

POLITECNICO DI MILANO

VI FACULTY OF ENGINEERING

POLO REGIONALE DI LECCO

Master of Science in Architectural Engineering

Master Thesis

**SUSTAINABILITY IN THE BUILT ENVIRONMENT:**

**GAMBOA SOCIAL HOUSING**

ANNEX

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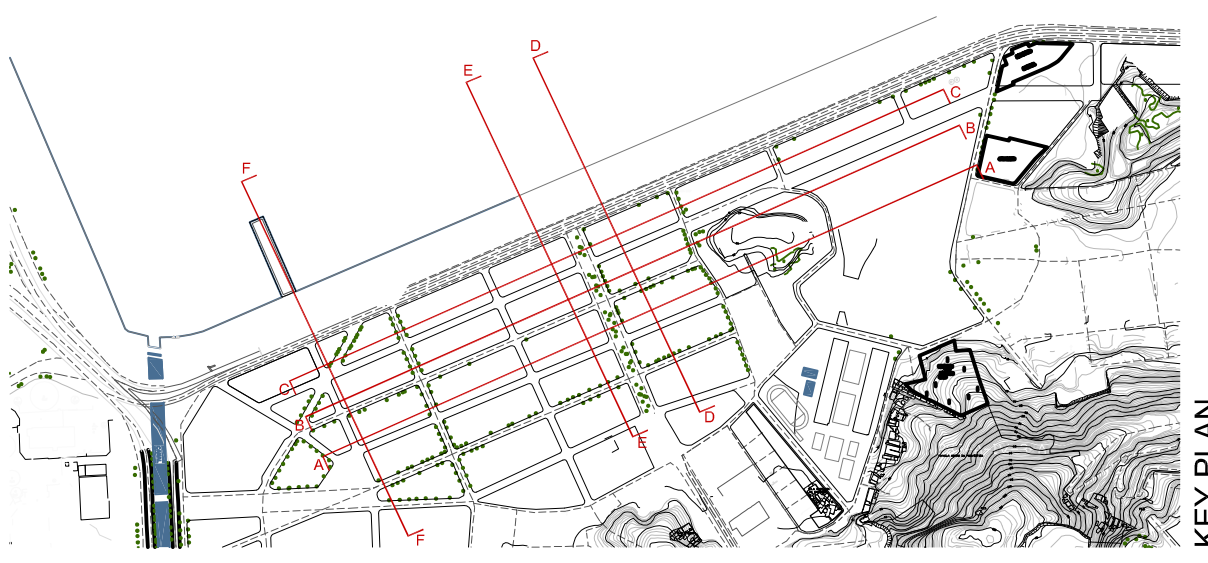
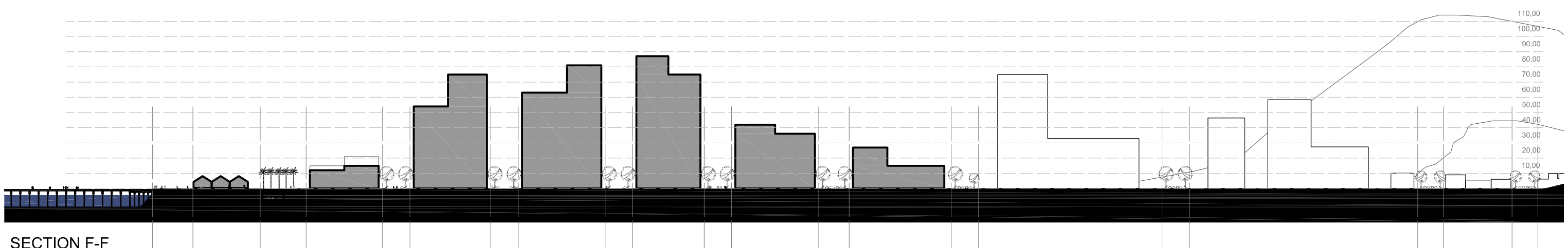
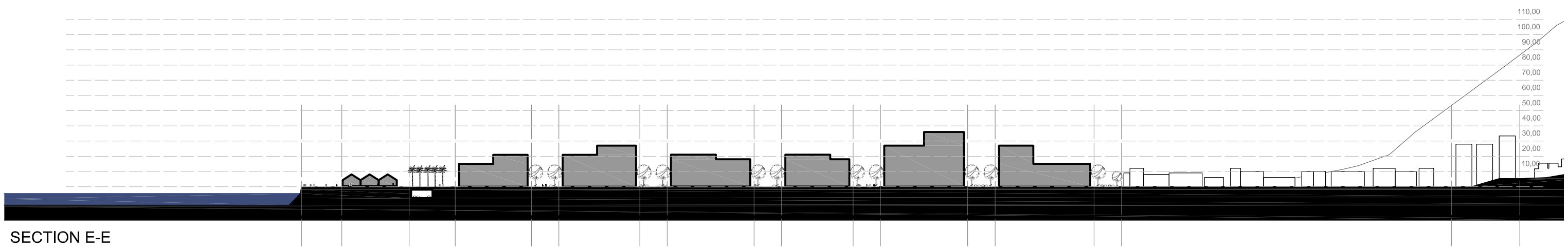
Drawing **IV-02** Winter Strategies

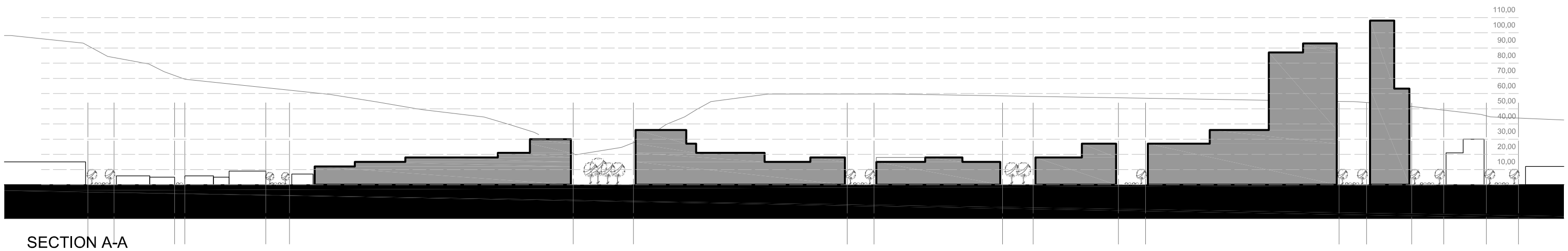
### V. Structural Design

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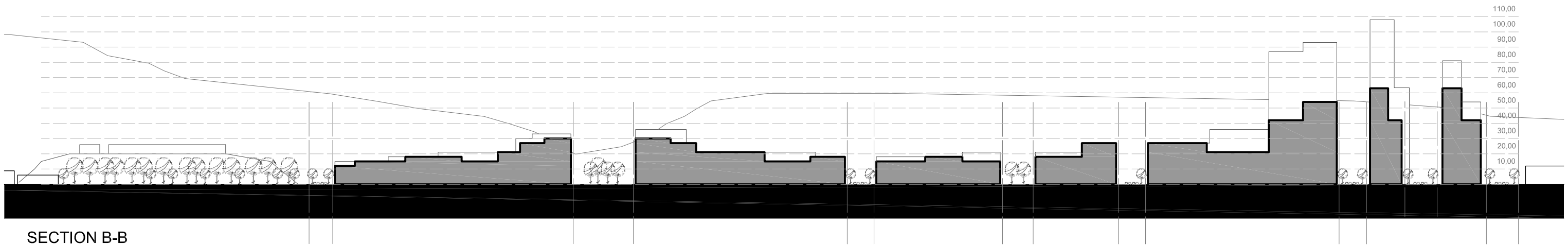
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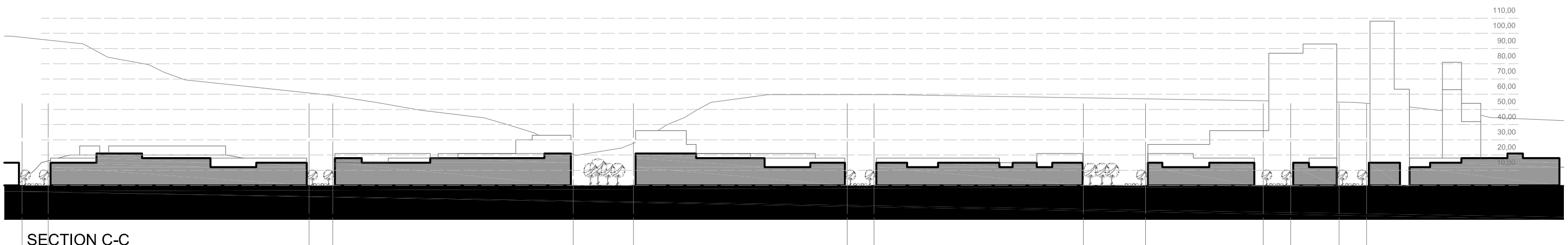




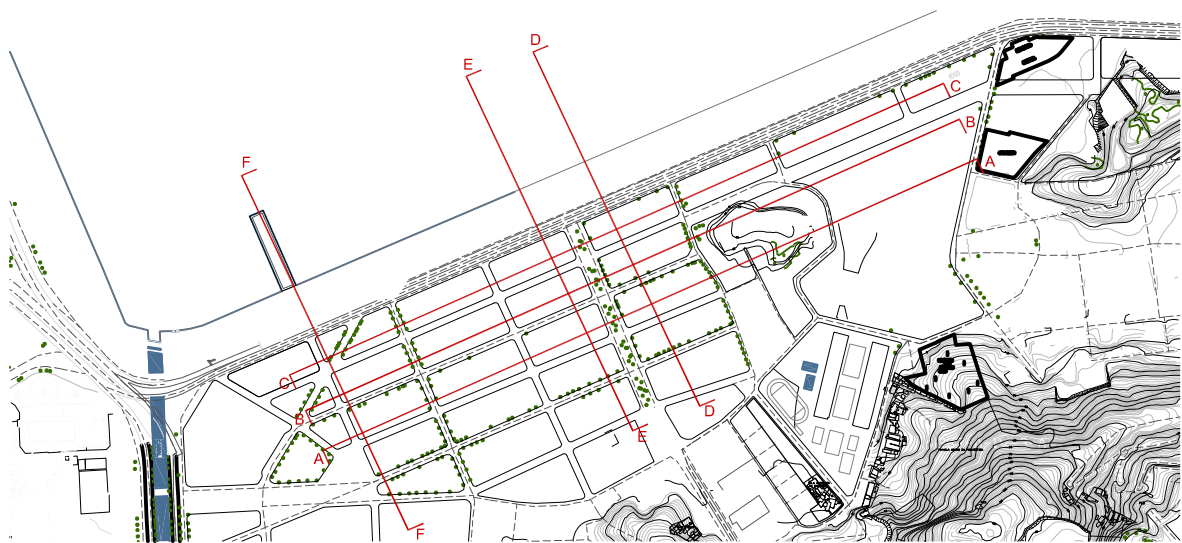
SECTION A-A



SECTION B-B

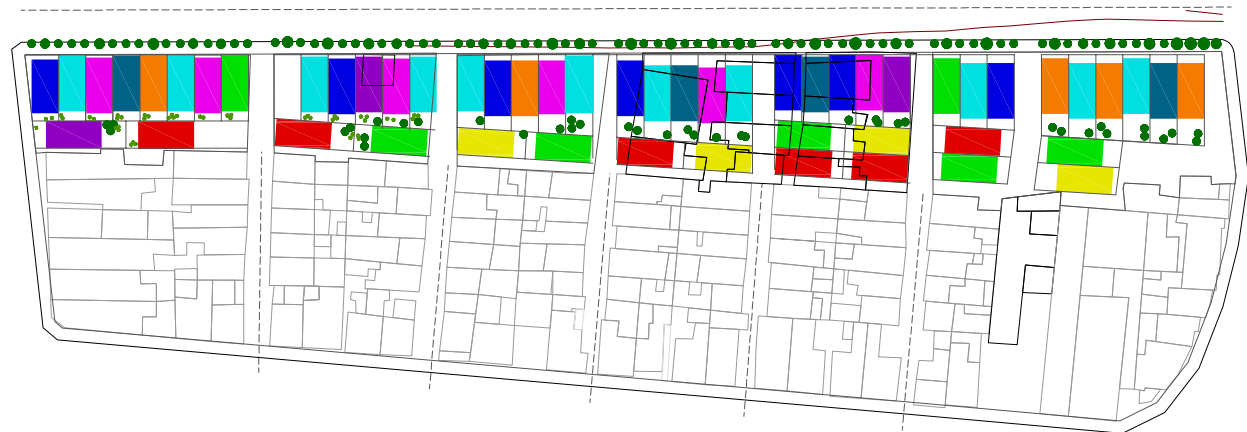
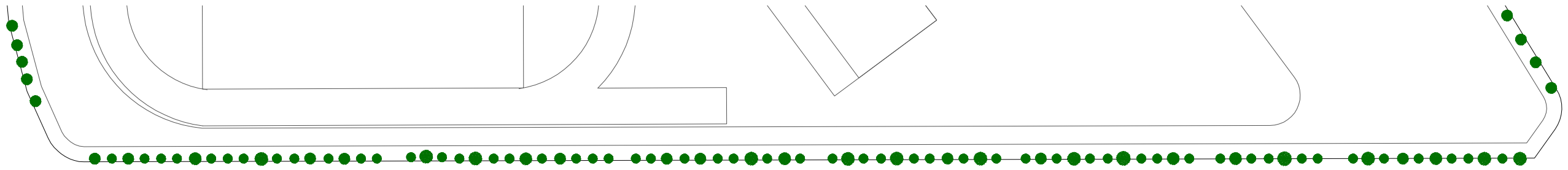


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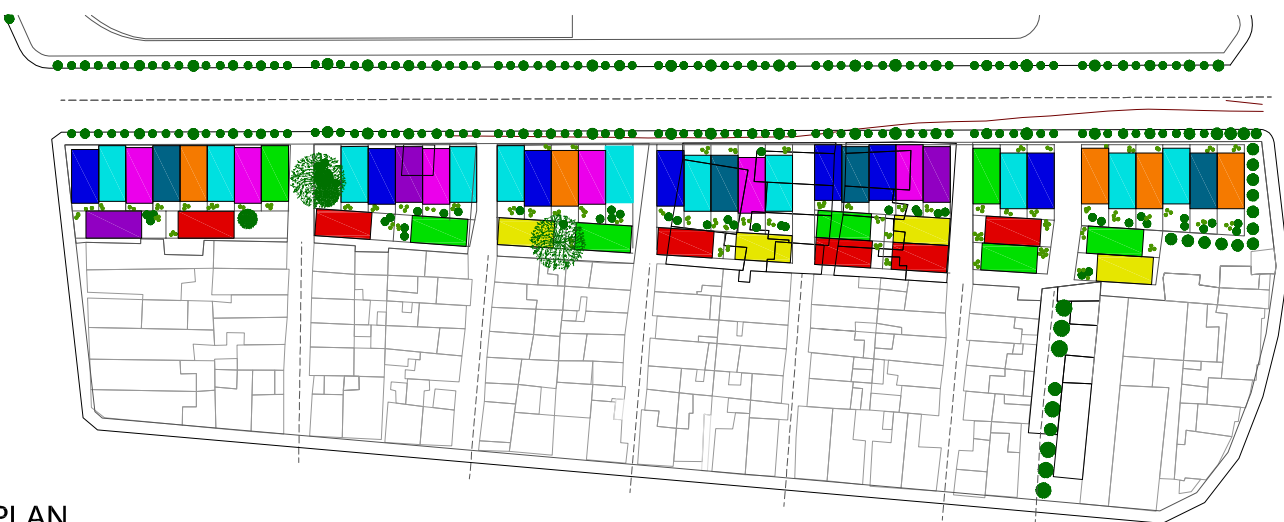
KEY PLAN







GENERAL PLAN GROUND FLOORS



KEY PLAN

Quotes

Legend

- |  |  |
|--|--|
|  <i>typology 01</i> |  <i>typology 07</i> |
|  <i>typology 02</i> |  <i>typology 08</i> |
|  <i>typology 03</i> |  <i>typology 09</i> |
|  <i>typology 04</i> |  |
|  <i>typology 05</i> |  |
|  <i>typology 06</i> |  |

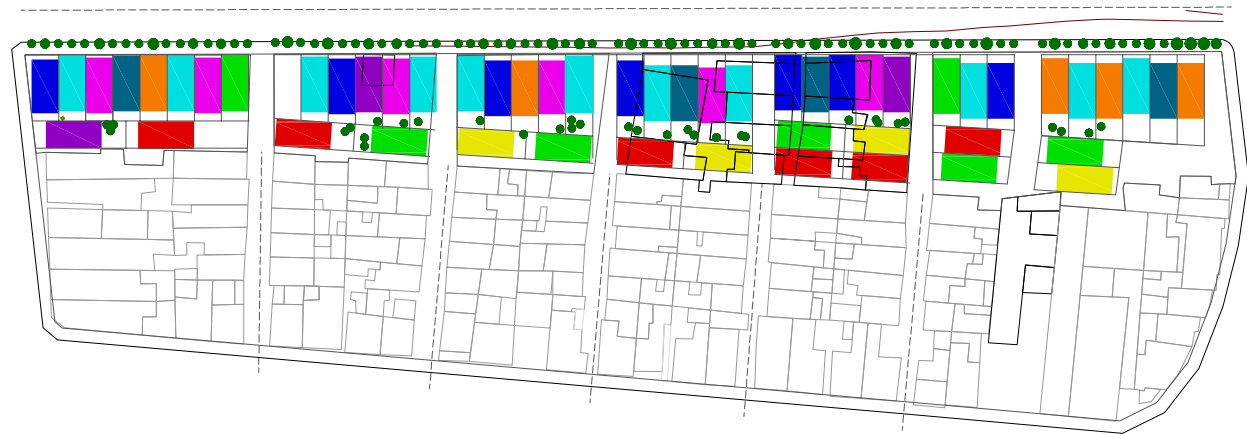
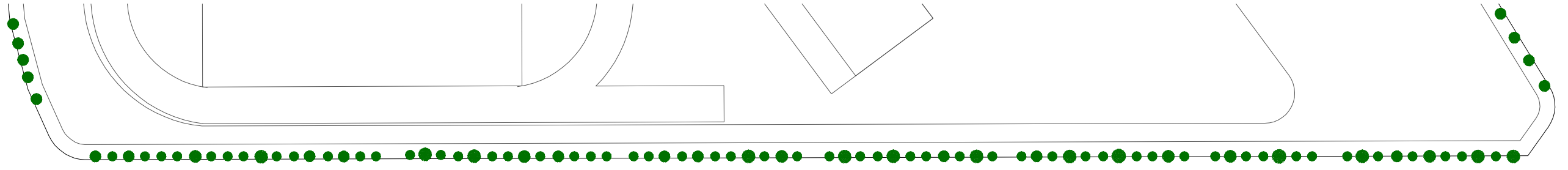
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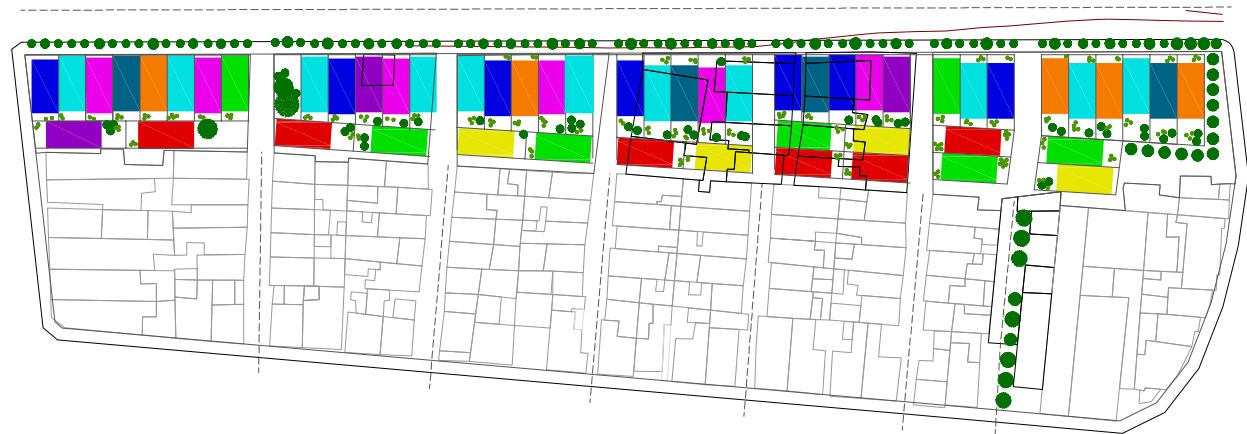
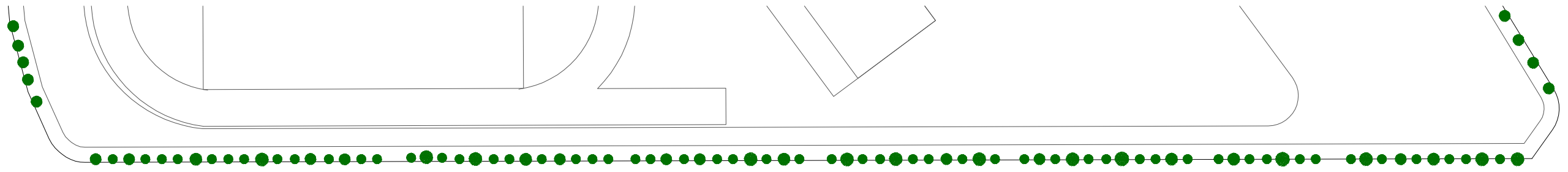


III-02

Architectural Project  
General Plans

1:750









NORTH EAST FACADES



SOUTH WEST FACADES

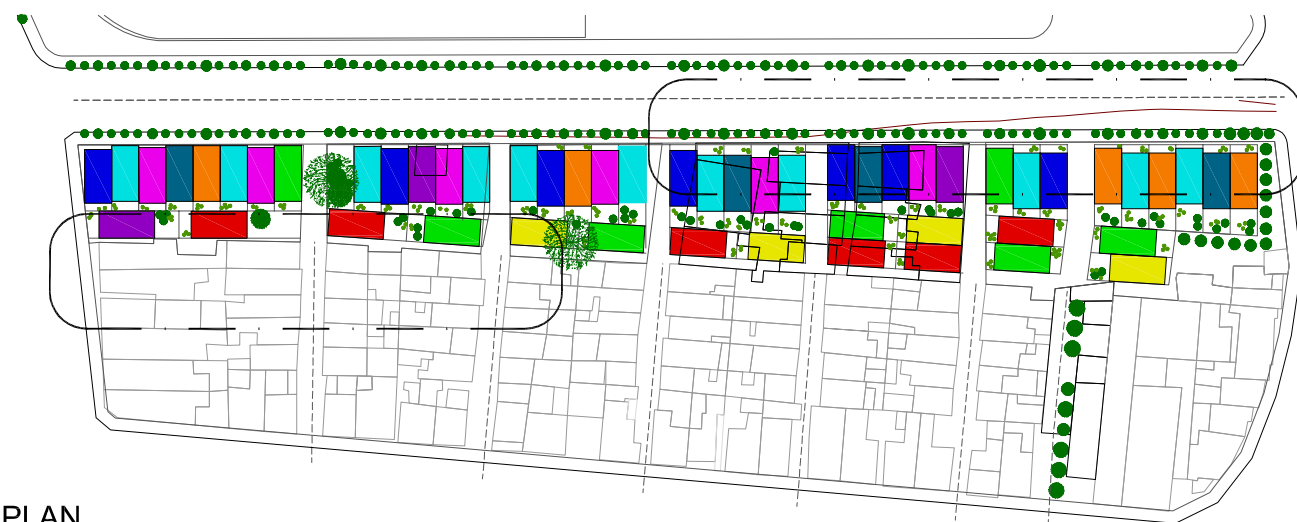


SOUTH WEST FACADES  
GENERAL FACADES

Quotes

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*



KEY PLAN

1:1500



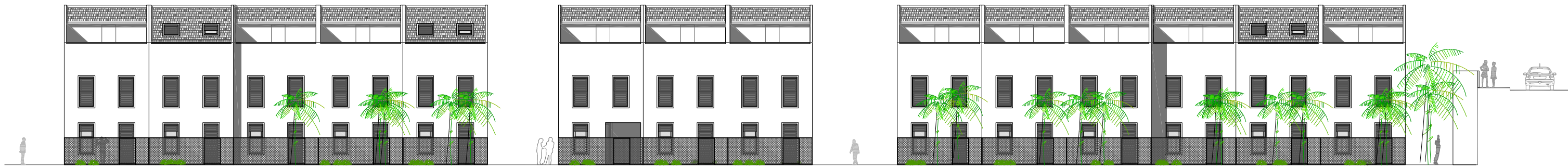
III-05

Architectural Project  
General Facades

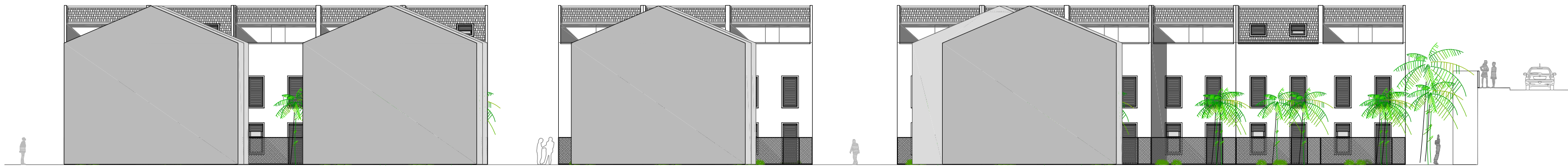
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NORTH EAST FACADES



SOUTH WEST FACADES



SOUTH WEST FACADES  
GENERAL FACADES

Quotes

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*



KEY PLAN

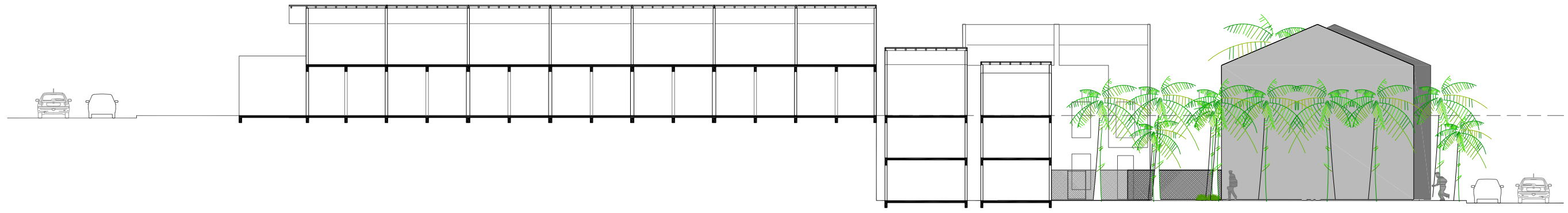
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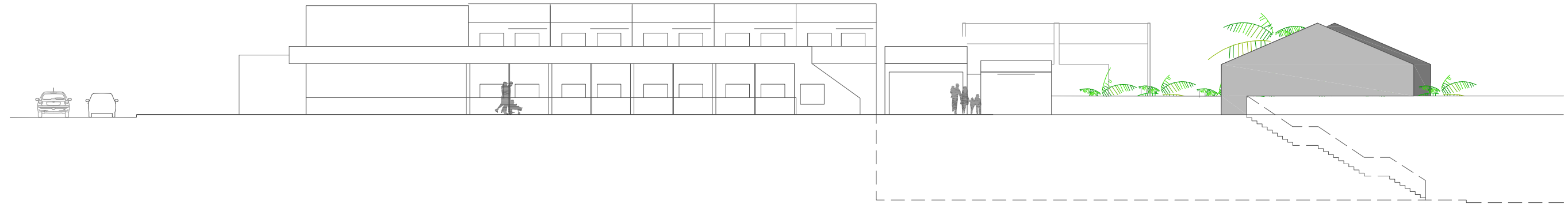
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Architectural Project  
General Facades

1:250



SOUTH EAST FACADES



SOUTH EAST FACADES



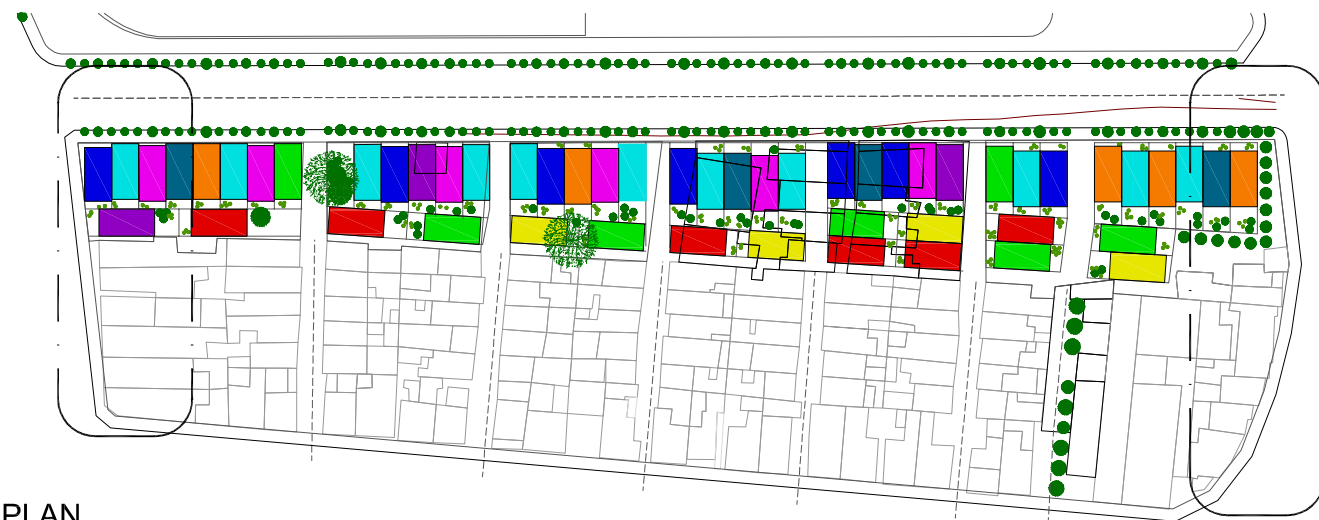
NORTH WEST FACADES

GENERAL FACADES

Quotes

Legend

- *typology 01*
- *typology 07*
- *typology 02*
- *typology 08*
- *typology 03*
- *typology 04*
- *typology 05*
- *typology 06*
- *typology 09*



KEY PLAN

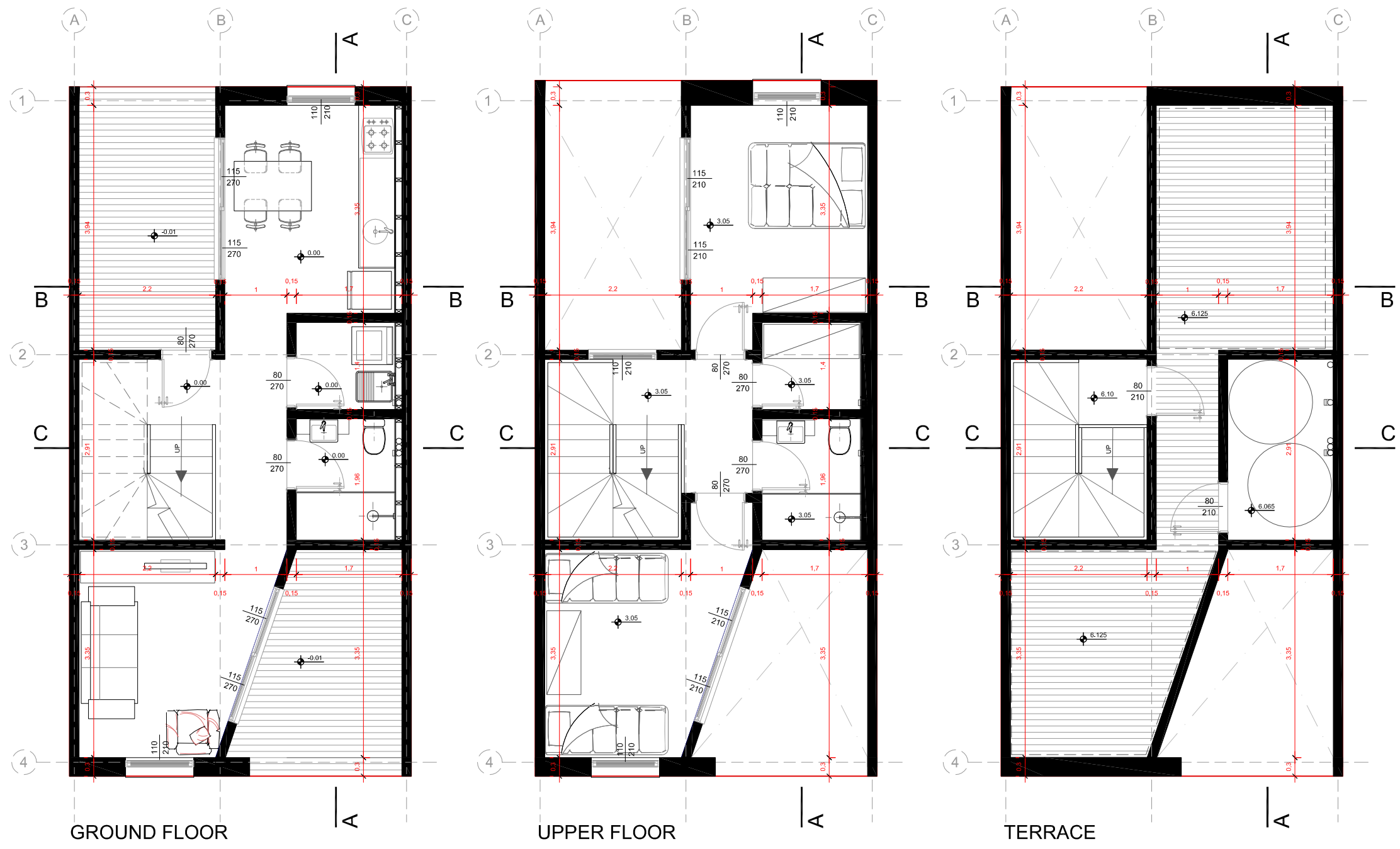
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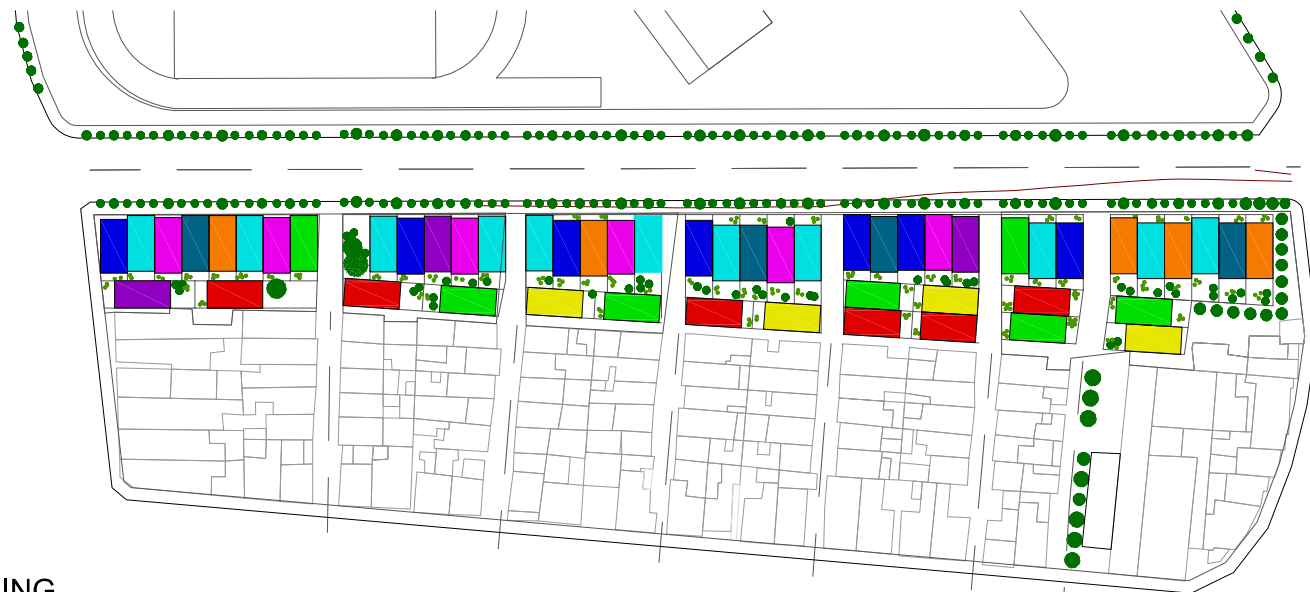
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Architectural Project  
General Facades

1:250



UNIT TYPOLOGY 01



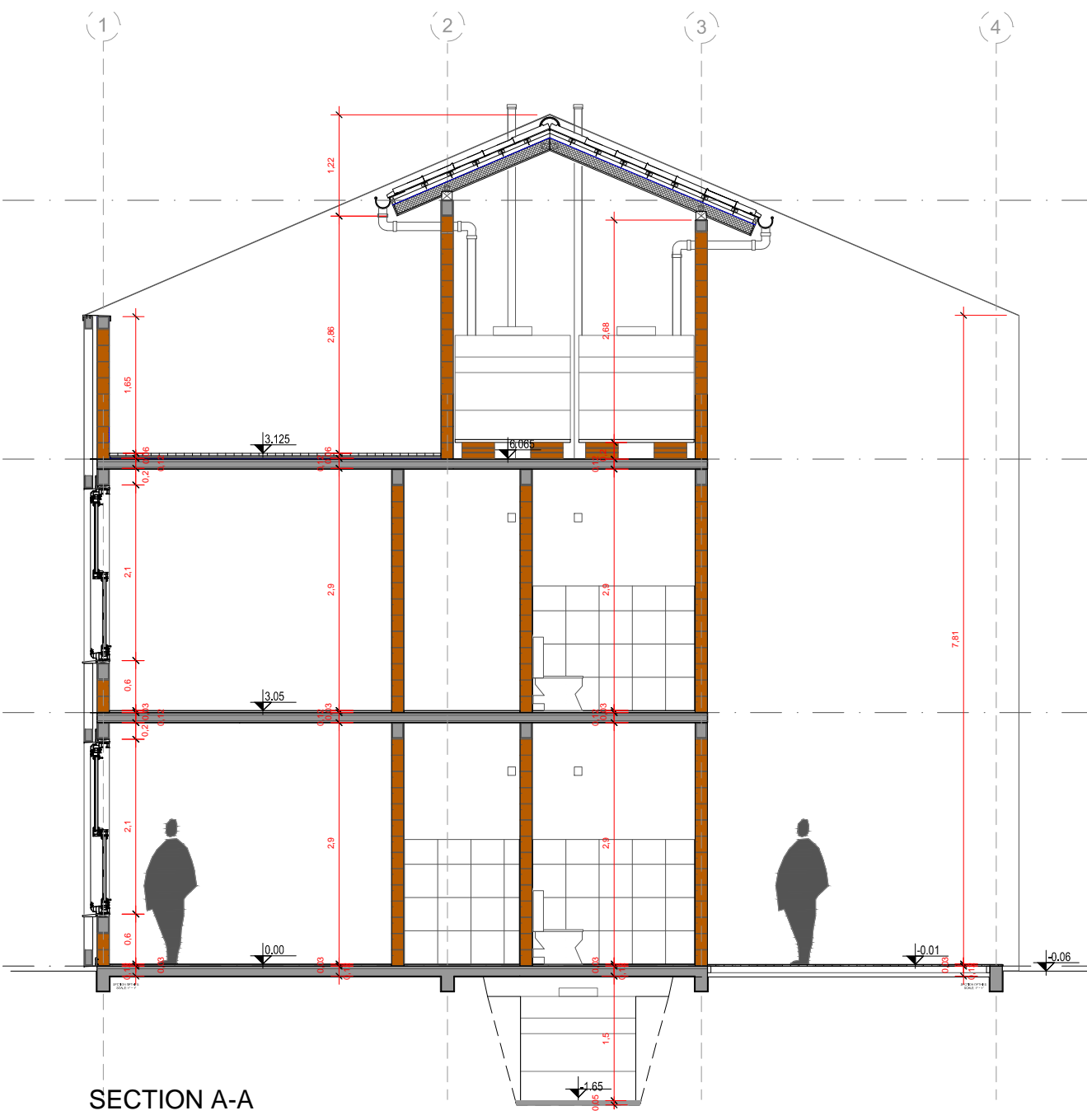
Quotes

residential building  
 standard single family house for 04 people + private terrace

