

TECHNICAL DRAWING GUIDE

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TABLE OF CONTENTS

1) DEFINITIONS.....page 3

2) SCALES - EXAMPLES

- Scales.....page 4
- 1:200 example drawings..... page 7
- 1:100 example drawings.....page 8
- 1:50 example drawings..... page 13
- 1:20/1:25 example drawings..... page 16

3) GENERAL INFORMATION

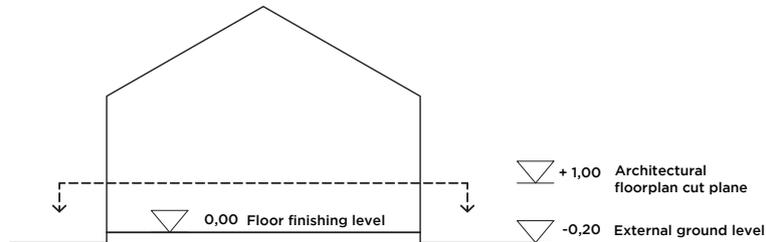
- Line thicknessespage 17
- Hatching styles..... page 18
- Dimensions page 19
- Indications & Annotations page 20

4) LAYOUT & FOLDER

- Drawing sheet layout.....page 22
- Submission folder layoutpage 23

DEFINITIONS

An **ARCHITECTURAL FLOORPLAN** is a drawing that cuts the building with a horizontal plane at a height of 1,00 m above floor finishing level. All the elements that are cut through (walls, columns, etc.) are shown drawn with a thicker line and/or hatched, depending on the scale of the drawing. The elements visible below in the view (Furniture, floor tiles, etc.) are represented with thinner lines.

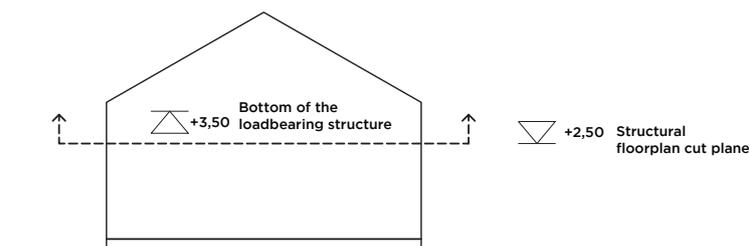


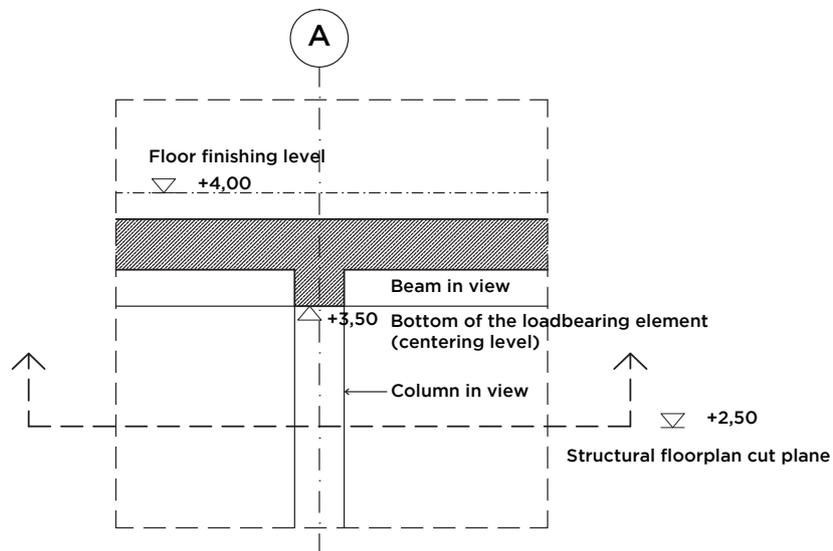
An **ARCHITECTURAL SECTION** is a drawing that cuts the building with a vertical plane at a specific position. All the elements that are cut through (Wall, slabs, ceiling, footing beams, etc.) are shown with thicker line and specific hatching patterns, depending on the scale of the drawing. The elements in view (doors, windows, handrails etc.) are represented with a thinner line.

An **ELEVATION** is an architectural section outside the line of the facade, used to illustrate the exterior view of the building. The exterior ground level is represented with a thick line. The main structure behind the facade can be represented by dashed lines if necessary.

An **ARCHITECTURAL DETAIL** is a zoomed in plan in specific parts of the buildings in order to illustrate the detailed connections between the elements. Details can be either horizontal or vertical sections.

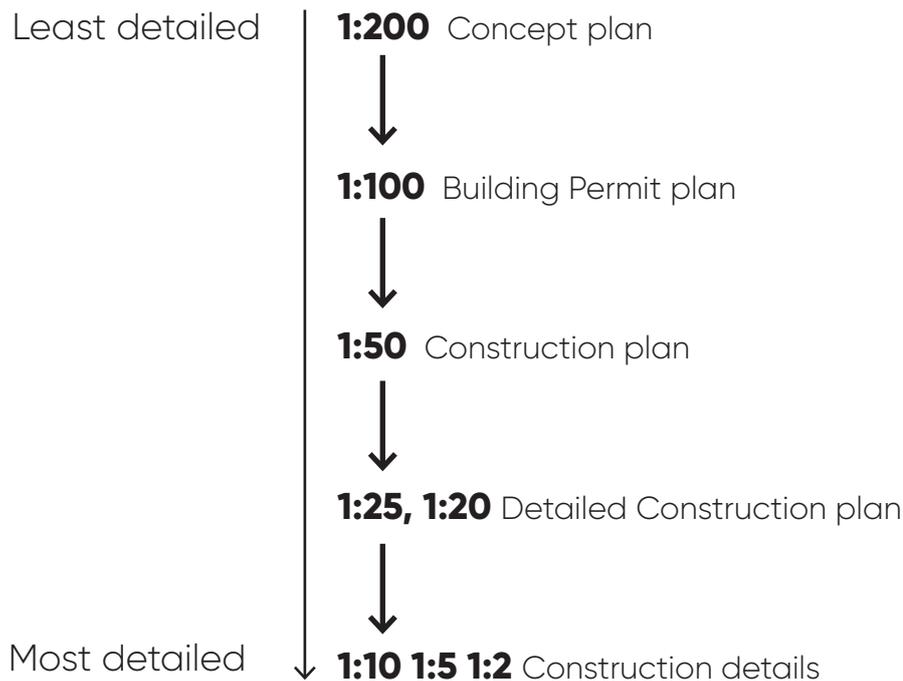
A **STRUCTURAL PLAN** is a drawing that cuts the building with a horizontal plane at a 1 m distance under the bottom of the load-bearing elements of the slab (e.g 1 meter height below the bottom of the downstand beam). It consists of only the main supporting structure without architectural elements such as coverings and accesories. The thermal insulation layers must only be indicated with a dashed line. The position of the partition walls can be represented as well with a dashed line. All the cut-through elements (columns, load-bearing walls, etc) are represented with a thick line. The elements visible above (e.g beams) are shown with thinner lines.





A **STRUCTURAL SECTION** is a drawing that cuts the building with a vertical plane but only indicates the supporting structural elements. Architectural elements (floor coverings, facade claddings, doors & windows etc.) are not included. However, the position of the openings must be understandable within the section. Thermal insulation layers and partition walls can be indicated with a dashed line if necessary. Cut-through elements (beams, slabs, loadbearing walls) are shown with thicker line and specific hatching patterns, depending on the scale of the drawing. The beams & columns in view must be represented with a thinner line.

