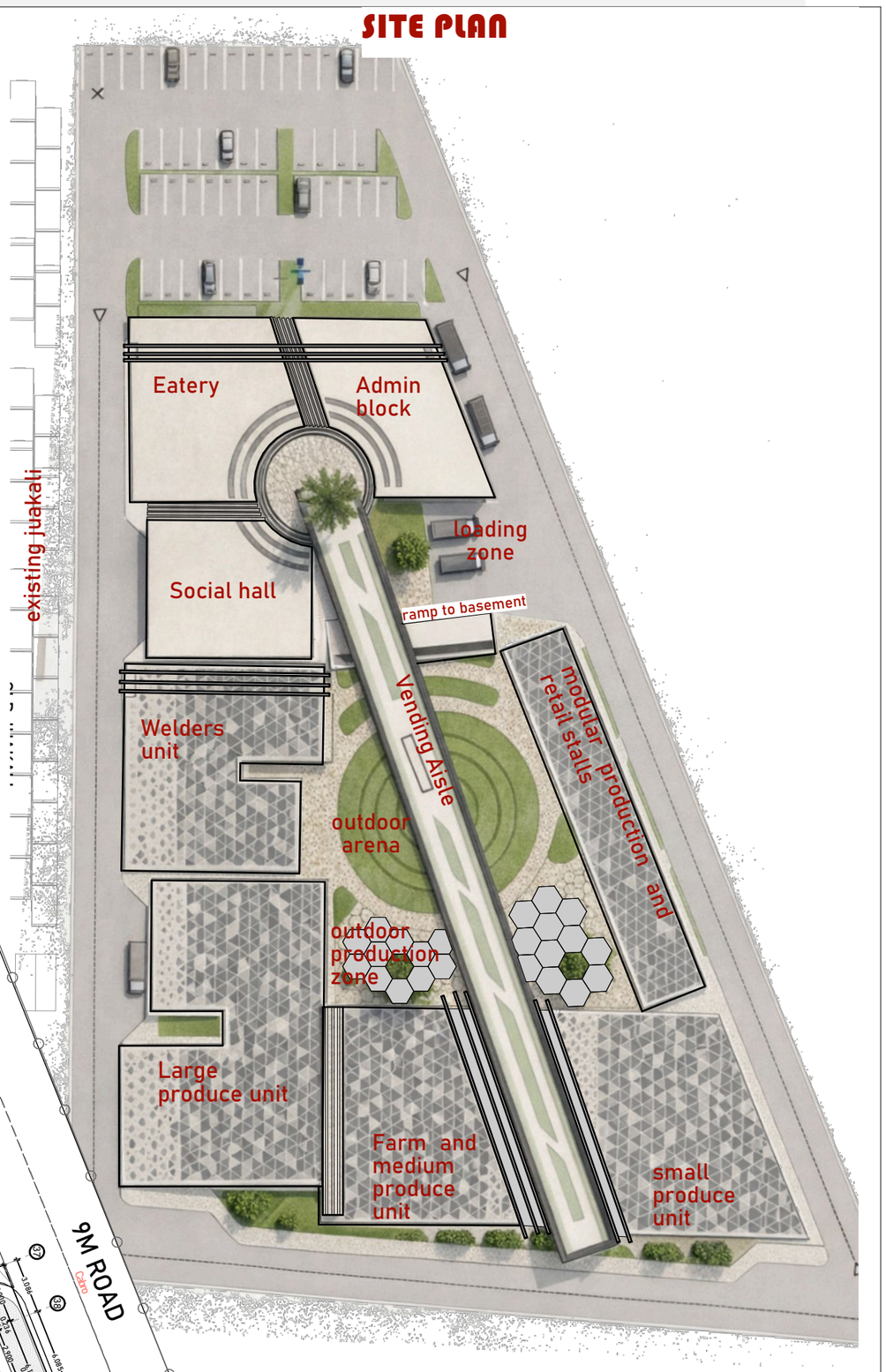
**CONCEPT STATEMENT:** BY FRAMING ADAPTABILITY AS BECOMING INFRASTRUCTURE, I ARGUE THAT JUAKALI ARCHITECTURE SHOULD NOT ONLY BE ECONOMIC BUT ALSO CONSTRUCTED WITH CHANGE, LONGEVITY, SAFETY AND COMFORT AS PRIMARY OPERATING LOGICS

- WITH THE METHOD BEING HEAVY ON MATERIAL TECHNOLOGY GUIDED BY THE DESIRED OUTCOMES AS ACTANTS BEHIND LOGIC OF CHOICE, JUAKALI ARCHITECTURE CAN BE NON-CHAOTIC SYSTEMS THAT CAN BE ARTICULATED AND REARTICULATED, POPULATED AND DISMANTLED, WITHOUT COMPROMISING THE INTENDED SPATIAL OUTCOMES.

# KIGANDAINI INDUSTRIAL HUB

THE ROLE OF MATERIAL LOGIC ON SPATIAL OUTCOMES IN KENYAN JUAKALIS:
A CASE OF THIKA KIGANDAINI

## SITE PLAN




OLD JUAKALI

9M ROAD

9M ROAD

FACTORY ROAD

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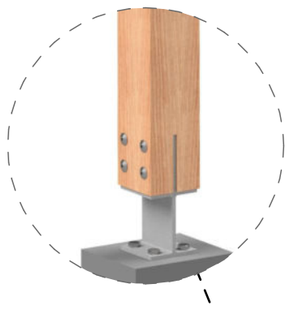
STONE COATED EPOXY FLOOR FINISH

TERAZZO (DARK COLOURED)