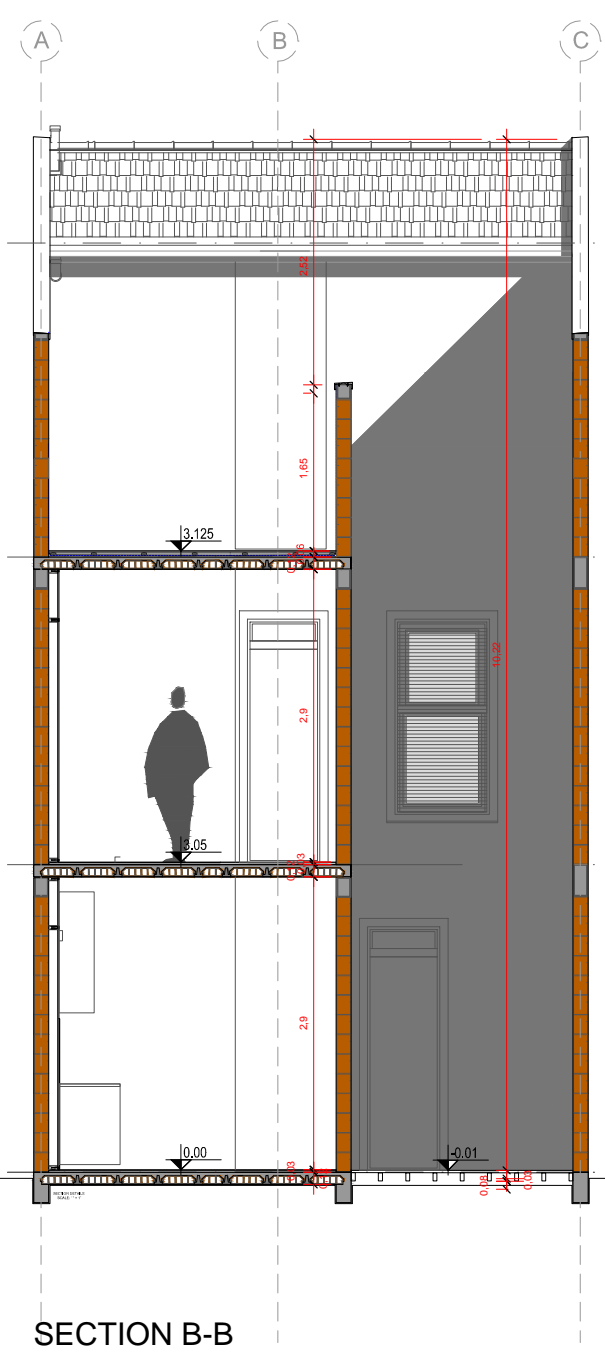
Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- typology 05
- typology 06

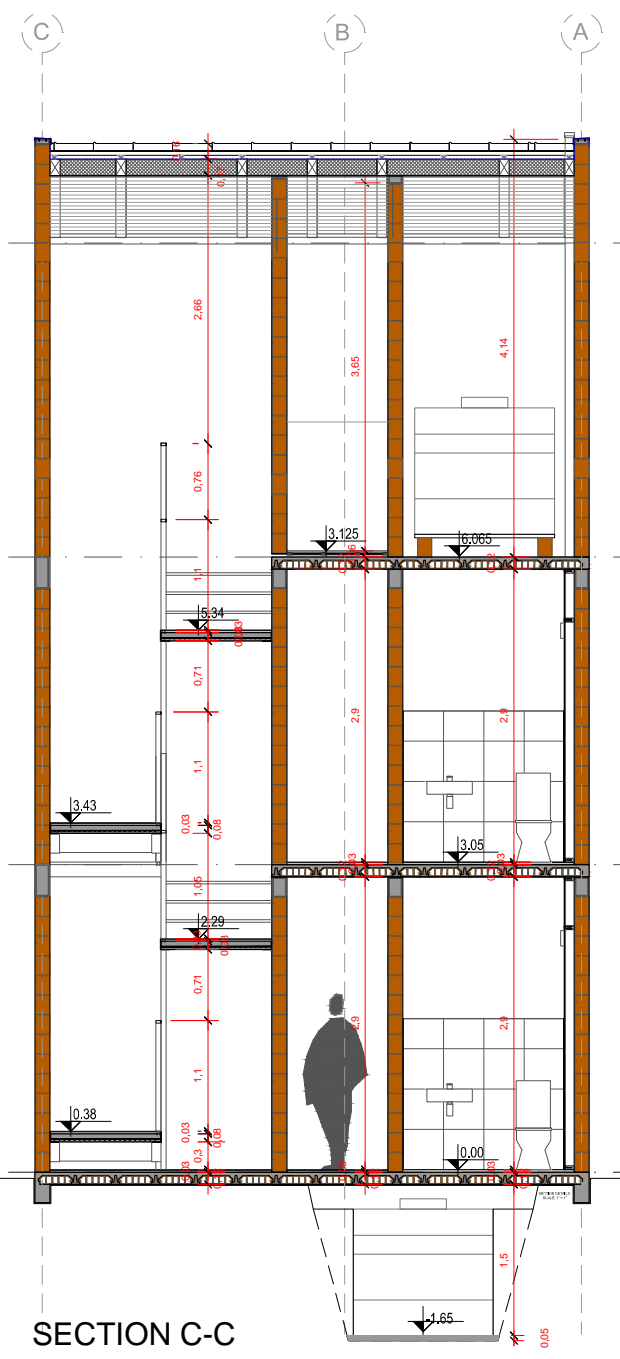




SECTION A-A

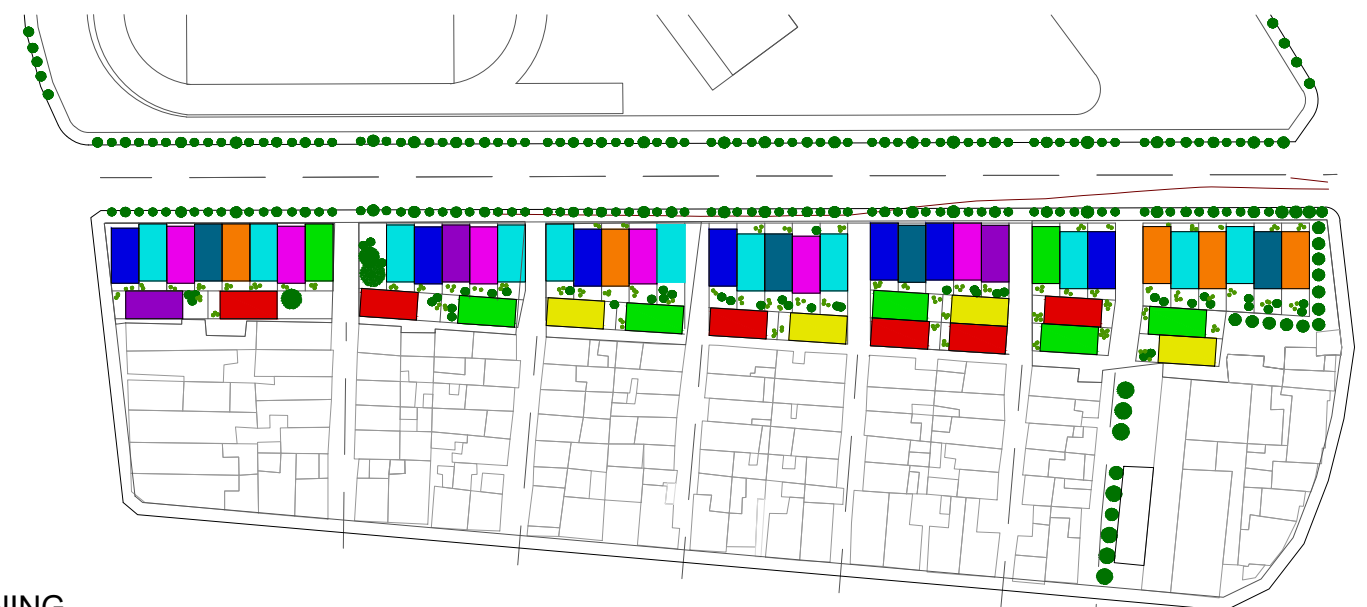


SECTION B-B



SECTION C-C

UNIT TYPOLOGY 01



ZONING

Quotes

*residential building*  
*standard single family house for 04 people + private terrace*

Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- 
- typology 05
- 
- typology 06
- 

1:1500



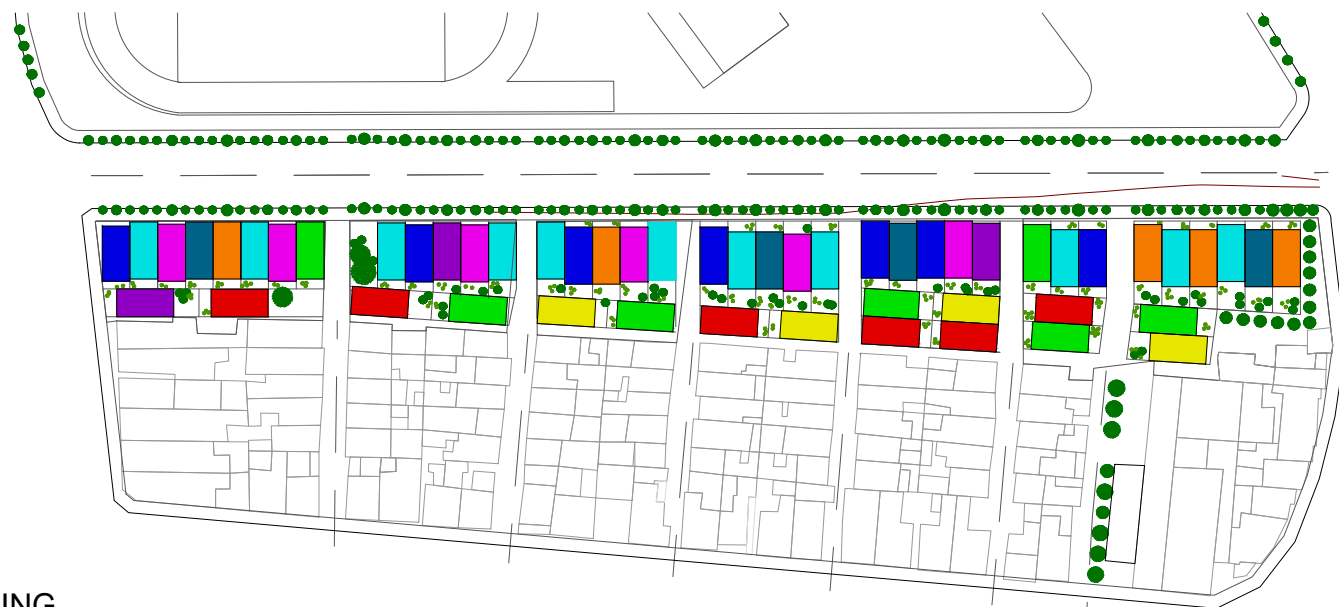
1:75



FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 01



ZONING

Quotes

*residential building*  
*standard single family house for 04 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

1:1500



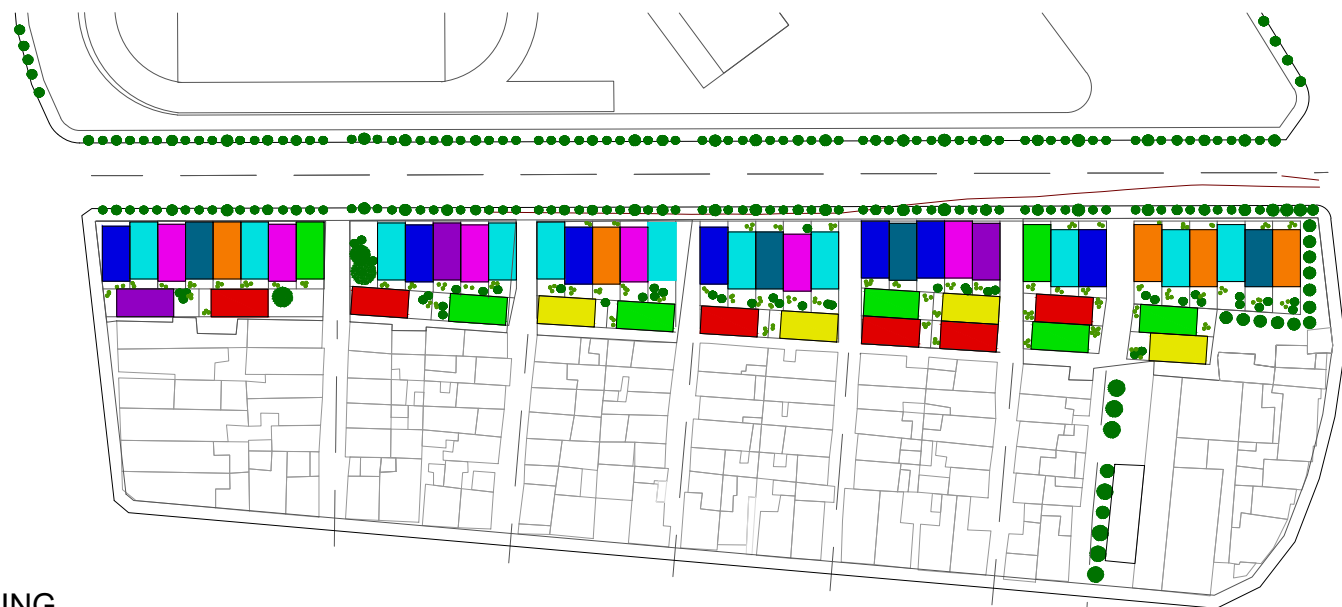
III-10

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 02



ZONING

Quotes

residential building  
private garden + single family house for 04 people + private terrace

Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- 
- typology 05
- 
- typology 06
- 

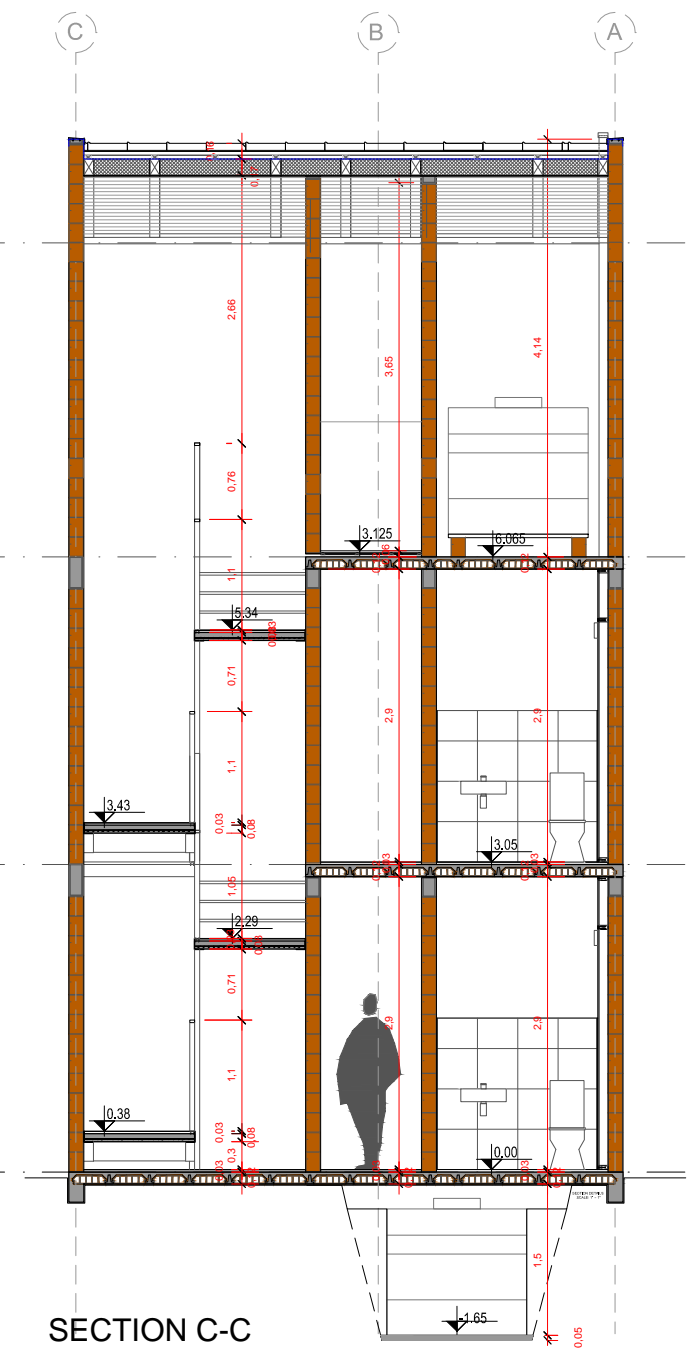
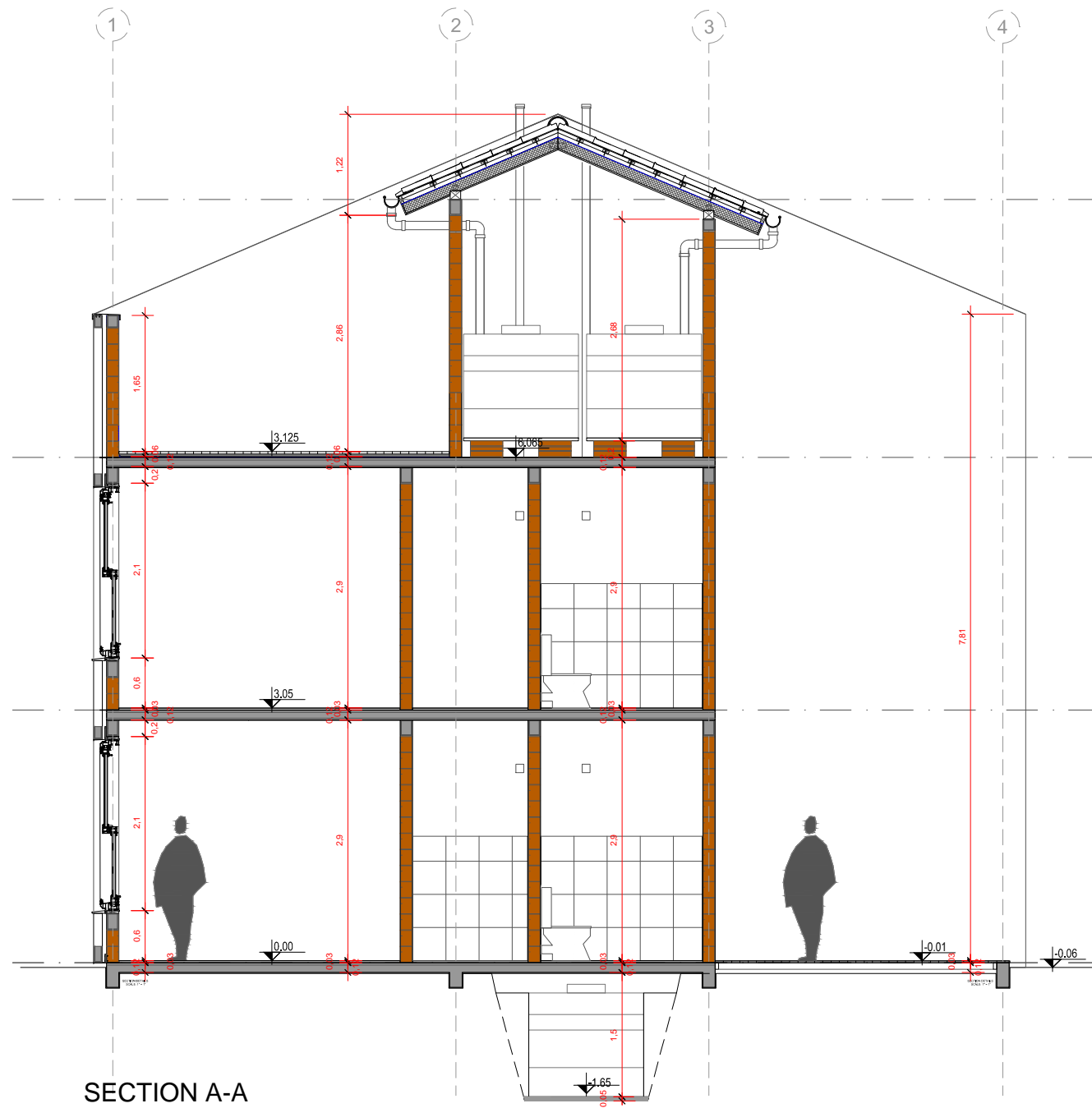
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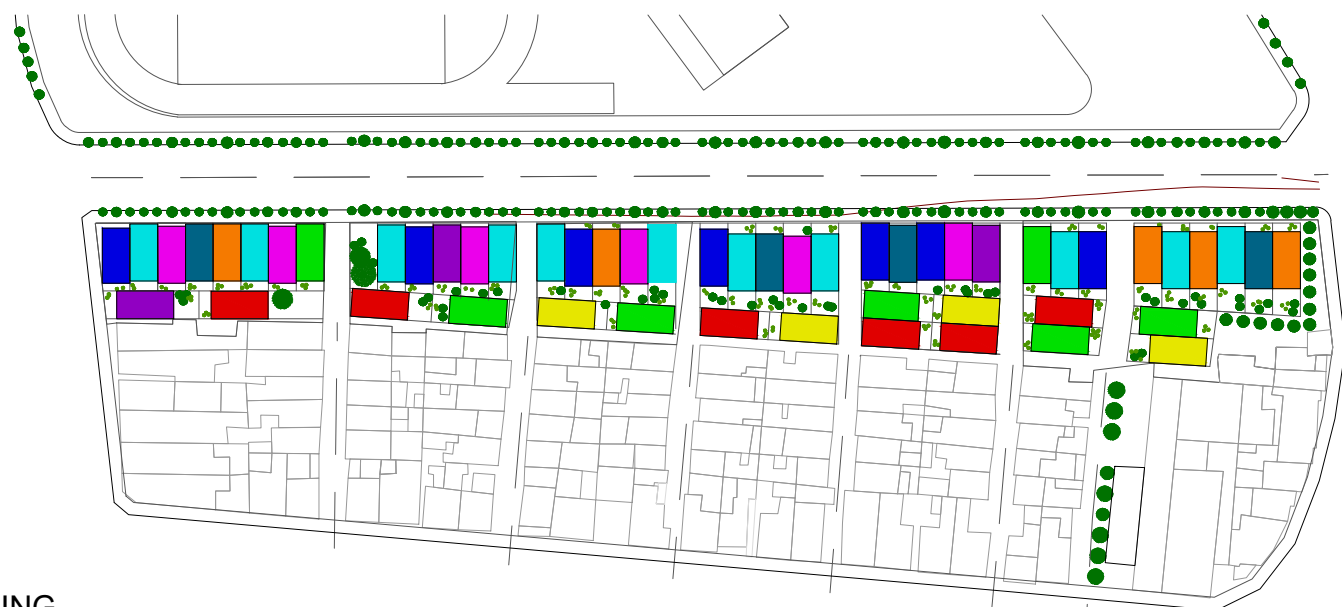
III-11

Architectural Project  
Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 02



Quotes

*residential building*  
*private garden + single family house for 04 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*



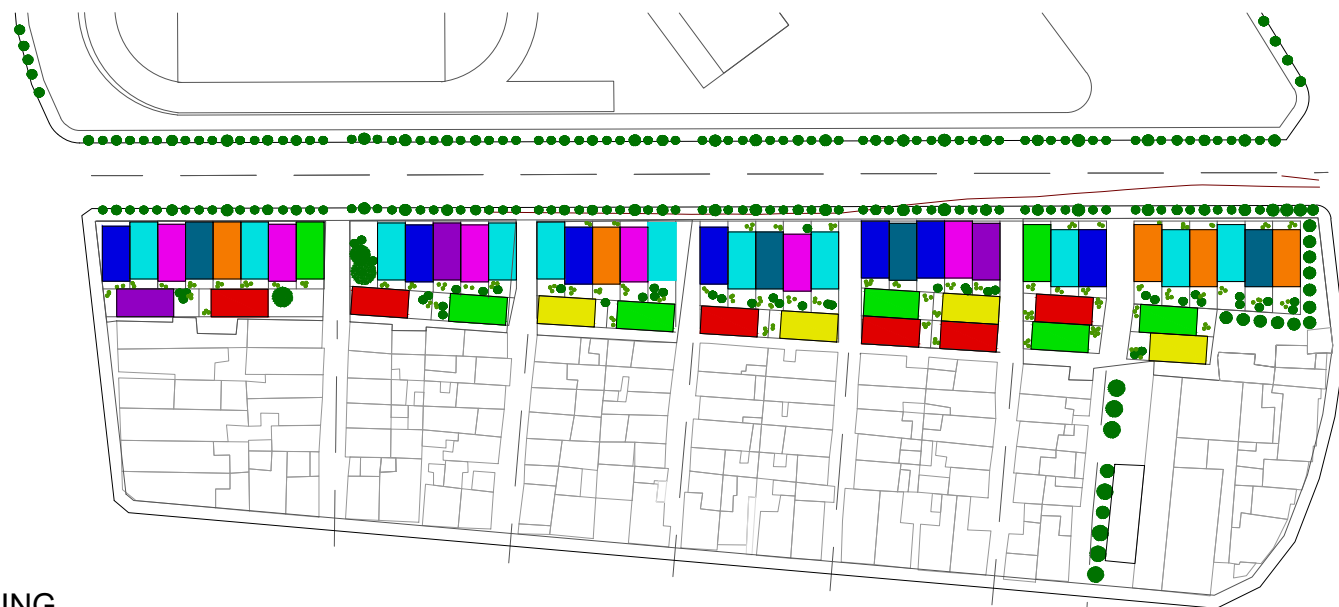




FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 02



ZONING

Quotes

*residential building*  
*private garden + single family house for 04 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

1:1500



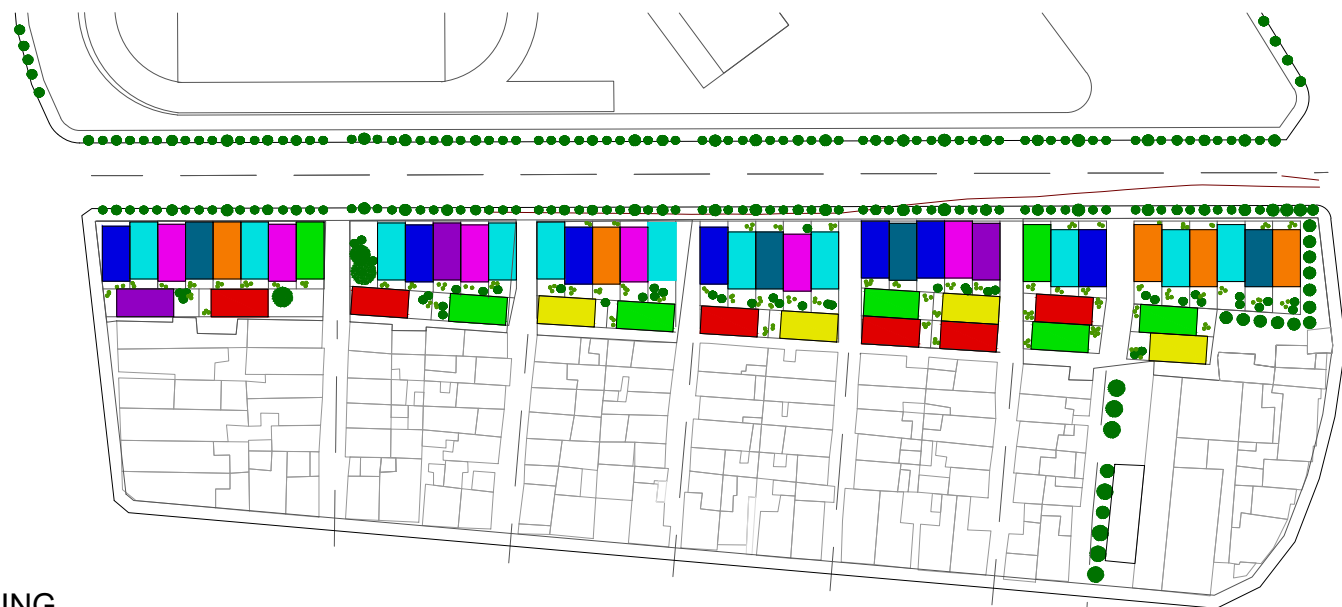
III-13

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 03



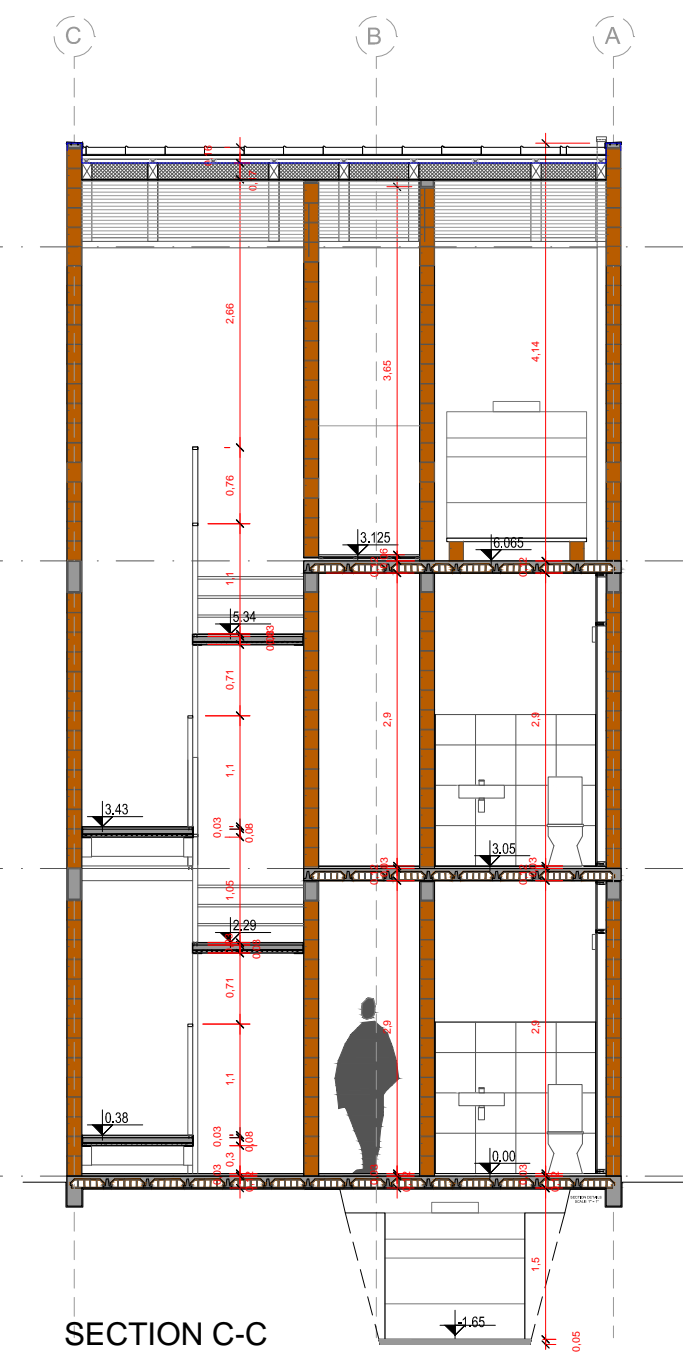
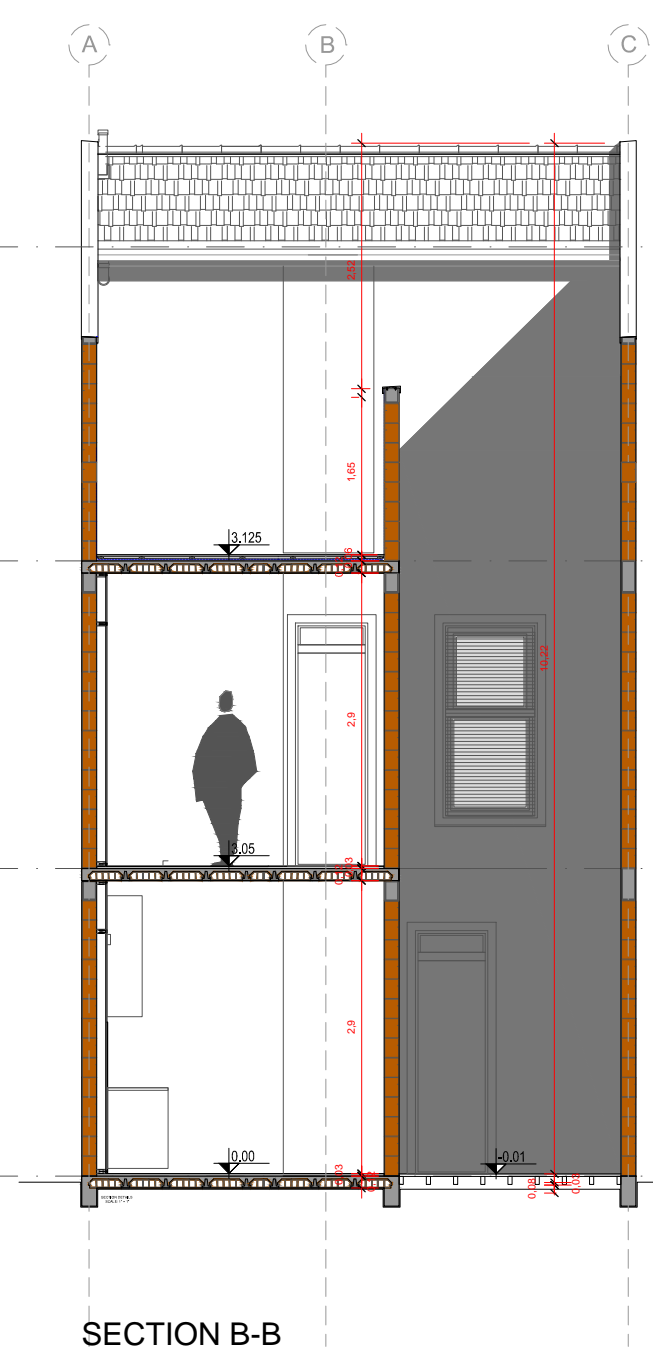
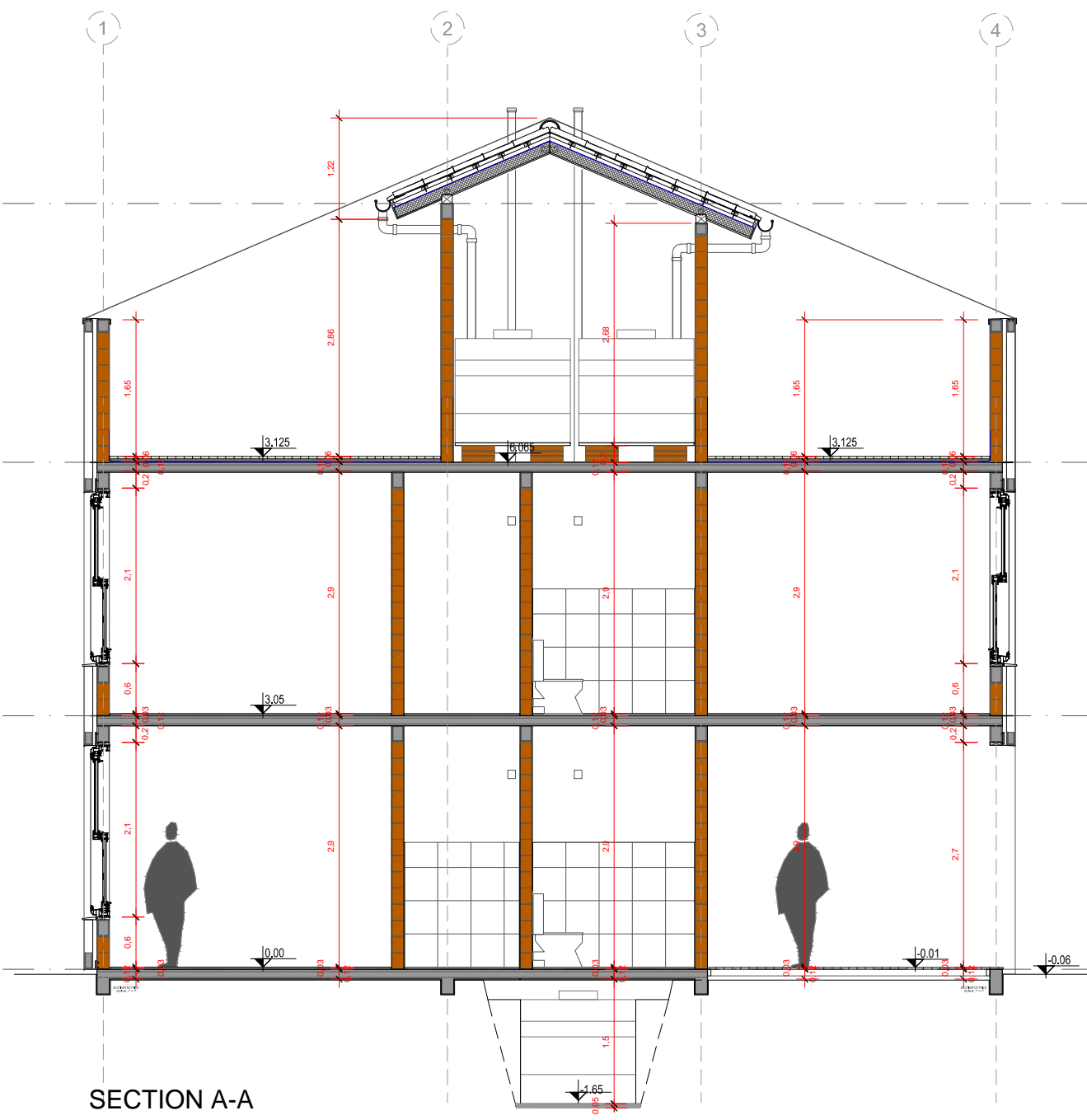
Quotes