TECHNICAL DRAWING SCALES – EXAMPLES



LINE THICKNESSES:

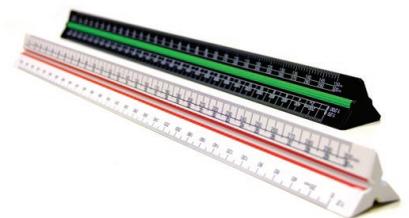
Three different line thicknesses must be used:

- Cut-through construction: Thick line
- Constructions in view & symbols: Medium line
- Dimensions & Axes: Thin line

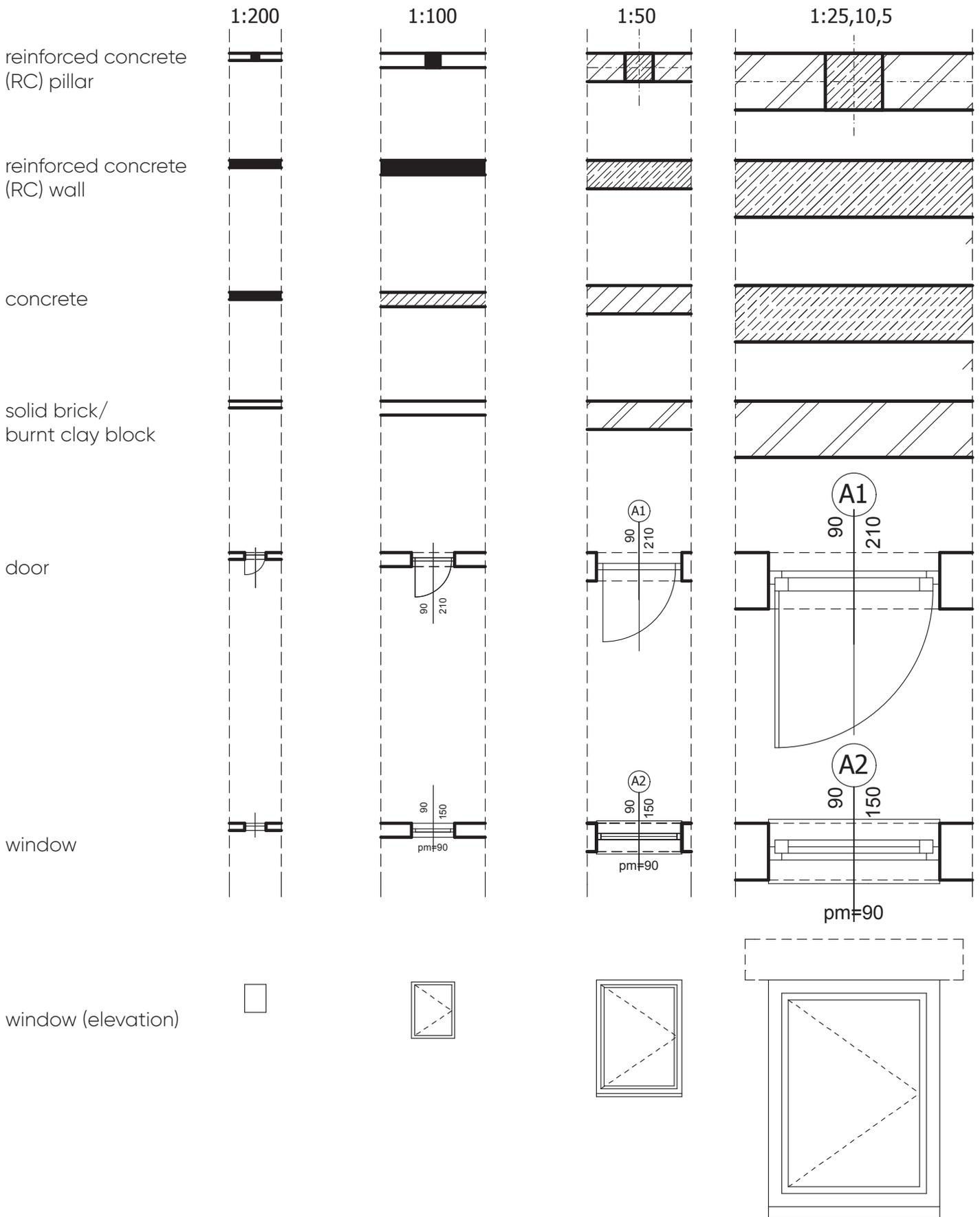
(further explanation on page 17.)

POINT TO REMEMBER: In bigger drawing scales, the more information and details are necessary. For example, drawing detailed window frames in 1:200 scale is not necessary and overcrowds the drawing, however, in 1:50, the window frames must be more clearly drawn. (as shown in the examples)

NOTE: Different scales can be easily measured and plotted via a scale ruler.



TECHNICAL DRAWING SCALES - GENERAL NOTATIONS



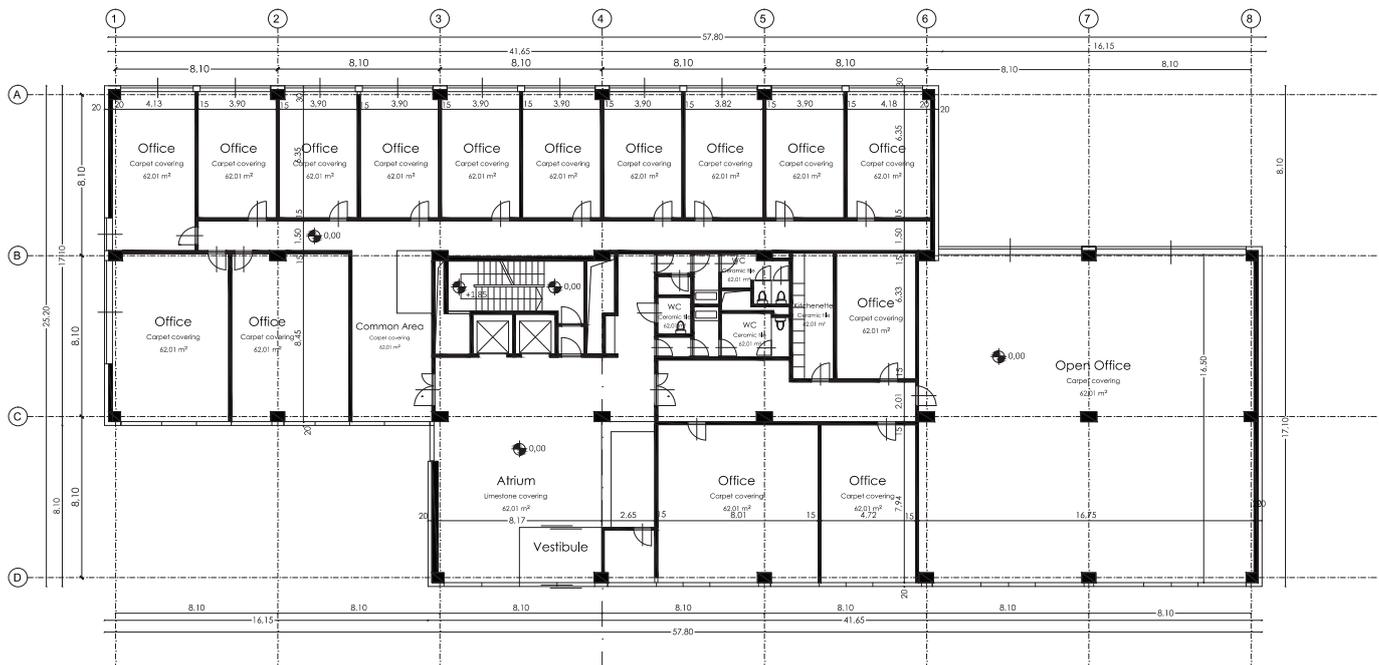
SCALE 1:200 – CONCEPT PLAN

1:200 drawings are prepared at early design stages and consequently are not very detailed. Nonetheless these drawings must clearly show the functional/internal arrangements, position of the openings and the primary architectural elements. Different materials do not need to be strictly differentiated & elements such as window/door frames & curtain wall profiles must be drawn in a very simplified manner.

