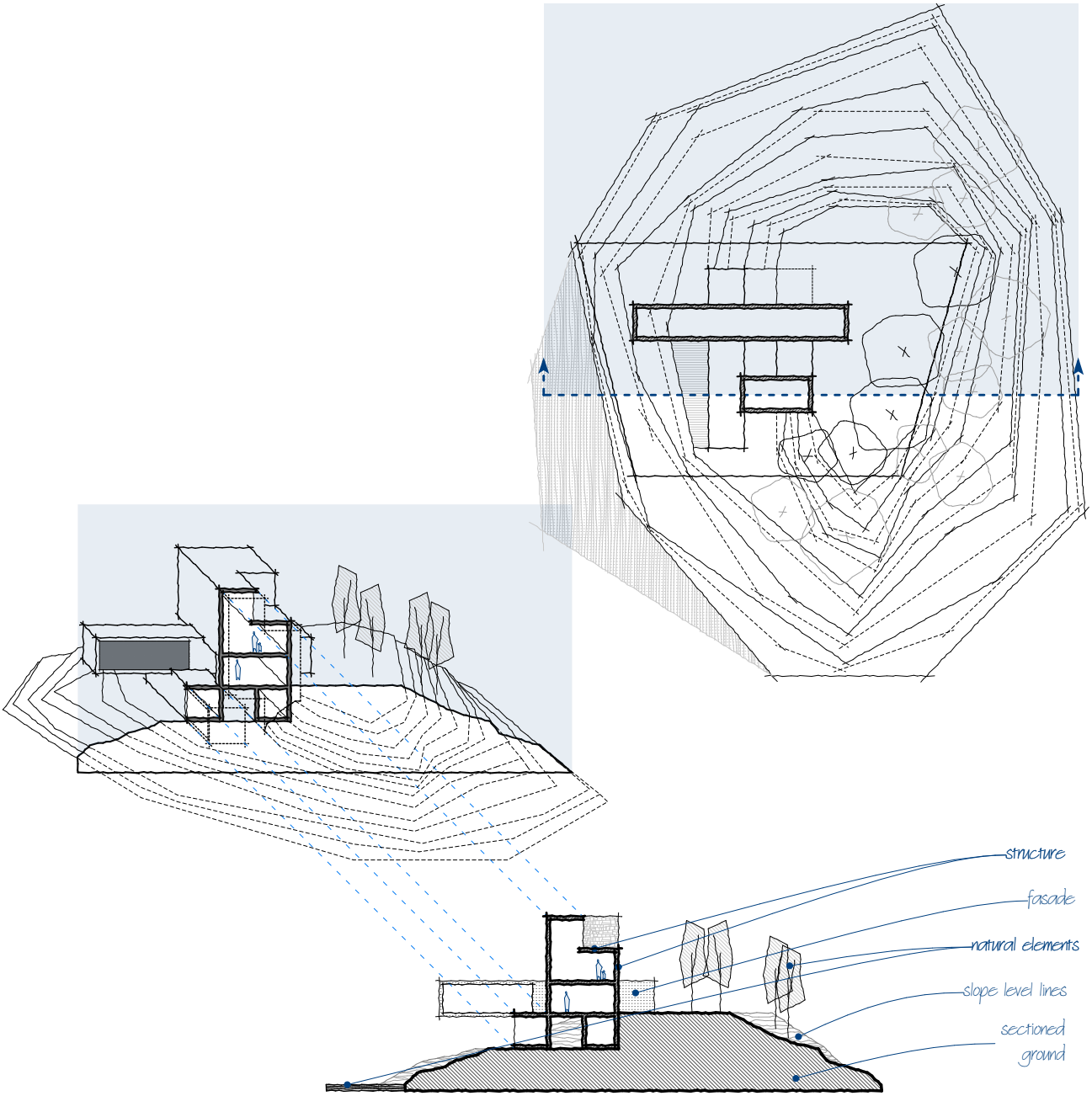
Architectural graphing



Erika Vörös

Architectural graphing

Pécs

2020

The Architectural graphing course material was developed under the project EFOP 3.4.3-16-2016-00005 "Innovative university in a modern city: open-minded, value-driven and inclusive approach in a 21st century higher education model".
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Az Architectural graphing tananyag az EFOP-3.4.3-16-2016-00005 azonosító számú, „Korszerű egyetem a modern városban: Értékközpontúság, nyitottság és befogadó szemlélet egy 21. századi felsőoktatási modellben” című projekt keretében valósul meg.
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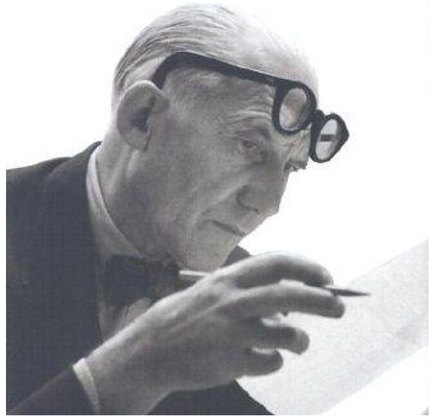
Architectural