*residential building*  
*private garden + single family house for 06 people + private terrace*

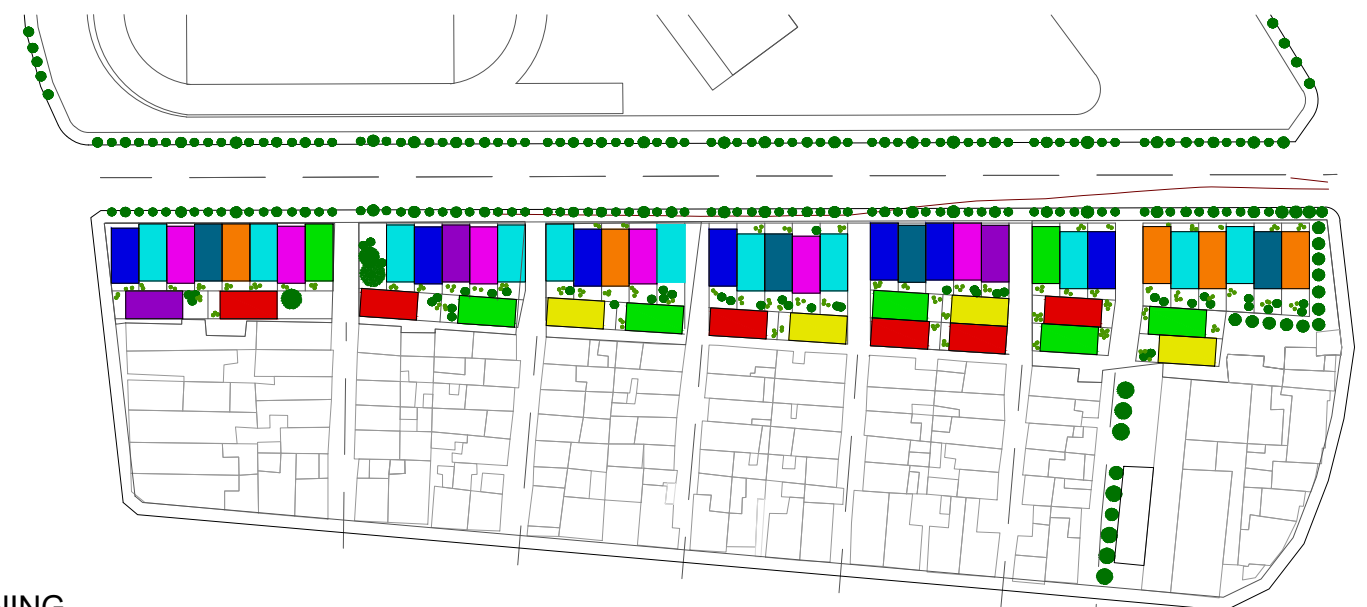
Legend

- *typology 01*
- *typology 07*
- *typology 02*
- *typology 08*
- *typology 03*
- *typology 09*
- *typology 04*
- *typology 05*
- *typology 06*





UNIT TYPOLOGY 03



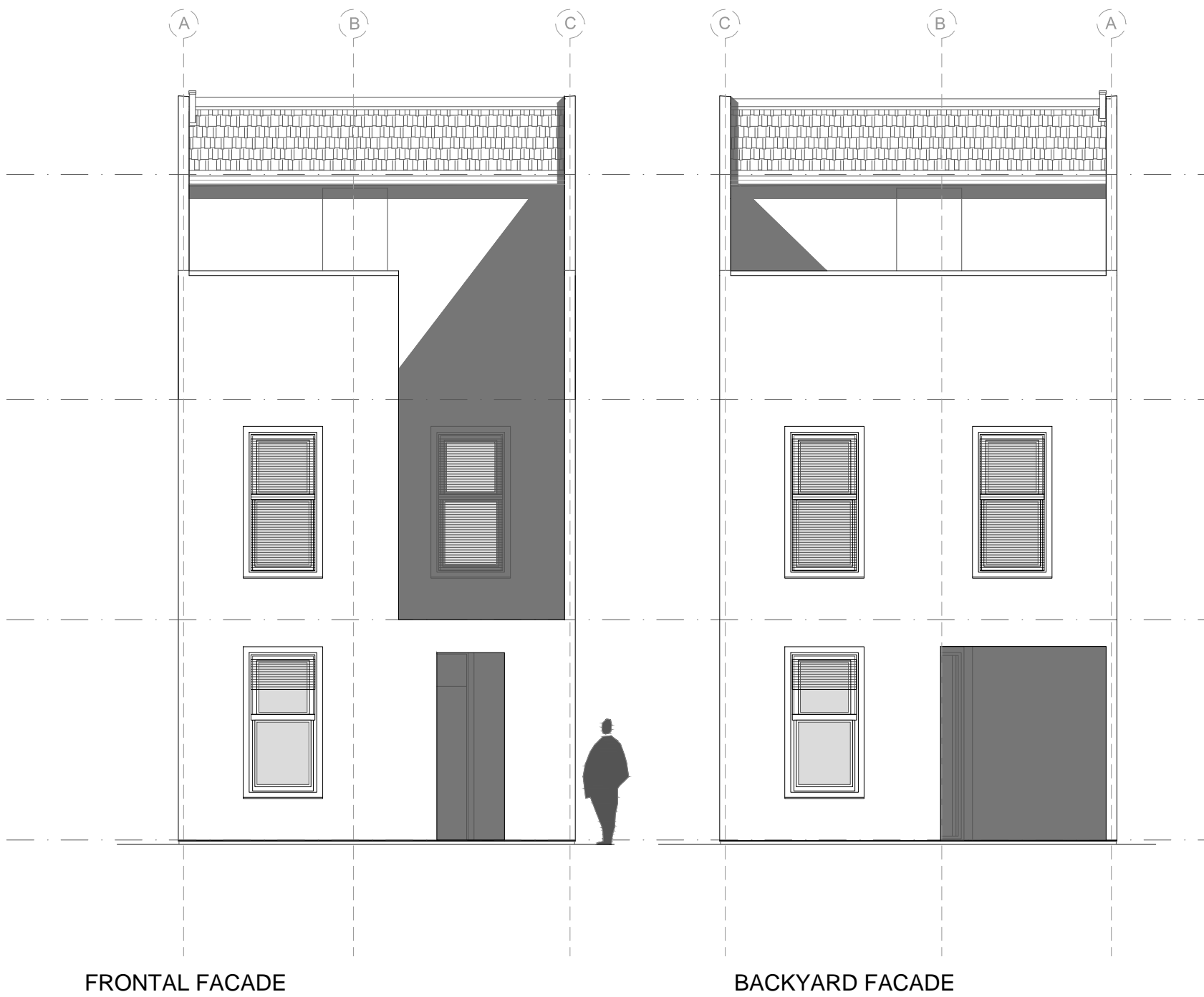
Quotes

residential building  
private garden + single family house for 06 people + private terrace

Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- typology 06

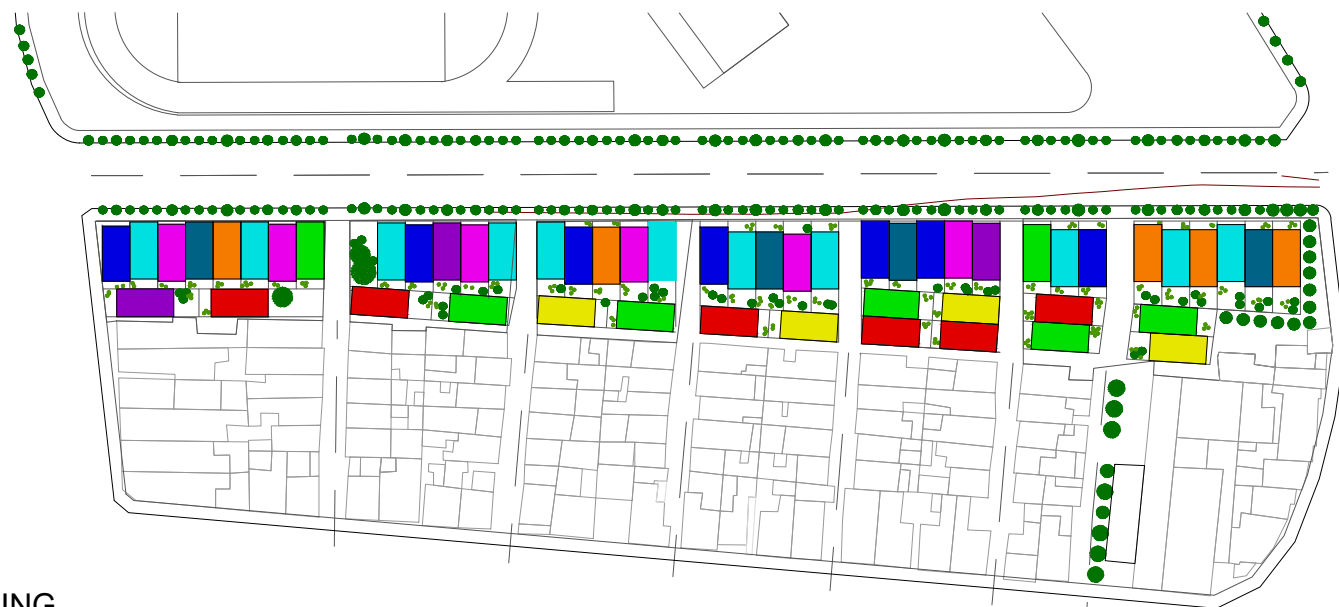




FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 03



ZONING

Quotes

*residential building*  
*private garden + single family house for 06 people + private terrace*

Legend

- |   |  |
|---|--|
| <span style="color: red;">■</span> <i>typology 01</i>     | <span style="color: purple;">■</span> <i>typology 07</i> |
| <span style="color: yellow;">■</span> <i>typology 02</i>  | <span style="color: orange;">■</span> <i>typology 08</i> |
| <span style="color: green;">■</span> <i>typology 03</i>   | <span style="color: blue;">■</span> <i>typology 09</i>   |
| <span style="color: cyan;">■</span> <i>typology 04</i>    |  |
| <span style="color: blue;">■</span> <i>typology 05</i>    |  |
| <span style="color: magenta;">■</span> <i>typology 06</i> |  |

1:1500



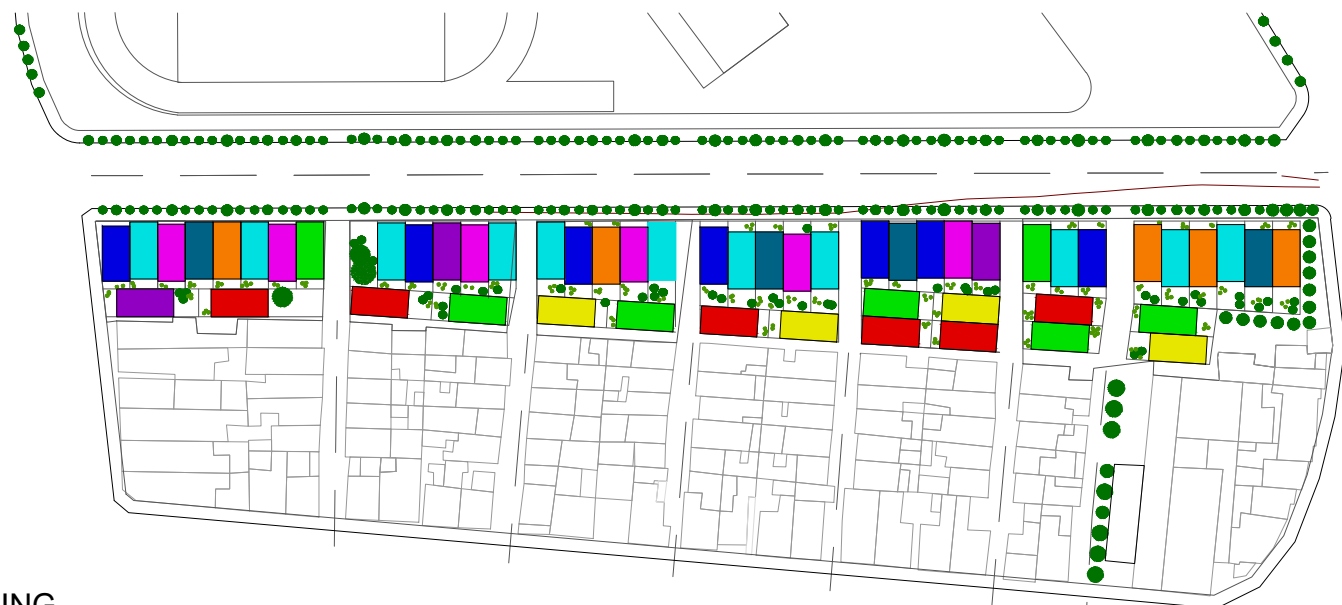
III-16

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 04



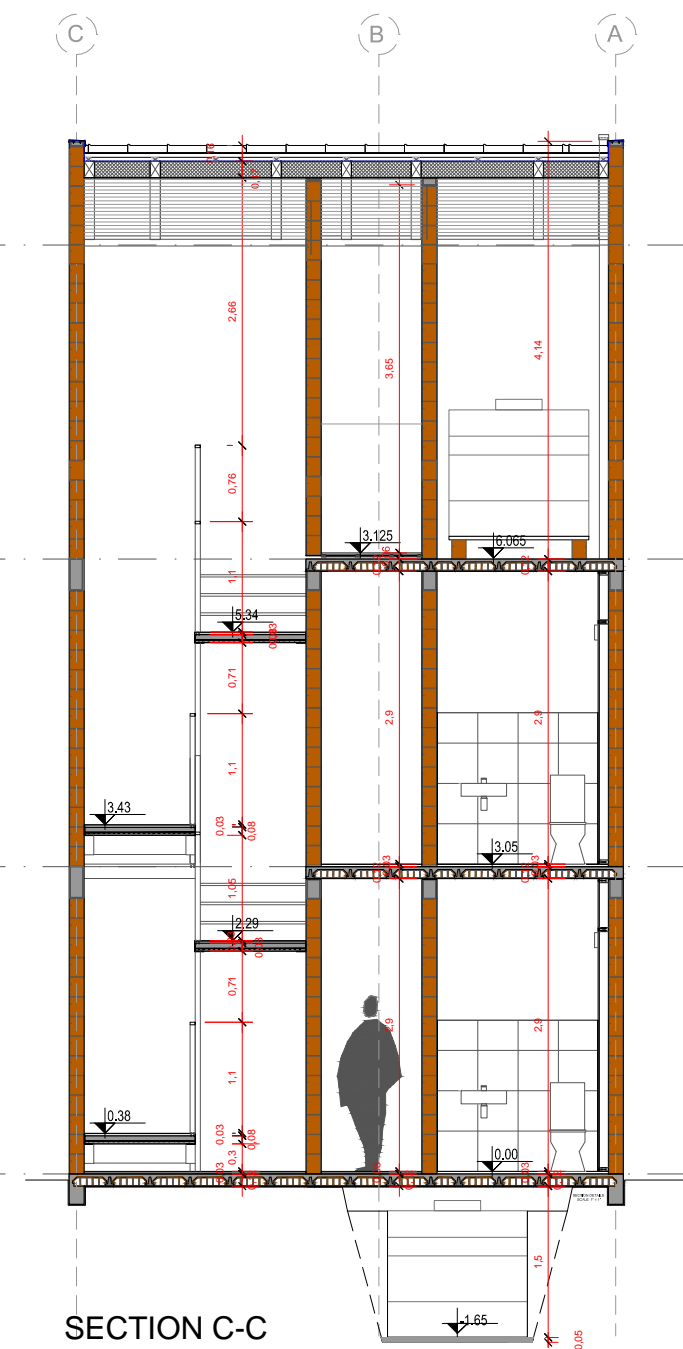
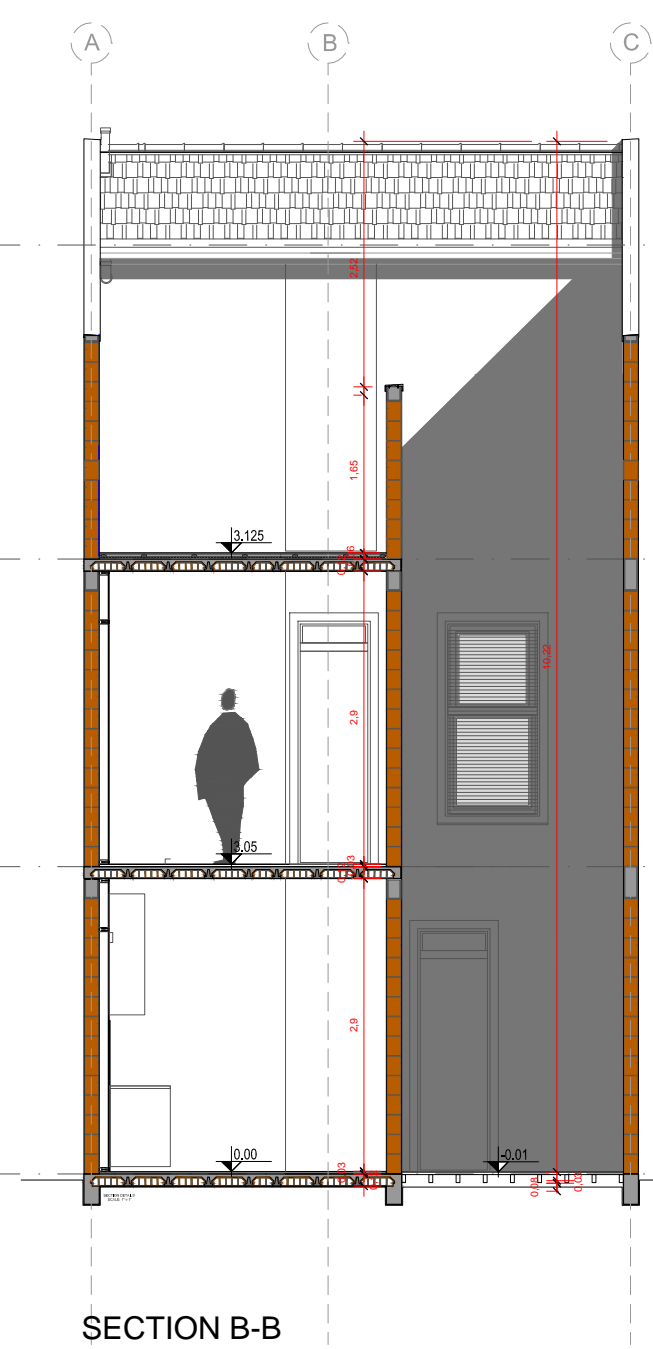
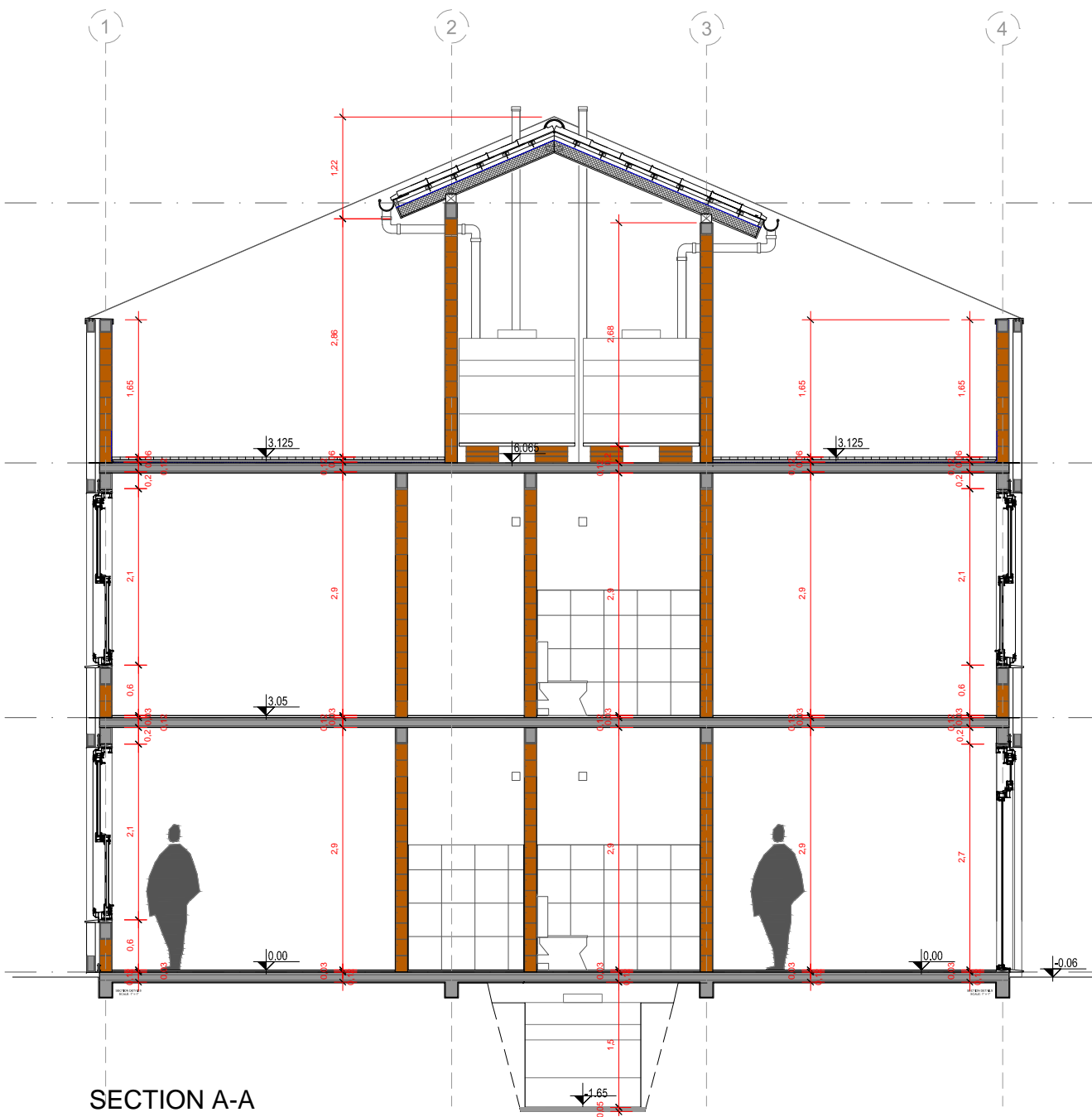
Quotes

*residential building*  
*private garden + single family house for 08 people + private terrace*

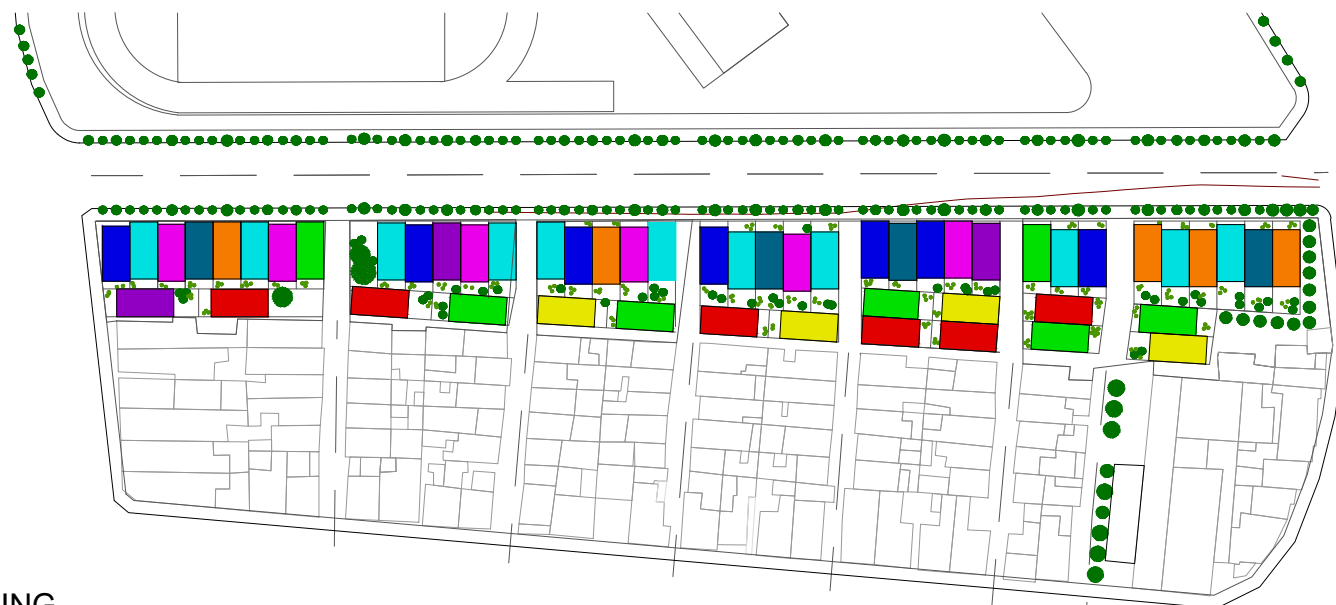
Legend

- typology 01*
- typology 07*
- typology 02*
- typology 08*
- typology 03*
- typology 09*
- typology 04*
- typology 05*
- typology 06*





UNIT TYPOLOGY 04



ZONING

Quotes

residential building  
private garden + single family house for 08 people + private terrace

Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- 
- typology 05
- 
- typology 06
- 

1:1500



III-18

Architectural Project  
Plan, Sections and Facades.

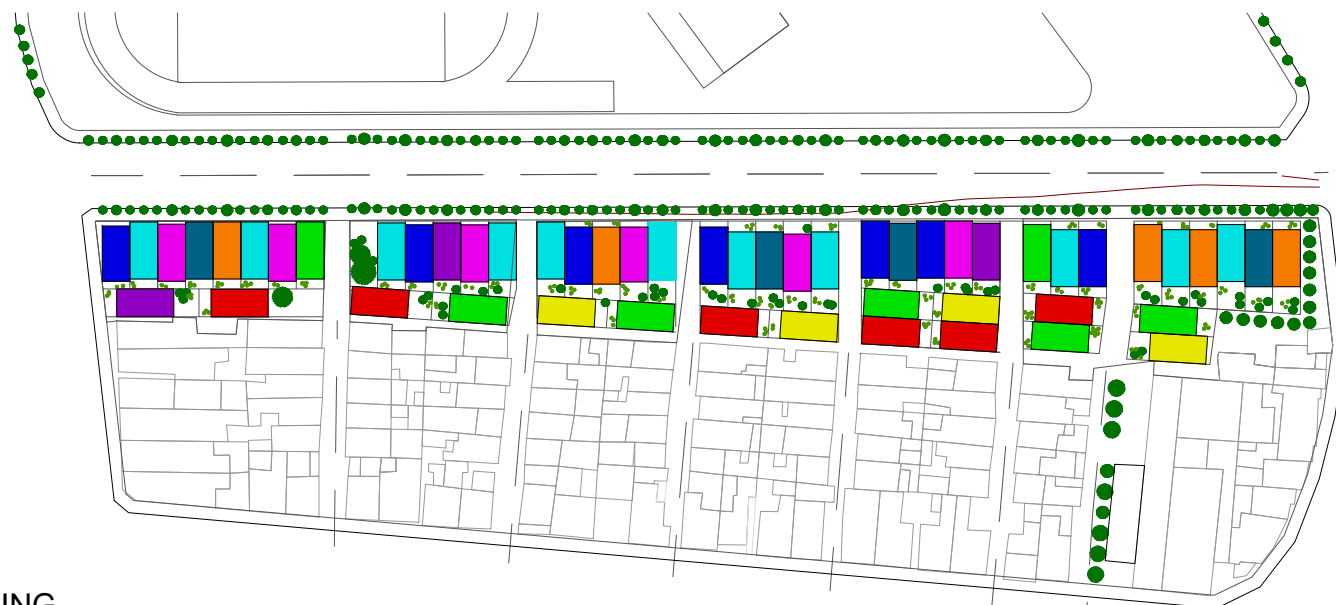
1:75



FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 04



ZONING

Quotes

*residential building*  
*private garden + single family house for 08 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

1:1500



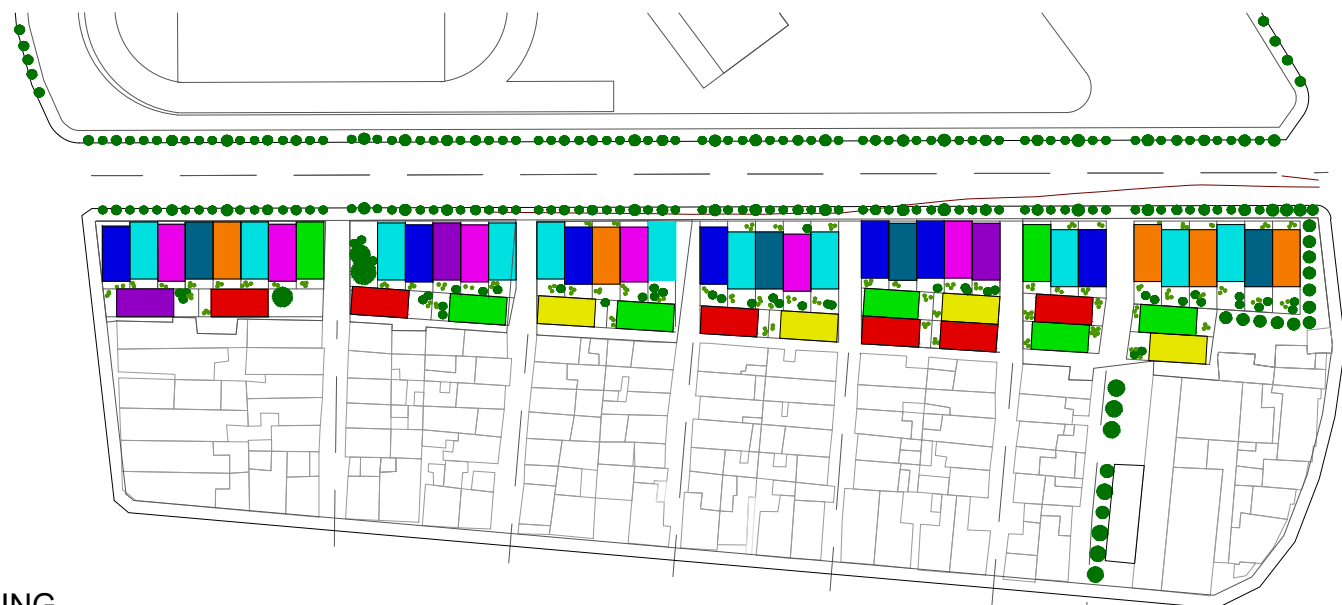
III-19

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 05



ZONING

Quotes

residential building  
private garden + multifamily housing for 06 people + private terrace

Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- typology 06
- typology 05

1:1500

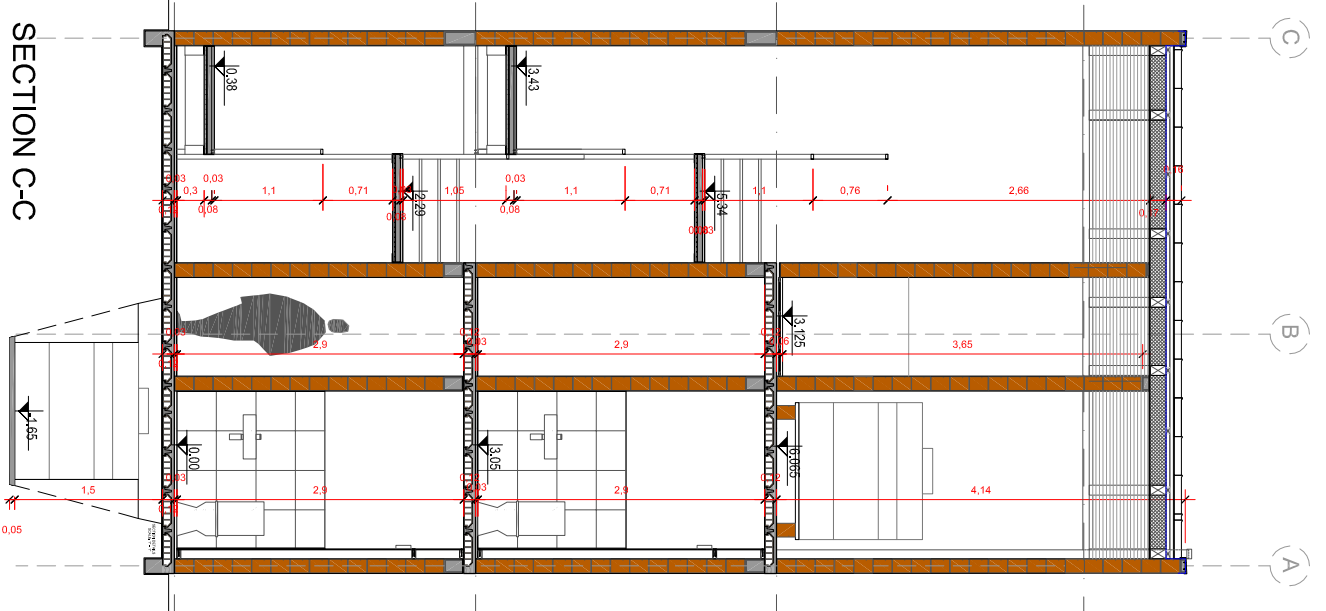
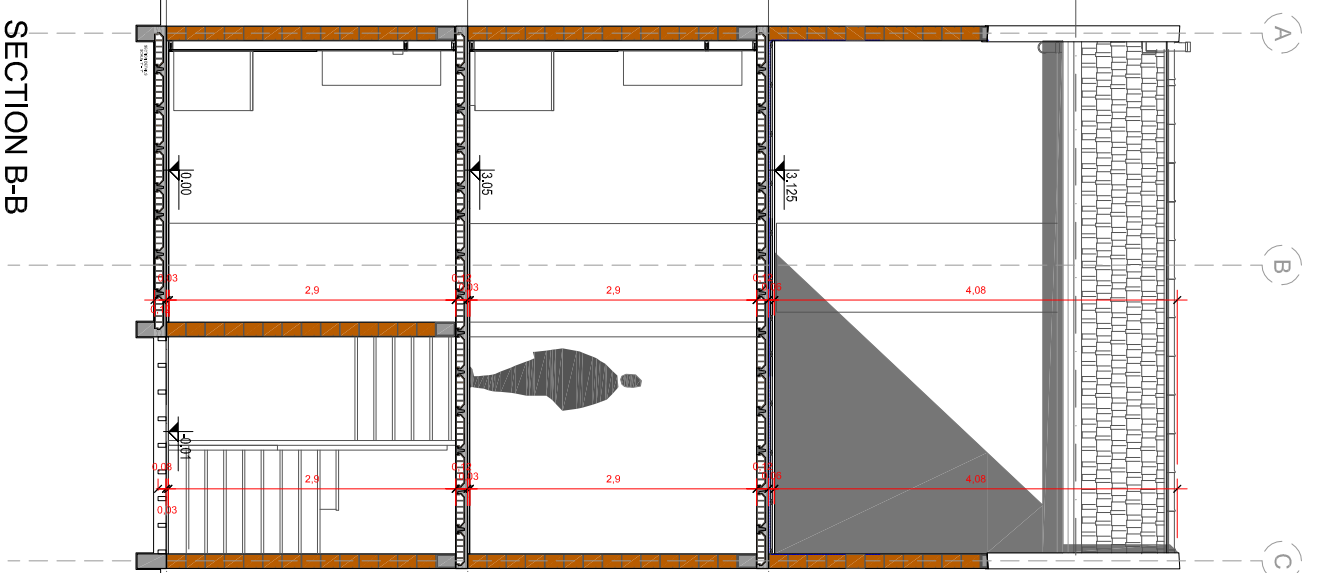
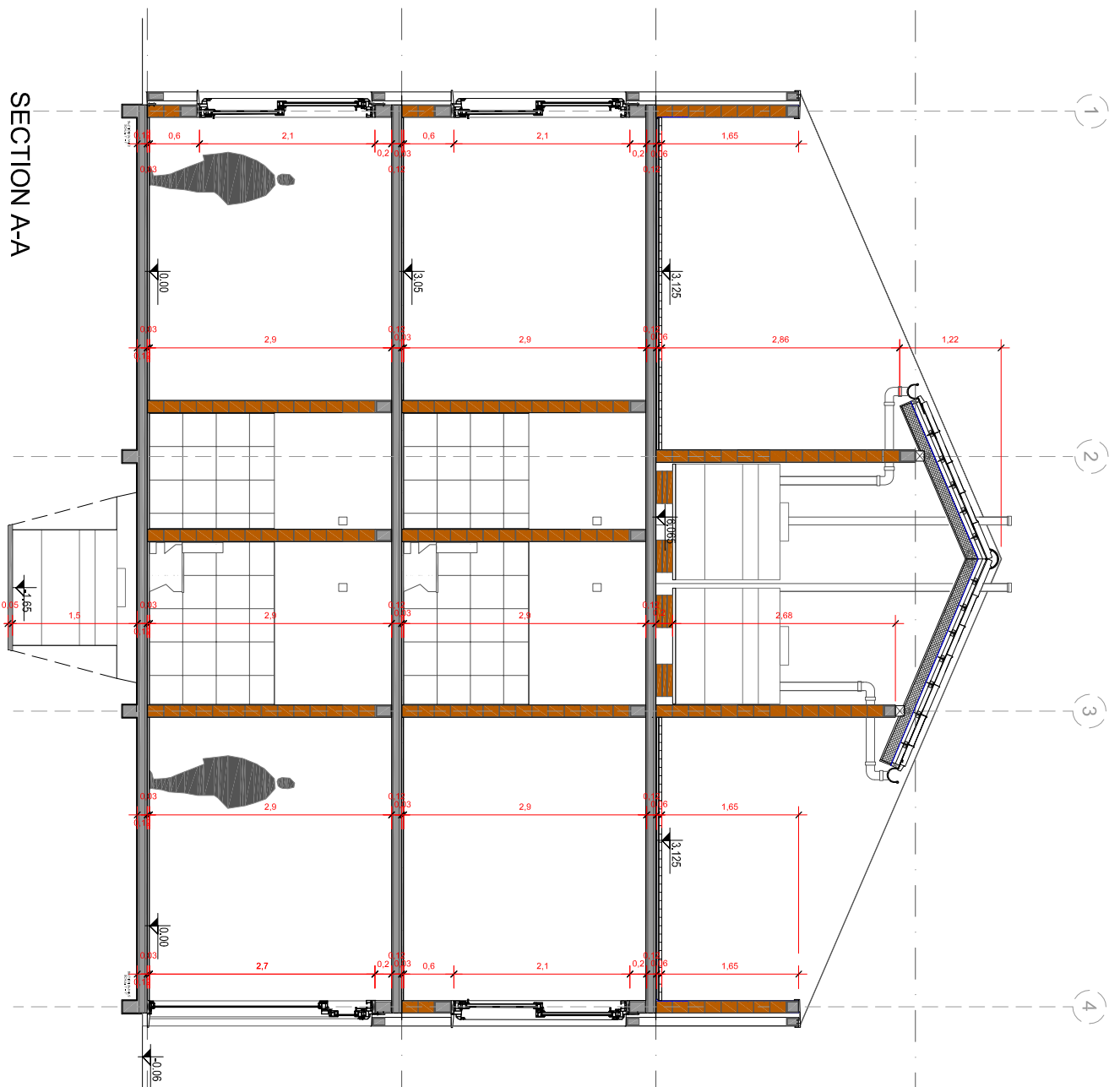


III-20

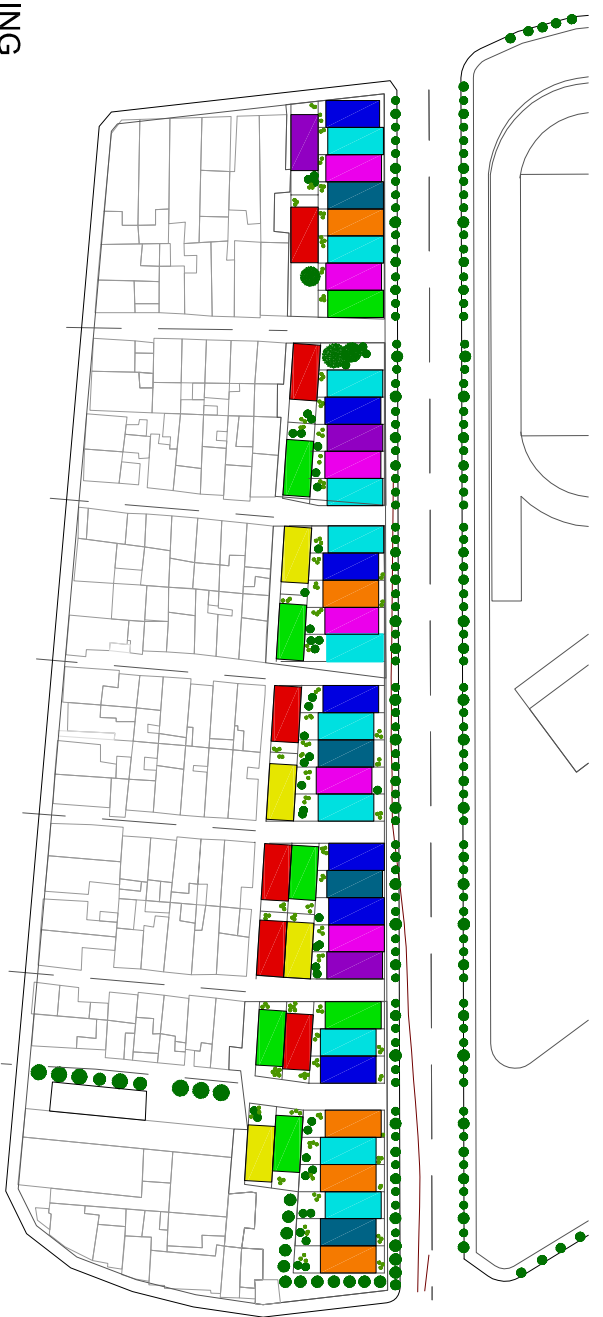
Architectural Project  
Plan, Sections and Facades.