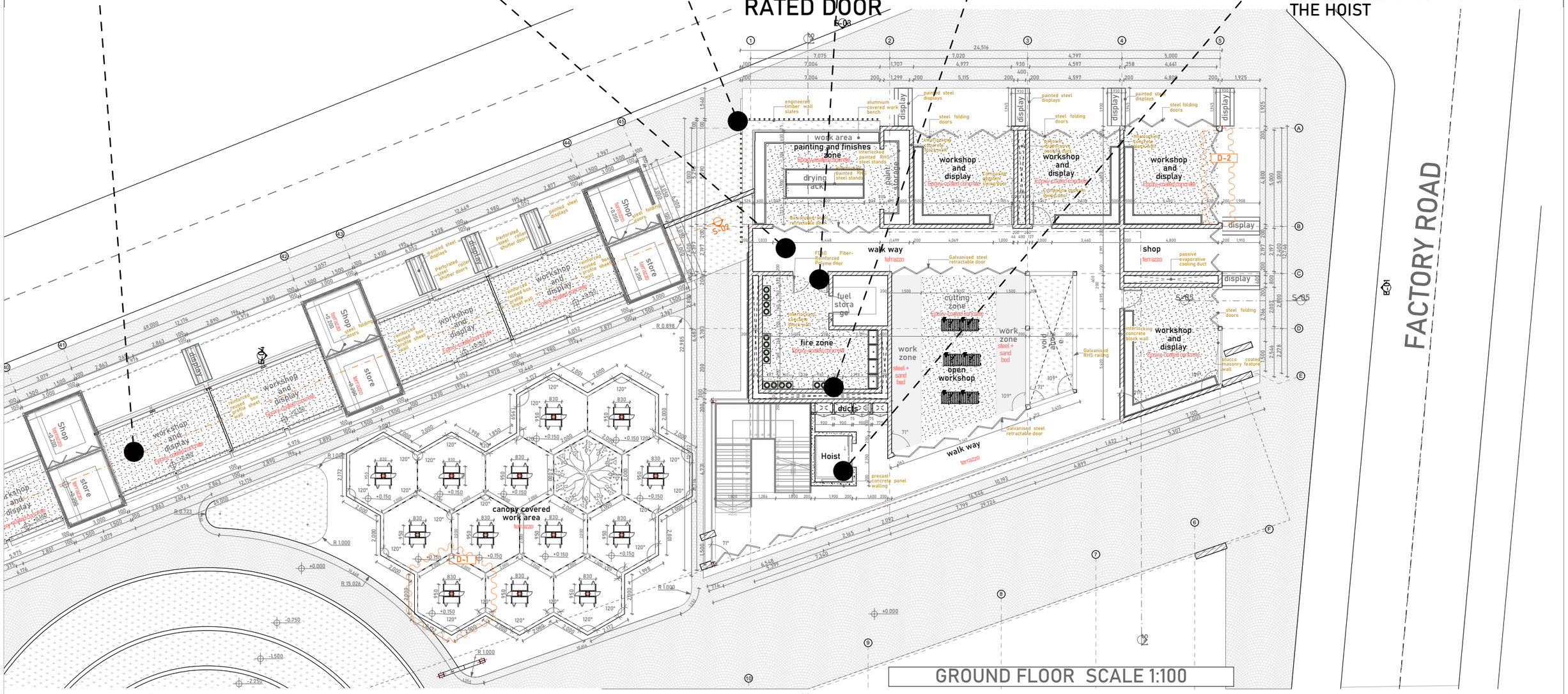


VERTICAL ENGINEERED TIMBER FINS

REIGNFORCED FIBER POLYMER CLASS A2 FIRE RATED DOOR

STEEL FIRING CHAMBER AND CHIMNEY

H-STEEL SECTION STRUCTURE FOR THE HOIST

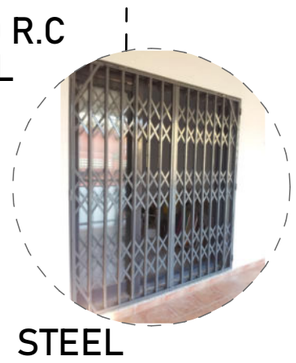




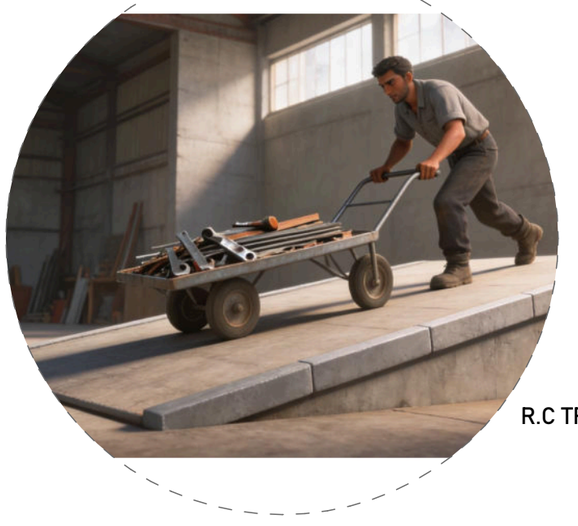





WATERPROOFED R.C RETAINING WALL



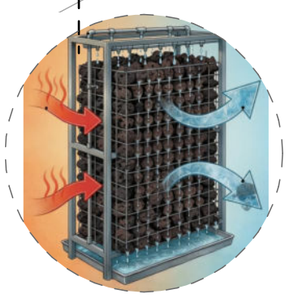
STEEL COLLAPSIBLE DOOR



R.C TROLLEY RAMP

REIGNFORCED INTERLOCKING CONCRETE BLOCKS

CHECKERED STEEL AND SAND BED FLOOR COMPOSITE



STAINLESS STEEL MESH AND CHALCOAL COMPOSITE COOLING

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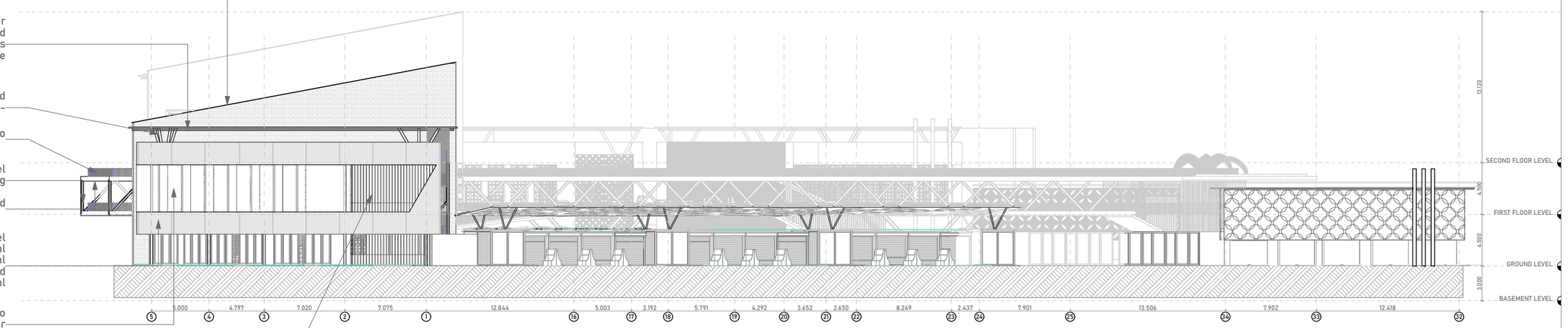
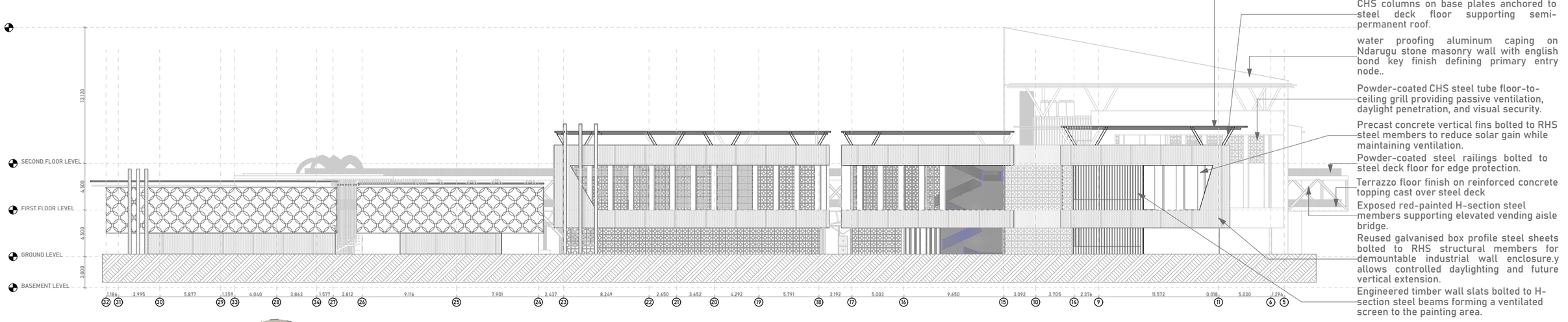
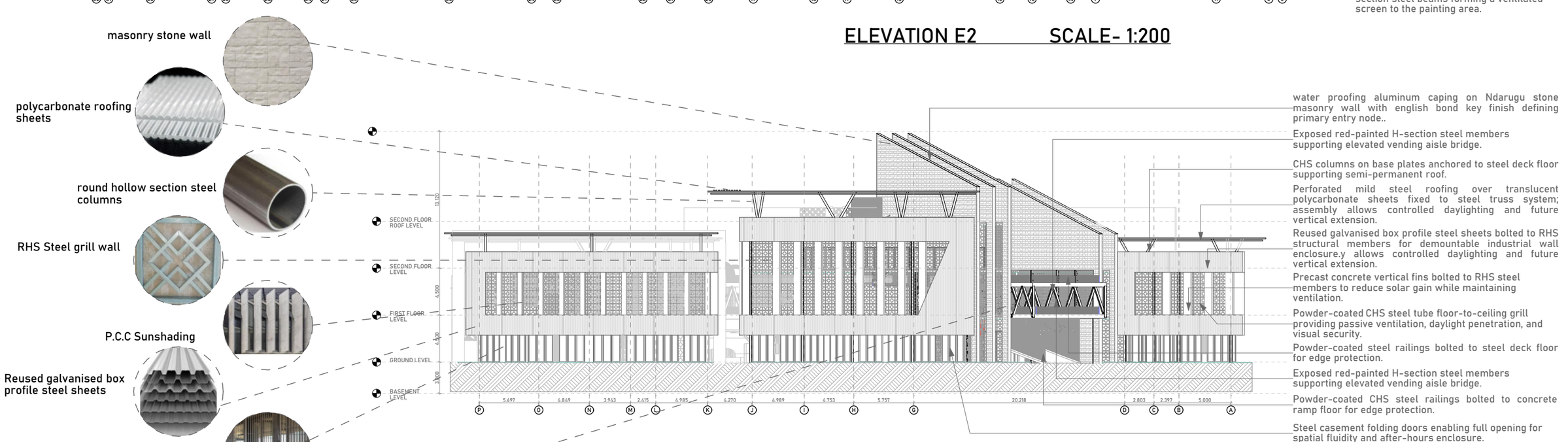