- All the walls (internal or external) below 20 cm thickness must be plotted with solid hatching.
- Walls thicker than 20 cm (e.g. block walls) must be drawn with two thick lines with no hatching.
- External thermal insulation & facade layers must be plotted as single thin line

Neccasary information:

- Room function & area (covering is optional)
- Primary dimensions (refer to page 18)
- Floor elevation marks (internal & external)
- Column axes (refer to page 19.)



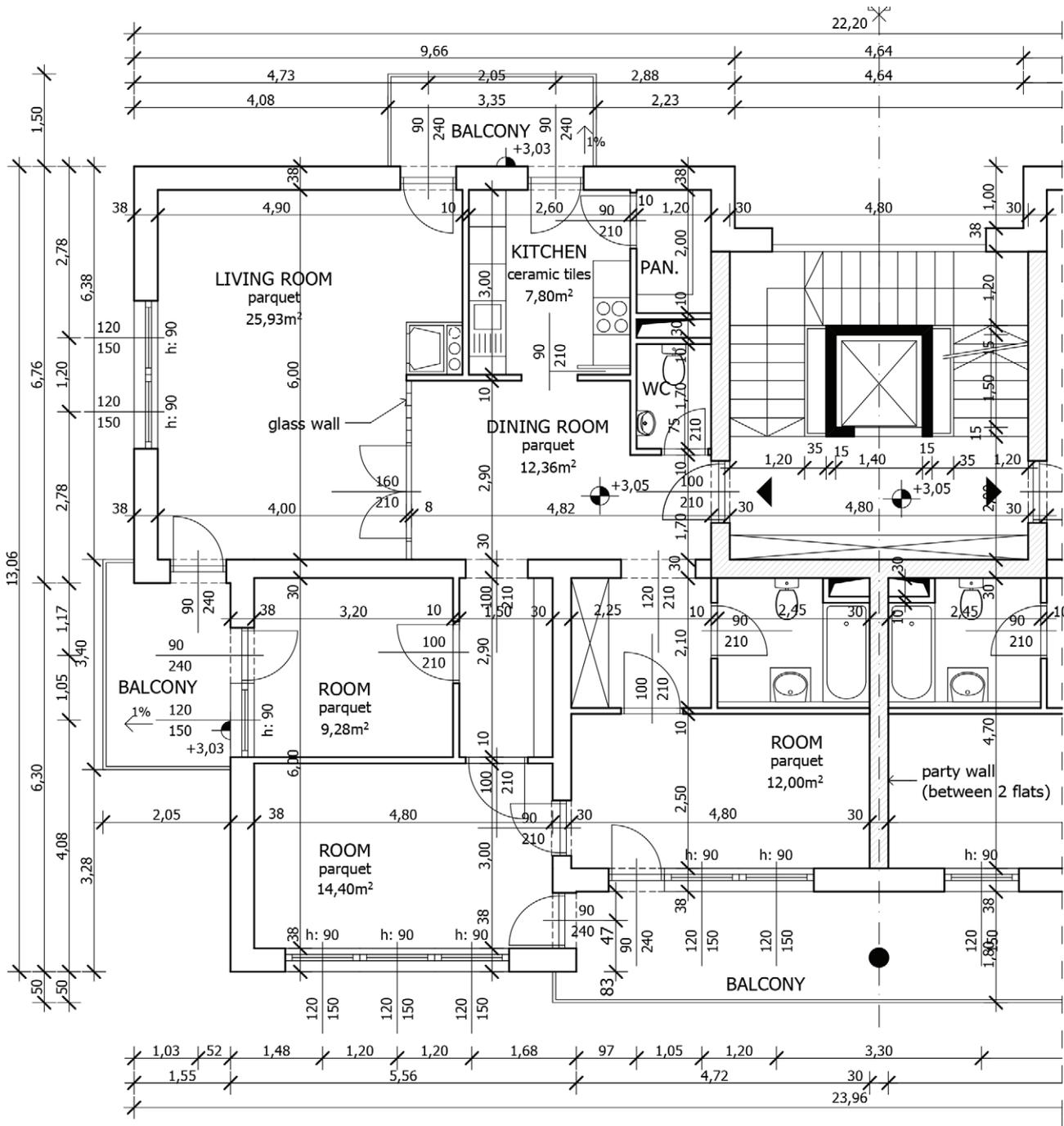
SCALE 1:100 – BUILDING PERMIT PLAN

The 1:100 scale is the most common scale for representing finalized architectural design solution. All the primary and the secondary architectural elements must be clearly visible to facilitate a clear understanding of the building. Construction elements and detailed solutions are later designed in larger scales such as 1:50 & 1:20.

The differences between 1:100 & 1:50 scales is demonstrated in the following pages.

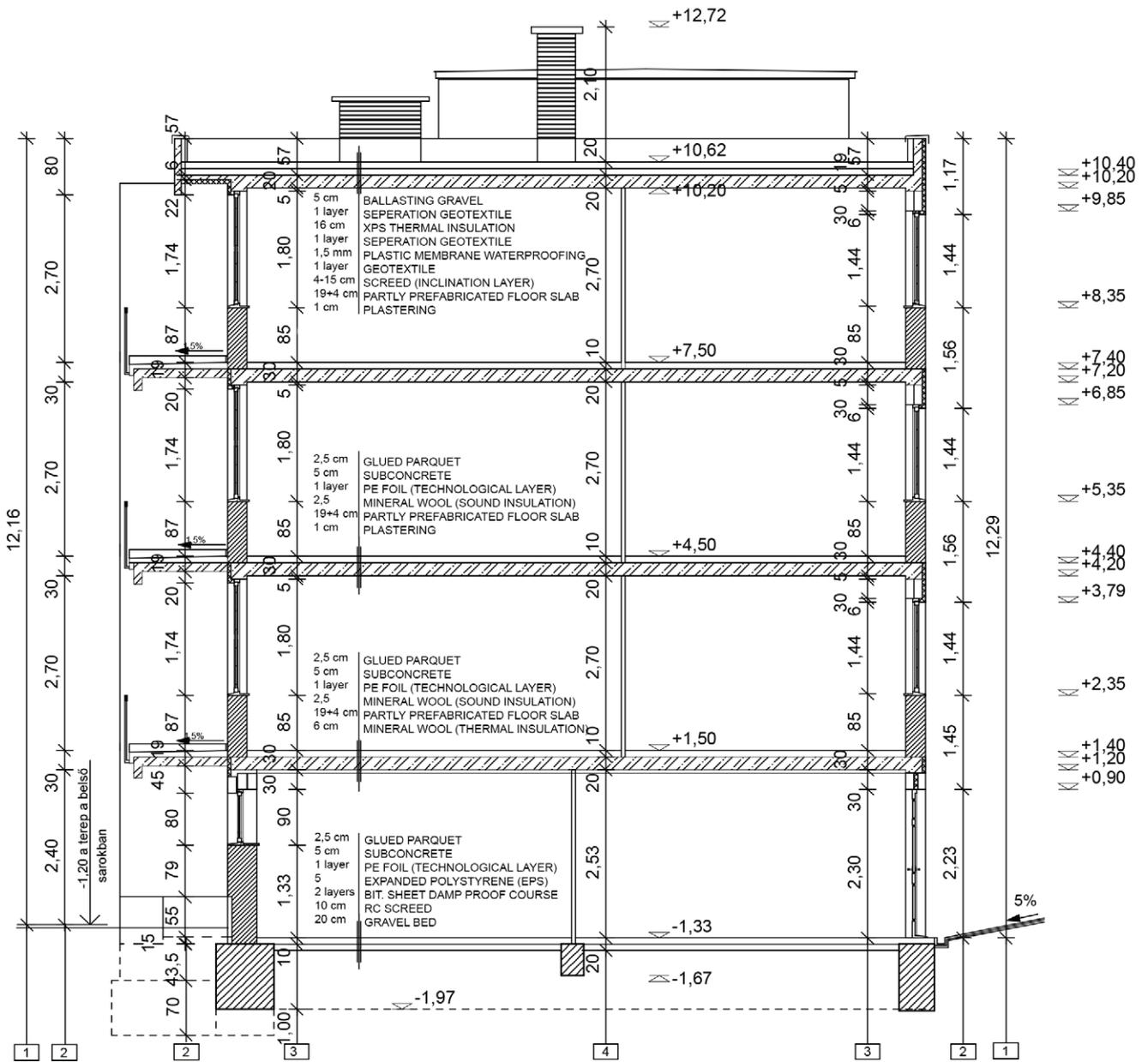
FLOORPLAN 1:100 – MULTI-STOREY RESIDENTIAL HOUSE A

Source : Building Construction 1 Workshop



SECTION A-A 1:100 – MULTI-STOREY RESIDENTIAL HOUSE B

Source : Introduction to Building Construction Workshop



NOTE: Every unique layer order must be written down as illustrated. (in this scale, individual layers must not be plotted independently, for example, the floating floor can be represented as a single line, rather than several lines showing all the different layers within the floor.)