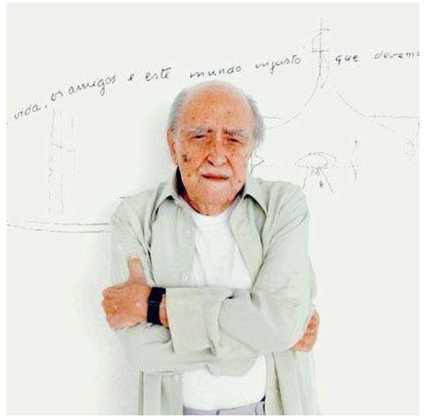
*Graphing_*

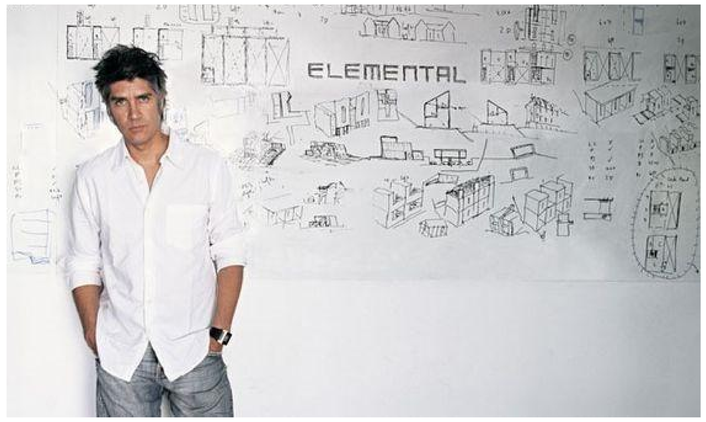
Architecture is a peculiar profession whose practitioners speak a specific common language. Its speciality is that it contains no words, sentences, not even sounds, yet it is used and understood by all initiates. In this particular language, one cannot write or read in the literal sense of the classic, common way. This common language is drawing.

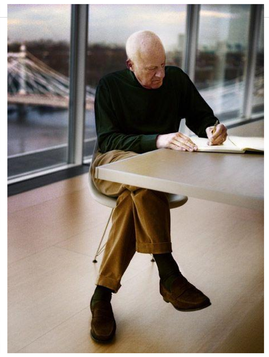
Drawing is the most important tool of architectural expression. The first ideas and concepts appearing in our thoughts take shape in the form of a quick sketch. Which is also a kind of drawing. Or the final, mature technical drawings, developed to the fullest extent, also belong to this common language. The point is that regardless of scale or elaboration, these drawings carry information that can be interpreted by all professionals, as they have learned to read and create with this common language. That is why an architectural plan can be interpreted anywhere in the world without any oral or written addition.

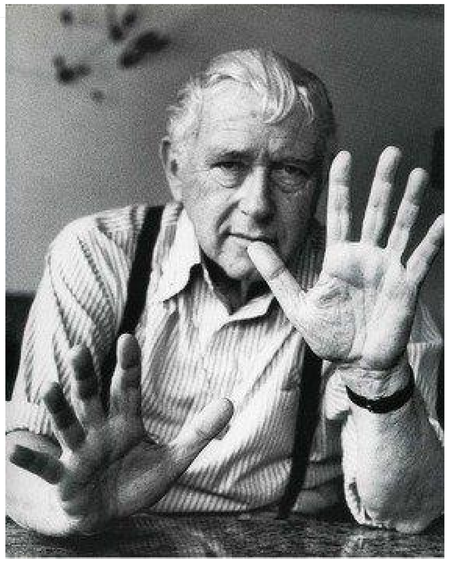
Of course, everyone shapes it into their own image, they speak the drawing language according to their own taste, but the basics of representation are the same everywhere. If we are aware of the basic rules and are able to apply them when drawing an idea, a plan, then anyone within the profession can interpret it. And this is also true vice versa. In possession of this knowledge, we can read and interpret the creative thoughts, ideas, plans and architectural attitudes of other architects through a drawing. When we already know the basics of the representation technique and can apply it, we can easily and confidently incorporate our own personalities into the works, we can make their appearance unique. This will make the architect's personality readable through drawings and artwork, or even recognizable through the designer's drawing style. Spite the the fact that all architects and designers work with the same basics of representation, the appearance of their drawings still becomes completely unique and special.