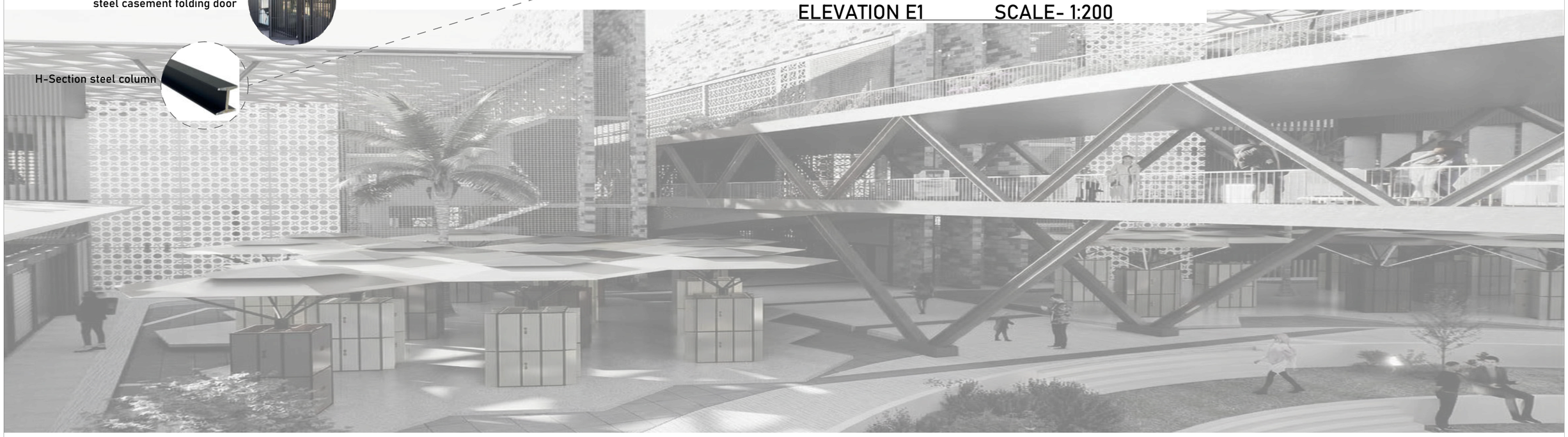

ELEVATION E4 SCALE- 1:200

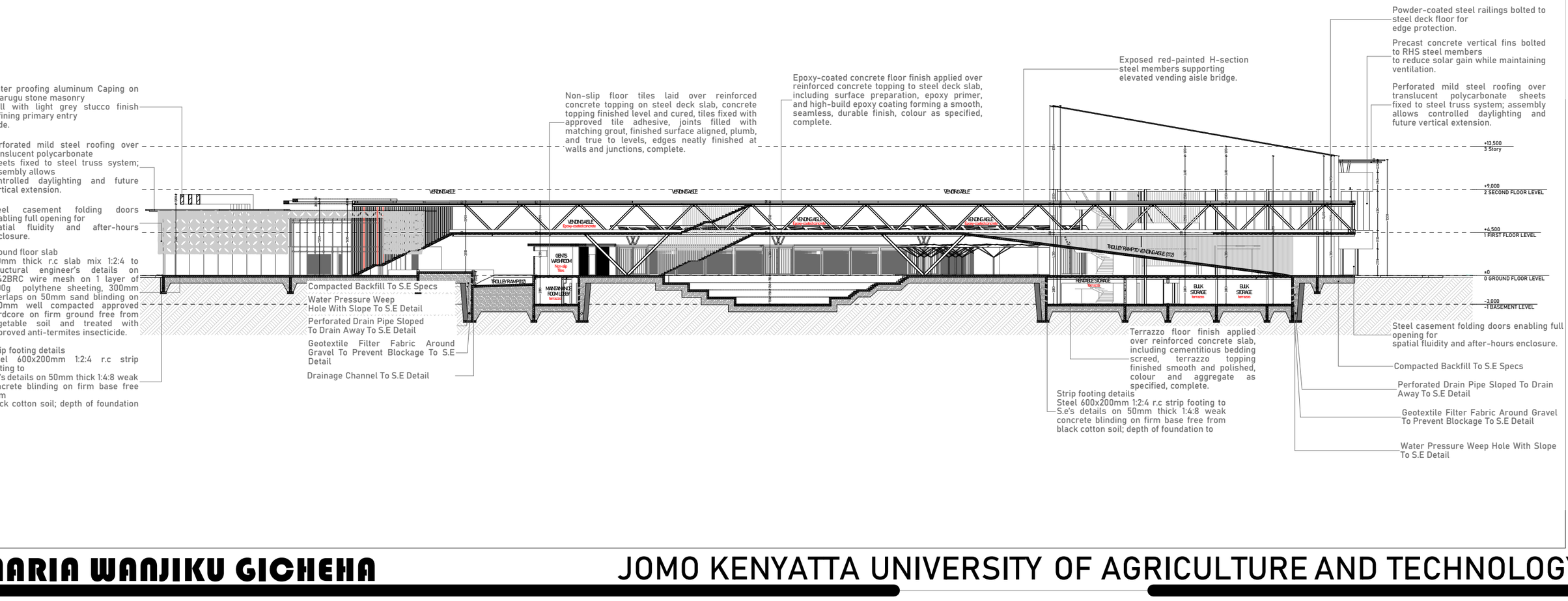



ELEVATION E2 SCALE- 1:200




ELEVATION E1 SCALE- 1:200