The following dimensions are necessary:

1. Maximum attic height
2. Elevation details
3. Internal headrooms
4. Slab thicknesses

+ Elevation height marks & slope indications

ELEVATION 1:100 – MULTI-STOREY RESIDENTIAL HOUSE B

Source : Introduction to Building Construction Workshop



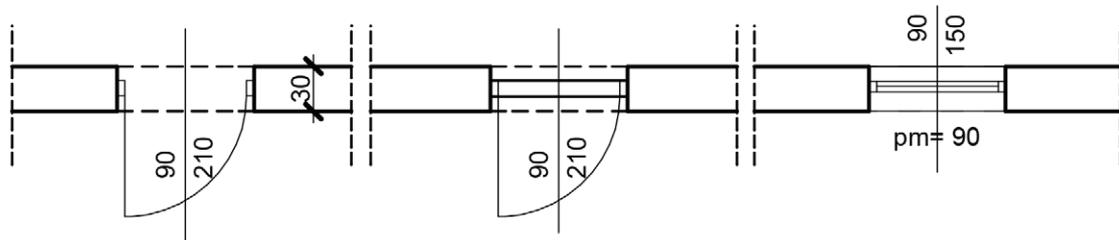
The following information must be indicated:

- All the applied materials & elements on the facade.
- The operation mode of the doors & windows
- Elevation marks
- Structure behind the facade, with dashed line (usually necessary, depending on the structure and the facade cladding)

NOTE: For better understanding of the architectural elevation, colors, shadows & textures may need to be added alongside the necessary indications. However, technical elevation drawings must **NOT** include any graphic design.

1:100 REPRESENTATION (DOORS & WINDOWS)

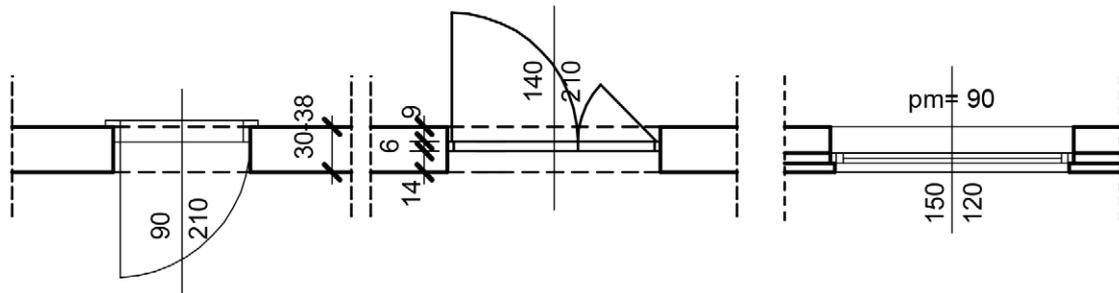
Source : Introduction to Building Construction Workshop



DOOR WITHOUT TRESHOLD

DOOR WITH TRESHOLD

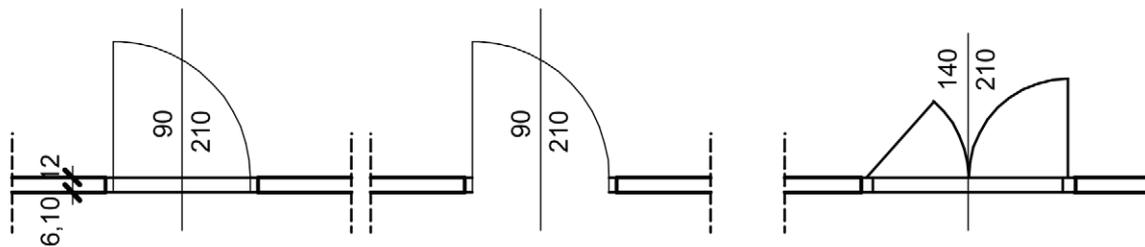
WINDOW WITHOUT REBATE



DOOR (FRAME ON EXTERNAL WALL PLANE)

DOUBLE-SIDED DOOR WITHOUT REBATE

WINDOW WITH REBATE

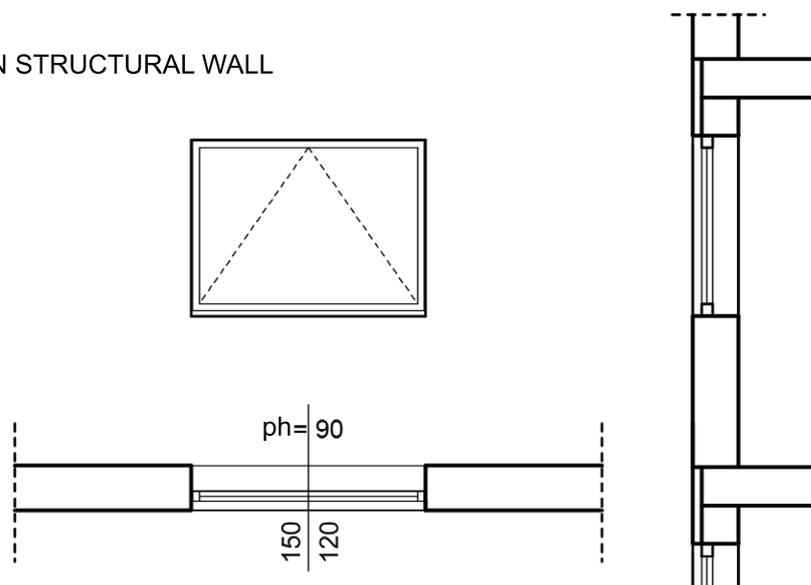


DOOR WITHIN PARTITION WALL

DOOR WITHIN PARTITION WALL (WITHOUT TRESHOLD)