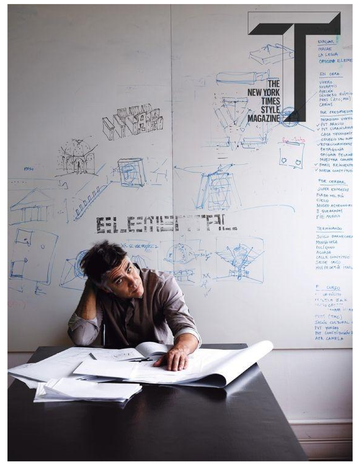





ELEMENTAL



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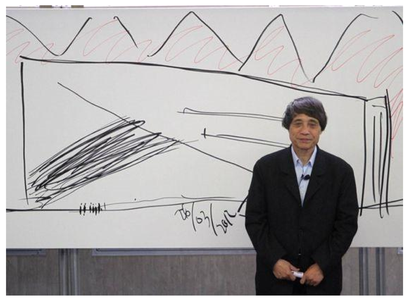


WORLDCRAFT
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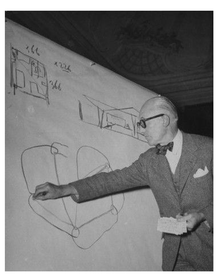
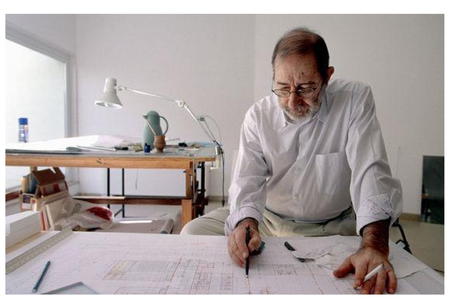
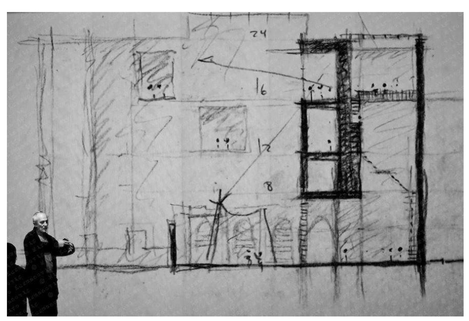
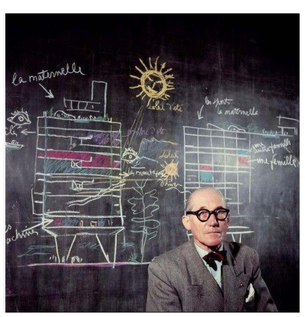






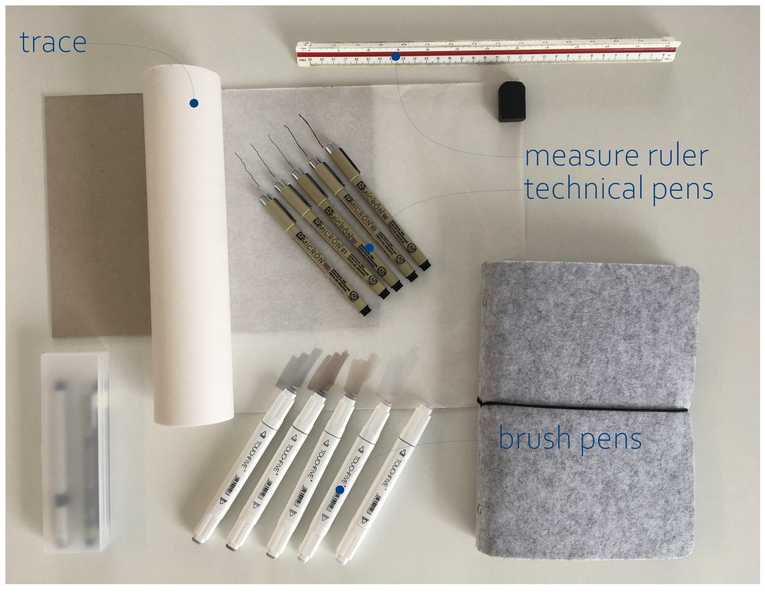

la maternelle

Basic tools of architectural graphing_

_paper

_drawing tool (pencil, felt-tip pen)

_scale



Paper:_

From first thought sketches to design plans, architectural ideas first take shape on paper. There are several forms of categorization of paper, the most important for us are size and quality.