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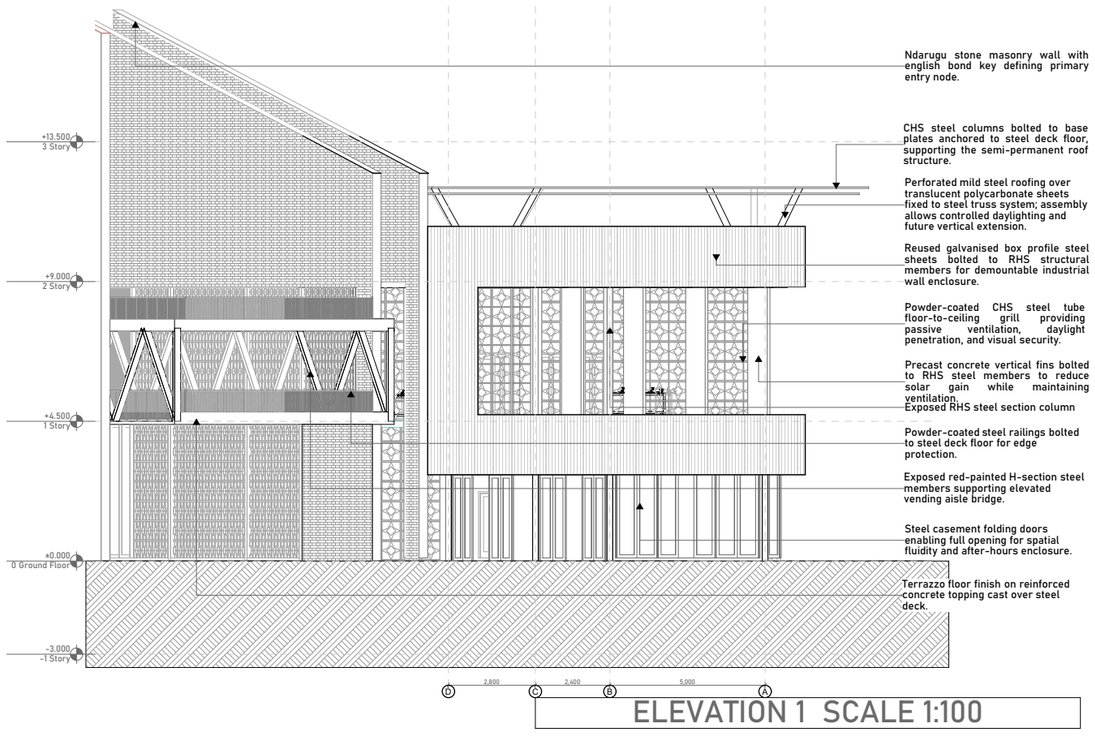
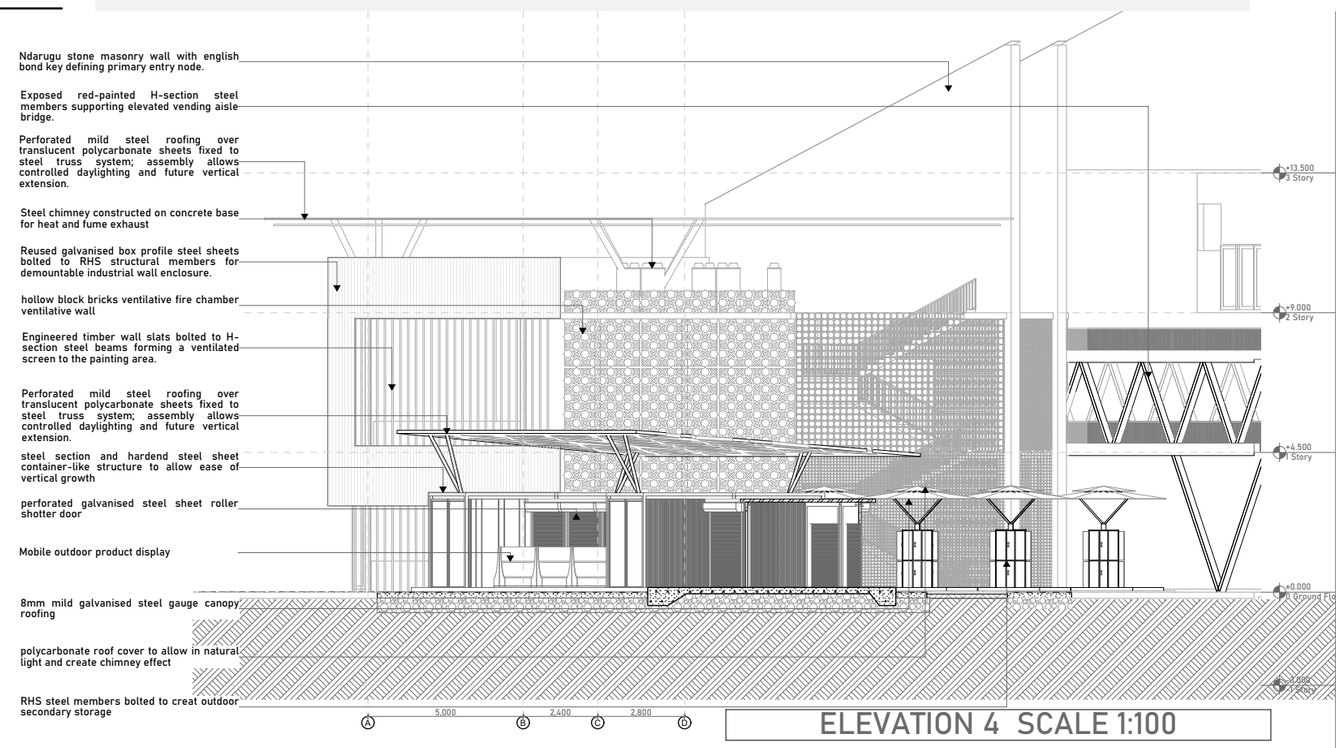
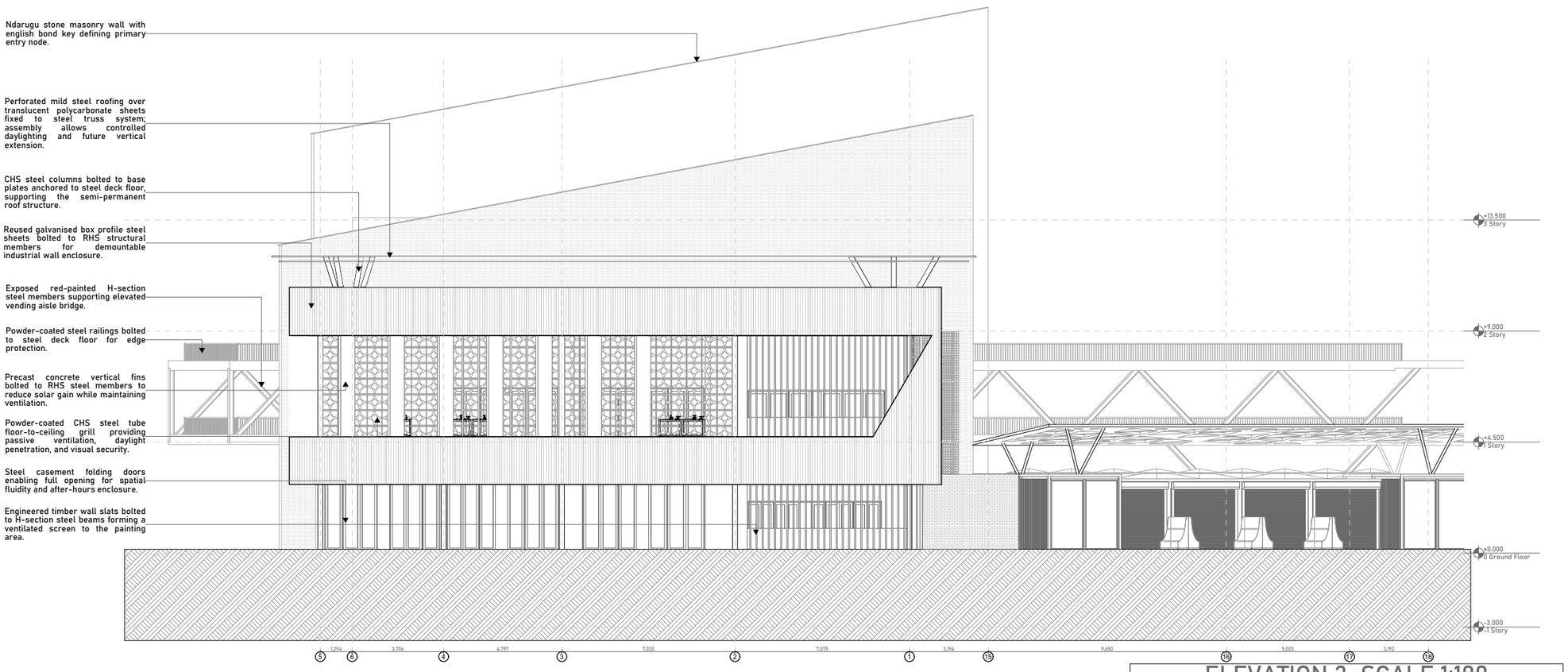