DOUBLE DOOR WITHIN PARTITION WALL

WINDOW WITHIN STRUCTURAL WALL

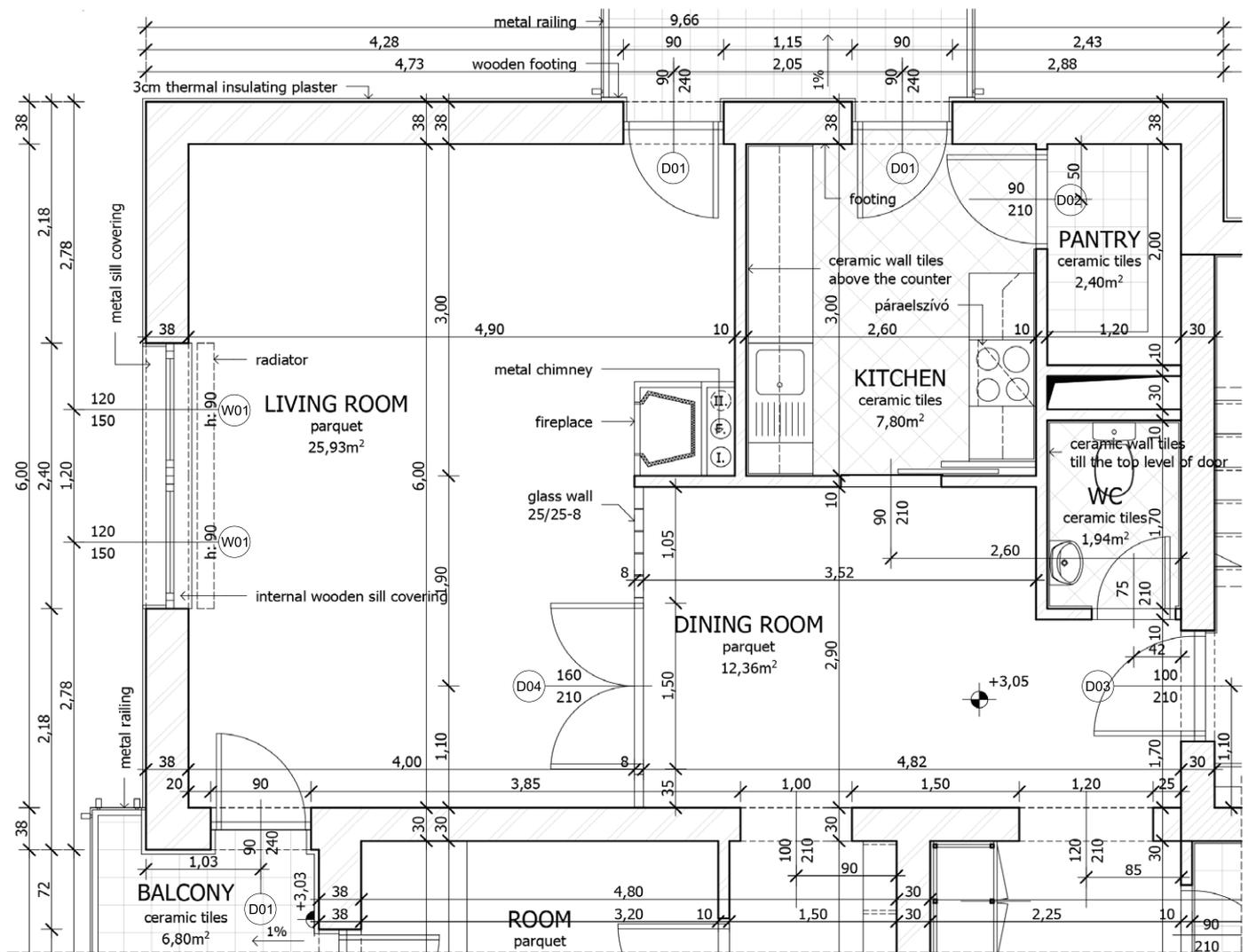


SCALE 1:50 - CONSTRUCTION PLAN

The 1:50 scale must contain adequate details for the construction of the building. It demonstrates the interior design solutions (coverings, ceilings, etc.) & the connections of the structural & non-structural elements. Representation of all the internal & external dimensions as well as the indication of the applied materials & elements is necessary.

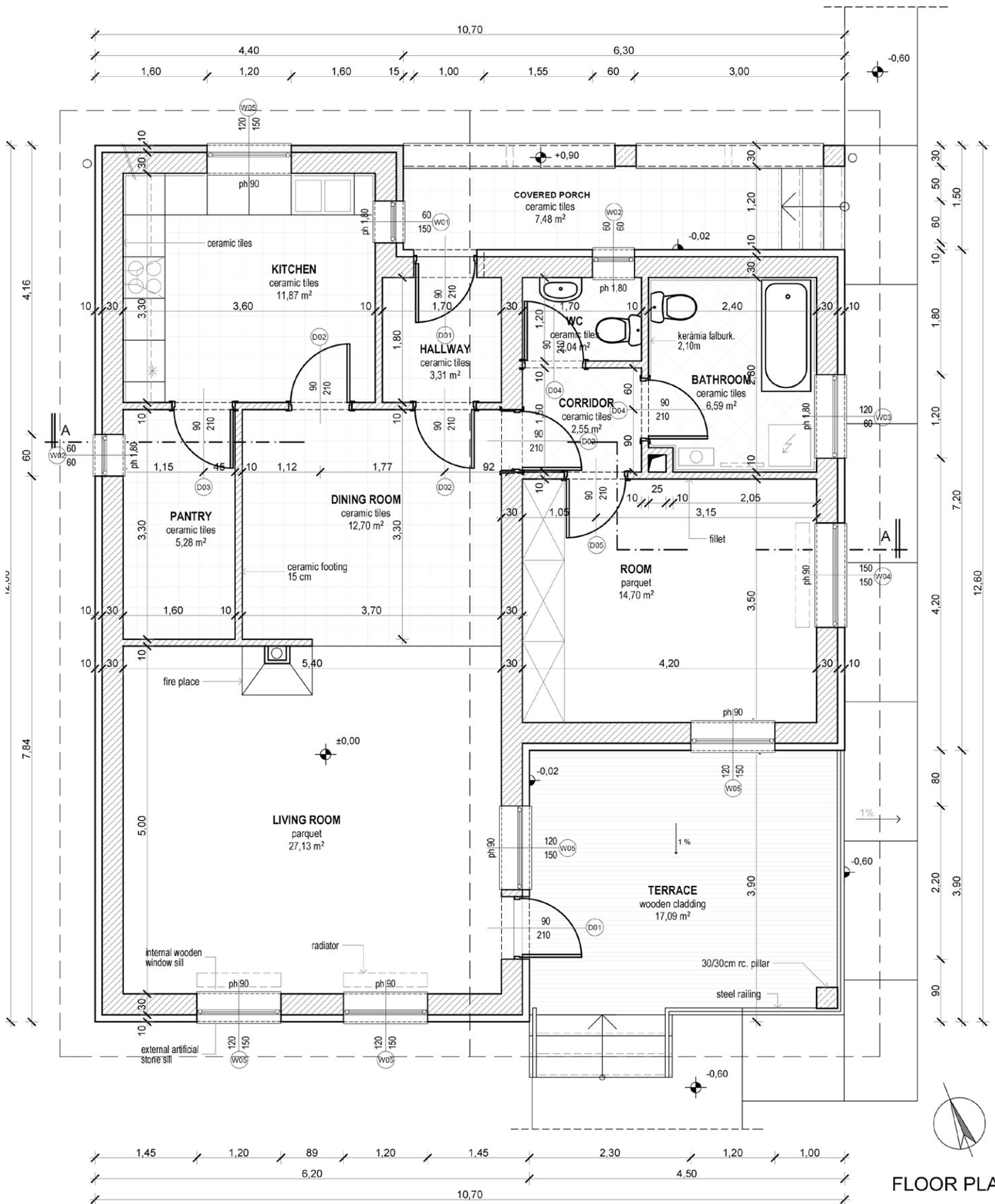
FLOORPLAN 1:50 - MULTI-STOREY RESIDENTIAL HOUSE A