1:75





UNIT TYPOLOGY 05



**Quotes**  
*residential building*  
*private garden + multifamily housing for 06 people + private terrace*

- Legend**
- typology 01*
  - typology 02*
  - typology 03*
  - typology 04*
  - typology 05*
  - typology 06*

- typology 07*
- typology 08*
- typology 09*

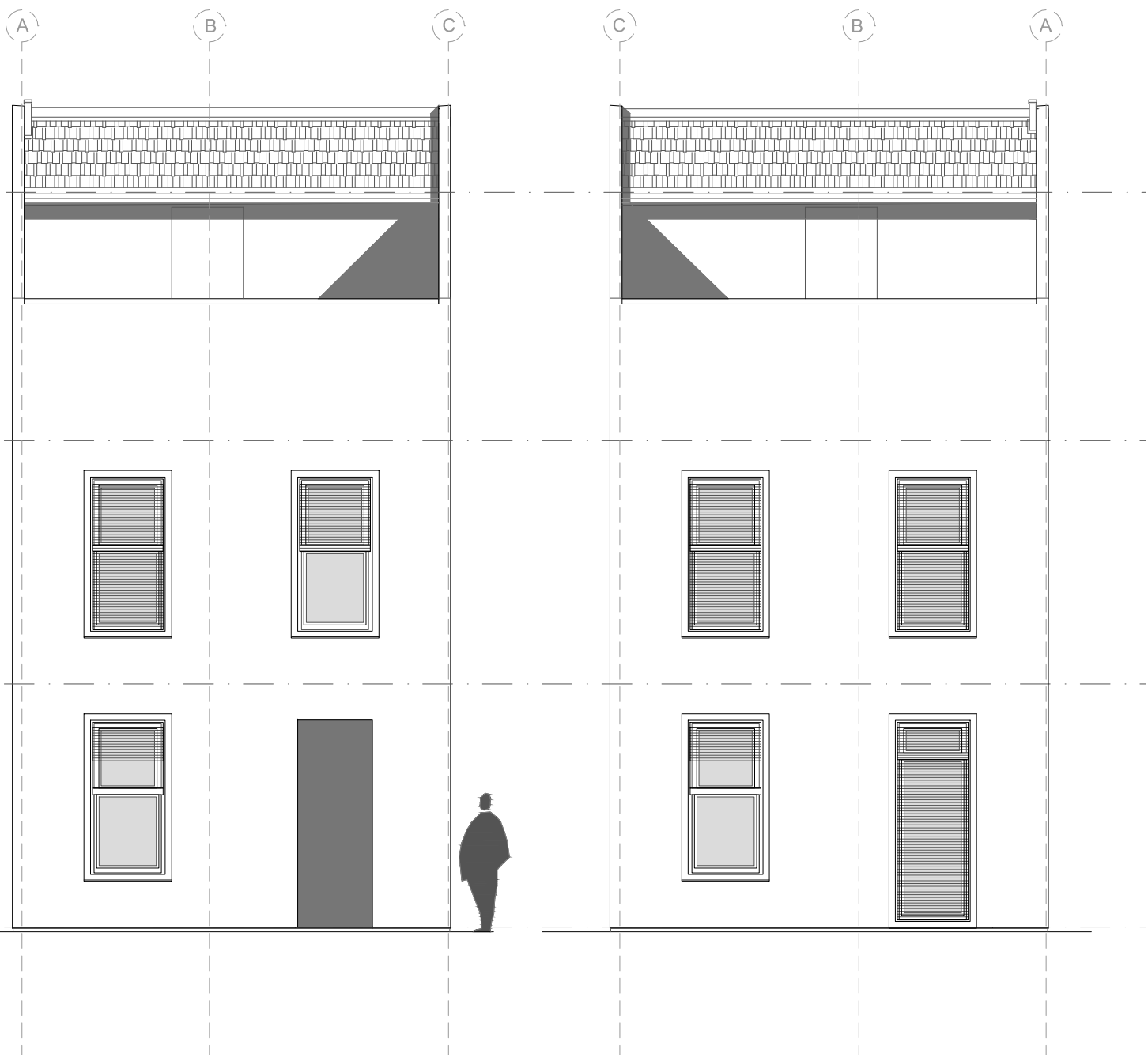
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III-21 **Architectural Project**  
 Plan, Sections and Facades.

1:75

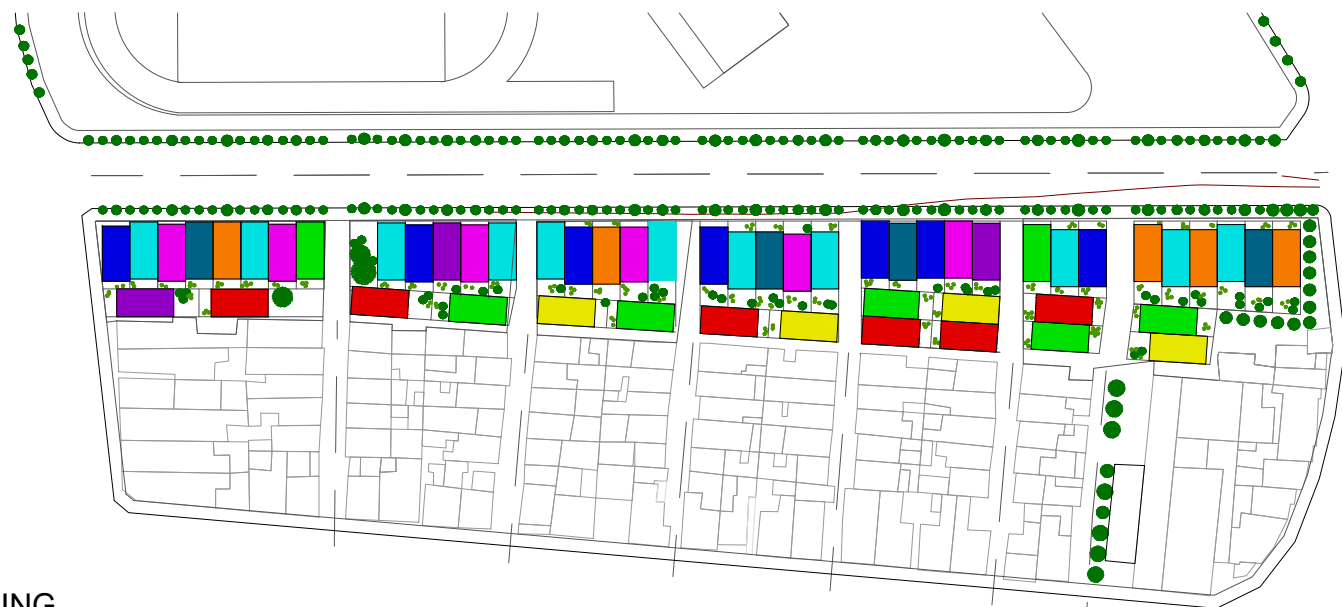
ZONING



FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 05



ZONING

Quotes

*residential building*  
*private garden + multifamily housing for 06 people + private terrace*

Legend

- |   |  |
|---|--|
| <span style="color: red;">■</span> <i>typology 01</i>     | <span style="color: purple;">■</span> <i>typology 07</i> |
| <span style="color: yellow;">■</span> <i>typology 02</i>  | <span style="color: orange;">■</span> <i>typology 08</i> |
| <span style="color: green;">■</span> <i>typology 03</i>   | <span style="color: blue;">■</span> <i>typology 09</i>   |
| <span style="color: cyan;">■</span> <i>typology 04</i>    |  |
| <span style="color: blue;">■</span> <i>typology 05</i>    |  |
| <span style="color: magenta;">■</span> <i>typology 06</i> |  |

1:1500



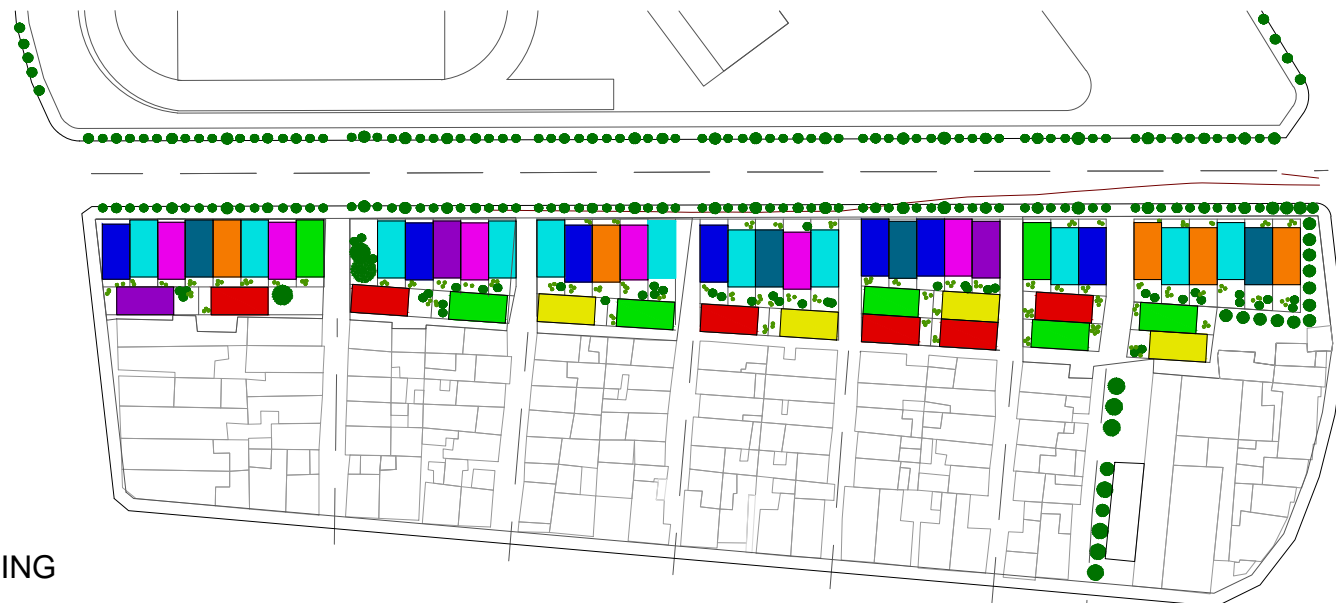
III-22

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 06



ZONING

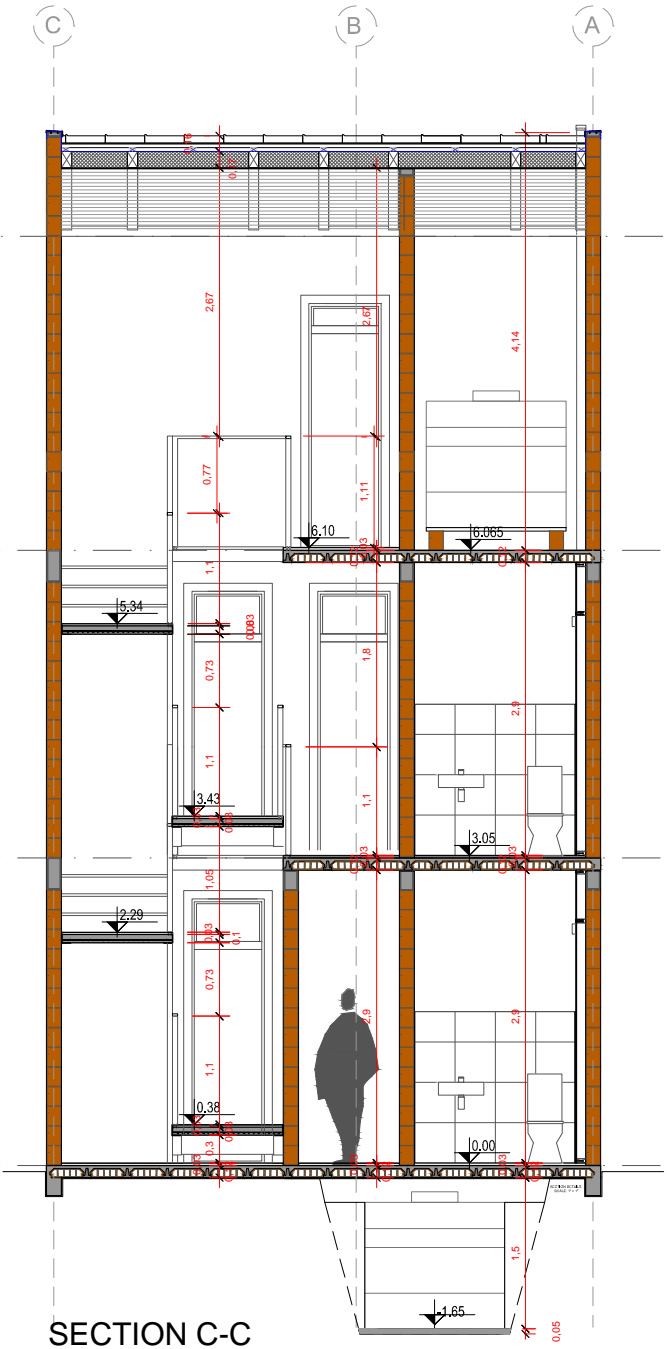
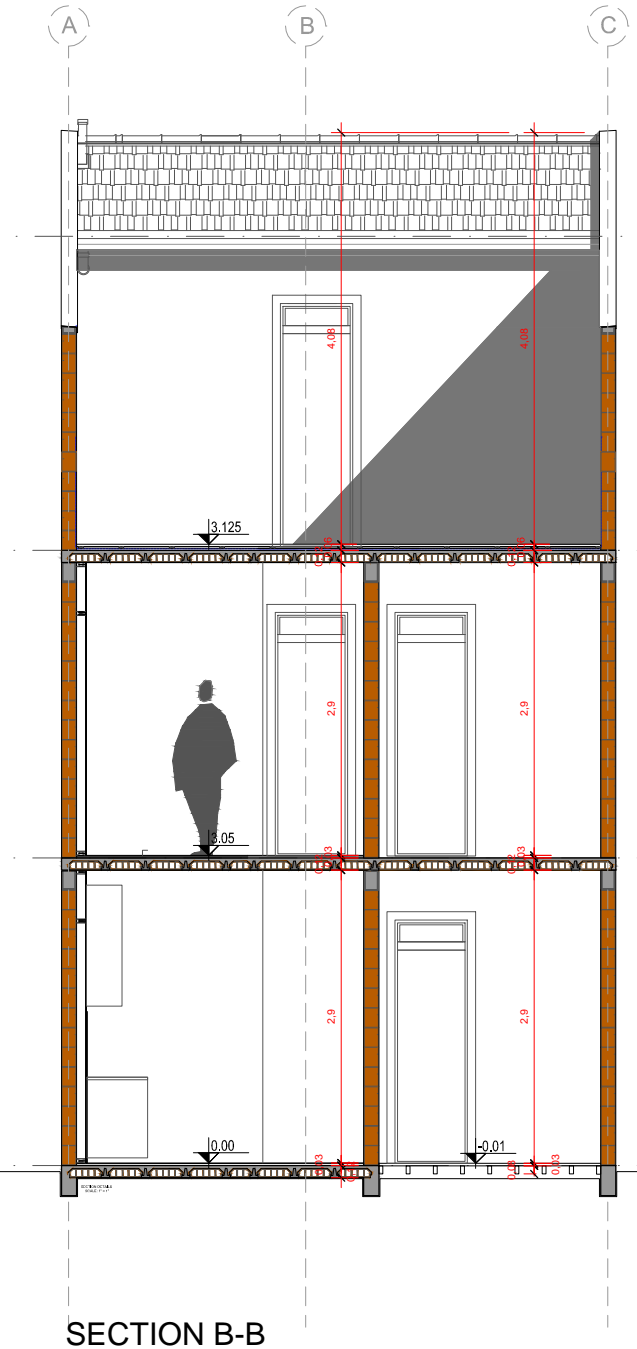
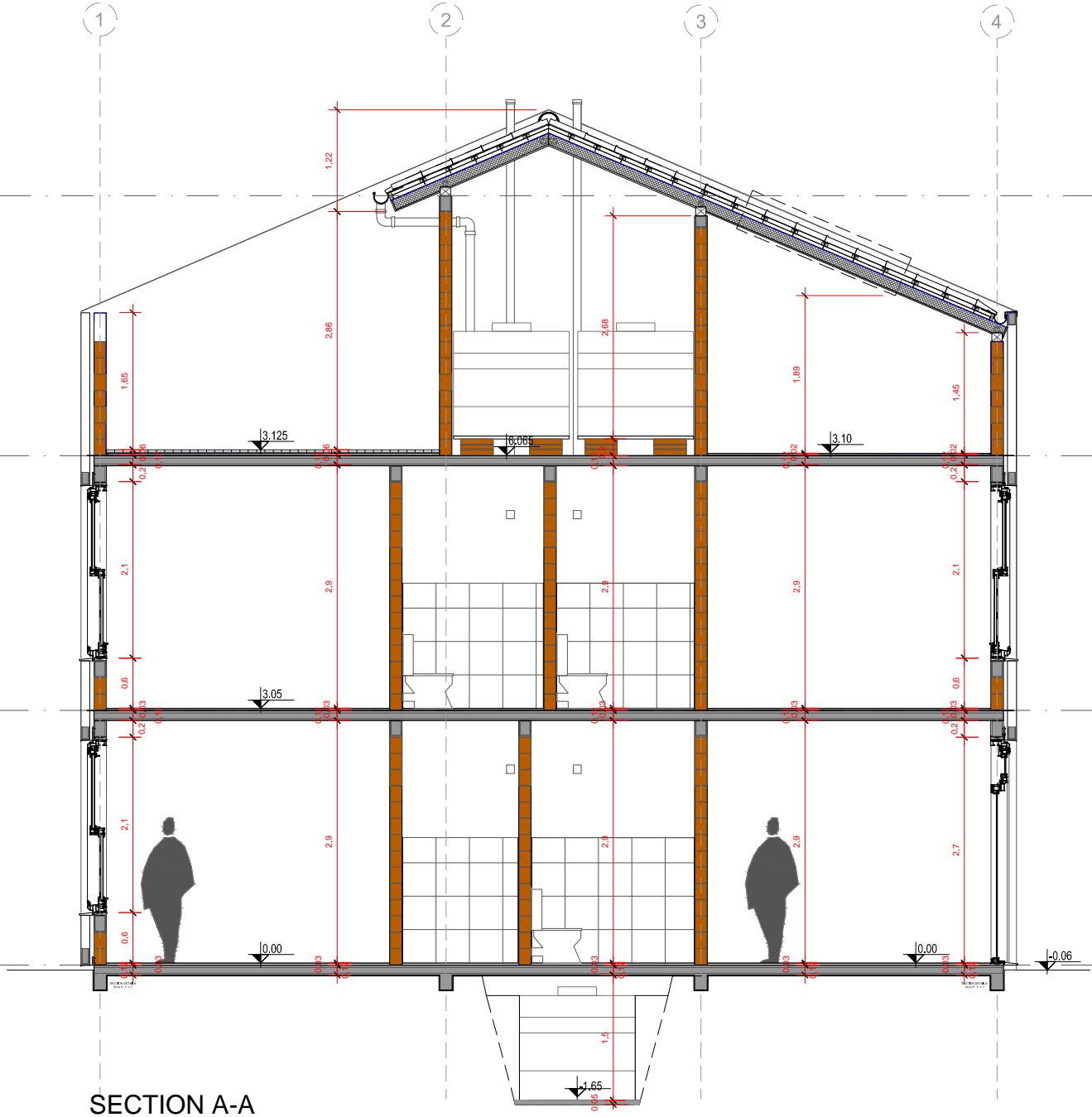
**Quotes**

*services building*  
*private garden + hostel accommodation for 12 people + private terrace*

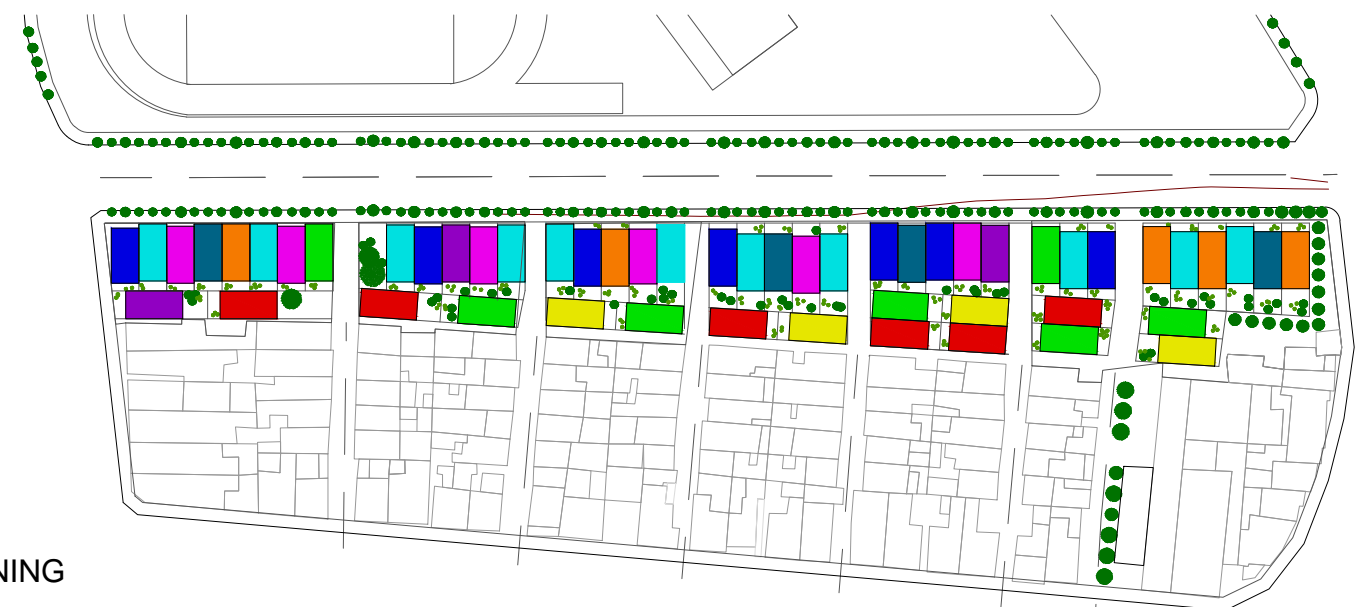
**Legend**

- *typology 01*
- *typology 07*
- *typology 02*
- *typology 08*
- *typology 03*
- *typology 09*
- *typology 04*
- *typology 05*
- *typology 06*





UNIT TYPOLOGY 06



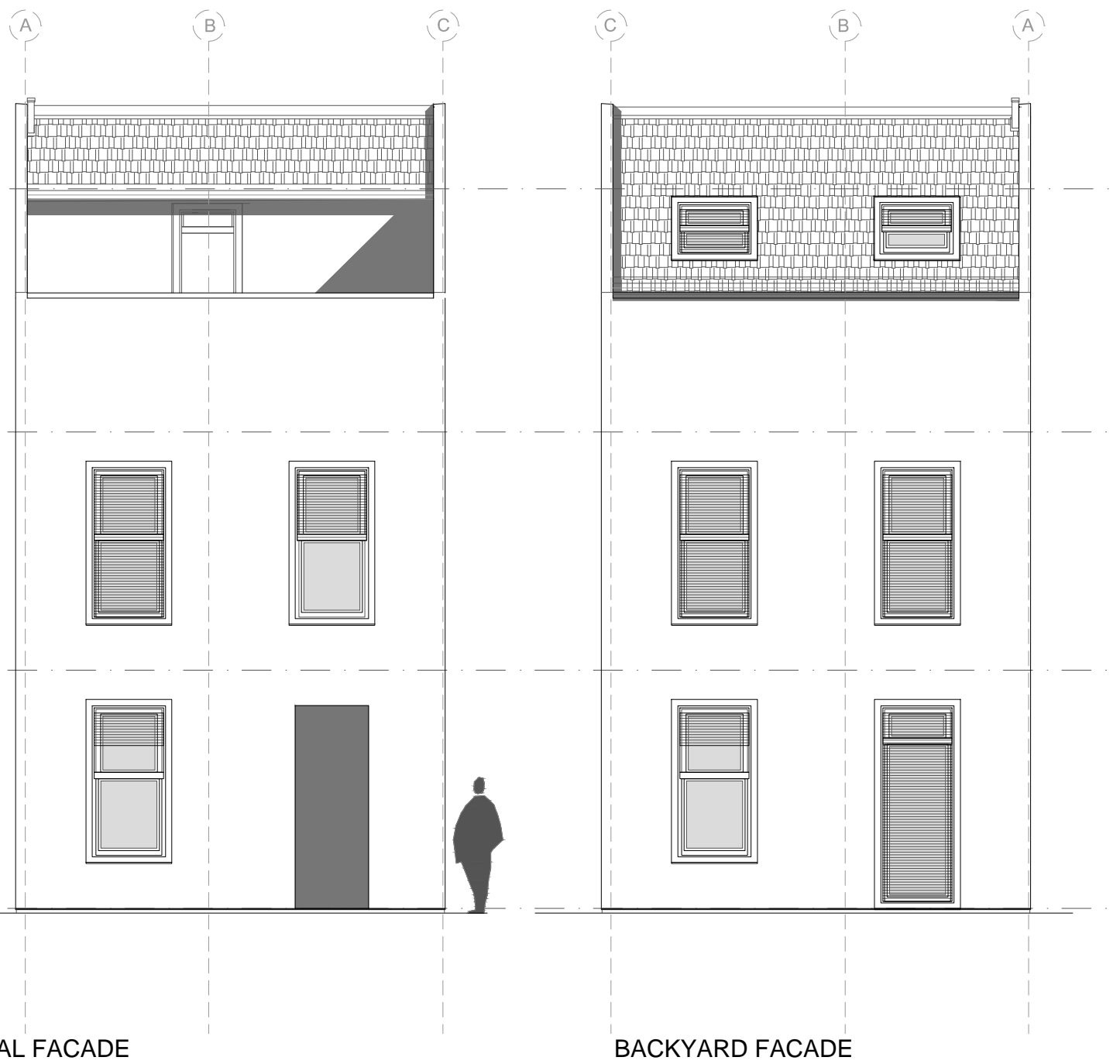
Quotes

services building  
private garden + hostel accommodation for 12 people + private terrace

Legend

- typology 01
- typology 02
- typology 03
- typology 04
- typology 05
- typology 06
- typology 07
- typology 08
- typology 09

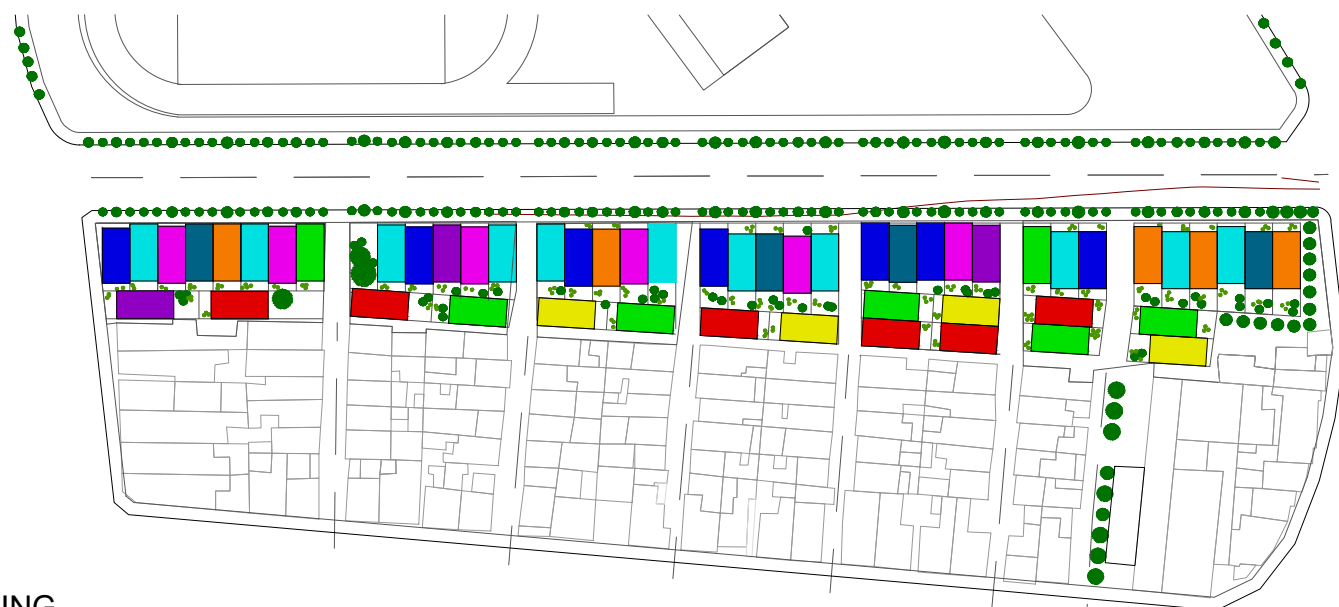




FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 06



ZONING

Quotes

*services building*  
*private garden + hostel accommodation for 12 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

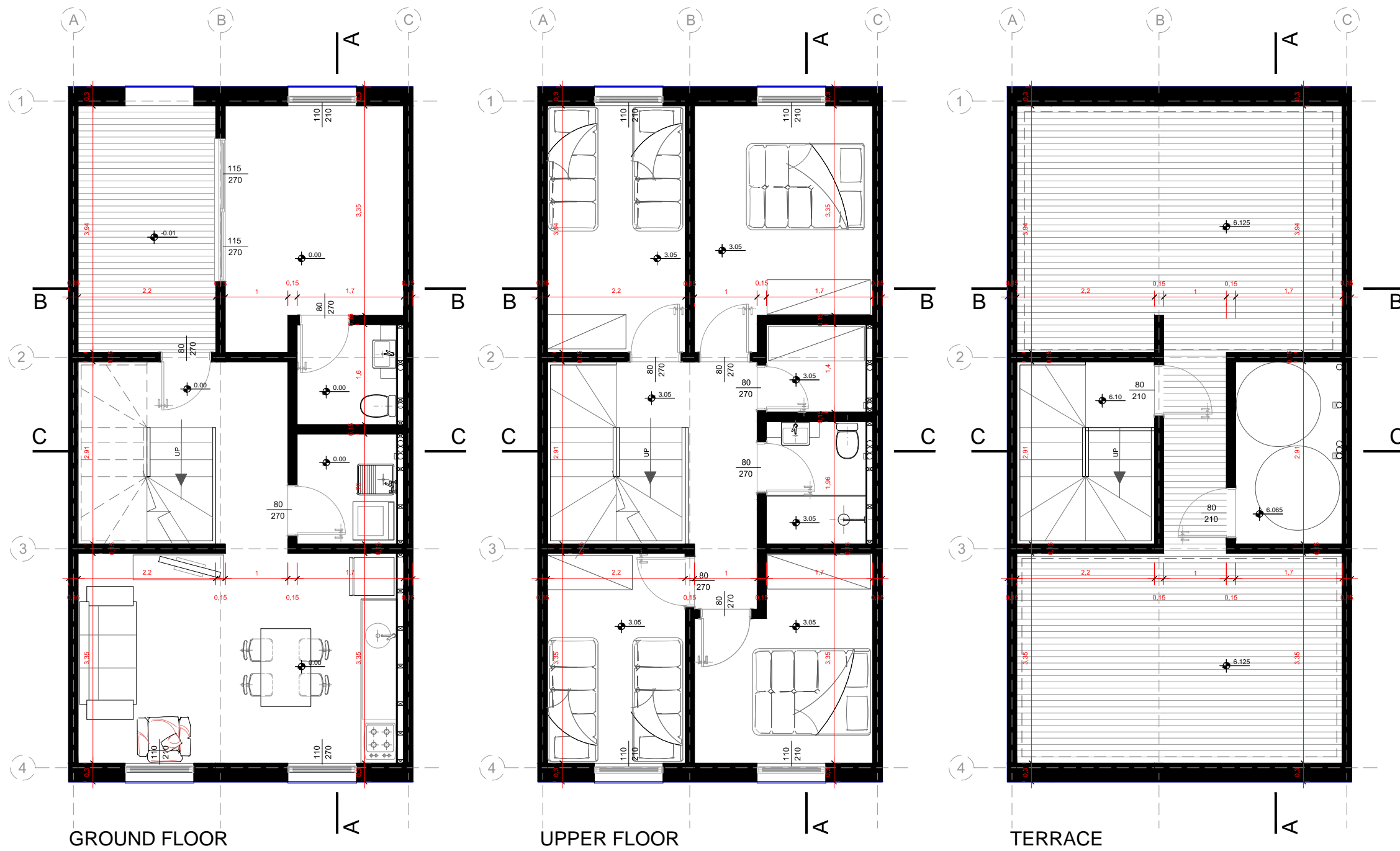
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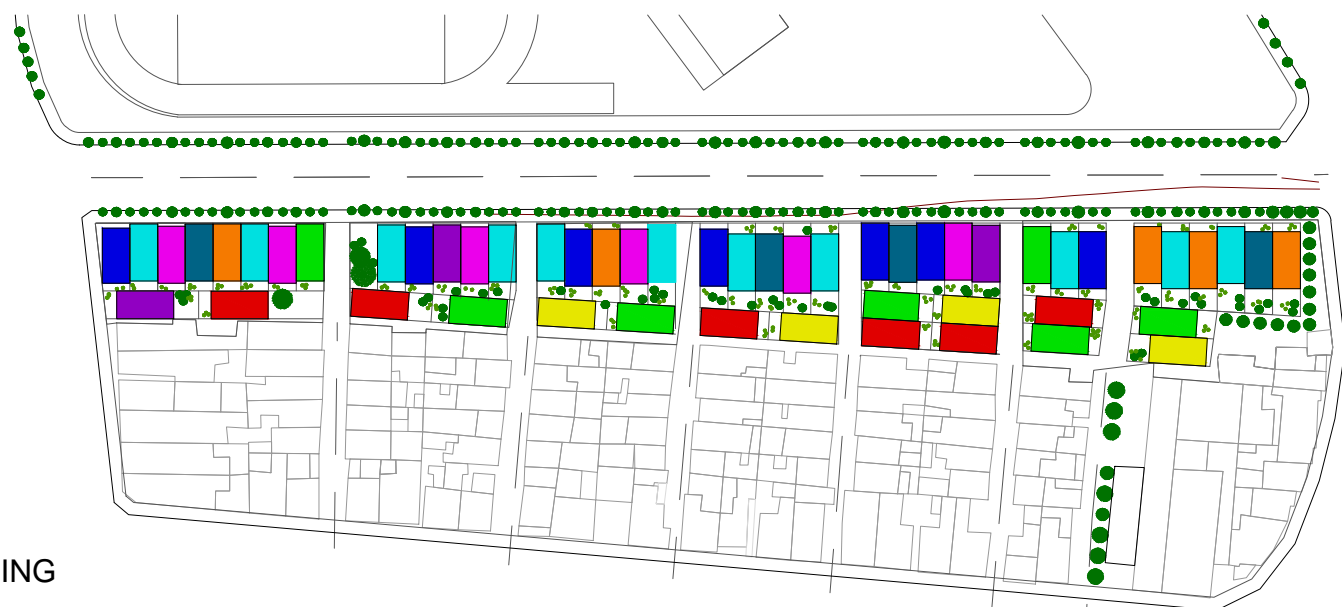
III-25