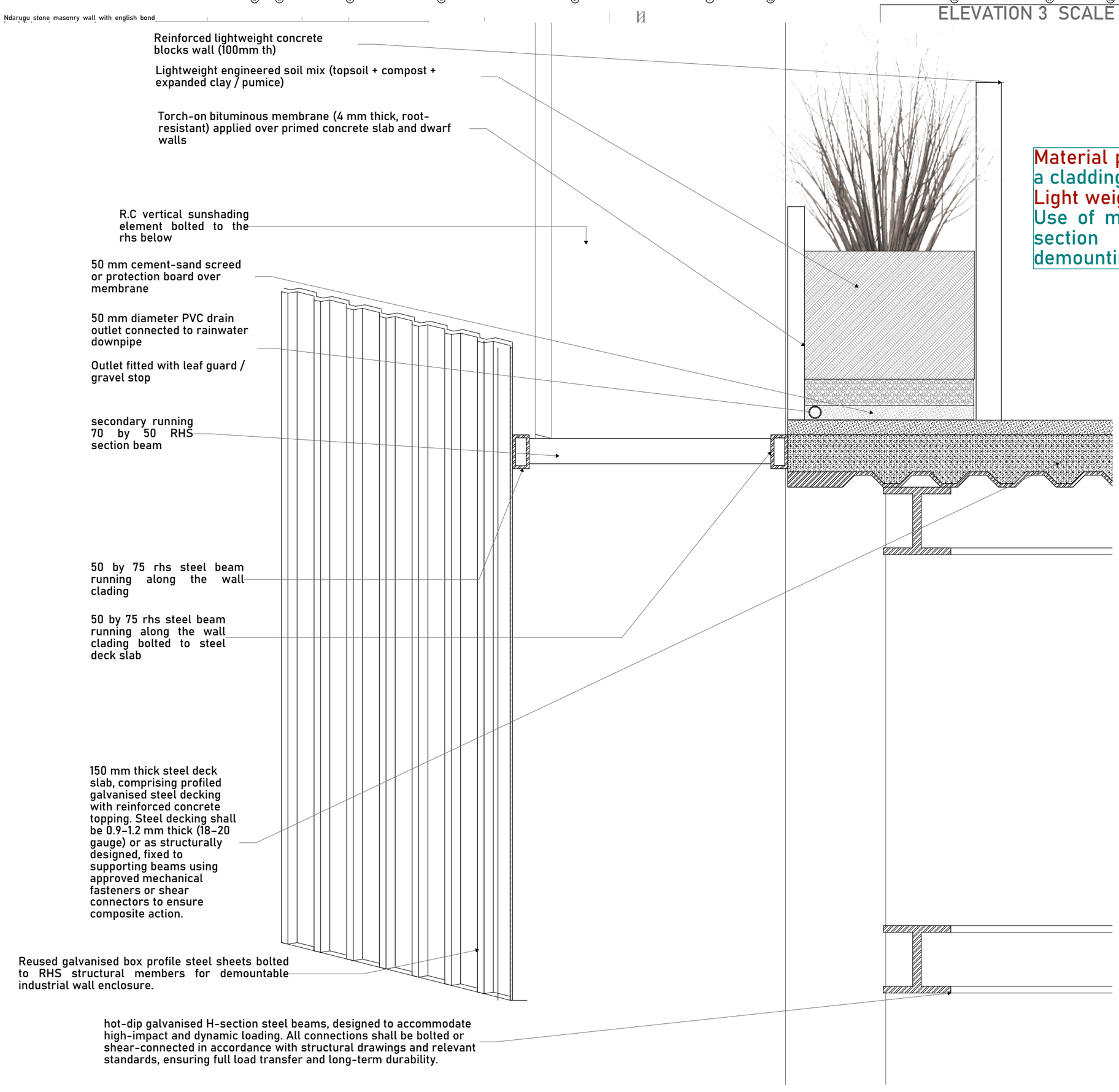

ELEVATION 1 SCALE 1:100




ELEVATION 4 SCALE 1:100




ELEVATION 3 SCALE 1:100




**Material pallet adoptation:** Use of mabati as a cladding to fit into context.
**Light weight, demountable building systems:** Use of materials like steel deck and steel section structres for easy replication, demounting or re-articulation.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# KIGANDAINI INDUSTRIAL HUB

## THE ROLE OF MATERIAL LOGIC ON SPATIAL OUTCOMES IN KENYAN JUAKALIS: A CASE OF THIKA KIGANDAINI

Perforated mild steel roofing over translucent polycarbonate sheets fixed to steel truss system; assembly allows controlled daylighting and future vertical extension.

CHS steel columns bolted to base plates anchored to steel deck floor, supporting the semi-permanent roof structure.

Clear waterproof outdoor varnish applied to terrazzo finish on reinforced concrete steel deck slab to protect against weathering and accommodate future vertical extension.

Powder-coated CHS steel tube floor-to-ceiling grill providing passive ventilation, daylight penetration, and visual security.

5 mm rubber sheet finish bonded to 6 mm mild steel plate on A98 BRC mesh on 40 mm sand bed encasing electromagnetic inductors, over 150 mm steel deck slab bolted to galvanised H-section steel beam for high-impact loading.

charcoal and stainless steel expanded mesh composite forming evaporative cooling duct, to detail.

Precast concrete vertical fins bolted to RHS steel members to reduce solar gain while maintaining ventilation.

Natural soil over sand bedding on rough riverbed pebbles laid over drainage pipes on waterproofing membrane.

Reused galvanised box profile steel sheets bolted to RHS structural members for demountable industrial wall enclosure.

Galvanised steel mesh fixed to H-section steel beams providing secondary storage.

Engineered timber wall slats bolted to H-section steel beams forming a ventilated screen to the painting area.