Source : Building Construction 1 Workshop



FLOORPLAN 1:50 - FAMILY HOUSE

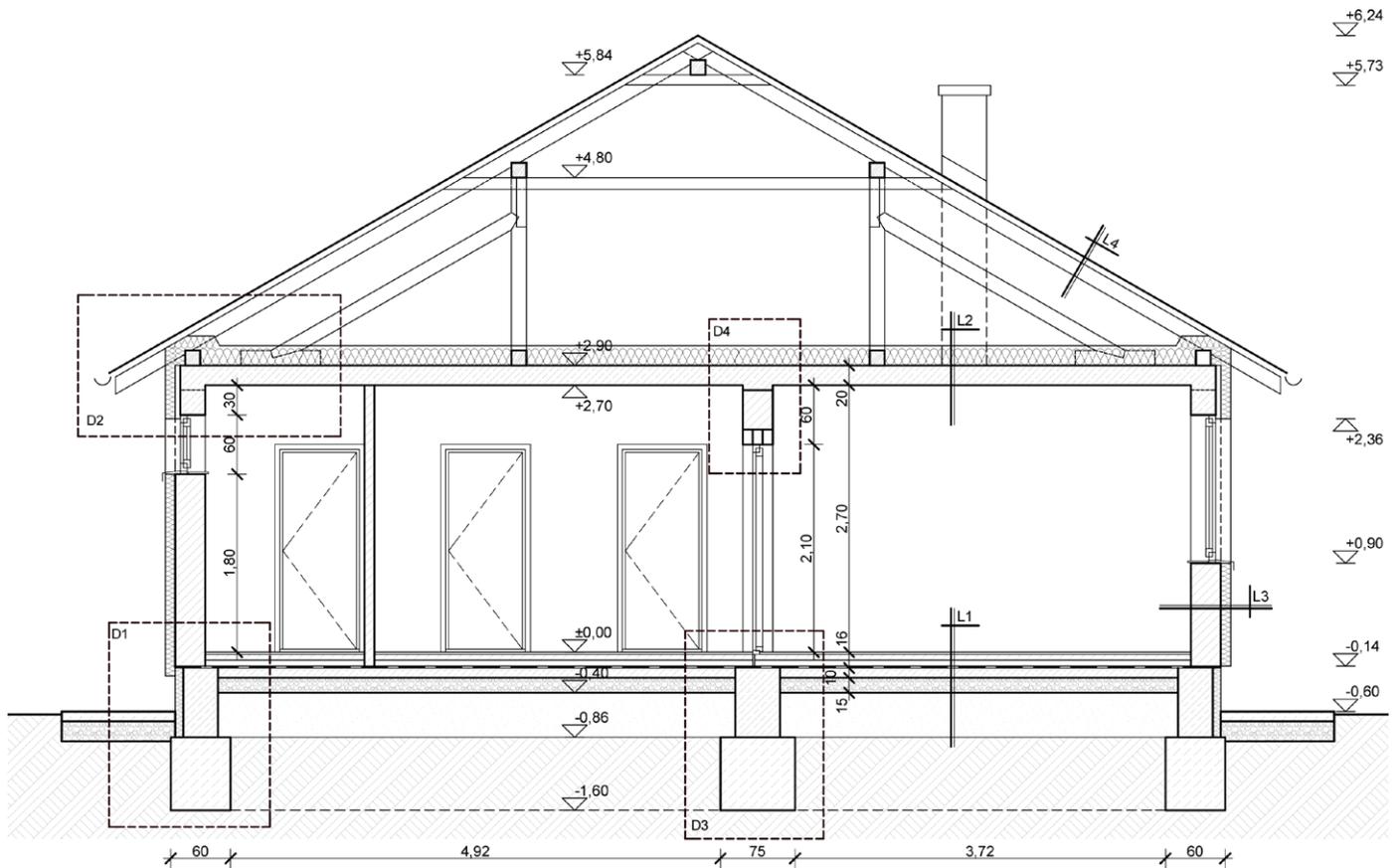
Source : Introduction to Building Construction Workshop