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 07



ZONING

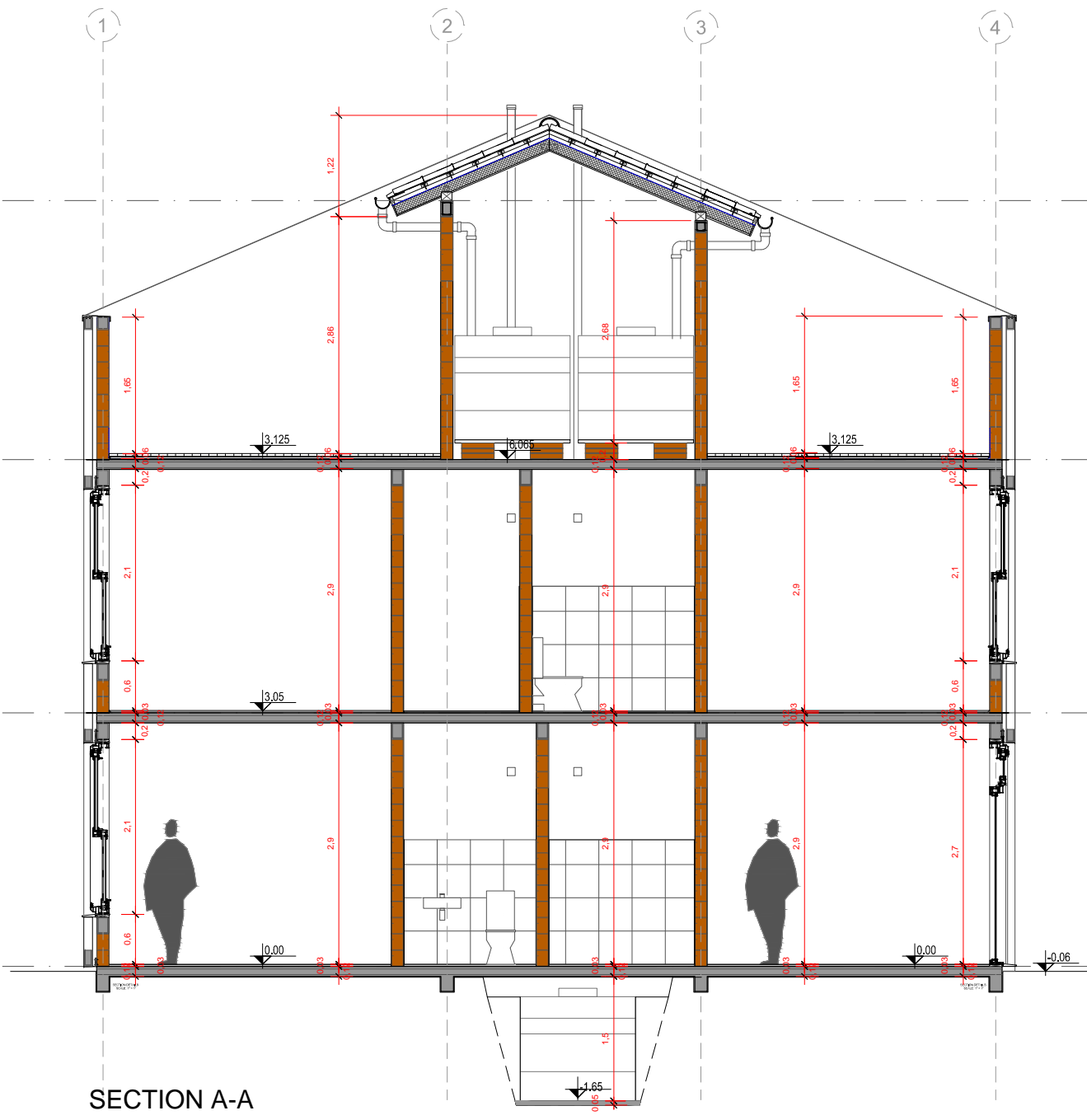
**Quotes**

*mix use building  
private garden + small business space + single family house for 04 people + private terrace*

**Legend**

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

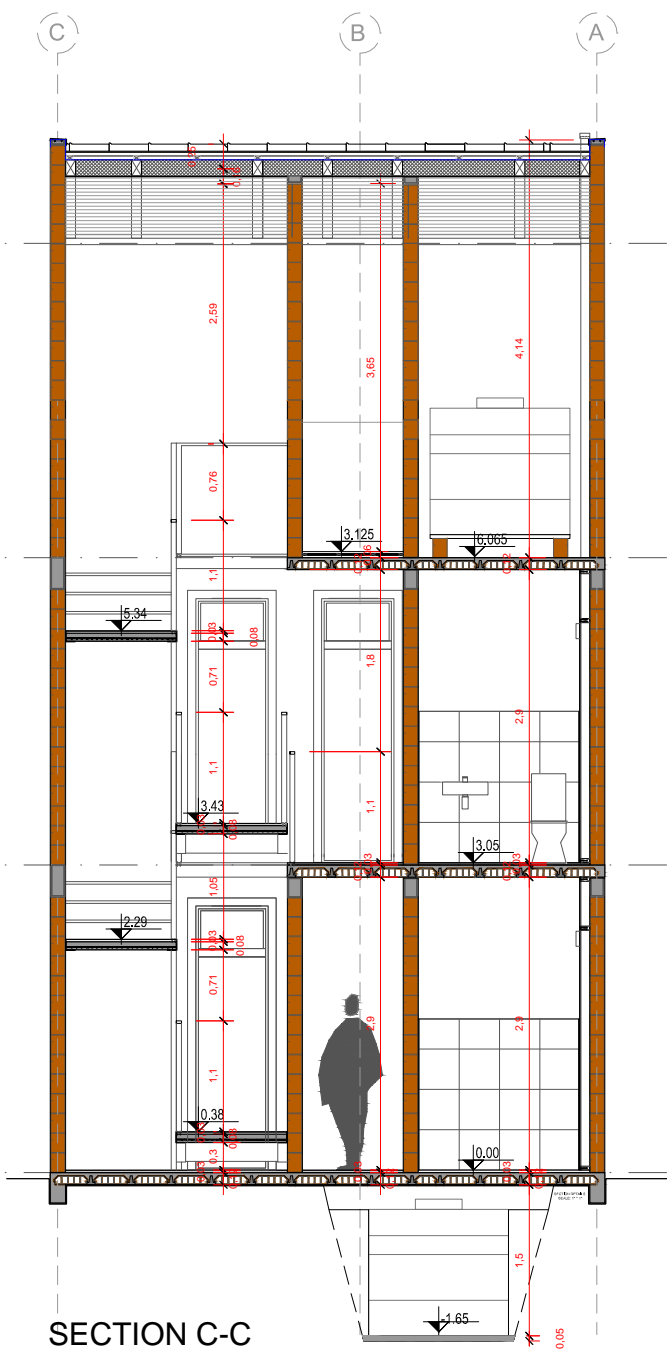




SECTION A-A

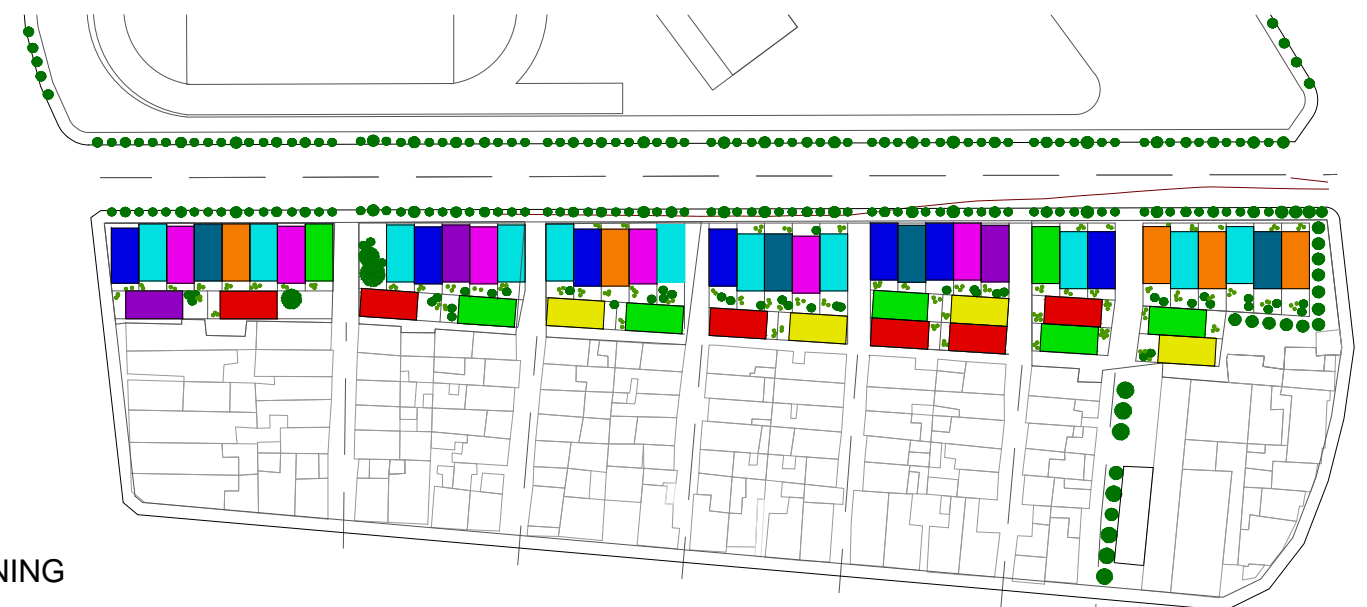


SECTION B-B



SECTION C-C

UNIT TYPOLOGY 07



ZONING

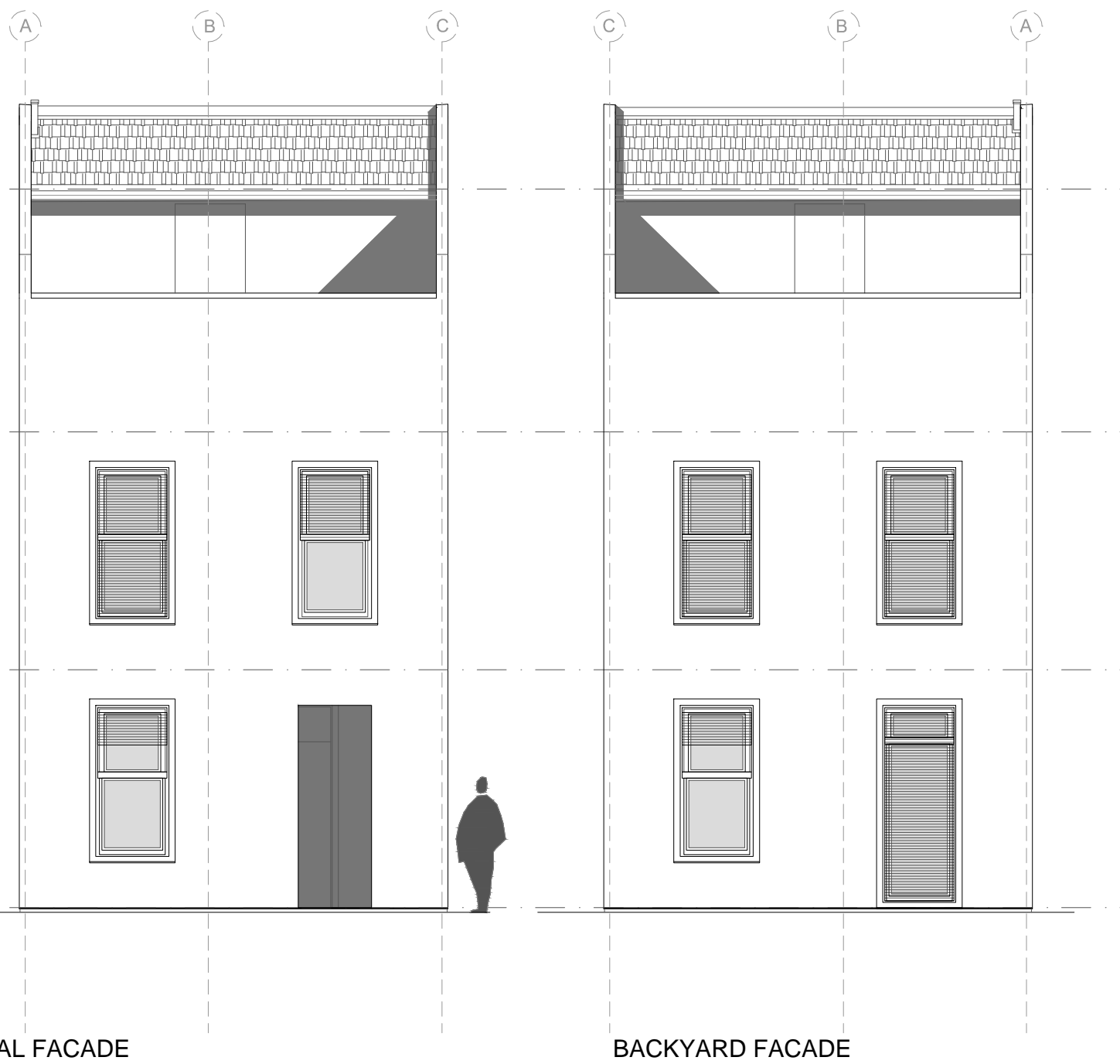
Quotes

*mix use building*  
*private garden + small business space + single family house for 04 people + private terrace*

Legend

- *typology 01*
- *typology 07*
- *typology 02*
- *typology 08*
- *typology 03*
- *typology 09*
- *typology 04*
- 
- *typology 05*
- 
- *typology 06*
- 

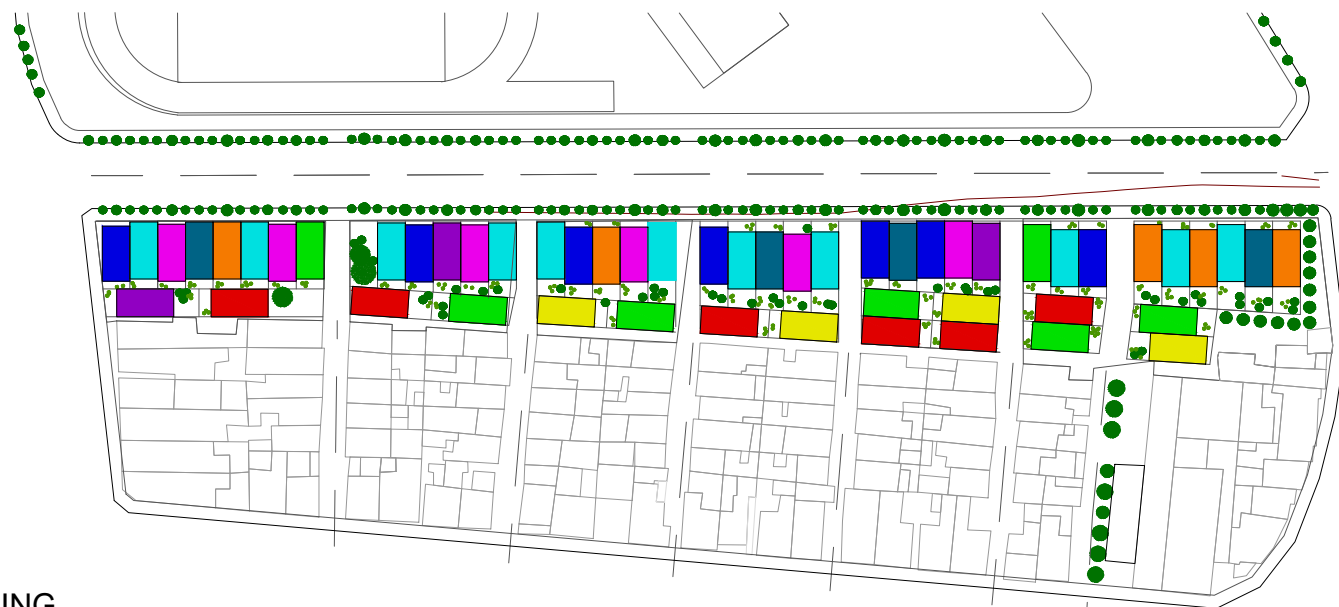




FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 07



ZONING

Quotes

*mix use building*  
*private garden + small business space + single family house for 04 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

1:1500

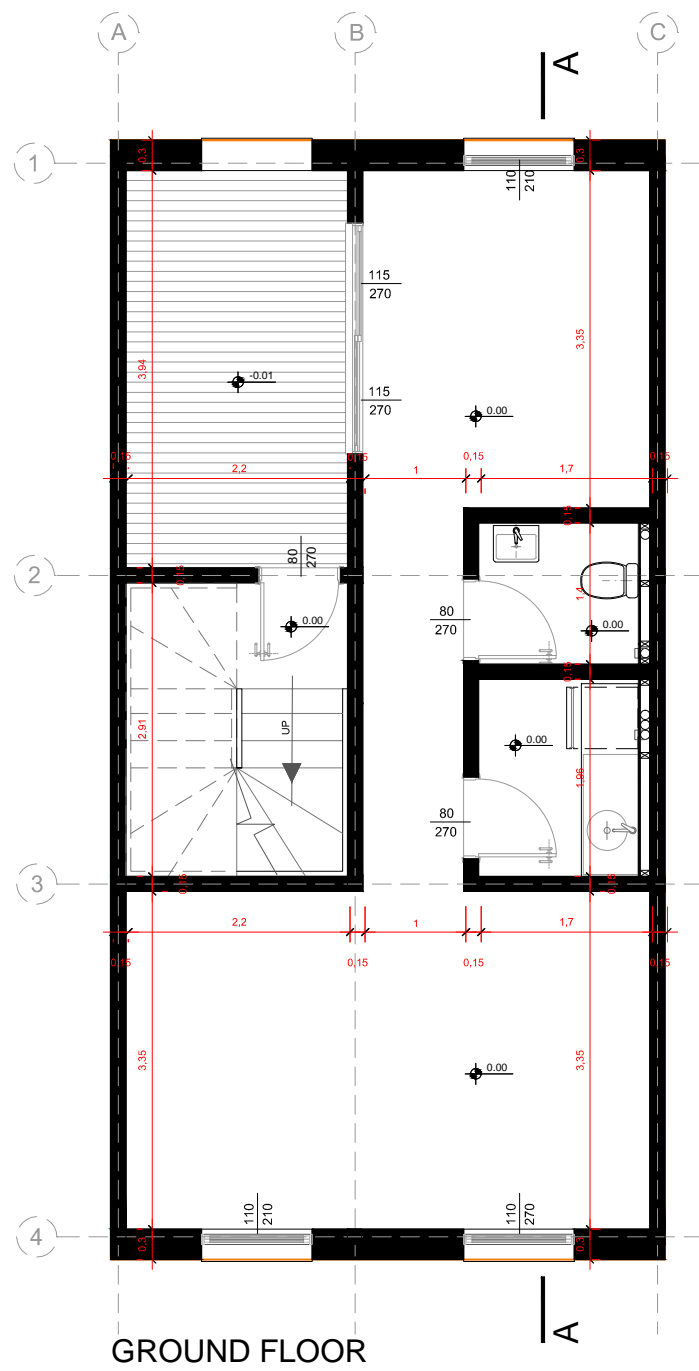


III-28

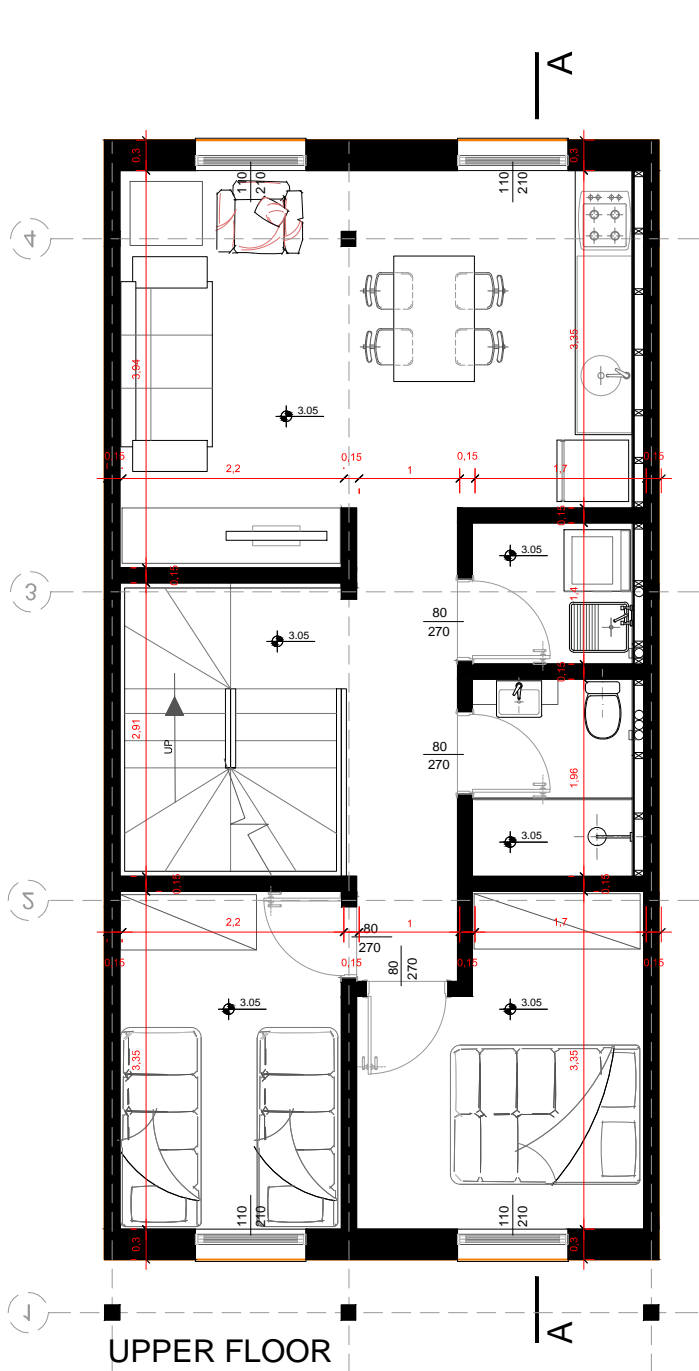
**Architectural Project**  
 Plan, Sections and Facades.

1:75

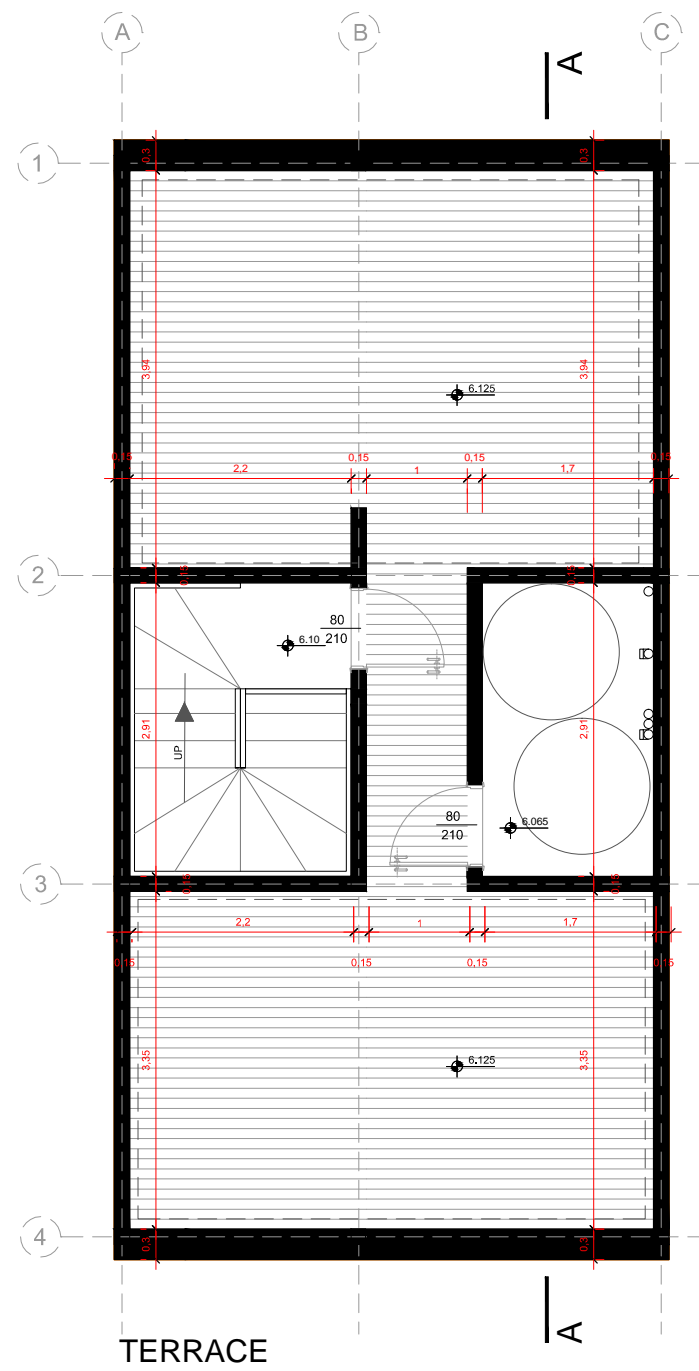




GROUND FLOOR

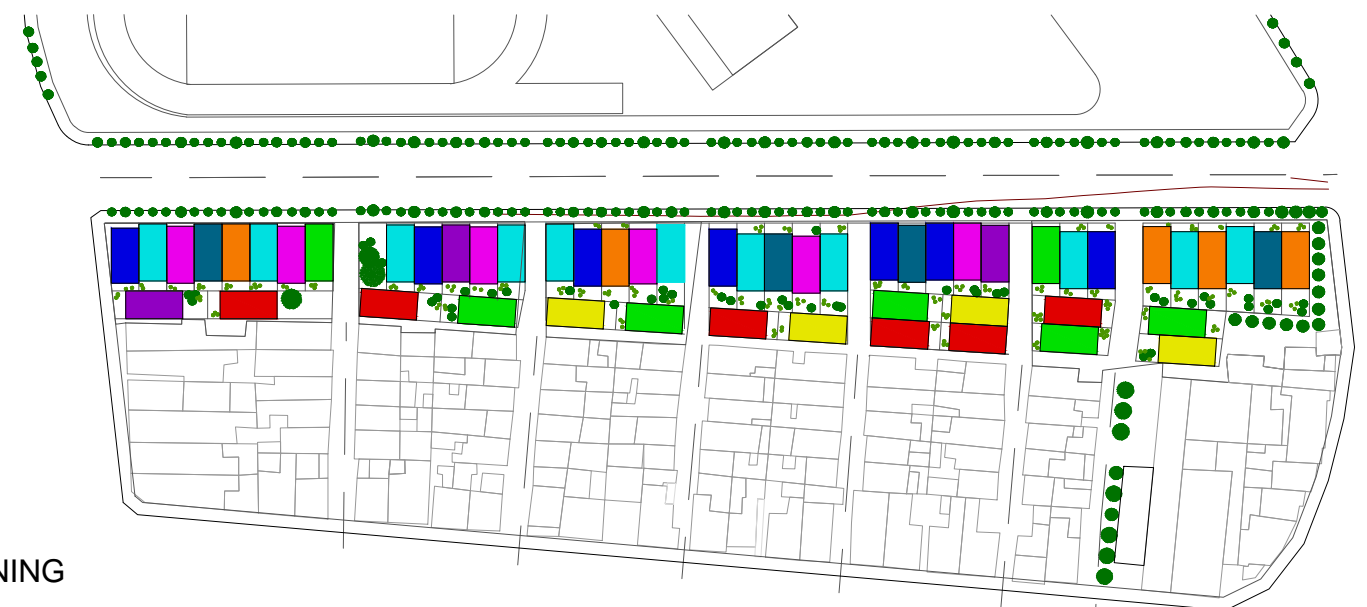


UPPER FLOOR



TERRACE

UNIT TYPOLOGY 08



ZONING

Quotes

*mix use building  
public garden + store on the ground floor + single family house for 06 people + private terrace*

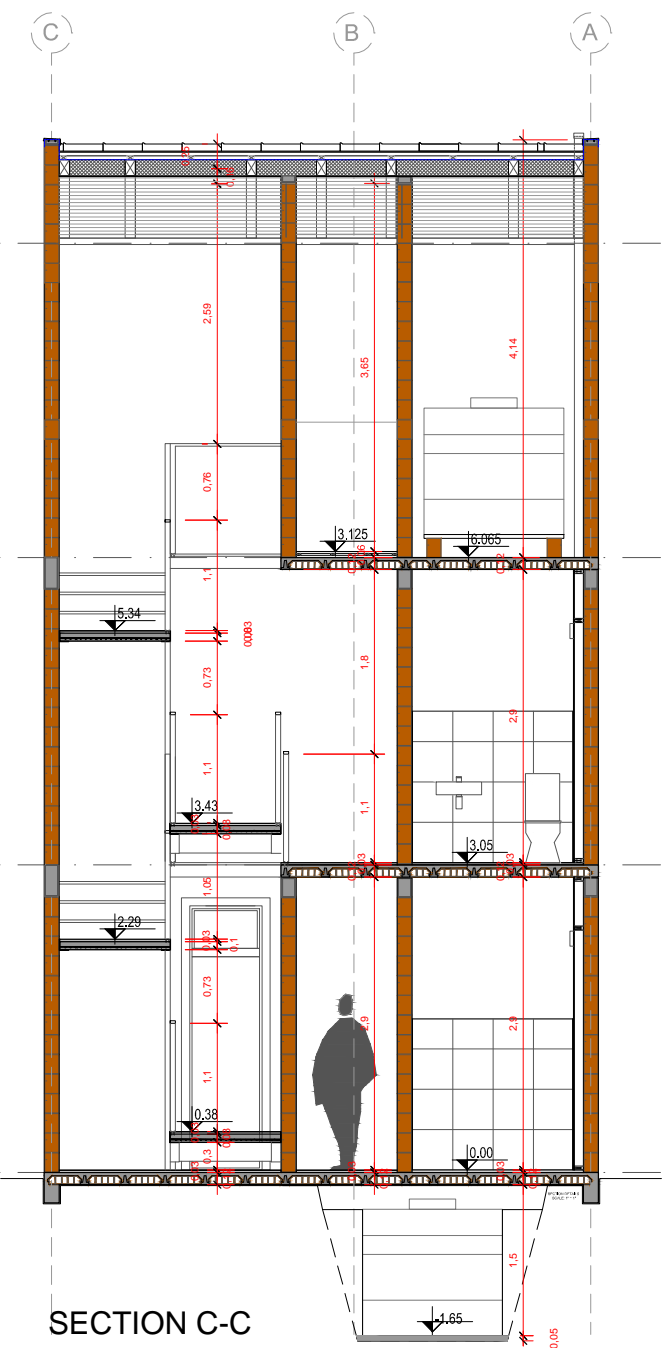
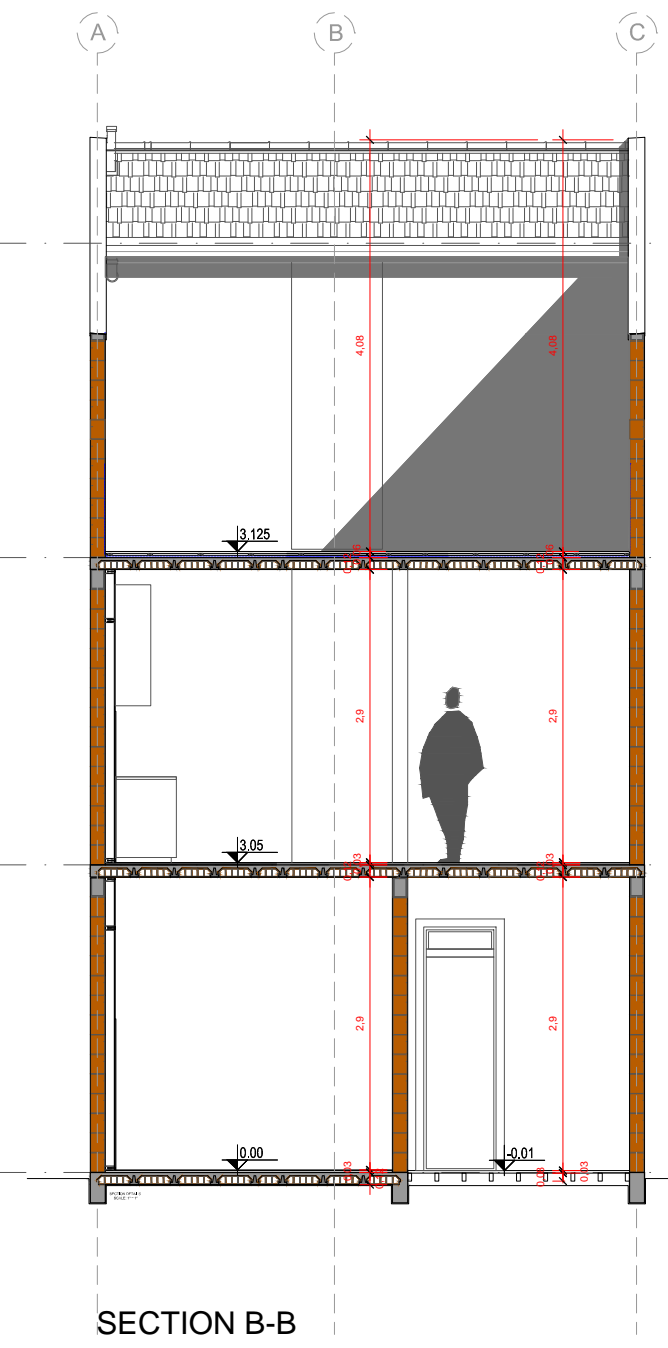
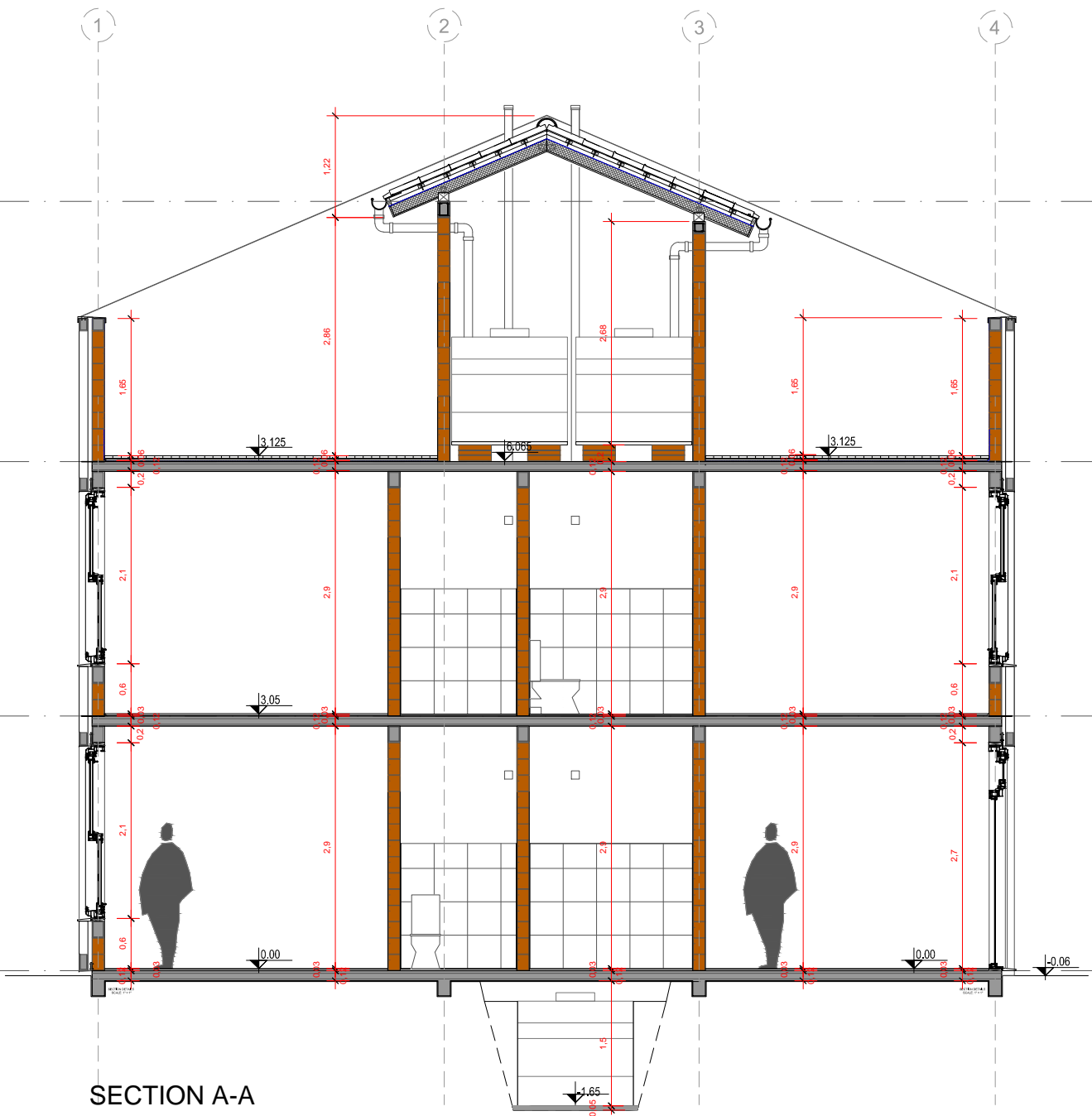
Legend

- typology 01
- typology 07
- typology 02
- typology 08
- typology 03
- typology 09
- typology 04
- 
- typology 05
- 
- typology 06
- 

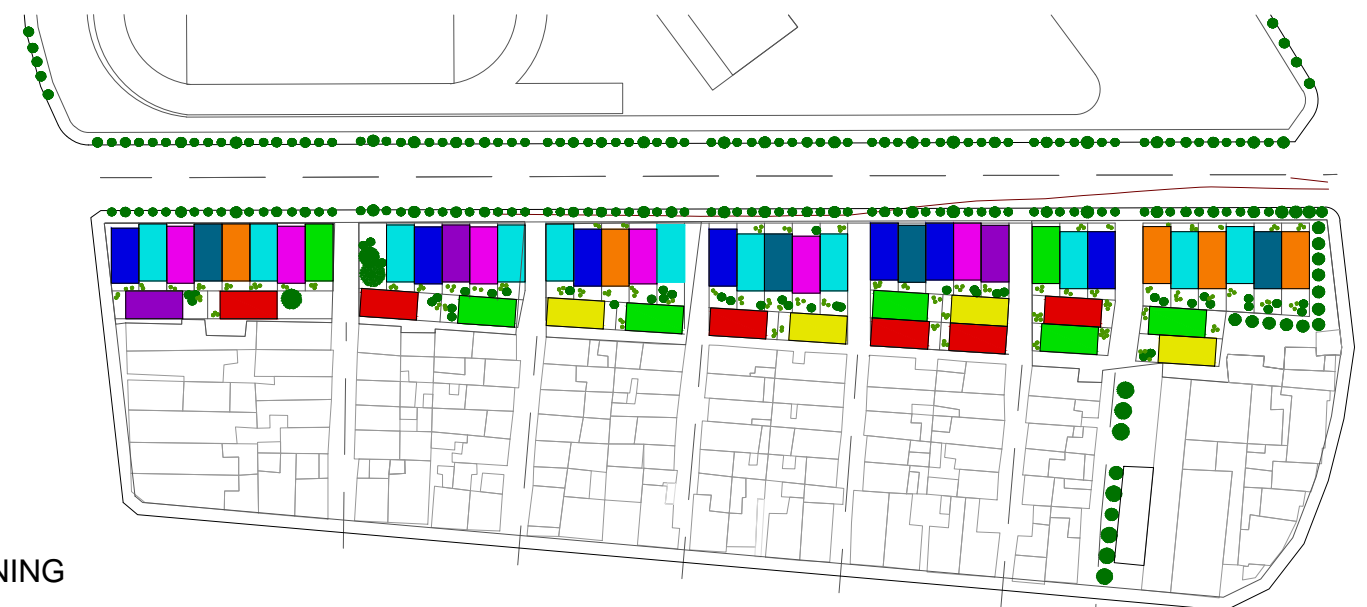
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1:75