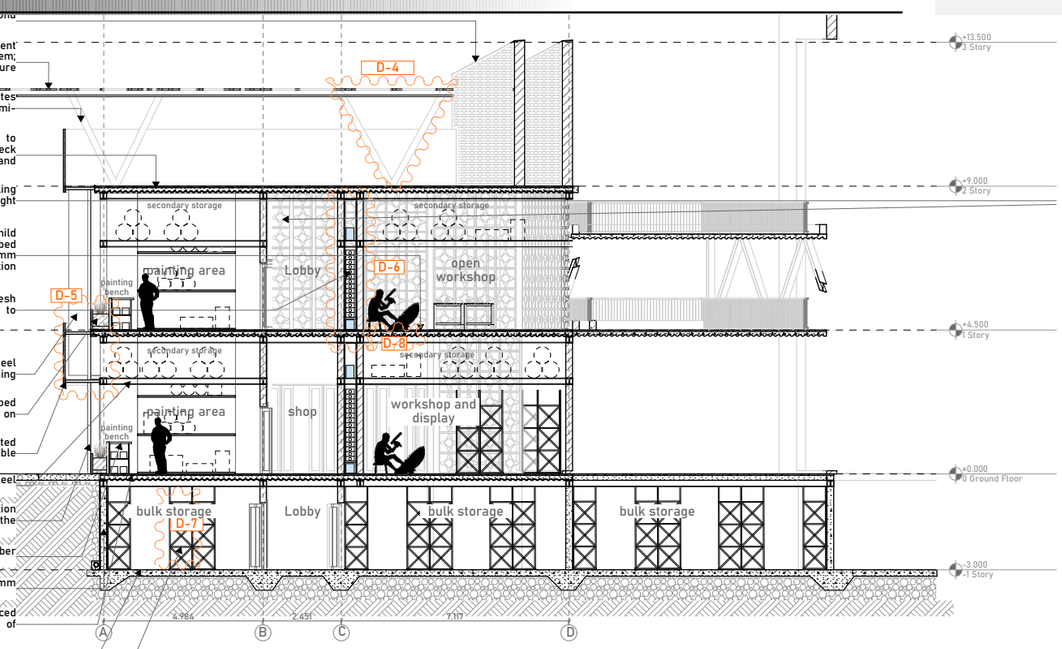
Aluminium sheet lining fixed to engineered timber support to painting bay.

Waterproofing membrane applied to 200 mm reinforced concrete retaining wall, to detail.

Stoned epoxy finish applied to reinforced concrete steel deck slab to allow ease of dismantling and resistance to heavy impact.

Terrazzo floor finish on reinforced concrete slab over DPM, on 25 mm blinding, on well-compacted hardcore on prepared subgrade.

Steel demountable storage rack system, bolted construction, to detail.




SECTION 1 SCALE 1:100

**Material innovation:** composite floor materials to absorb impact (sand, steel plate and mesh)
**energy harvesting:** electromagnetic inductors sandwiched between the composite material

5 mm thick industrial-grade rubber sheet finish, impact- and vibration-resistant, forming the final wearing surface. The rubber finish shall be fully bonded using heavy-duty industrial adhesive to the steel plate below, capable of withstanding dynamic and cyclic loads without delamination.

6 mm thick mild steel plate (approx. 4-gauge), bolted to C-section steels floor beams running on either side acting as a rigid load-distribution layer. The steel plate shall evenly distribute point loads, protect embedded systems, and resist deformation under high-impact conditions.

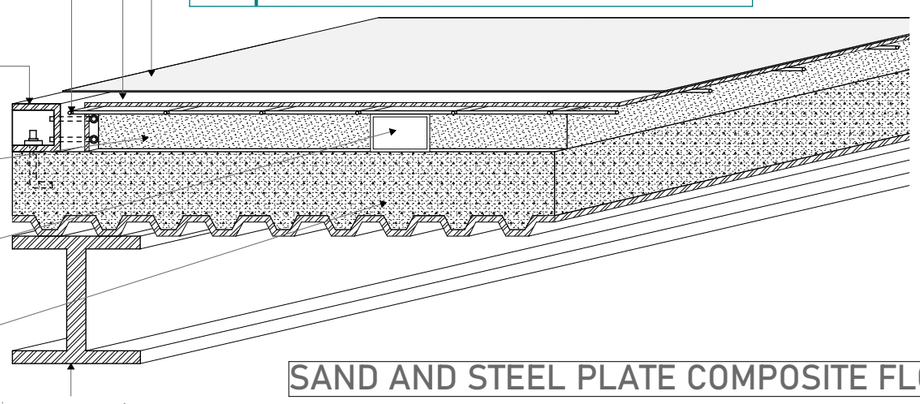
A98 high-yield BRC reinforcement mesh, centrally positioned within the sand bed. The mesh shall comprise approximately 9 mm diameter wires, securely supported to maintain correct cover and alignment, and shall provide crack control and structural stability under dynamic loading.

hot-dip galvanised C-section steel framing, 50 mm deep, formed from 14 gauge, to the full perimeter of the composite floor build-up. C-sections shall be mechanically anchored to the steel deck slab using approved anchor bolts at regular centres, forming a continuous containment frame to restrain the system and prevent lateral movement, uplift, and displacement under operational and impact loading.

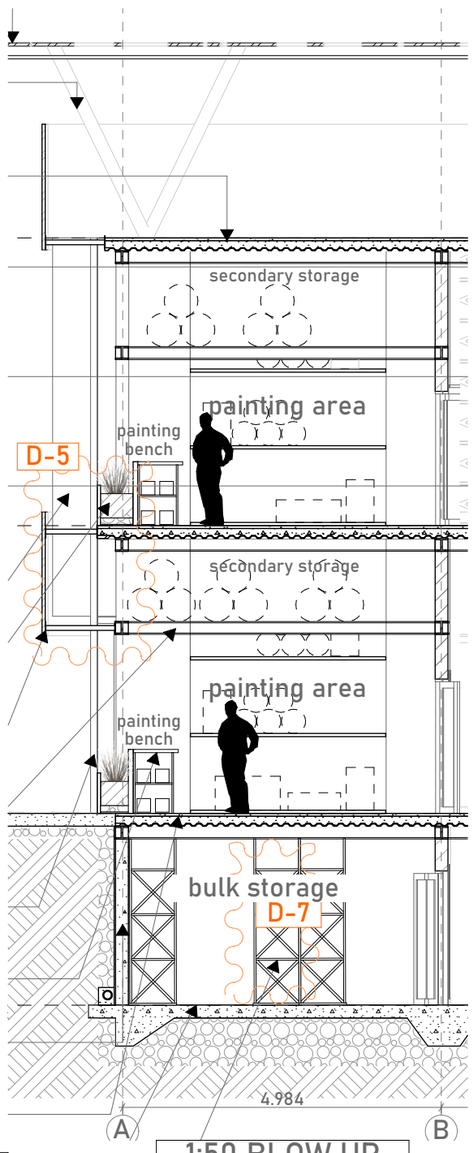
40 mm thick compacted sharp sand bed, clean and free from organic material, forming a uniform encasement to electromagnetic inductors. The sand bed shall allow fine leveling, absorb minor vibrations, and act as a protective and thermal buffer layer for embedded components.

Electromagnetic inductors fully embedded within the sand bed in accordance with MEP's specifications. Used to harvest the kinetic energy produced on impact

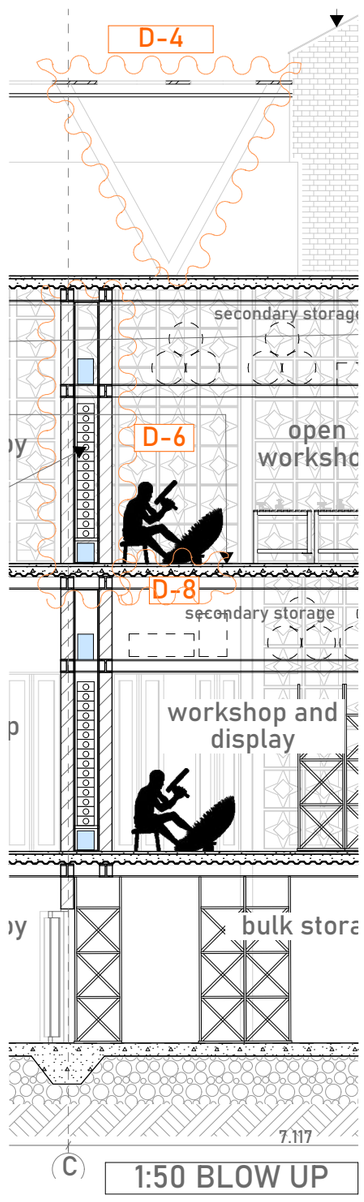
150 mm thick steel deck slab, comprising profiled galvanised steel decking with reinforced concrete topping. Steel decking shall be 0.9–1.2 mm thick (18–20 gauge) or as structurally designed, fixed to supporting beams using approved mechanical fasteners or shear connectors to ensure composite action.