FLOOR PLAN
scale = 1: 50

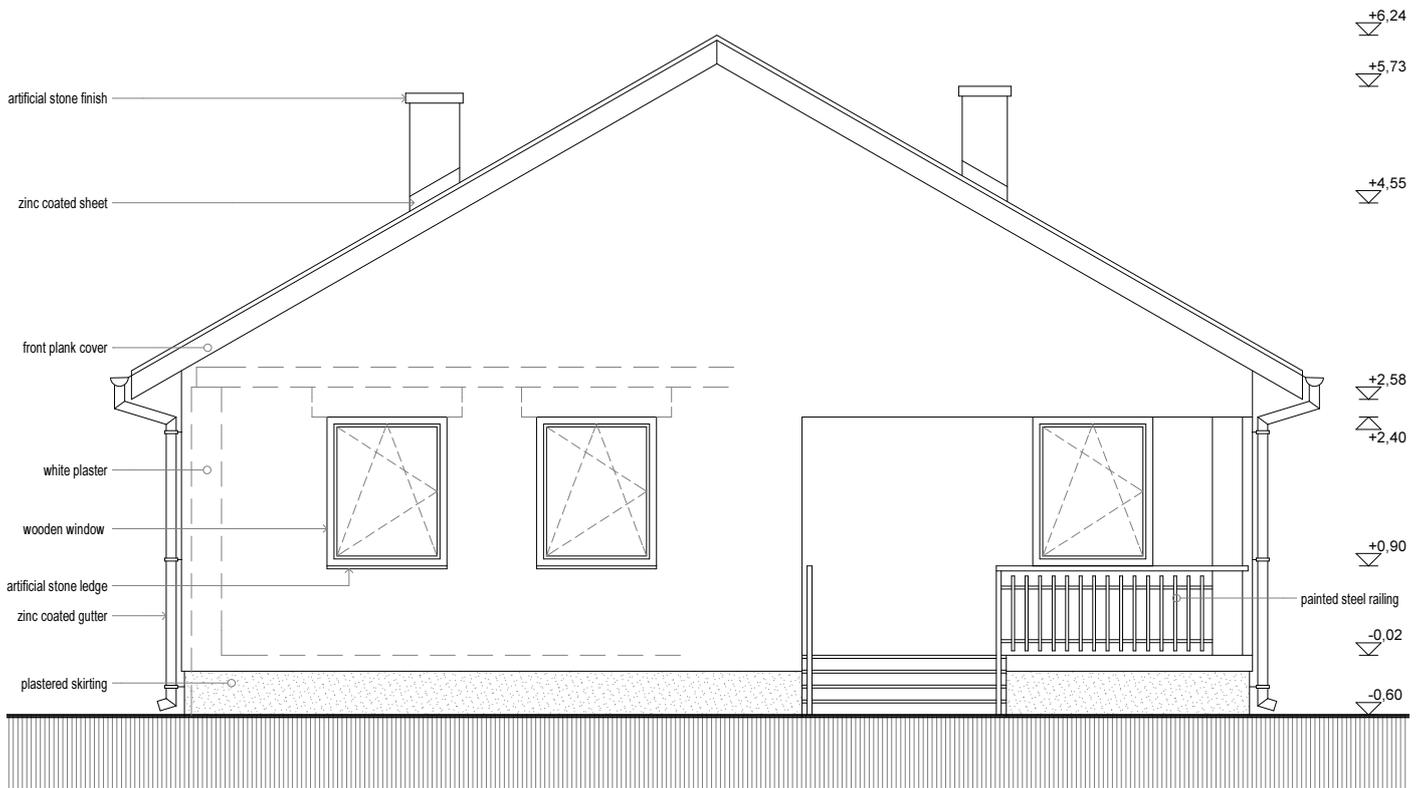
SECTION A-A 1:50 - FAMILY HOUSE

Source : Introduction to Building Construction Workshop



SOUTH-EAST ELEVATION 1:50 - FAMILY HOUSE

Source : Introduction to Building Construction Workshop



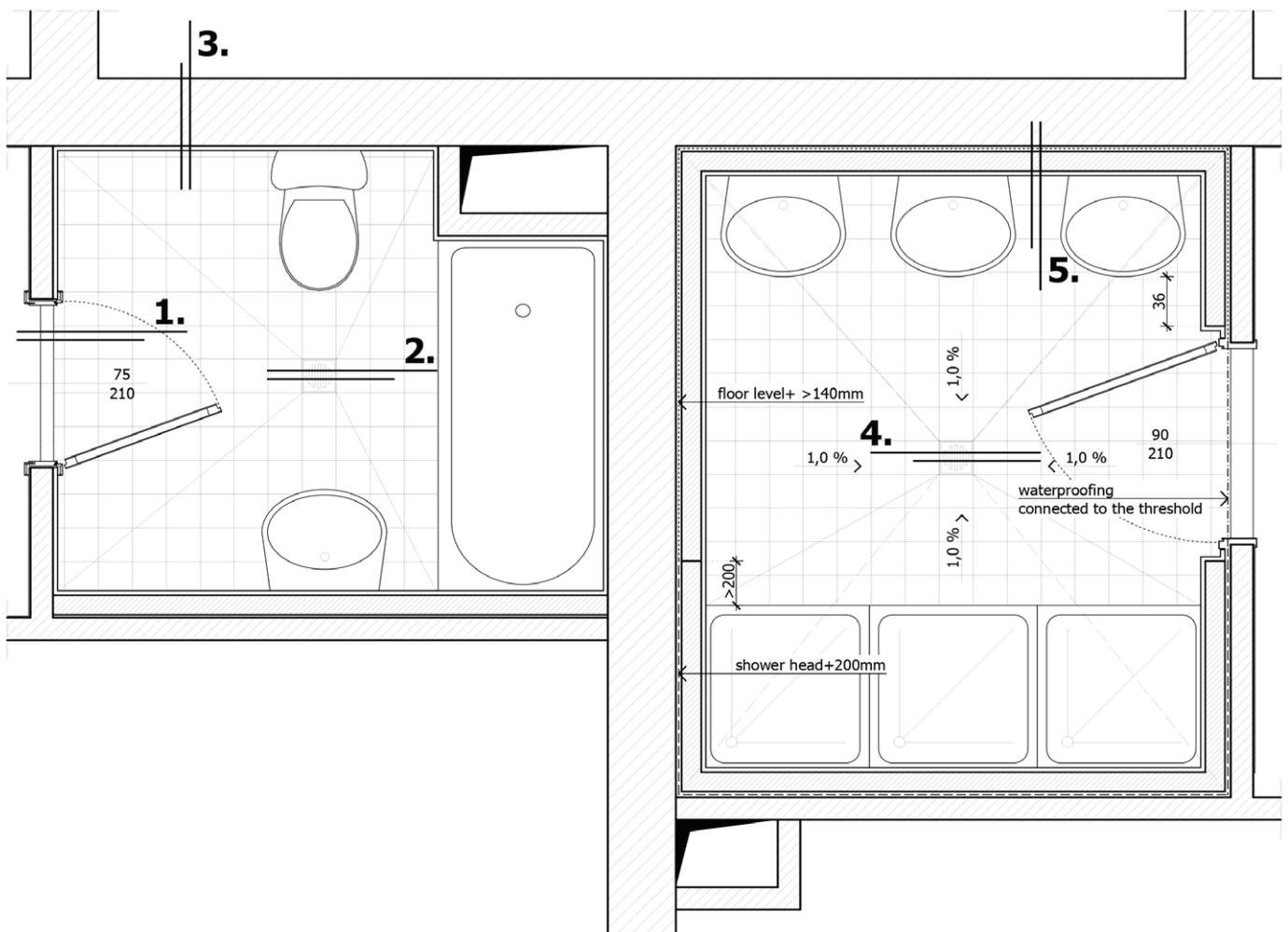
SCALE 1:20/1:25 – DETAILED CONSTRUCTION PLAN

Certain technical or architectural solutions within specific parts of a building may not be understandable/visible in 1:50 scale and therefore must be represented in 1:20 or 1:25 scales. These may include:

- Bathroom layouts (indicating the sanitary equipment & the solution for indoor water collection)
- Staircase plans (indicating the floor coverings, handrails, railings and the turning edge solution)
- Masonry wall section/elevation (indicating the vertical size coordination & the support for the openings.)
- Externally cladded wall/curtain wall elevation (indicating the fixation of the facade panels)
- Suspended ceiling plan (indicating the hanged ceiling frames & the fixation of the panels)
- Interior design plan (indicating the surfaces, and applied elements)
- etc.

FLOORPLAN 1:25 – BATHROOM LAYOUT

Source : Building Constructions 4 – Indoor waterproofings Workshop Exercise



GENERAL INFORMATION – LINE THICKNESSES

Technical drawings are only useful if they are clearly understandable. You must show the difference between the elements which are cut through, those which are in view and the added information.

To do so, you will need to use mechanical pencils/pens with different thicknesses. You must use three different line thicknesses:

- Cut-through construction: Thick line
- Constructions in view & symbols: Medium line
- Dimensions & Axes: Thin line

REMEMBER: There is no particular rule regarding the used pencils/pens, but you must make sure that the differences in the thicknesses are clearly recognizable and for example secondary lines such as the floor tiles are not confused with the partition walls.

TIP: Draw all the annotation in a thin inked pen (Rapid pen). By doing so, you can show the difference between building elements and the annotations very clearly. At the same time, your drawing will look more professional and aesthetic.

GENERAL INFORMATION - HATCHING STYLES

Hatchings are an important part of a technical drawing, which is used to show the difference between the applied materials. Only the cut-through elements must be hatched. Without proper hatching, your drawing will be misunderstood.

You must apply the following hatching patterns in your drawings. You may use alternative hatching patterns, however, in that case you must add a legend box in the corner of the drawing that indicates the hatching corresponding to each material.

REMEMBER: In one single project, the same hatching pattern must be used for a particular material in every single drawing of similar scale, including floorplans, sections and details.

MATERIAL	HATCHING
GROUND SOIL	
SOIL BACKFILL	
NATURAL STONE	
CARVED STONE	
BRICK/BLOCK	
CONCRETE	
REINFORCED CONCRETE	
ARTIFICIAL STONE	
WOOD (IN DIFFERENT CUT PLANES)	
STEEL	
MORTAR	
GLASS	
MINERAL WOOL	
POLYSTYRENE (EPS/XPS)	
WATERPROOFING (DPC LAYER)	
OTHER CONSTRUCTIONS	

NOTE: You will have to apply different hatching pattern in different scales. (refer to page 5.)

GENERAL INFORMATION – DIMENSIONS

Drawings are filled with horizontal dimensions that define the sizes and measurements within the building. The type or size of the dimensions are up to you, nonetheless, they must remain consistent in all the drawings in a single project. Bigger scale drawings require more dimensions. The following dimensions are necessary in each type of drawing:

FLOORPLANS:

External:

- total building size
- main changes in the shape of the building
- centerline of the openings
- distance between column axes

Internal

- Spanning distance between main walls
- partitions
- internal openings

SECTIONS:

External:

- total building height
- elevation elements (top & bottom of openings, footing height, etc.)

Internal

- internal heights (headrooms, centering level of the slab, floor finish level)
- Vertical thicknesses (slab/floor thickness, roof thickness, etc.)

+ occasional horizontal dimensions (especially when the floorplan drawings are not attached within the same project)

ELEVATIONS:

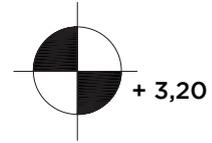
- total building height
- facade elements (top & bottom of openings)
- floor finish levels
- headrooms

GENERAL INFORMATION – ANNOTATIONS & INDICATIONS

In addition to the measures and dimension lines, the following information must be included in a floorplan:

- **Floor elevation marks**

Used to indicate the level of the finishing, both interior and exterior.



- **Section lines**

Indicates the plane of the section, which is drawn in a separate sheet. Includes a reference number or letter (e.g. Section A-A). The Section line must be drawn in a thick line and clearly visible.



- **Room information**

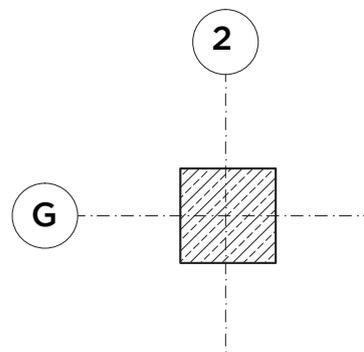
The room name, size and type of floor finish must be written down in every room in the following manner:

LIVING ROOM
parquet
25,50 m²

- **Column Axes**

Each axis passes through the centre of the column. Two perpendicular column axes define the position of a column. You must make sure that every single column in the building can be defined by a unique code (e.g. Column G2)

Loadbearing walls do not need an axis!