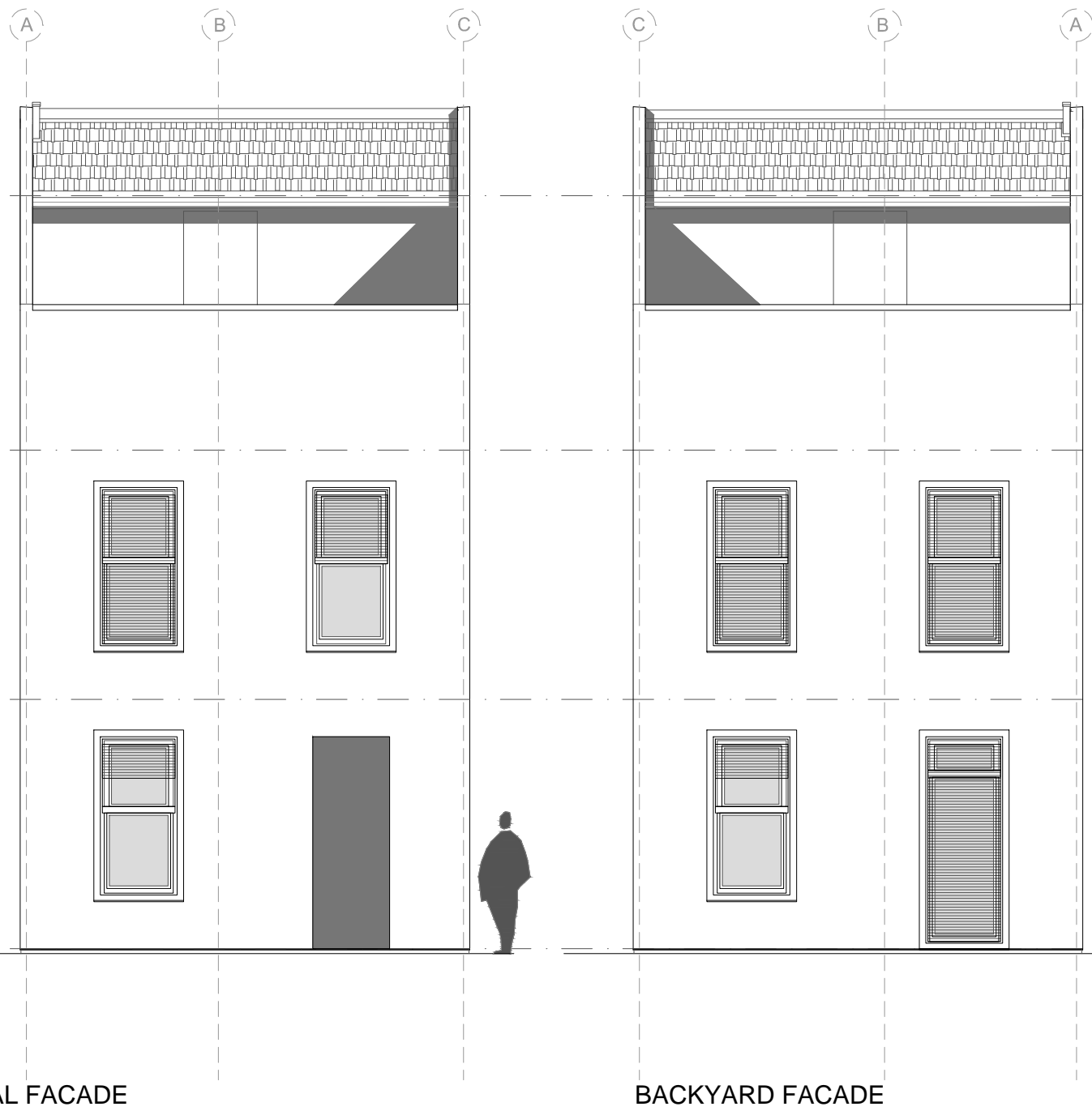
UNIT TYPOLOGY 08



**Quotes**  
*mix use building*  
*public garden + store on the ground floor + single family house for 06 people + private terrace*

- Legend**
- *typology 01*
  - *typology 07*
  - *typology 02*
  - *typology 08*
  - *typology 03*
  - *typology 09*
  - *typology 04*
  - 
  - *typology 05*
  - 
  - *typology 06*
  -

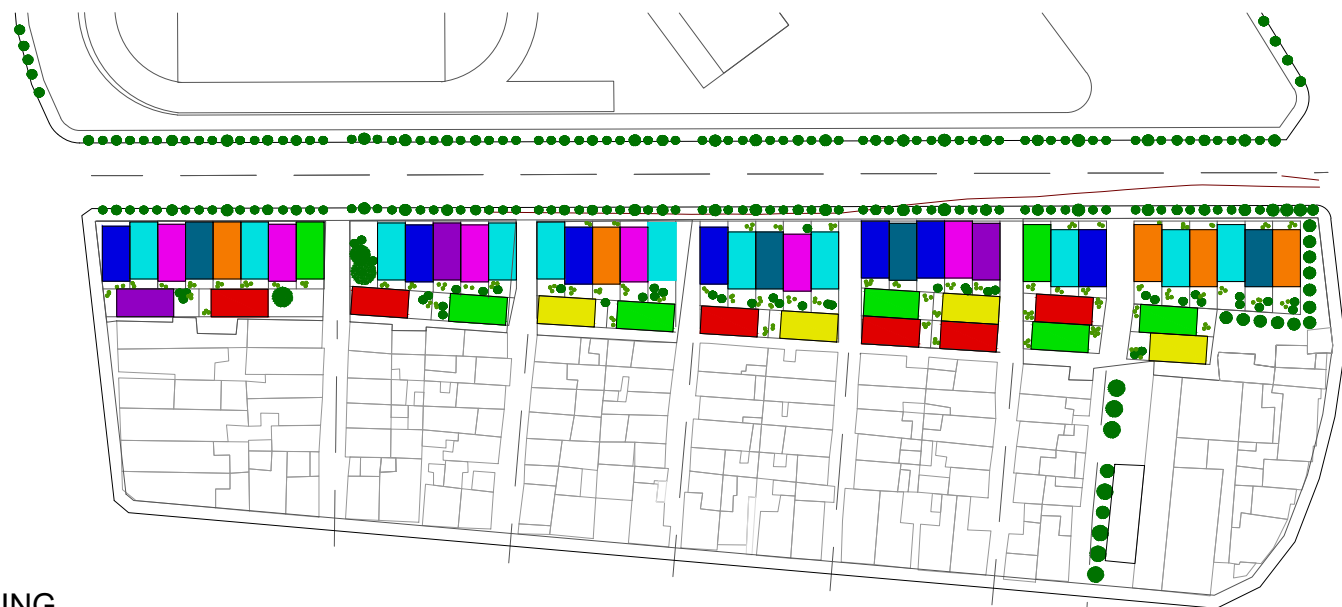




FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 08



ZONING

Quotes

*mix use building*  
*public garden + store on the ground floor + single family house for 06 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

1:1500



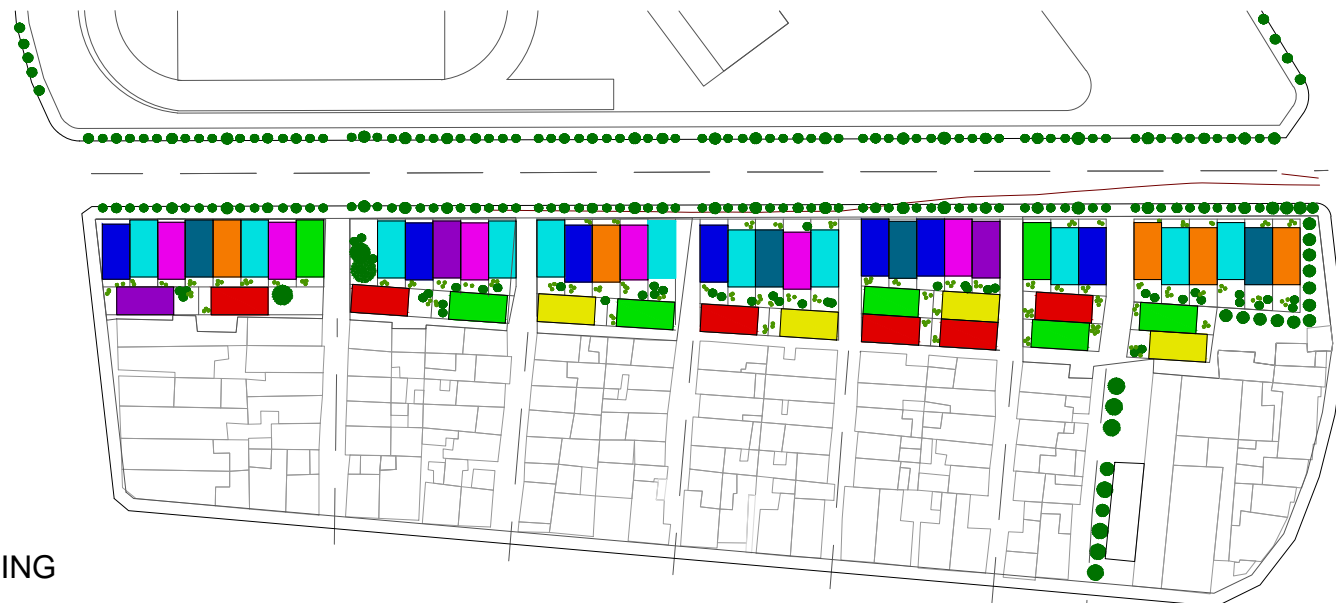
III-31

**Architectural Project**  
 Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 09



ZONING

*mix use building*

*public garden + store on the ground floor + single family house for 08 people + private terrace*

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

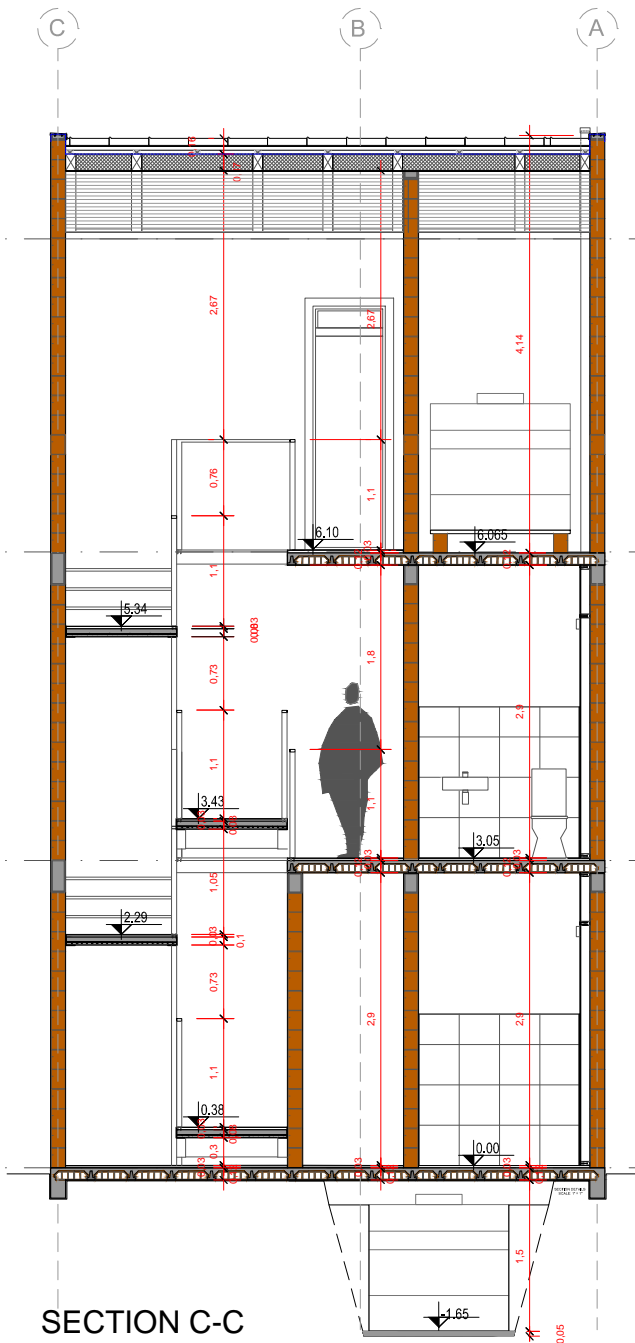
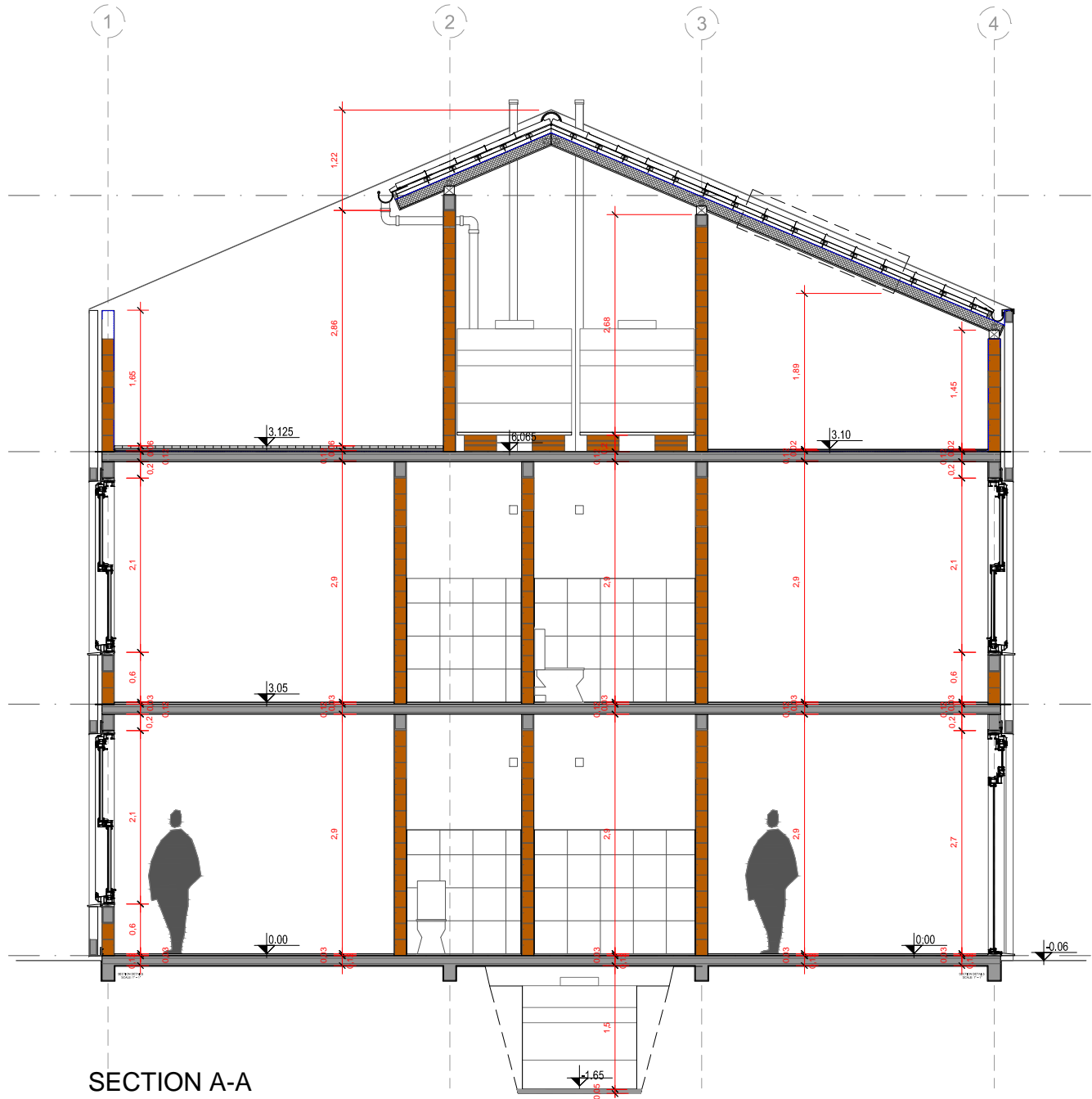
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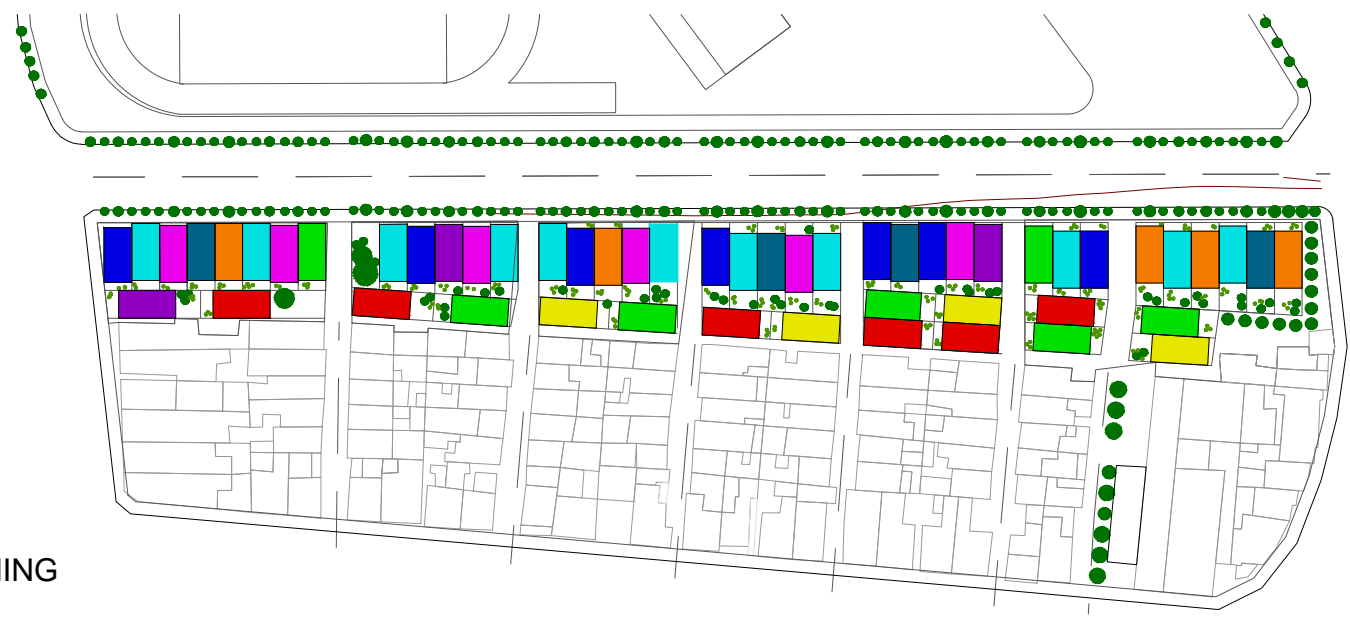
III-32

**Architectural Project**  
Plan, Sections and Facades.

1:75



UNIT TYPOLOGY 09



Quotes

*mix use building*  
*public garden + store on the ground floor + single family house for 08 people + private terrace*

Legend

- typology 01*
- typology 07*
- typology 02*
- typology 08*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 09*

1:1500



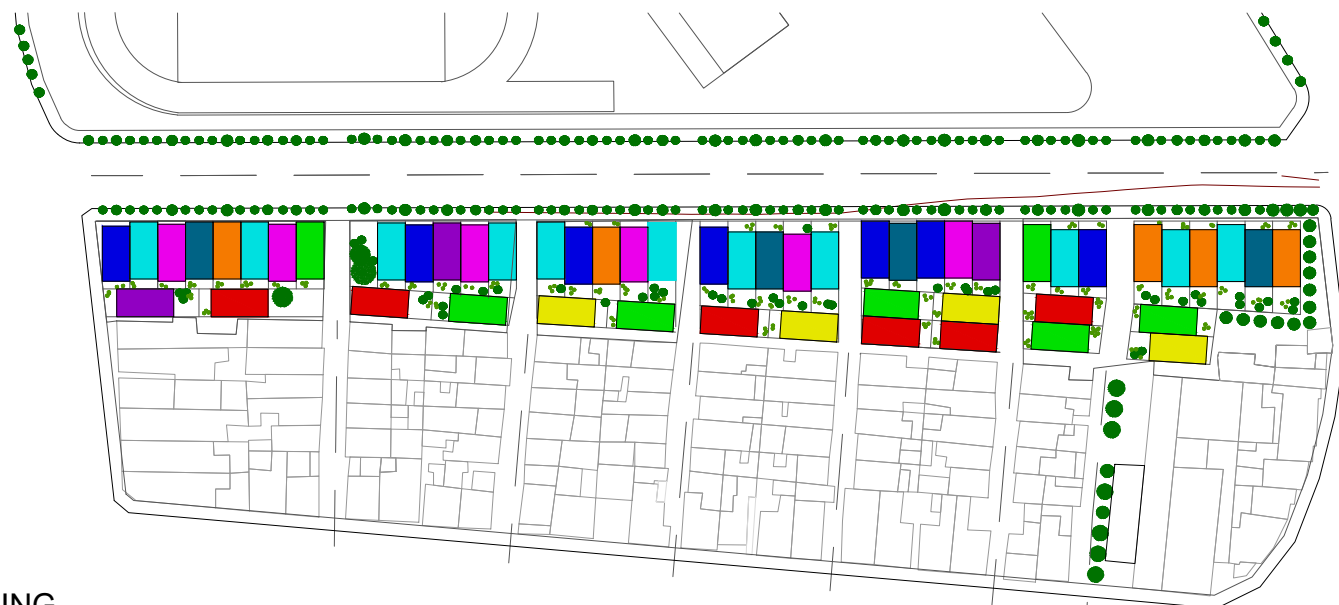
1:75



FRONTAL FACADE

BACKYARD FACADE

UNIT TYPOLOGY 09



ZONING

Quotes

*mix use building*  
*public garden + store on the ground floor + single family house for 08 people + private terrace*

Legend

- typology 01*
- typology 02*
- typology 03*
- typology 04*
- typology 05*
- typology 06*
- typology 07*
- typology 08*
- typology 09*

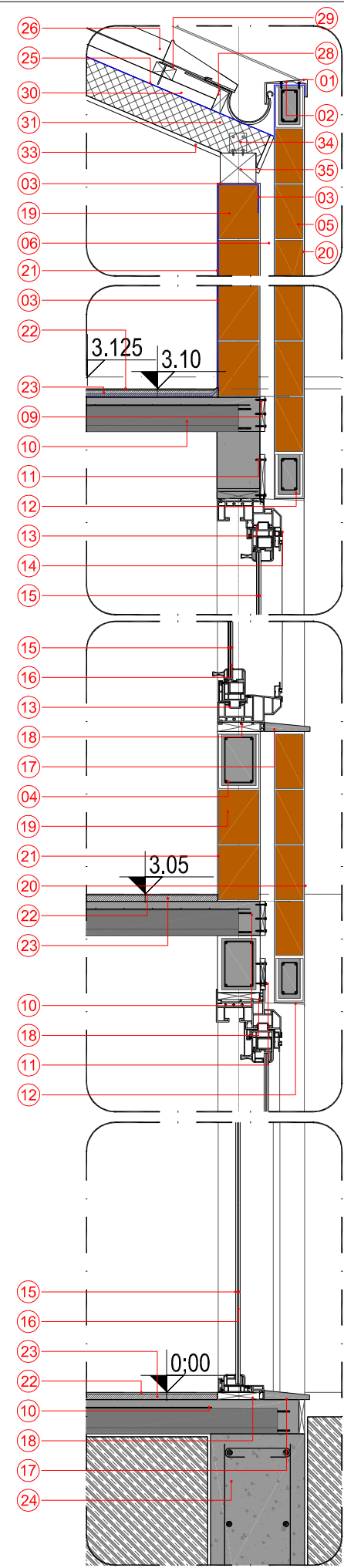
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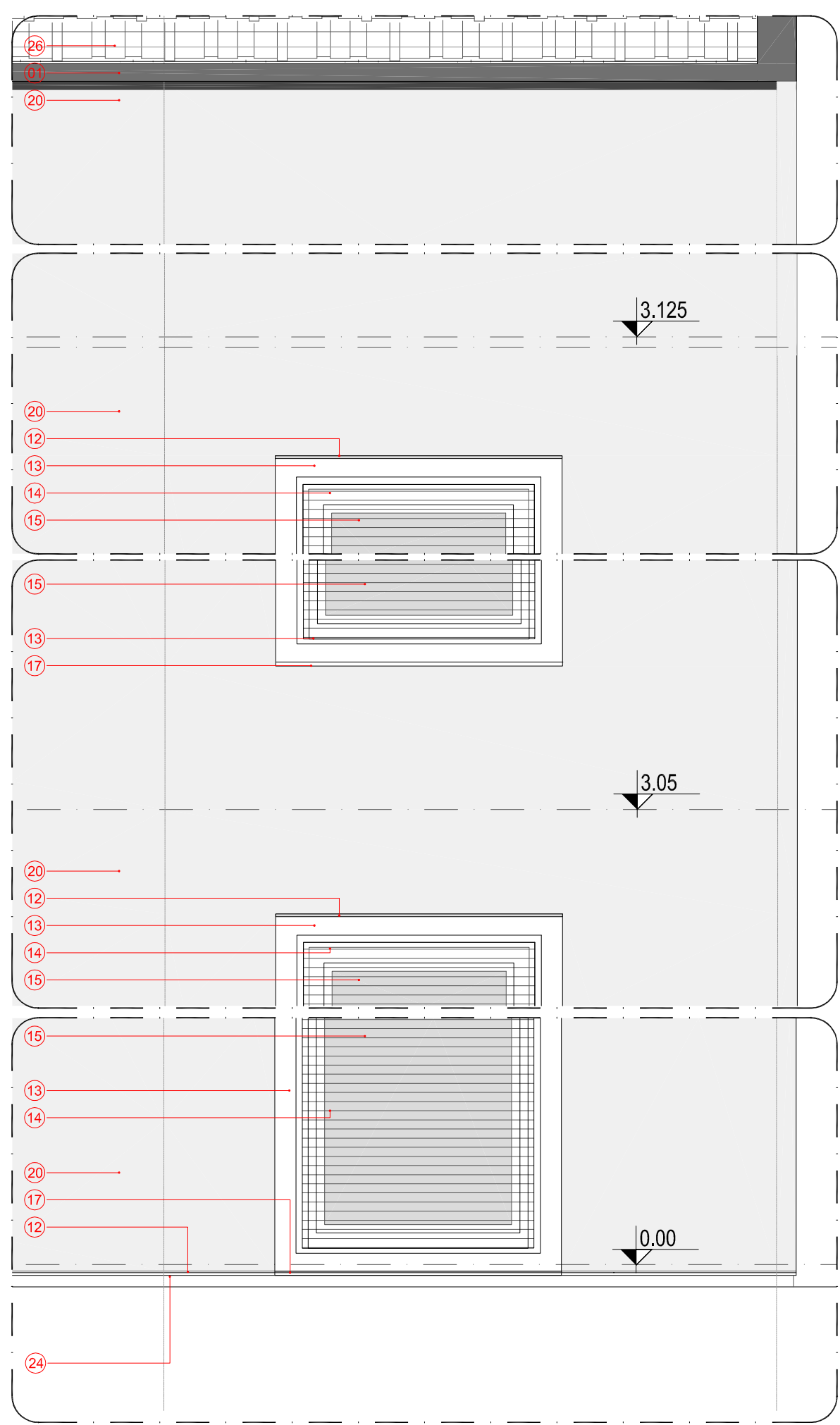
III-34

**Architectural Project**  
 Plan, Sections and Facades.

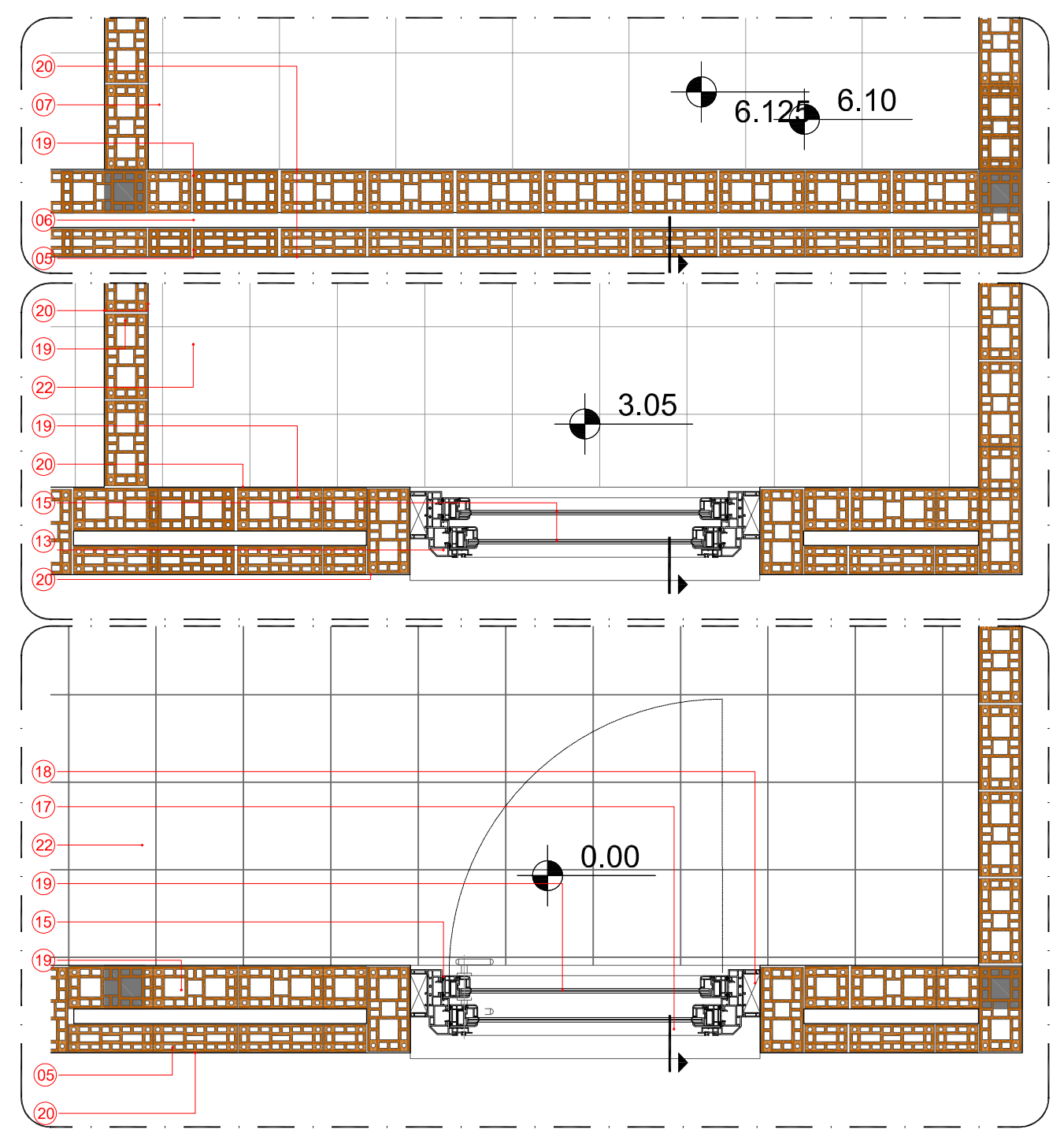
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SECTION



FACADE

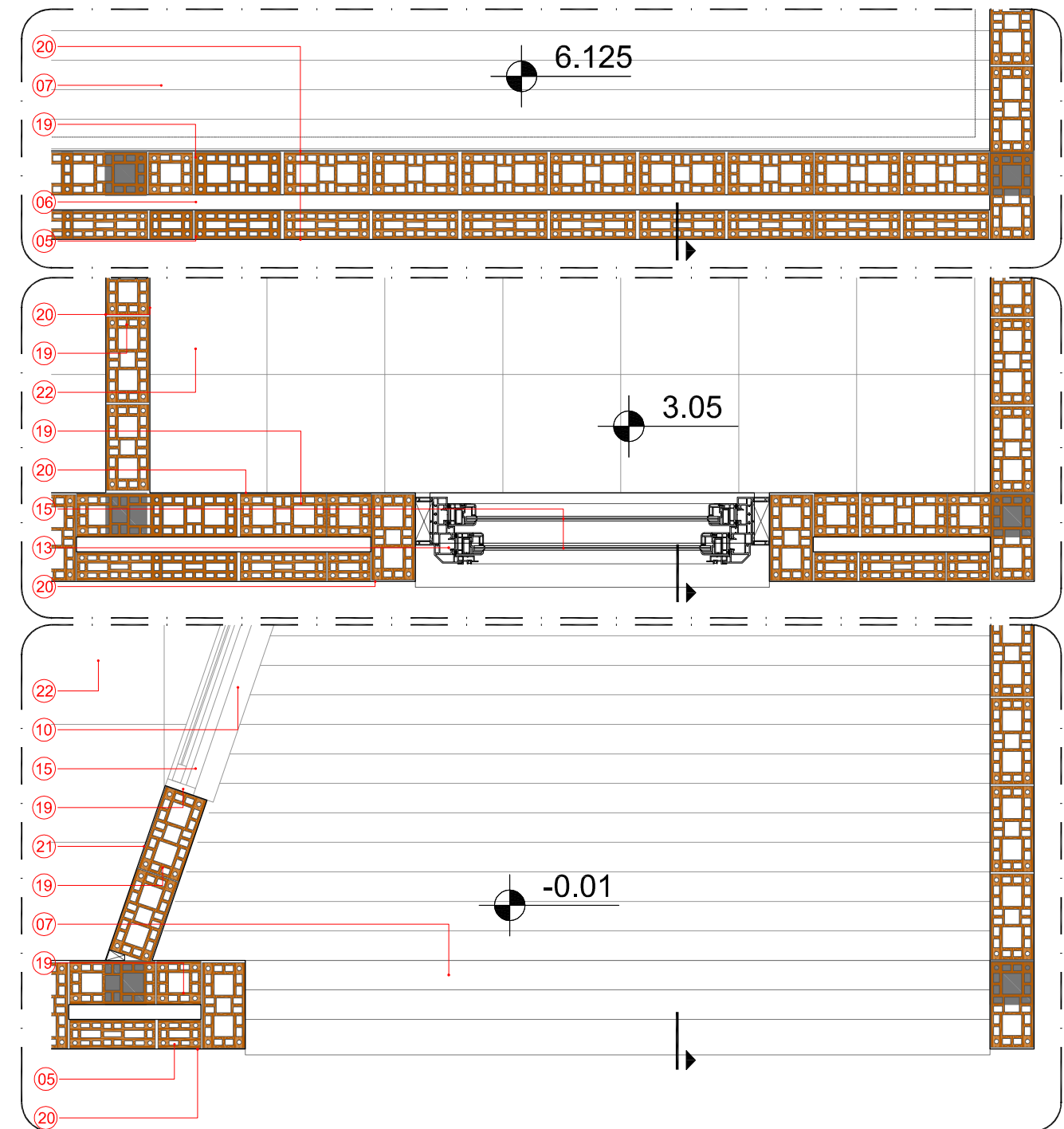
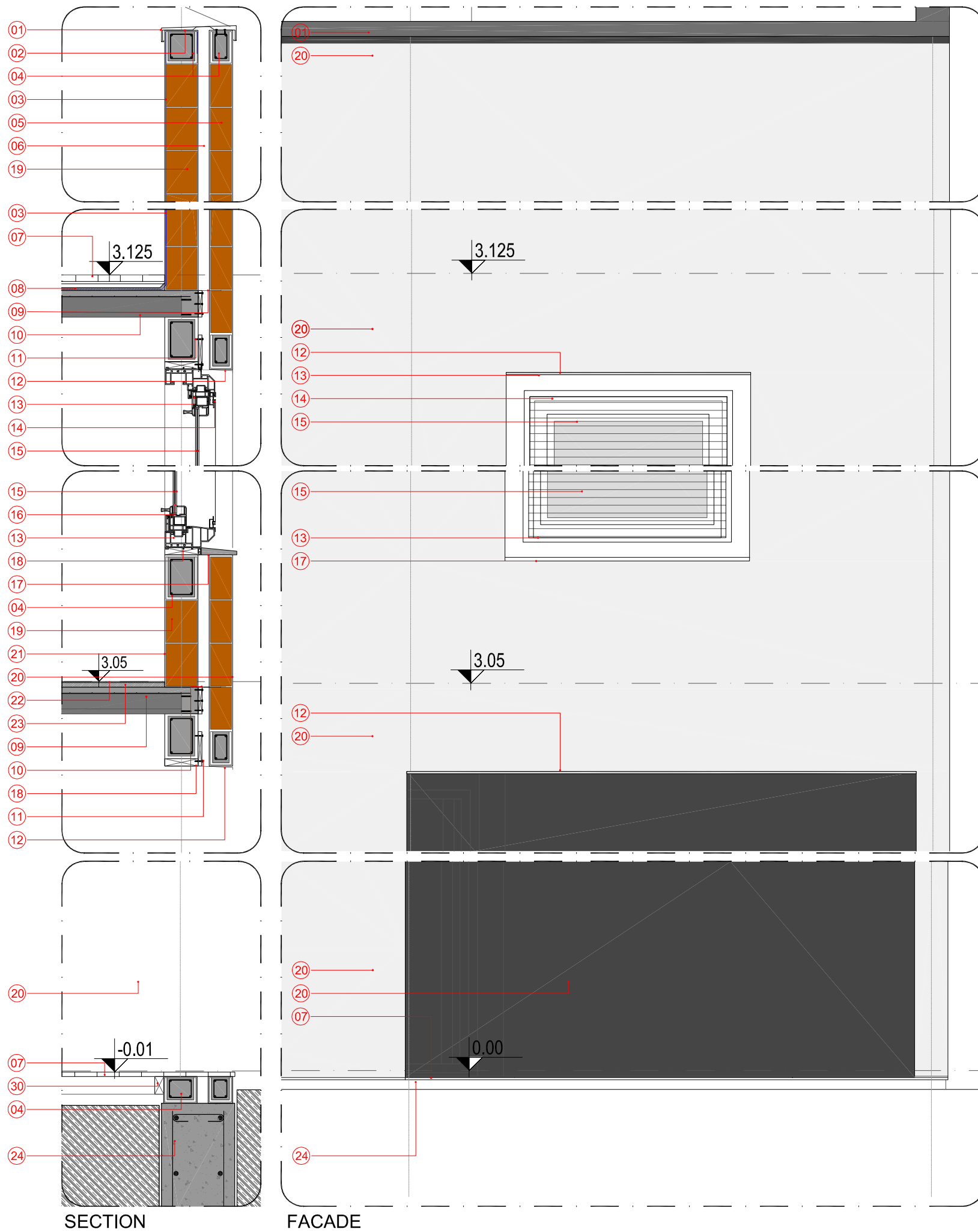