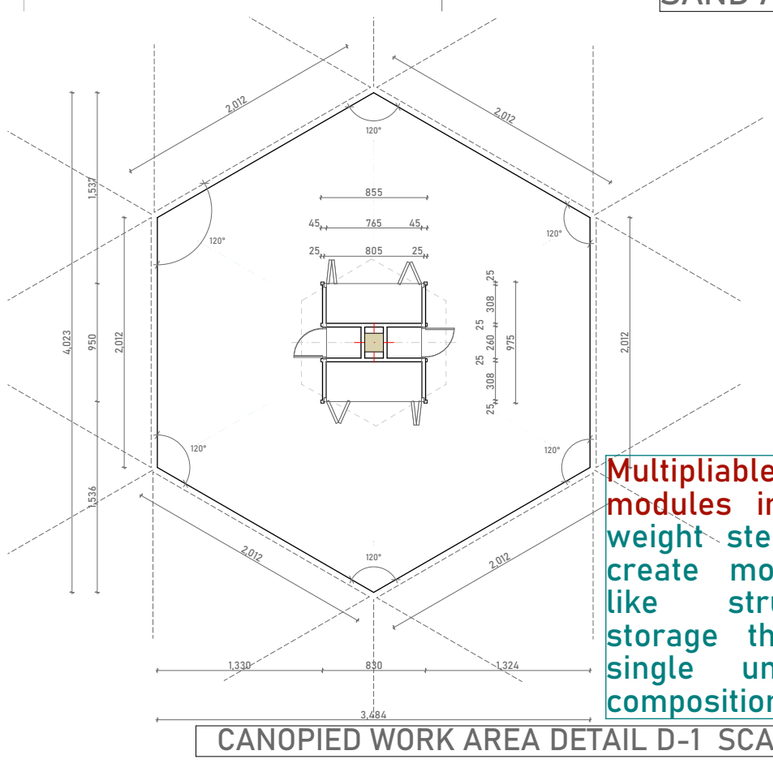
SAND AND STEEL PLATE COMPOSITE FLOOR

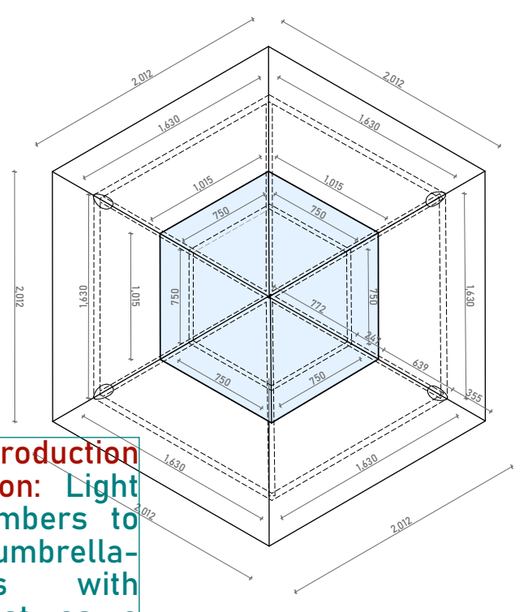



1:50 BLOW UP



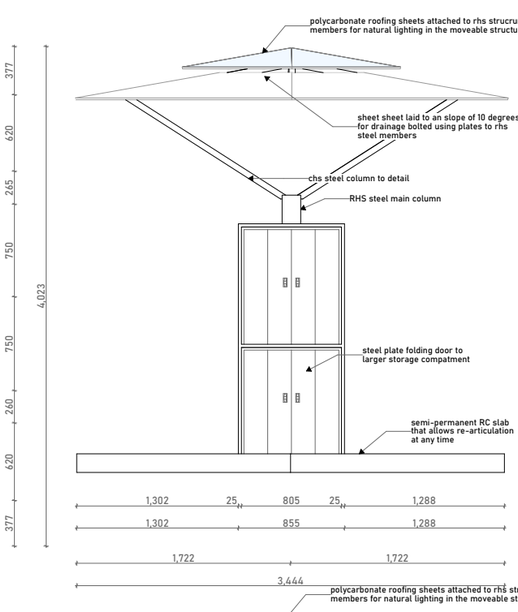

1:50 BLOW UP



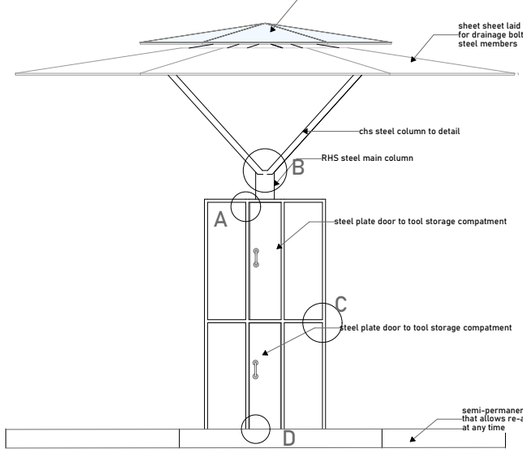

**Multipliable production modules innovation:** Light weight steel members to create mobile, umbrella-like structures with storage that exist as a single unit or in a composition of many.

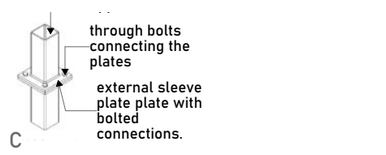
CANOPIED WORK AREA DETAIL D-1 SCALE- 1:20

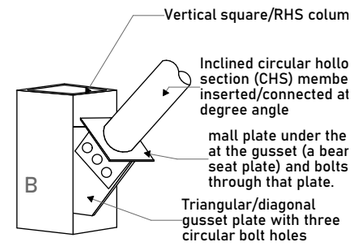


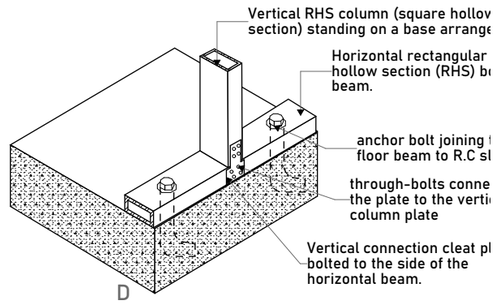


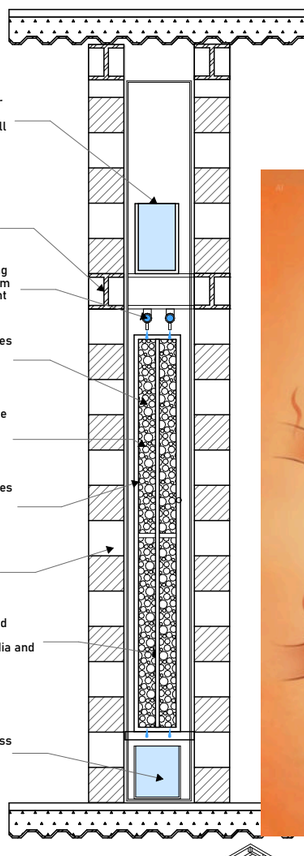




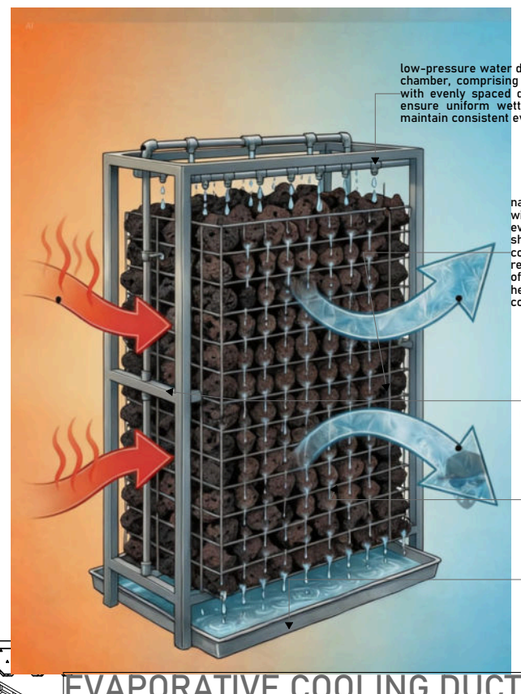




**Cooling system innovation:** chalcoal direct evaporation cooling system for workshops and fire zones




EVAPORATIVE COOLING DUCT DETAIL




**mobile display stands:** use of steel to create strong but mobile light weight stands to allow for space re-articulaton