- **North sign**

Can be represented in any understandable shape or form. Missing north sign automatically indicates the upper side of the sheet as the north direction.

- **Slopes**

Slope arrow & percentage must be indicated at inclined surfaces such as the balcony and in some cases bathroom floors.

- **Wall coverings**

In larger scales (particularly 1:50, 1:25), the wall covering material must be indicated in every room. External wall claddings must also be indicated. There is a huge variety of possible cladding materials, explained further in the courses Building Construction 3 & Building Construction 4.

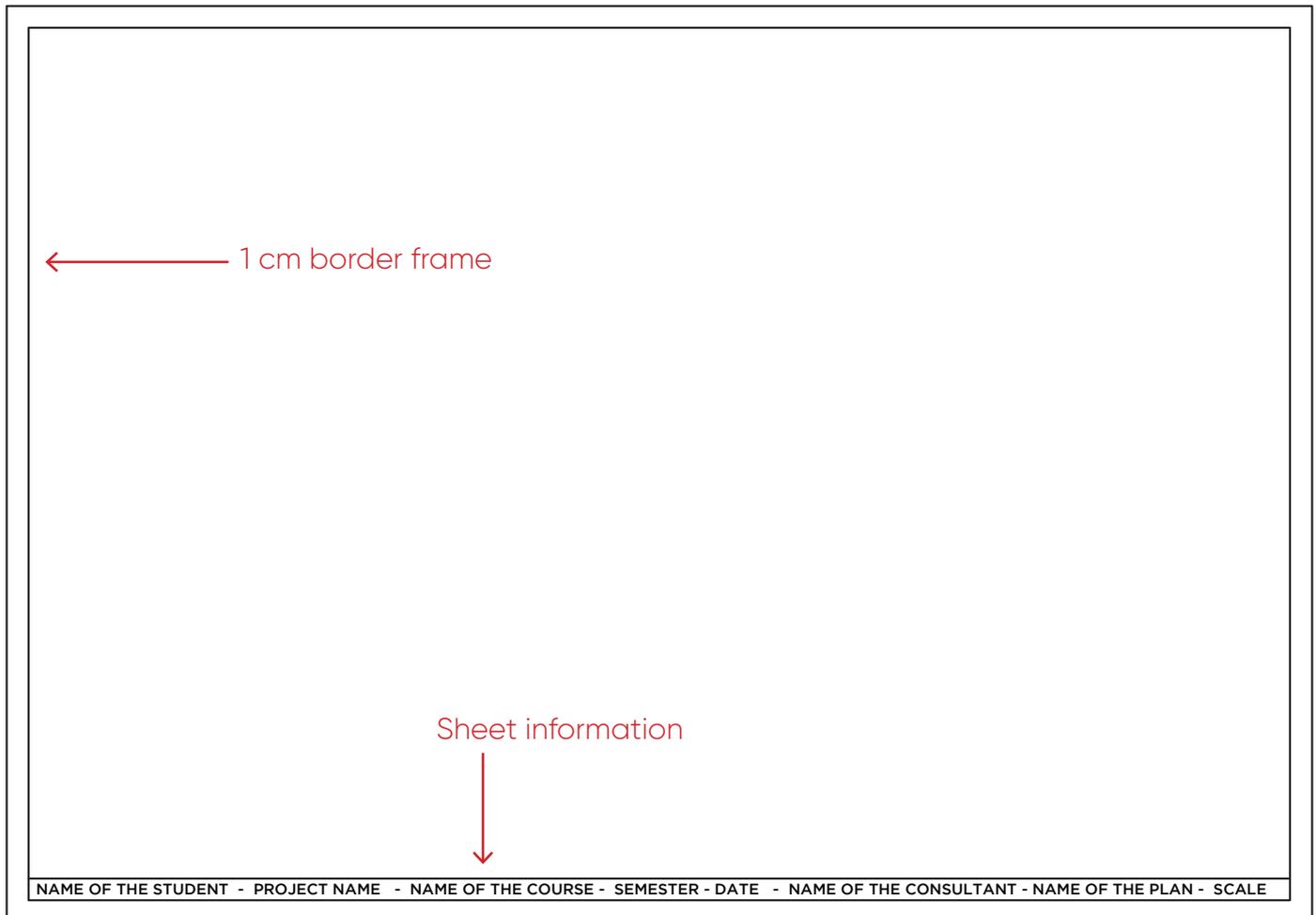
The most common internal wall covering is plastering+ painted surface in general areas and ceramic tile cladding in wet areas such as the kitchen or the bathroom.

DRAWING SHEET LAYOUT – REQUIRED FORMAT

You must choose the paper size based on the size of your drawings and the semester project requirements. Every single sheet must contain the following information:

- Name of the course (e.g. Building Constructions 1)
- Name of the student
- Name of the consultant/instructor
- Name of the plan (Groundfloor Plan, Section A-A, Northwest Elevation, etc.)
- Year & Semester (e.g. Fall Semester 2016-17)
- Scale of the drawing (1:100, 1:200, etc.)
- Date of submission (09/05/2017)

A 1 cm border frame must be drawn around the sheet. This information can be put down at the bottom or the corner of the page within a dedicated frame. Here is an example layout:

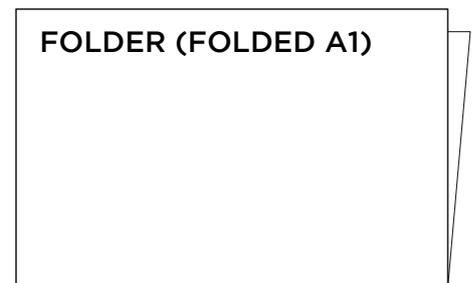
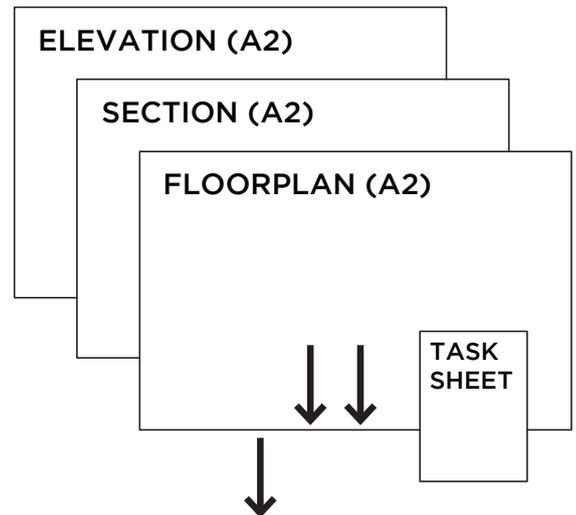


PROJECT FOLDER LAYOUT – REQUIRED FORMAT

All the prepared drawings must be submitted within a folder. The folder must be a folded sheet twice as large as your biggest drawing sheet (e.g. A folded A1 sheet for A2 drawings.)

The following information must be written on the folder, preferably with inked pen. Do not forget to attach/staple the semester project task sheet within the folder. The layout of the title is optional as long as it is understandable.

- Name of the course (e.g. Building Constructions 1)
- Name of the student
- Neptun Code
- Name of the project (e.g 1st Semester Project)
- Name of the consultant/instructor
- Hand-in Date (Actual submission date)
- Year & Semester (e.g. Fall Semester 2016-17)



NAME OF THE STUDENT	NEPTUN CODE
NAME OF THE COURSE	YEAR/SEMESTER
NAME OF THE PROJECT	NAME OF THE CONSULTANT
HAND-IN DATE	STUDENT'S SIGNATURE