PLANS

Legend

- |  |  |
|--|--|
| 01 METAL COVERING SHEET + WHITE EPOXY PAINTING   | 20 15mm EXTERNAL PLASTER                               |
| 02 SCLP/ECLP- NBK CLIP ZINC-CASTING  | 21 15mm INTERNAL PLASTER                               |
| 03 WATER PROOFING  | 22 CERAMIC FINISHING TILES                             |
| 04 U - SHAPED CERAMIC BRICK PLUS CAST IN SITE CONCRETE REINFORCEMENT BELT ( 90/150mm)      | 23 LEVELING MORTAR + CEMENT GLUE ( 25 mm)              |
| 05 STRUCTURAL CERAMIC BRICK ( 90mm)  | 24 CAST IN SITE REINFORCED CONCRETE FOUNDATION         |
| 06 AIR GAP ( 50mm)   | 25 LP BRAZIL BREATHABLE POLYPROPYLENE MEMBRANE         |
| 07 FLOATING WOODEN DECK BOARD ( 30mm)  | 26 CERAMIC ROOF TILE ( PORTUGUESE STYLE)               |
| 08 MORTAR SREED ( 20mm)  | 27 AQUAPLUV TIGRE U- SHAPED PVC GUTTER ( 125mm)        |
| 09 SUPPORTING STEEL HANGER STAPLE (Ø1,5mm)   | 28 WOODEN STRUCTURAL SUPPORTING LATH ( 55x35mm)        |
| 10 REINFORCED CONCRETE COVERING + PREFABRICATED GRINDER SLAB/CERAMIC INTERJOIST ( 40+80mm) | 29 FIXING SCREW ANCHOR ( 75mm)                         |
| 11 1/4" DRIL-FLEX  | 30 WOODEN STRUCTURAL COUNTER LATH ( 75x65mm)           |
| 12 ALUMINUM FLASHING 1mm   | 31 120mm CELLULOSE INSULATION BATT PANEL               |
| 13 LUMINA WINDOWS PVC FRAME (GUILLOTINE MODEL / OPEN DOOR MODEL)                           | 32 WOODEN STRUCTURAL RAFTER ( 125x100mm)               |
| 14 MOVABLE EXTERNAL SHADING SYSTEM   | 33 15mm FINISHING PLYWOOD BOARD                        |
| 15 4mm GLASS PANELS (DOUBLE GLAZING SYSTEM)  | 34 1.5mm L-SHAPED STEEL PROFILE JOIN                   |
| 16 12mm CHAMBER FILLED WITH ARGON GAS  | 35 WOODEN STRUCTURAL WALL PLATE ( 125x125mm)           |
| 17 25mm CAST IN SITE CONCRETE PARAPET  | 36 PRE CAST REINFORCED CONCRETE STAIRCASE ( 80mm)      |
| 18 WOODEN FRAME ( 150x25mm)  | 37 1.5mm L-SHAPED STEEL SHEET                          |
| 19 STRUCTURAL CERAMIC BRICK ( 150mm)   | 38 CERAMIC RIDGE TILE ( PORTUGUESE STYLE)              |
|  | 39 BENT METAL TUBE FIXED BY SCREWS HANDRAIL ( 25x50mm) |



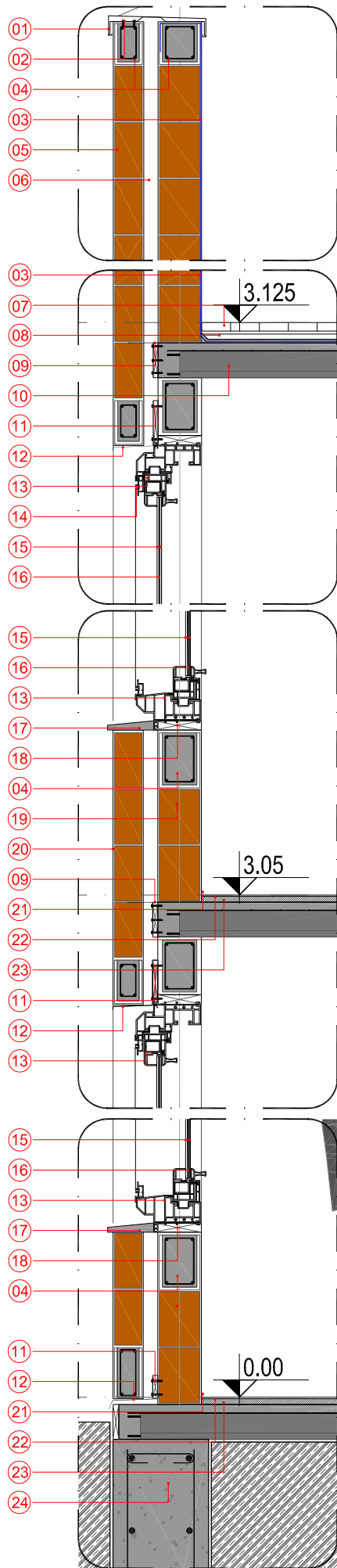


**PLANS**

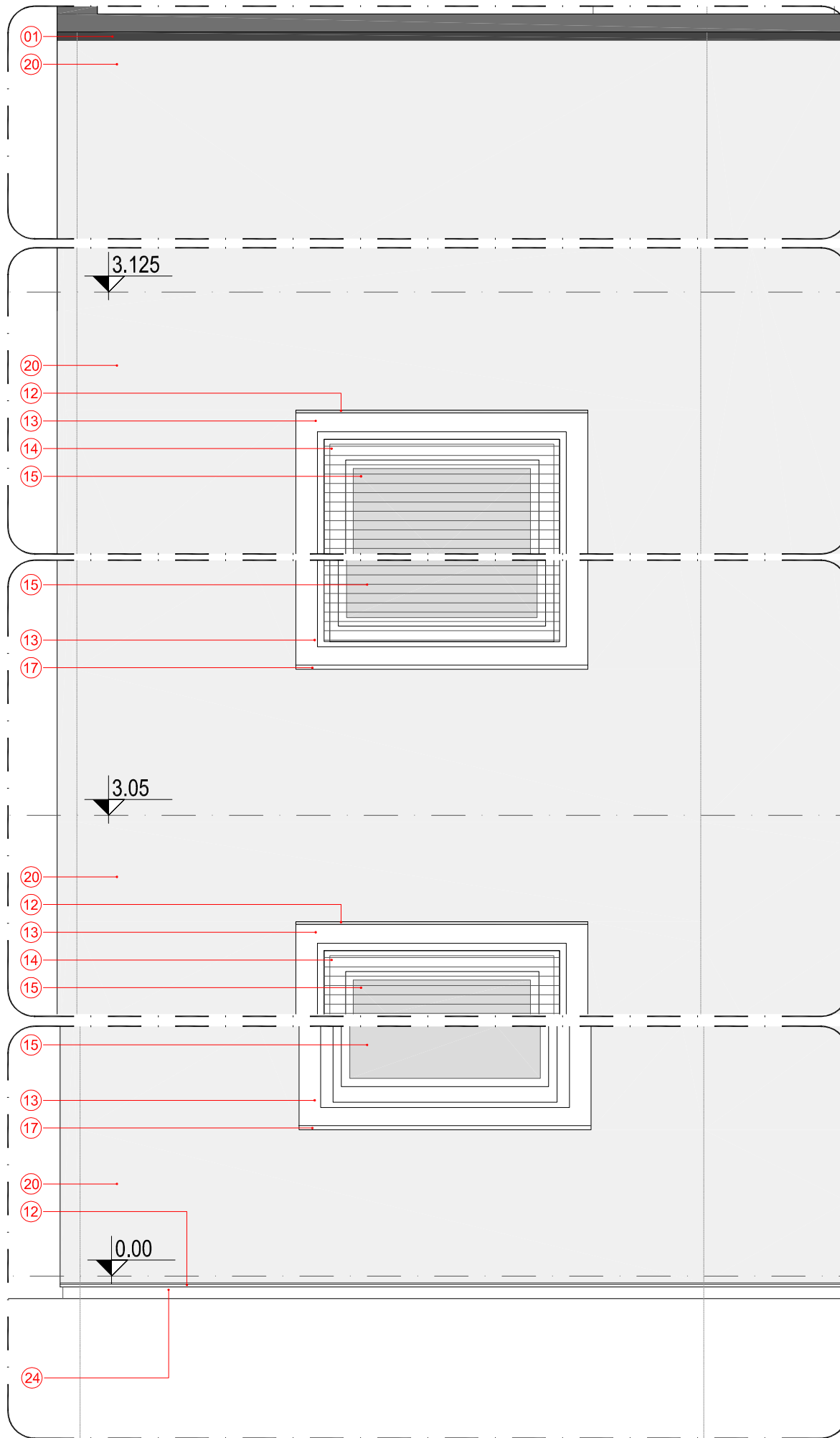
**Legend**

01 METAL COVERING SHEET + WHITE EPOXY PAINTING	20 15mm EXTERNAL PLASTER
02 SCLP/ECLP- NBK CLIP ZINC-CASTING	21 15mm INTERNAL PLASTER
03 WATER PROOFING	22 CERAMIC FINISHING TILES
04 U - SHAPED CERAMIC BRICK PLUS CAST IN SITE CONCRETE REINFORCEMENT BELT ( 90/150mm)	23 LEVELING MORTAR + CEMENT GLUE ( 25 mm)
05 STRUCTURAL CERAMIC BRICK ( 90mm)	24 CAST IN SITE REINFORCED CONCRETE FOUNDATION
06 AIR GAP ( 50mm)	25 LP BRAZIL BREATHABLE POLYPROPYLENE MEMBRANE
07 FLOATING WOODEN DECK BOARD ( 30mm)	26 CERAMIC ROOF TILE ( PORTUGUESE STYLE)
08 MORTAR SREED ( 20mm)	27 AQUAPLUV TIGRE U- SHAPED PVC GUTTER ( 125mm)
09 SUPPORTING STEEL HANGER STAPLE (Ø1,5mm)	28 WOODEN STRUCTURAL SUPPORTING LATH ( 55x35mm)
10 REINFORCED CONCRETE COVERING + PREFABRICATED GRINDER SLAB/CERAMIC INTERJOIST ( 40+80mm)	29 FIXING SCREW ANCHOR ( 75mm)
11 1/4" DRIL-FLEX	30 WOODEN STRUCTURAL COUNTER LATH ( 75x65mm)
12 ALUMINUM FLASHING 1mm	31 120mm CELLULOSE INSULATION BATT PANEL
13 LUMINA WINDOWS PVC FRAME (GUILLOTINE MODEL / OPEN DOOR MODEL)	32 WOODEN STRUCTURAL RAFTER ( 125x100mm)
14 MOVABLE EXTERNAL SHADING SYSTEM	33 15mm FINISHING PLYWOOD BOARD
15 4mm GLASS PANELS (DOUBLE GLAZING SYSTEM)	34 1.5mm L-SHAPED STEEL PROFILE JOIN
16 12mm CHAMBER FILLED WITH ARGON GAS	35 WOODEN STRUCTURAL WALL PLATE ( 125x125mm)
17 25mm CAST IN SITE CONCRETE PARAPET	36 PRE CAST REINFORCED CONCRETE STAIRCASE ( 80mm)
18 WOODEN FRAME(150x25mm)	37 1.5mm L-SHAPED STEEL SHEET
19 STRUCTURAL CERAMIC BRICK ( 150mm)	38 CERAMIC RIDGE TILE ( PORTUGUESE STYLE)
	39 BENT METAL TUBE FIXED BY SCREWS HANDRAIL ( 25x50mm)

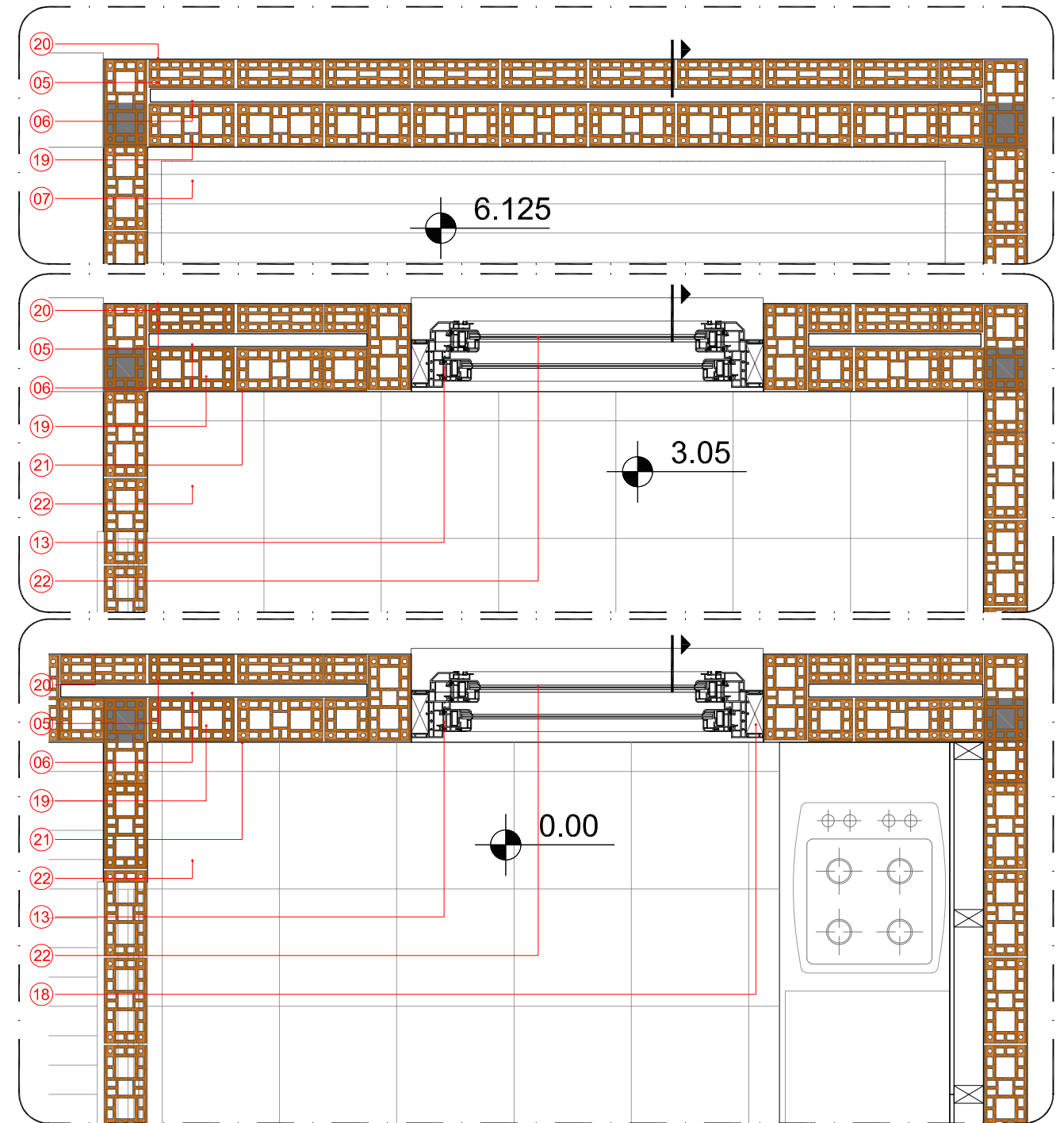




SECTION



FACADE

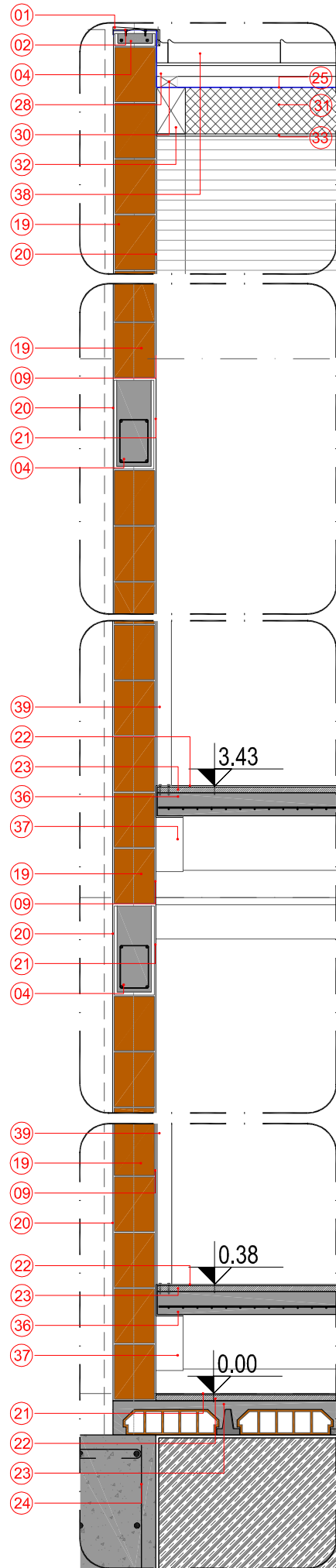


PLANS

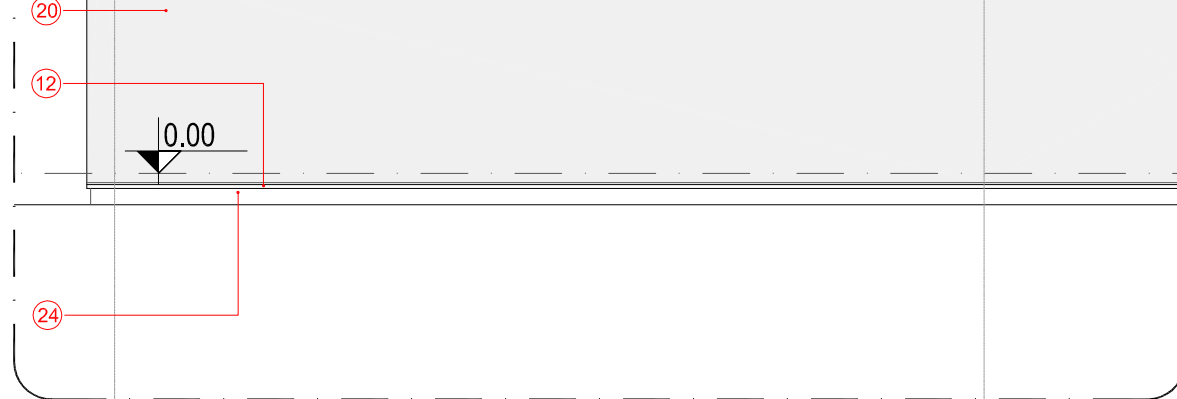
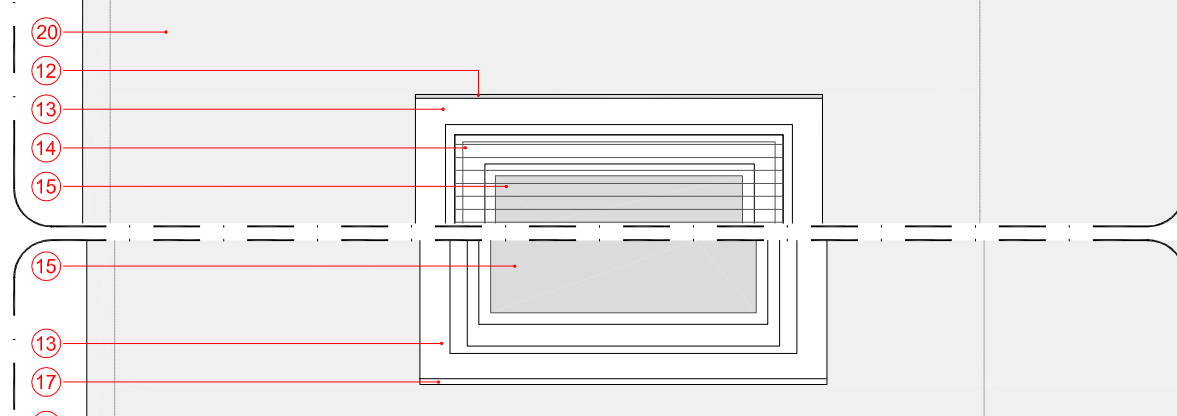
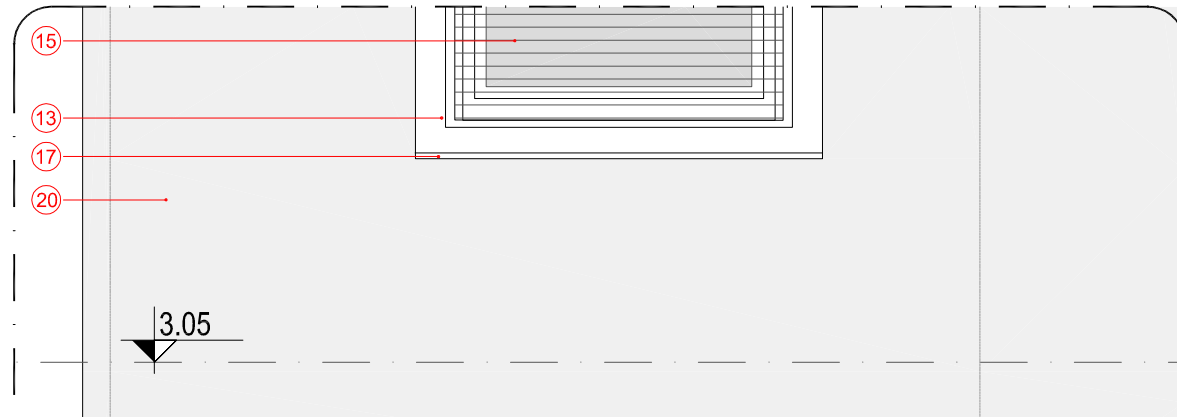
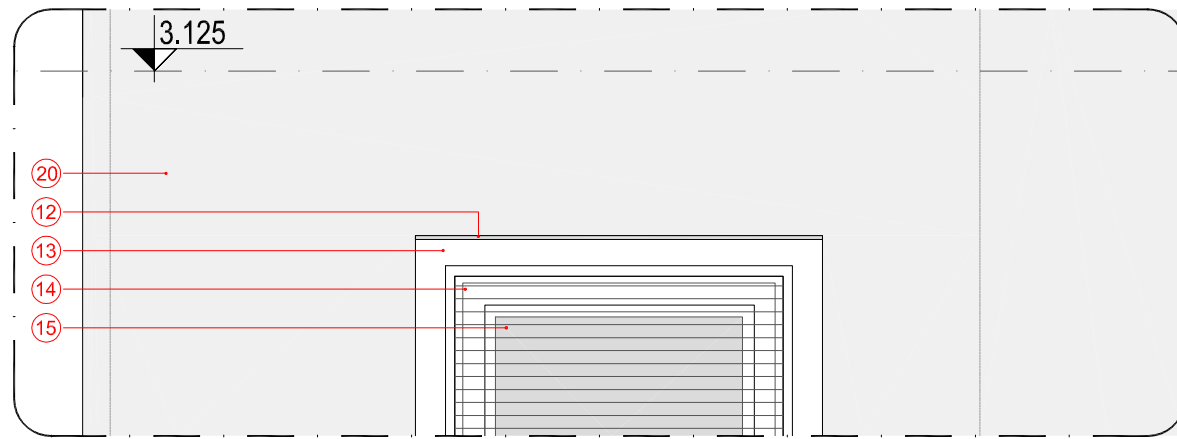
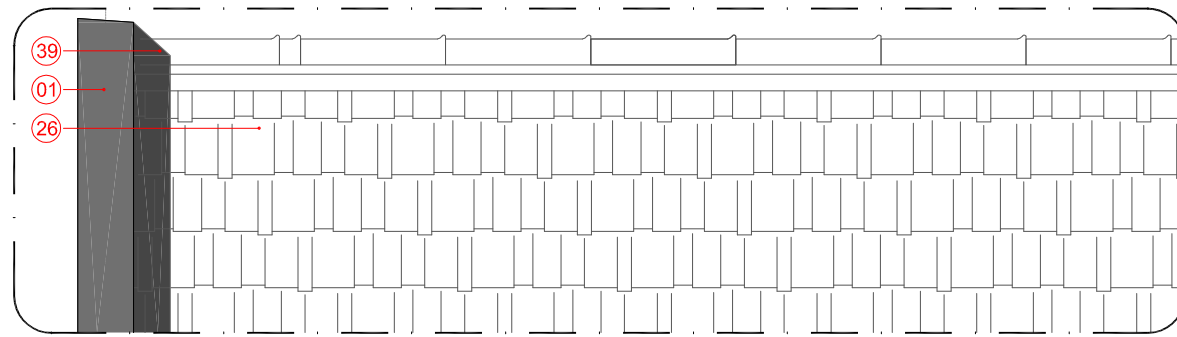
Legend

- |  |  |
|--|--|
| 01 METAL COVERING SHEET + WHITE EPOXY PAINTING   | 20 15mm EXTERNAL PLASTER                               |
| 02 SCLP/ECLP- NBK CLIP ZINC-CASTING  | 21 15mm INTERNAL PLASTER                               |
| 03 WATER PROOFING  | 22 CERAMIC FINISHING TILES                             |
| 04 U - SHAPED CERAMIC BRICK PLUS CAST IN SITE CONCRETE REINFORCEMENT BELT ( 90/150mm)      | 23 LEVELING MORTAR + CEMENT GLUE ( 25 mm)              |
| 05 STRUCTURAL CERAMIC BRICK ( 90mm)  | 24 CAST IN SITE REINFORCED CONCRETE FOUNDATION         |
| 06 AIR GAP ( 50mm)   | 25 LP BRAZIL BREATHABLE POLYPROPYLENE MEMBRANE         |
| 07 FLOATING WOODEN DECK BOARD ( 30mm)  | 26 CERAMIC ROOF TILE ( PORTUGUESE STYLE)               |
| 08 MORTAR SREED ( 20mm)  | 27 AQUAPLUV TIGRE U- SHAPED PVC GUTTER ( 125mm)        |
| 09 SUPPORTING STEEL HANGER STAPLE (Ø1,5mm)   | 28 WOODEN STRUCTURAL SUPPORTING LATH ( 55x35mm)        |
| 10 REINFORCED CONCRETE COVERING + PREFABRICATED GRINDER SLAB/CERAMIC INTERJOIST ( 40+80mm) | 29 FIXING SCREW ANCHOR ( 75mm)                         |
| 11 1/4" DRIL-FLEX  | 30 WOODEN STRUCTURAL COUNTER LATH ( 75x65mm)           |
| 12 ALUMINUM FLASHING 1mm   | 31 120mm CELLULOSE INSULATION BATT PANEL               |
| 13 LUMINA WINDOWS PVC FRAME ( GUILLOTINE MODEL / OPEN DOOR MODEL)                          | 32 WOODEN STRUCTURAL RAFTER ( 125x100mm)               |
| 14 MOVABLE EXTERNAL SHADING SYSTEM   | 33 15mm FINISHING PLYWOOD BOARD                        |
| 15 4mm GLASS PANELS ( DOUBLE GLAZING SYSTEM)   | 34 1.5mm L-SHAPED STEEL PROFILE JOIN                   |
| 16 12mm CHAMBER FILLED WITH ARGON GAS  | 35 WOODEN STRUCTURAL WALL PLATE ( 125x125mm)           |
| 17 25mm CAST IN SITE CONCRETE PARAPET  | 36 PRE CAST REINFORCED CONCRETE STAIRCASE ( 80mm)      |
| 18 WOODEN FRAME( 150x25mm)   | 37 1.5mm L-SHAPED STEEL SHEET                          |
| 19 STRUCTURAL CERAMIC BRICK ( 150mm)   | 38 CERAMIC RIDGE TILE ( PORTUGUESE STYLE)              |
|  | 39 BENT METAL TUBE FIXED BY SCREWS HANDRAIL ( 25x50mm) |

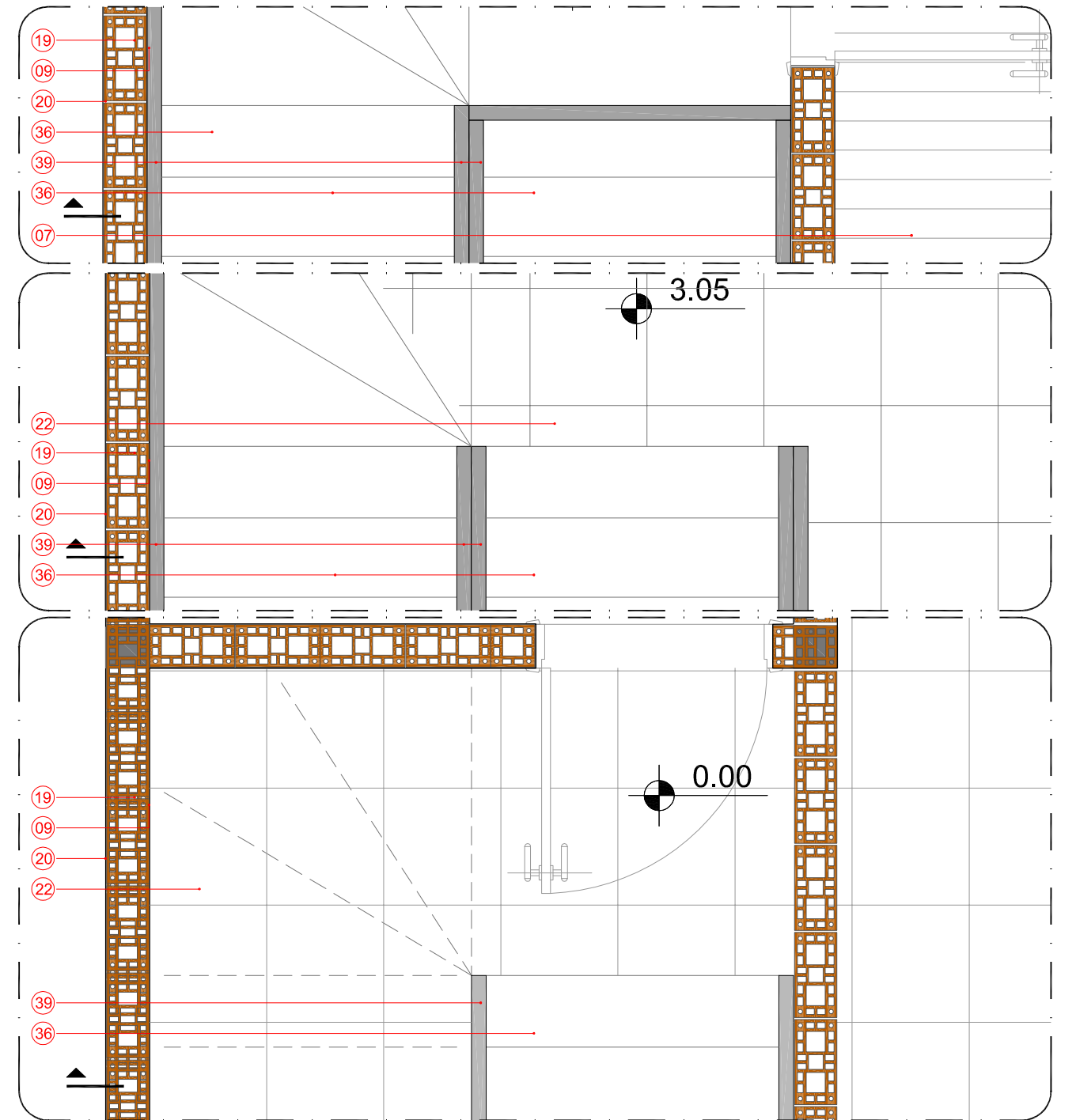




SECTION



FACADE



PLANS

Legend

- 01 METAL COVERING SHEET + WHITE EPOXY PAINTING
- 02 SCLP/ECLP- NBK CLIP ZINC-CASTING
- 03 WATER PROOFING
- 04 U - SHAPED CERAMIC BRICK PLUS CAST IN SITE CONCRETE REINFORCEMENT BELT ( 90/150mm)
- 05 STRUCTURAL CERAMIC BRICK ( 90mm)
- 06 AIR GAP ( 50mm)
- 07 FLOATING WOODEN DECK BOARD ( 30mm)
- 08 MORTAR SREED ( 20mm)
- 09 SUPPORTING STEEL HANGER STAPLE (Ø1,5mm)
- 10 REINFORCED CONCRETE COVERING + PREFABRICATED GRINDER SLAB/CERAMIC INTERJOIST ( 40+80mm)
- 11 1/4" DRIL-FLEX
- 12 ALUMINUM FLASHING 1mm
- 13 LUMINA WINDOWS PVC FRAME (GUILLOTINE MODEL / OPEN DOOR MODEL)
- 14 MOVABLE EXTERNAL SHADING SYSTEM
- 15 4mm GLASS PANELS (DOUBLE GLAZING SYSTEM)
- 16 12mm CHAMBER FILLED WITH ARGON GAS
- 17 25mm CAST IN SITE CONCRETE PARAPET
- 18 WOODEN FRAME(150x25mm)
- 19 STRUCTURAL CERAMIC BRICK ( 150mm)
- 20 15mm EXTERNAL PLASTER
- 21 15mm INTERNAL PLASTER
- 22 CERAMIC FINISHING TILES
- 23 LEVELING MORTAR + CEMENT GLUE ( 25 mm)
- 24 CAST IN SITE REINFORCED CONCRETE FOUNDATION
- 25 LP BRAZIL BREATHABLE POLYPROPYLENE MEMBRANE
- 26 CERAMIC ROOF TILE ( PORTUGUESE STYLE)
- 27 AQUAPLUV TIGRE U- SHAPED PVC GUTTER (125mm)
- 28 WOODEN STRUCTURAL SUPPORTING LATH ( 55x35mm)
- 29 FIXING SCREW ANCHOR ( 75mm)
- 30 WOODEN STRUCTURAL COUNTER LATH ( 75x65mm)
- 31 120mm CELLULOSE INSULATION BATT PANEL
- 32 WOODEN STRUCTURAL RAFTER ( 125x100mm)
- 33 15mm FINISHING PLYWOOD BOARD
- 34 1.5mm L-SHAPED STEEL PROFILE JOIN
- 35 WOODEN STRUCTURAL WALL PLATE ( 125x125mm)
- 36 PRE CAST REINFORCED CONCRETE STAIRCASE ( 80mm)
- 37 1.5mm L-SHAPED STEEL SHEET
- 38 CERAMIC RIDGE TILE ( PORTUGUESE STYLE)
- 39 BENT METAL TUBE FIXED BY SCREWS HANDRAIL ( 25x50mm)







# SUMMER STRATEGY



Average precipitation during summer season  
57% RH=80%



It is sunny 51.3% of daylight hours.

Summer noon Angle 60\*

Solar water heating systems on the roof can remain the underground water tanks

Using of energy-efficient lighting system

Special hight trees to direct the air flow into the building

Permeable pavement for rain water collection along all the square area

There is a special air pipe in the middle of the building - help to air ventilation

Rainwater collection tank - using of water for watering the flowers

Optional application of Photovoltaic solar panels help to reduce electricity consumption

Light color material on the roof reflect solar heat

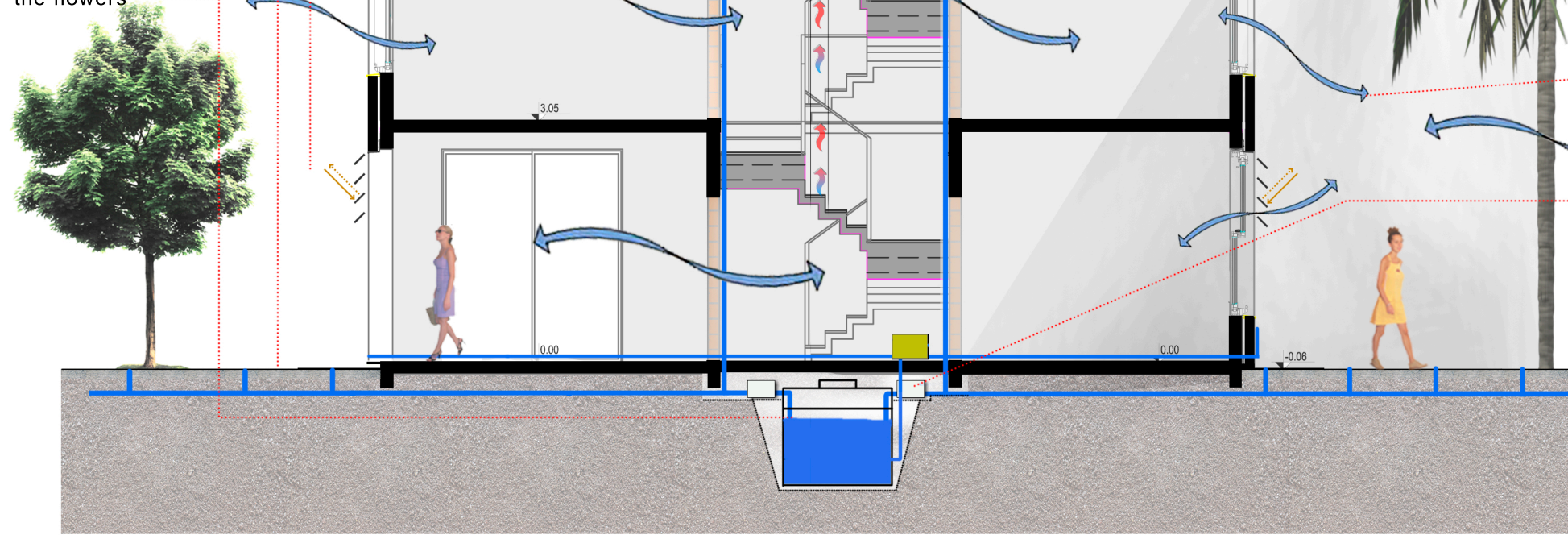
White fabric material as a canopy to protect to horizontal surfaces from solar rays

Shading system against direct solar rays

Foliage trees provide additional shadow in the envelope against direct solar rays

Natural ventilation

Water filtering system and a pump to water supply



# WINTER STRATEGY



Average precipitation during winter season 32% RH=90%

It is sunny 67% of daylight hours.