DEMOUNTABLE STORAGE DETAIL DETAIL (D-7)




**territorial and deterritorial membranes:** Use of steel retractable doors as porous membranes but also secure enough.

RETRACTABLE/COLLAPSIBLE DOOR DETAIL (D-3)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# KIGANDAINI INDUSTRIAL HUB

THE ROLE OF MATERIAL LOGIC ON SPATIAL OUTCOMES IN KENYAN JUAKALIS:
A CASE OF THIKA KIGANDAINI

## RESEARCH THESIS RECOMMENDATIONS IN DESIGN

EASE OF GROWTH | EFFICIENT LAYOUT SUPPORT | AESTHETICS AND FITTING INTO CONTEXT | LONGEVITY AND DURABILITY | COMFORT AND SAFETY

EXISTING + NEW ARCHITECTURE (RELATABILITY THROUGH MATERIAL USE)


ELEVATED AND OPEN VENDING AISLE

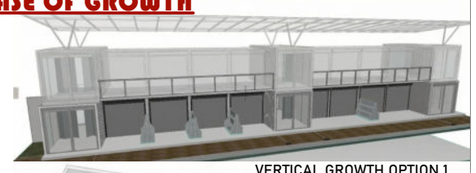
RHIZOMATIC REARTICULATABLE AND REPOPULATABLE STRUCTURES

USE OF STEEL TO OPTIMISE GROUND LEVEL SPACE

SOCIAL NODE AND TRAFFIC PULL AREA

EXTENSION OF MATERIAL LOGIC TO SUPPORT STRUCTURES

### EASE OF GROWTH

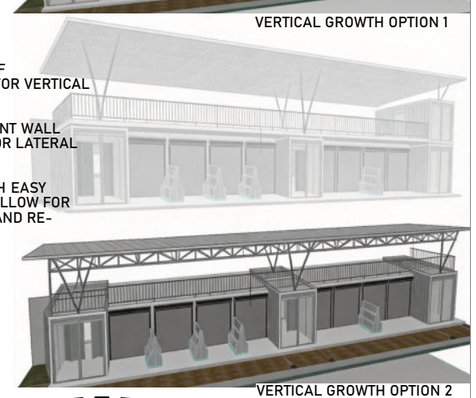


VERTICAL GROWTH OPTION 1

- SEMI-PERMANENT ROOF STRUCTURES TO ALLOW FOR VERTICAL GROWTH

- USE OF SEMI-PERMANENT WALL PARTITIONS TO ALLOW FOR LATERAL GROWTH

- USE OF MATERIALS WITH EASY JOINERY TECHNIQES TO ALLOW FOR EASY RE-ARTICULATION AND RE-POPULATION



VERTICAL GROWTH OPTION 2

### AESTHETICS AND FITTING INTO CONTEXT

- USE OF LOCALLY USED MATERIAL PALLET

- LOOK AND FEEL OF INDUSTRIAL ARCHITECTURE FUSED WITH INFORMAL INDUSTRIAL MATERIAL LOGIC

- NATURAL MATERIAL TEXTURE EXPOSURE TO SHOW VARIETY, CONTRAST AND GIVE THE PROJECT THE REQUIRED INDUSTRIAL AESTHETIC

### EFFICIENT LAYOUT SUPPORT

- BLURRY LINE BETWEEN TERRITORIAL AND DETERRITORIAL ARCHITECTURE BY USE OF MATERIALS LIKE STEELTUBES, ENGINEERED TIMBER SLATES, STEEL RETRACTABLE AND FOLDING DOORS TO GAIN THE BENEFITS OF THE BOTH

- ENCOURAGING RHIZOMATIC OR ORGANIC GROWTH ON THE OUTDOORS THROUGH MODULAR STRUCTURE MATERIAL APPLICATION

- SEMI-PERMANENT PARTITIONS AND FIXTURES TO ALLOW FOR LAYOUT RE-CONFIGARATION

- ADOPTING AND IMPROVING EXISTING TACTICS ON LAYOUT ARRANGEMENT

- USE OF STEEL MODULAR RE-POPULATABLE UNITS DUE TO AVAILABILITY OF TECHNICAL KNOWLEDGE, ITS LIGHTWEIGHT AND EASE OF JOINERY AND DECONSTRUCTION PROPERTIES

### COMFORT AND SAFETY

- USE OF MATERIALS THAT ALLOW NATURAL LIGHT PENETRATION WITH MINIMAL SOLAR GAINS

- USE OF FIRE SAFETY MATERIALS IN FIRE AREAS

- USE OF EVAPORATIVE COOLING-SUPPORTIVE MATERIALS.

### LONGEVITY AND DURABILITY

- USE OF HIGH LOAD BEARING MATERIALS ON WALLS

- USE OF ABBRESSION AND IMPACT RESISTANT MATERIALS ON THE FLOORS

- USE OF RIGID BUT EASILY REATICULATED STUCTURAL MEMBERS

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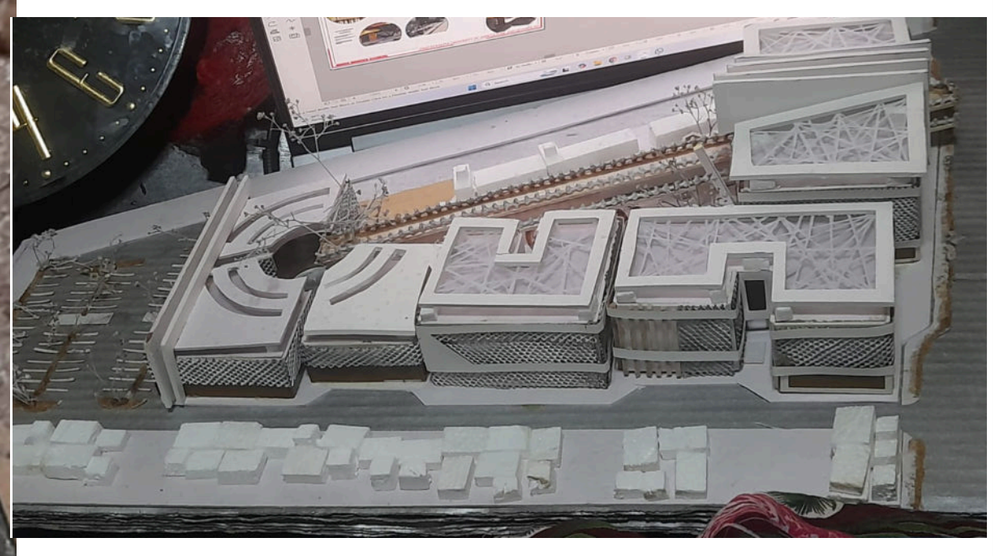
THE END.

THANKYOU!



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