Winter noon Angle 34\*

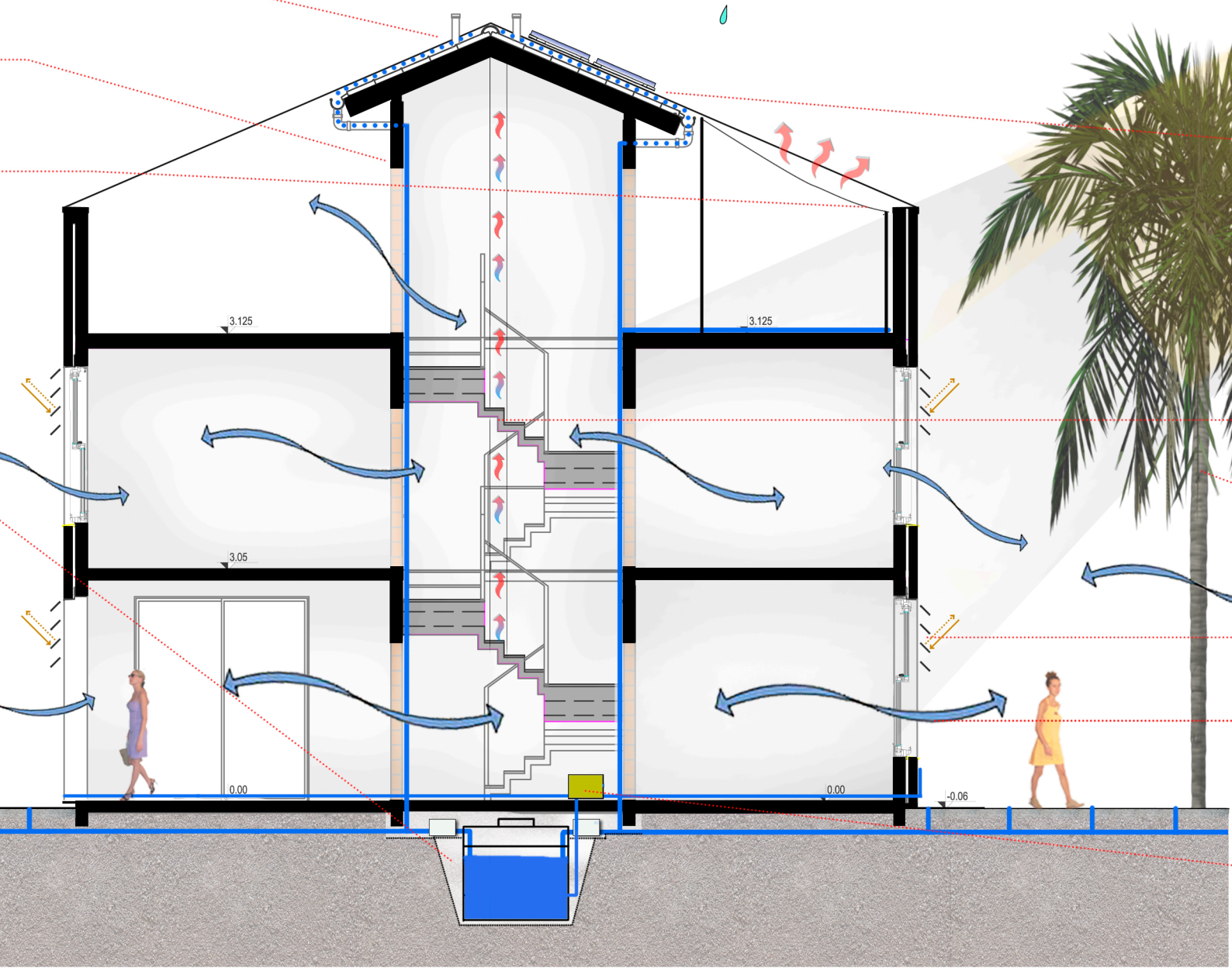
Optional application of Photovoltaic solar panels help to reduce electricity consumption

Using of energy-efficient lighting system

White fabric material as a canopy to protect to horizontal surfaces from solar rays

Permeable pavement for rain water collection along all the square area

Rainwater collection tank - using of water for watering the flowers



Light color material on the roof reflect solar heat

There is a special air pipe in the middle of the building - help to air ventilation

Foliage trees provide additional shadow in the envelope against direct solar rays

Shading system against direct solar rays -angle is also suitable for winter

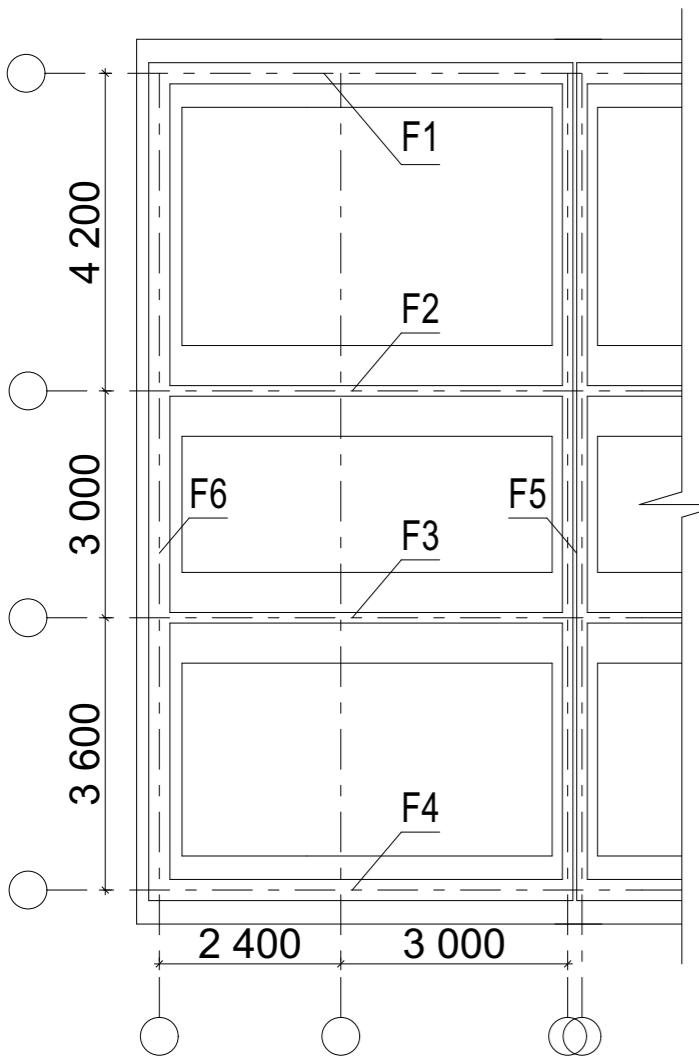
Natural ventilation

Water filtering system and a pump to water supply

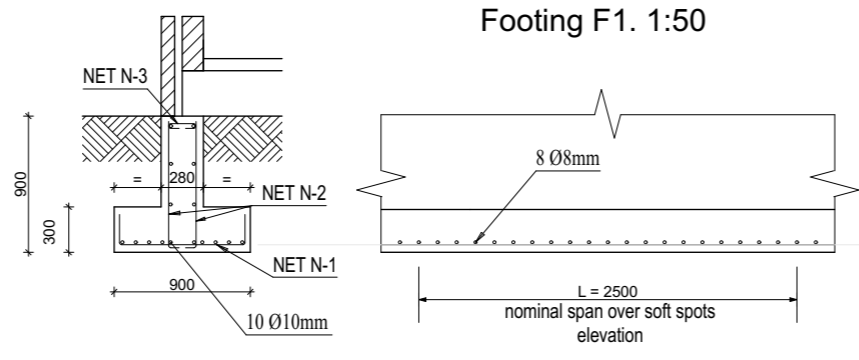


DESIGNATION	NAME	AMOUNT	MASS (KG)	TOTAL MASS
<b>STRIP FOUNDATION F-1</b>				
N-1	NET N-1 for 1 m run	1	10.12	
1	EN 10080 Ø8 B400A L=1250MM	8	0.494	3.95
2	EN 10080 Ø10 B400A L=1000MM	10	0.617	6.17
N-2	NET N-2 for 1 m run	2	3.826	7.652
3	EN 10080 Ø10 B400A L=1000MM	3	0.617	1.851
4	EN 10080 Ø8 B400A L=1000MM	5	0.395	1.975
N-3	NET N-3 for 1 m run	1	0.79	
5	EN 10080 Ø8 B400A L=400MM	5	0.158	0.79
MATERIAL			CONCRETE M35	0.44M <sup>3</sup>
<b>STRIP FOUNDATION F-2</b>				
N-1	NET N-1 for 1 m run	1	13.545	
1	EN 10080 Ø10 B400A L=1500MM	6	0.926	5.553
2	EN 10080 Ø12 B400A L=1000MM	9	0.888	7.992
N-2	NET N-2 for 1 m run	1	5.749	
3	EN 10080 Ø12 B400A L=1000MM	3	0.888	2.664
4	EN 10080 Ø10 B400A L=1000MM	5	0.617	3.085
MATERIAL			CONCRETE M35	0.5 M <sup>3</sup>
<b>STRIP FOUNDATION F-3</b>				
N-1	NET N-1 for 1 m run	1	13.917	
1	EN 10080 Ø8 B400A L=1500MM	10	0.593	5.925
2	EN 10080 Ø12 B400A L=1000MM	9	0.888	7.992
N-2	NET N-2 for 1 m run	1	4.639	
3	EN 10080 Ø12 B400A L=1000MM	3	0.888	2.664
4	EN 10080 Ø8 B400A L=1000MM	5	0.395	1.975
MATERIAL			CONCRETE M35	0.5 M <sup>3</sup>
<b>STRIP FOUNDATION F-4</b>				
N-1	NET N-1 for 1 m run	1	10.12	
1	EN 10080 Ø8 B400A L=1250MM	8	0.494	3.95
2	EN 10080 Ø10 B400A L=1000MM	10	0.617	6.17
N-2	NET N-2 for 1 m run	2	3.826	7.652
3	EN 10080 Ø10 B400A L=1000MM	3	0.617	1.851
4	EN 10080 Ø8 B400A L=1000MM	5	0.395	1.975
N-3	NET N-3 for 1 m run	1	0.79	
5	EN 10080 Ø8 B400A L=400MM	5	0.158	0.79
MATERIAL			CONCRETE M35	0.44M <sup>3</sup>
<b>STRIP FOUNDATION F-5</b>				
N-1	NET N-1 for 1 m run	1	5.214	
1	EN 10080 Ø8 B400A L=900MM	8	0.356	2.844
2	EN 10080 Ø8 B400A L=1000MM	6	0.395	2.37
N-2	NET N-2 for 1 m run	2	3.16	6.32
3	EN 10080 Ø8 B400A L=1000MM	3	0.395	1.185
4	EN 10080 Ø8 B400A L=1000MM	5	0.395	1.975
N-3	NET N-3 for 1 m run	1	0.79	
5	EN 10080 Ø8 B400A L=400MM	5	0.158	0.79
MATERIAL			CONCRETE M35	0.38M <sup>3</sup>
<b>STRIP FOUNDATION F-6</b>				
N-1	NET N-1 for 1 m run	1	5.214	
1	EN 10080 Ø8 B400A L=900MM	8	0.356	2.844
2	EN 10080 Ø8 B400A L=1000MM	6	0.395	2.37
N-2	NET N-2 for 1 m run	2	3.16	6.32
3	EN 10080 Ø8 B400A L=1000MM	3	0.395	1.185
4	EN 10080 Ø8 B400A L=1000MM	5	0.395	1.975
N-3	NET N-3 for 1 m run	1	0.79	
5	EN 10080 Ø8 B400A L=400MM	5	0.158	0.79
MATERIAL			CONCRETE M35	0.35M <sup>3</sup>

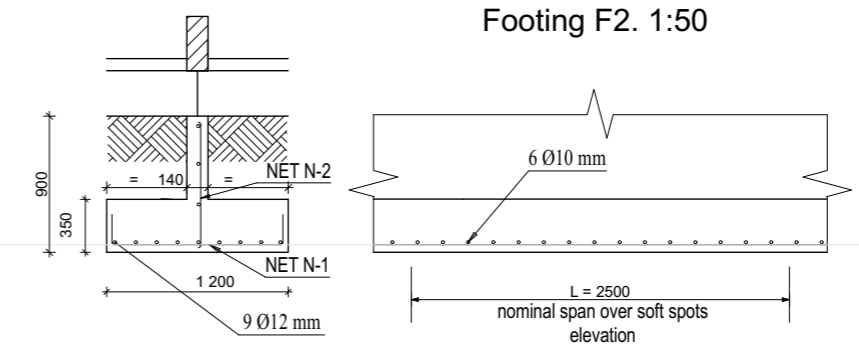
Plan of Footings. 1:100



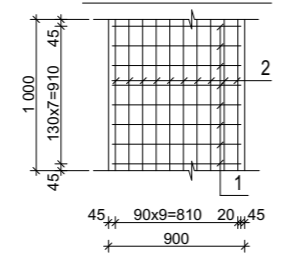
Footing F1. 1:50



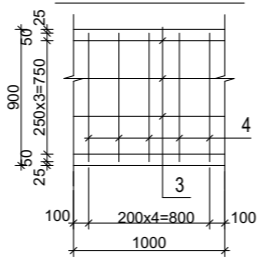
Footing F2. 1:50



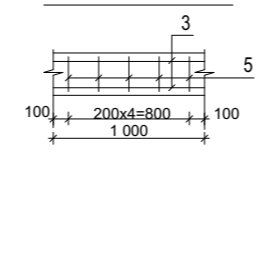
NET N-1 for 1m run



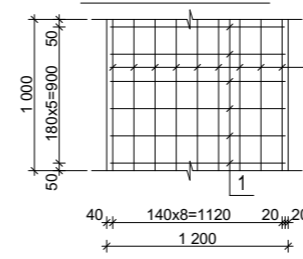
NET N-2 for 1m run



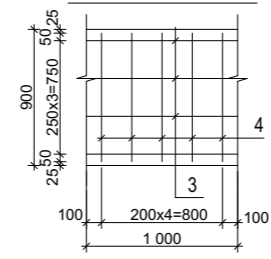
NET N-3 for 1m run



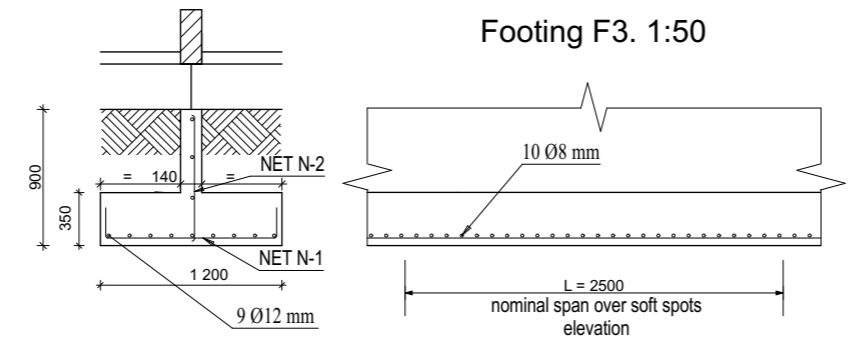
NET N-1 for 1m run



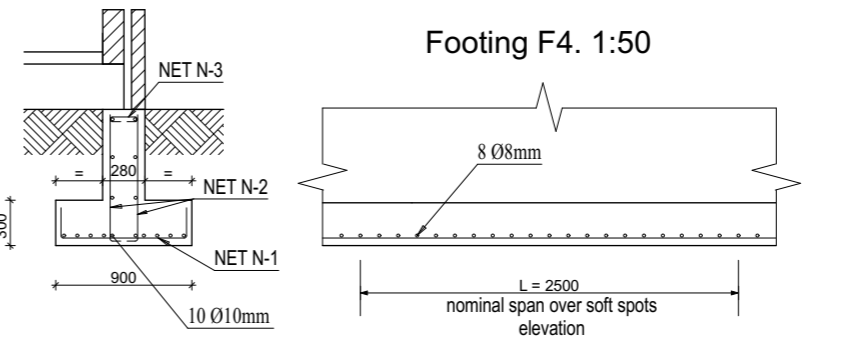
NET N-2 for 1m run



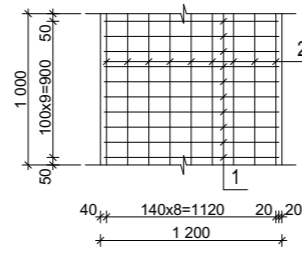
Footing F3. 1:50



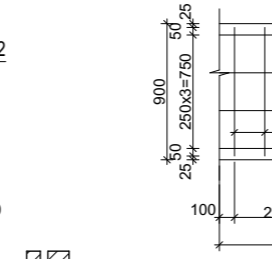
Footing F4. 1:50



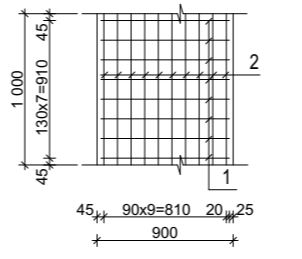
NET N-1 for 1m run



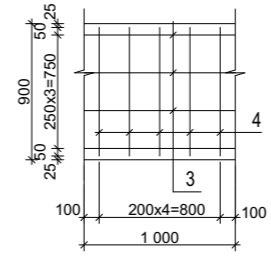
NET N-2 for 1m run



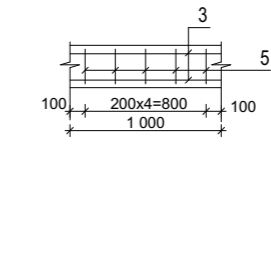
NET N-1 for 1m run



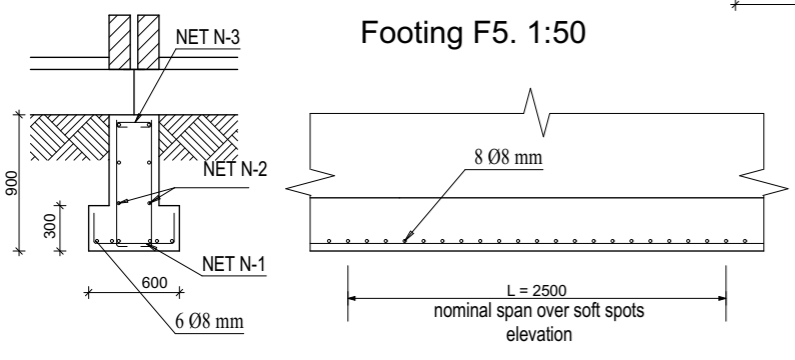
NET N-2 for 1m run



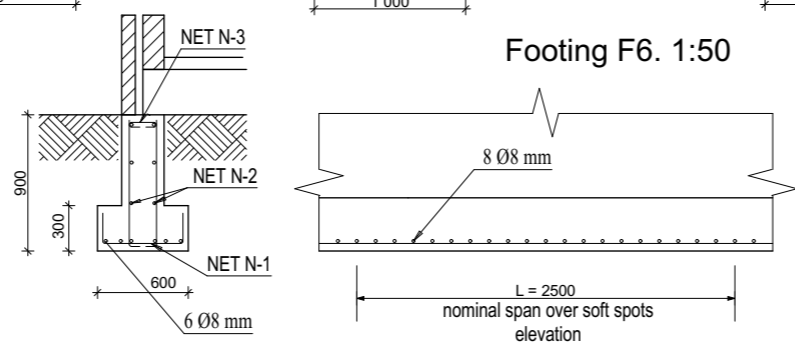
NET N-3 for 1m run



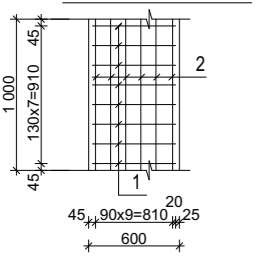
Footing F5. 1:50



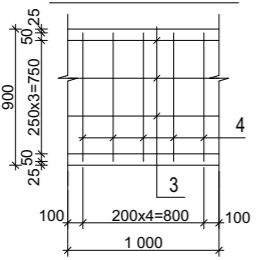
Footing F6. 1:50



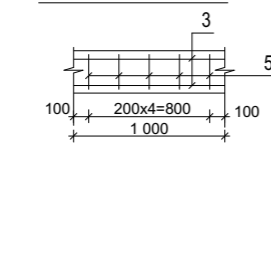
NET N-1 for 1m run



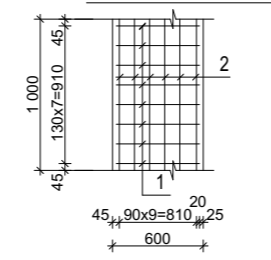
NET N-2 for 1m run



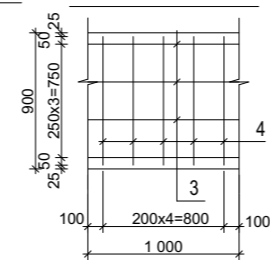
NET N-3 for 1m run



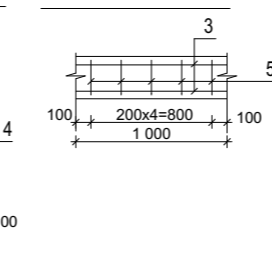
NET N-1 for 1m run



NET N-2 for 1m run



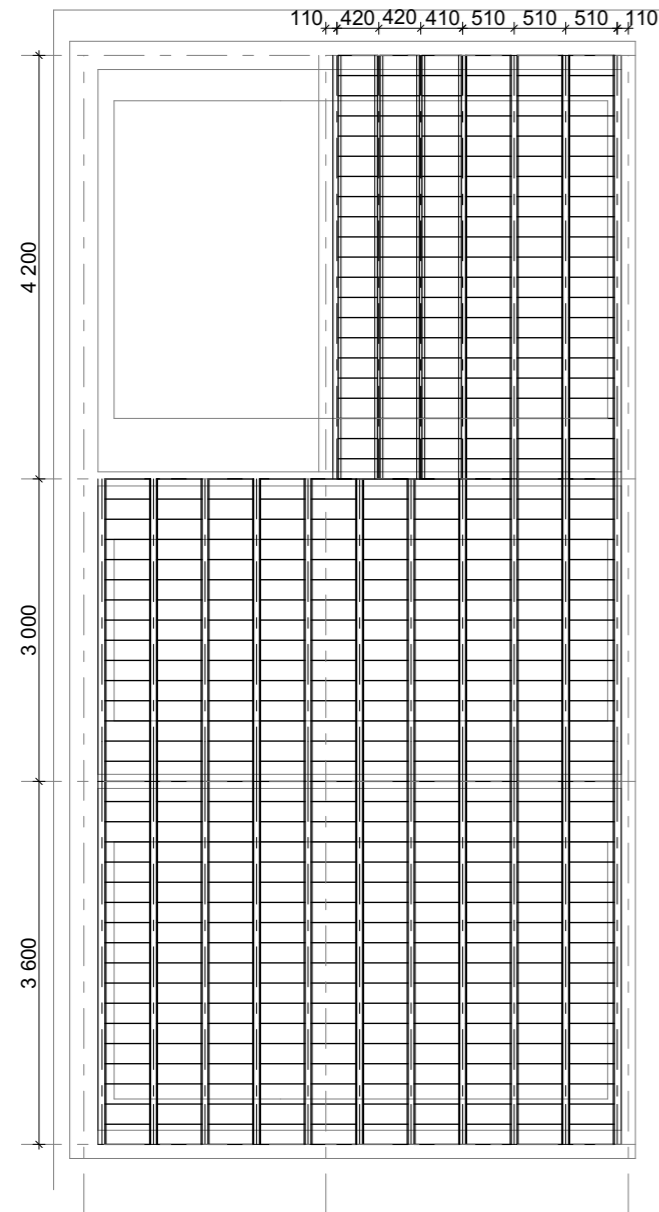
NET N-3 for 1m run



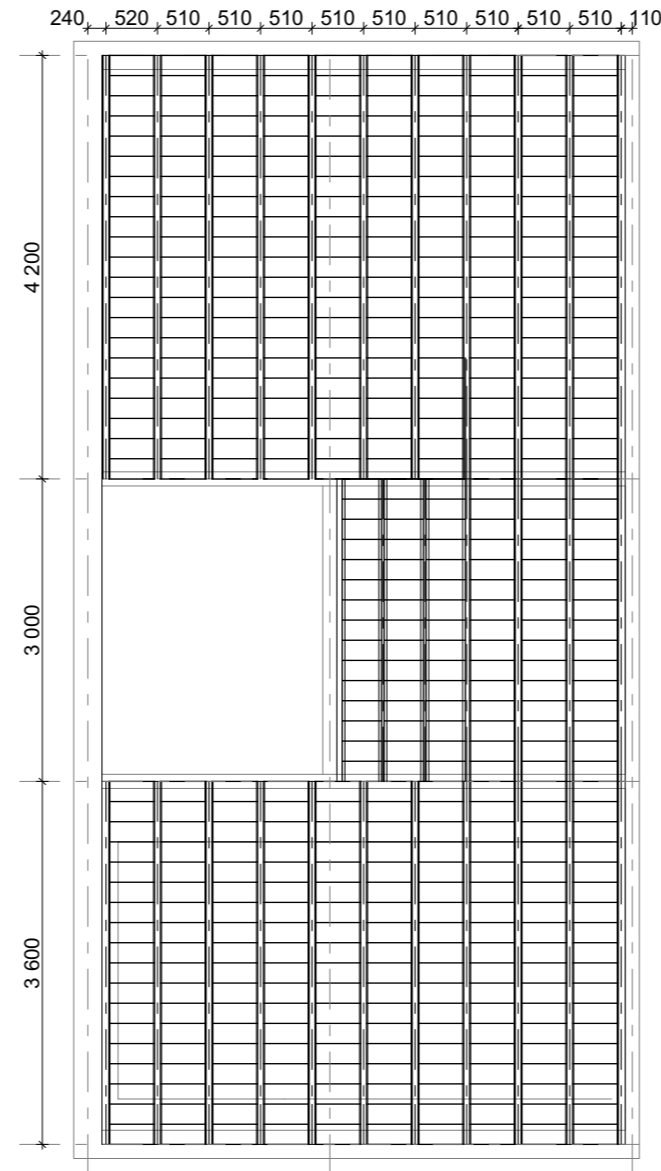
Notes.

- The basis of the foundation is 9,7 m of soft organic dark gray clay soil. The type and characteristics of the soils of the construction site are shown in the report;
- Foundations designed are made of monolithic reinforced concrete: strip footing - under load-bearing and self-supporting walls;
- Under the foundation the layer of coarse sand thickness of 100 mm has to be performed, with plan dimensions 100 mm greater than the dimensions of foundations in each direction;
- The lateral surfaces of the concrete structures in contact with soil, should have the bitumen coating of 2 layers;
- The horizontal isolation of the foundation is a double-layer of waterproof coating material on the bitumen mastic.

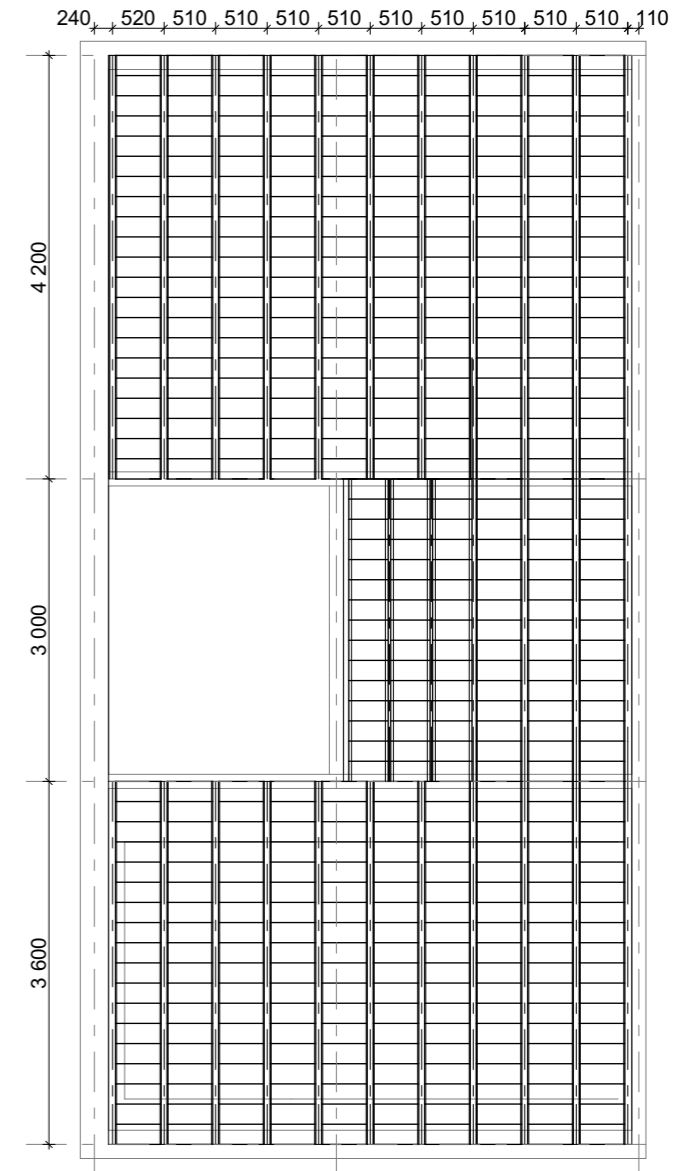
Slab Plan at the ground level. 1:75



Slab Plan at the first floor level. 1:75



Slab Plan at the second floor level. 1:75



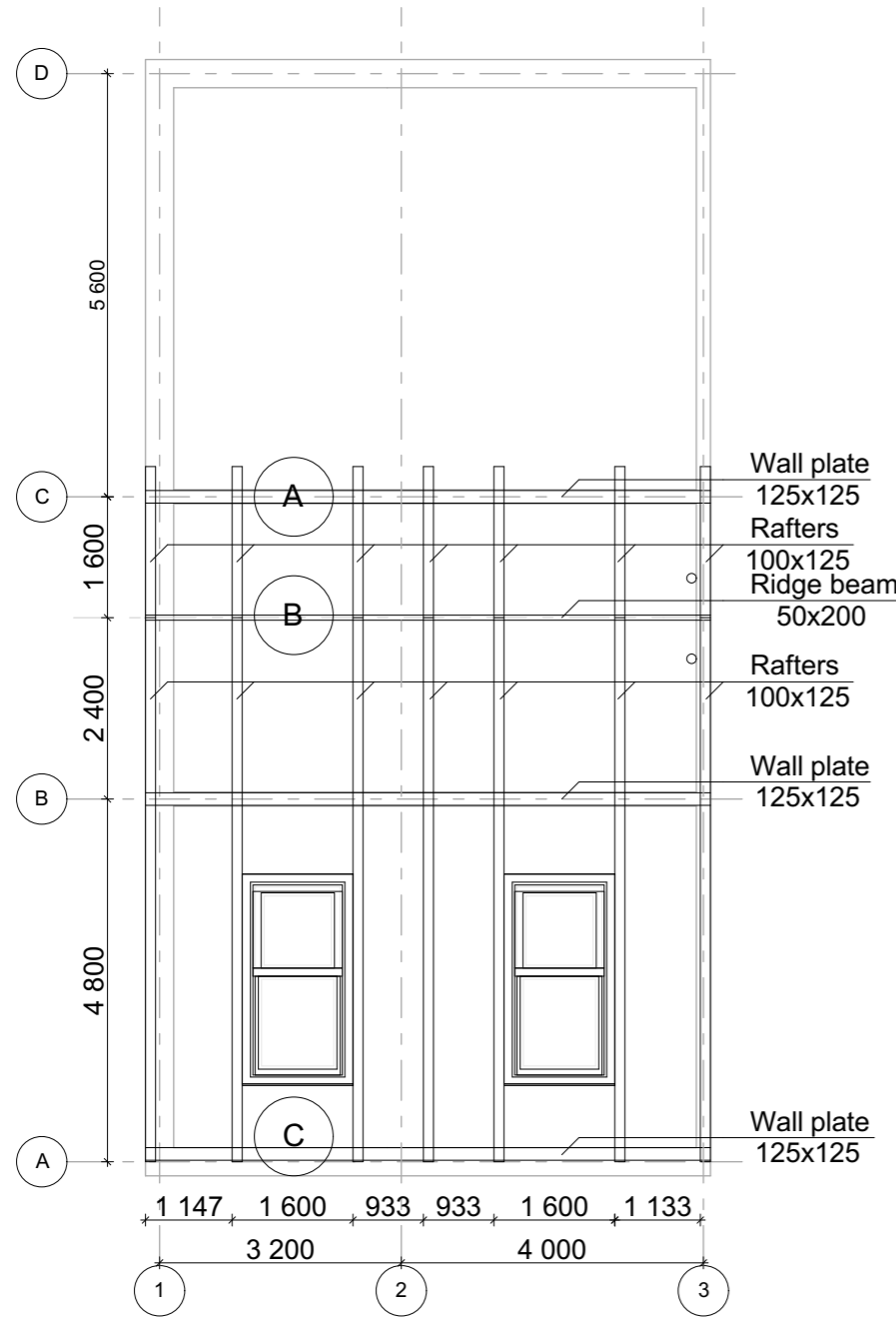
SPECIFICATION OF REINFORCED CONCRETE COVERING + PREFABRICATED GRINDER SLAB/CERAMIC INTERJOIST (40+80)

	DESIGNATION	NAME	AMOUNT		DESIGNATION	NAME	AMOUNT		DESIGNATION	NAME	AMOUNT
GF	LT 12(8+4)			F1	LT 12(8+4)			F2	LT 12(8+4)		
1	NBR 14859-1	Interjoist VT8 L=4200MM	7	1	NBR 14859-1	Interjoist VT8 L=4200MM	11	1	NBR 14859-1	Interjoist VT8 L=4200MM	7
2	NBR 14859-1	Interjoist VT8 L=3000MM	11	2	NBR 14859-1	Interjoist VT8 L=3000MM	7	2	NBR 14859-1	Interjoist VT8 L=3000MM	11
3	NBR 14859-1	Interjoist VT8 L=3600MM	11	3	NBR 14859-1	Interjoist VT8 L=3600MM	11	3	NBR 14859-1	Interjoist VT8 L=3600MM	11
4	NBR 14859-1	Ceramic filling element H8 (b=40)	393	4	NBR 14859-1	Ceramic filling element H8 (b=40)	435	4	NBR 14859-1	Ceramic filling element H8 (b=40)	393
5	NBR 14859-1	Ceramic filling element H8 (b=32)	63	5	NBR 14859-1	Ceramic filling element H8 (b=32)	45	5	NBR 14859-1	Ceramic filling element H8 (b=32)	63
6	NBR 14859-1	Concrete M35	2.45M <sup>3</sup>	6	NBR 14859-1	Concrete M35	2.61M <sup>3</sup>	6	NBR 14859-1	Concrete M35	2.45M <sup>3</sup>



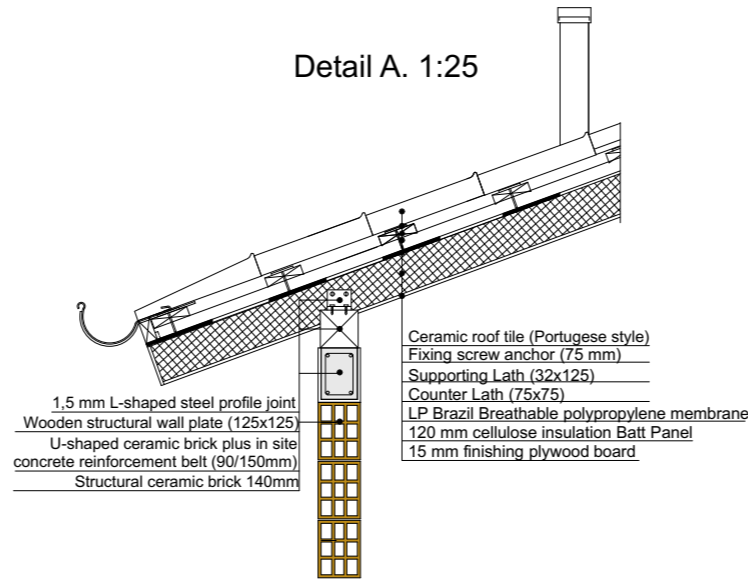


# Roof Plan. 1:100

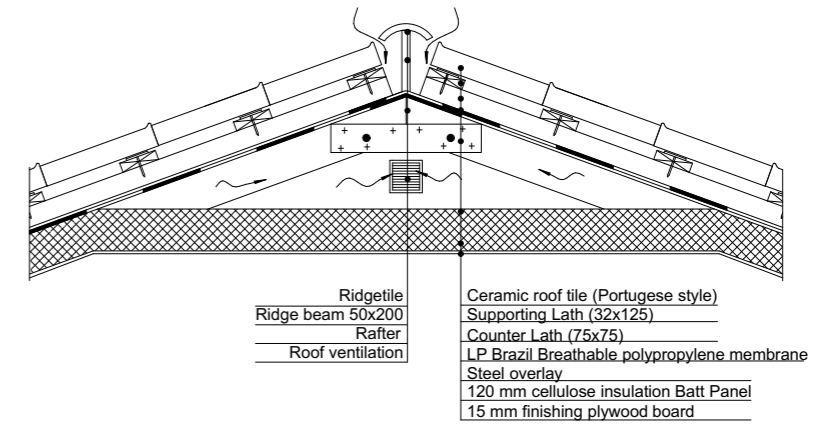


- Wall plate 125x125
- Rafters 100x125
- Ridge beam 50x200
- Rafters 100x125
- Wall plate 125x125
- Wall plate 125x125

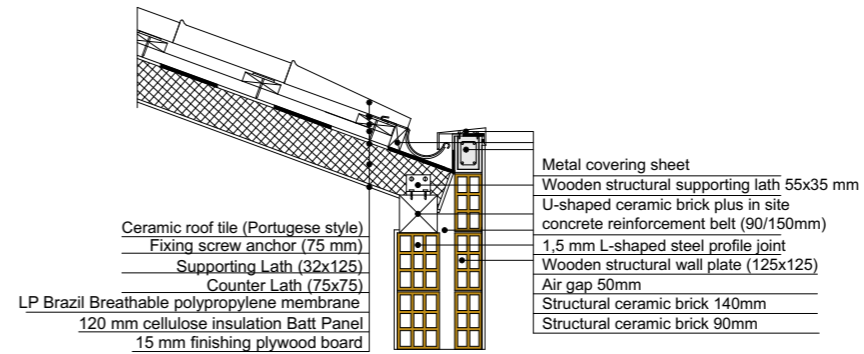
Detail A. 1:25



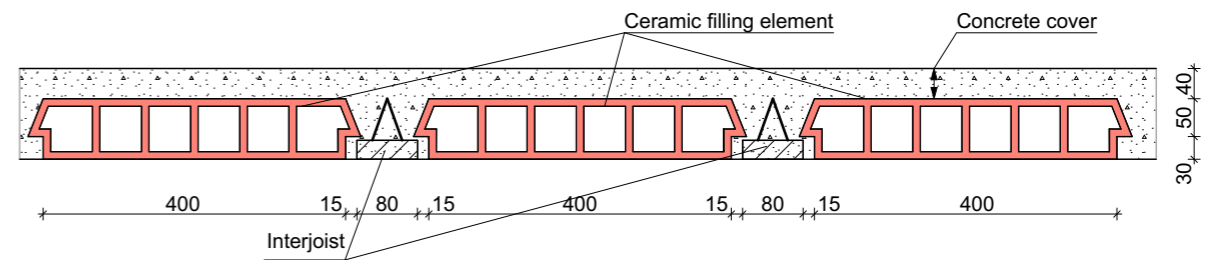
Detail B. 1:25



Detail C. 1:25



Detail of the reinforced concrete covering LT 12(8+4). 1:10



	DESIGNATION	NAME	AMOUNT
1	EN 338:2003	Rafter 100x125x5750	7
2	EN 338:2003	Rafter 100x125x1600	7
3	EN 338:2003	Wall Plate 125x125x5600	3
4	EN 338:2003	Ridge beam 50x200x5600	1