Paper size is determined by the ISO standard. There are ISO standards A, B, and C. In Hungary and Europe, the ISO A paper size is the most common, based on the 1m2 A0 sheet size (841 * 1189). Additional smaller paper sizes (A1, A2, A3, A4, A5, A6...) are created by dividing up sheet A0. The aspect ratio is always 1: 1.4142, so folding an ISO standard sheet in half gives you the next smaller paper size.

In terms of quality, the scale is wide and in this manner it is all about sheet thickness, which we measure in g/m3. The best known and most widely used paper quality is 90 g/m3, also known as photocopy paper used in architecture to document digital designs. Thicker papers can be used for individual quality requirements up to 450 g/m3. Above this , we are talking about cardboard. The most important tool for architectural activity, the most commonly used type of paper in design, is the sketchpaper. Its transparency greatly facilitates the design process. The drawings of the lower layers are transparent on the superimposed sketch sheets. Design is a process whose current stages and evolution can be easily traced with the sketch layers.

There is no need to constantly redraw the parts that are already thought to be good/final in its current state. It is enough to put another layer on the existing drawing and rethink, redraw the parts to be redesigned. In addition to its transparency, its roll packaging makes it really practical, when we must determine the size by tearing the paper. Be careful to tear the roll with proper edges and do not work on shredded paper. Waste as much sketchpaper as necessary, it is a working paper. We use it to outline all our ideas and thoughts on it. It tracks the design process from dead-ends through sub-solutions to the end result.

Drawing tools_

Our most commonly used drawing tools are pencils, fountain pens, felt-tip pens, pens, but this can also include ink and various watercolor. An architectural plan contains a wealth of information, some of which are important or less important. However, this does not mean that the less important should not be depicted. This wide variety of data should be displayed in such a way that in each case the most relevant information appears first in the drawing. Other information, based on its significance must be put more in the background. This creates a kind of hierarchy in the drawing, defined by several line thickness and type. An architectural drawing is considered to be good when it can be easily and quickly interpreted and read. This largely depends on the dynamics of the drawing, which is determined by the relationship between line thicknesses, fills, textures, and the relatation of drawing elements (vegetation, man, environment). The drawing tools can be used separately or even in a mixed way, the point is to facilitate the correct interpretation of the drawing, while also displaying our unique representation techniques.

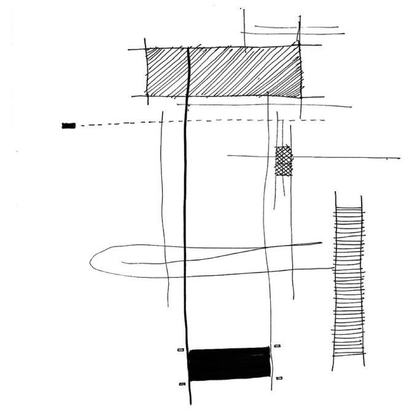
Scale_

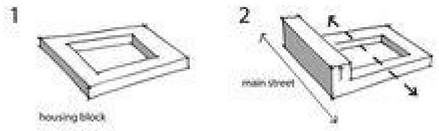
A scale is called the proportion, or rate of change to a plan. There are scales of different sizes that are needed in an architectural representation because we cannot draw the planned building in its actual size. Therefore, it is necessary to downscale the actual size keeping its proportions. The extent of this reduction is the scale, proportion, or adjustment ratio. The sign of the scale M, is a ratio showing the fraction of the original drawing. In architecture, the depicted drawings size is reduced from the original, we draw it in a smaller size. However, in some design professions (industrial design) where the designed objects are small, it is often necessary to draw in a larger size than the original so that details become visible. From the proportion and scale we can read that the given drawing has been reduced, enlarged or made to the same scale as the original.

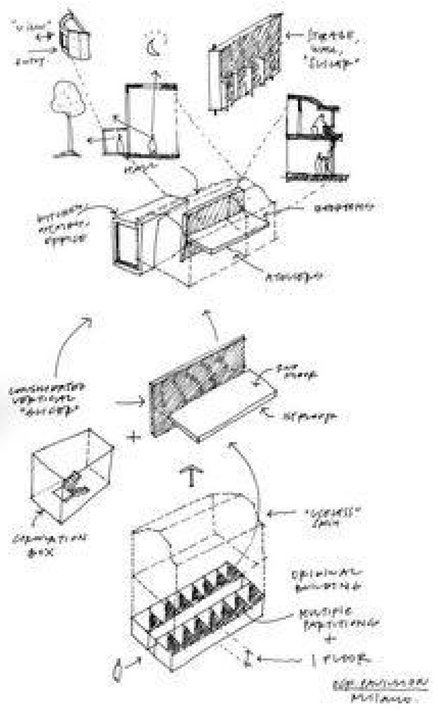
Drawing types_

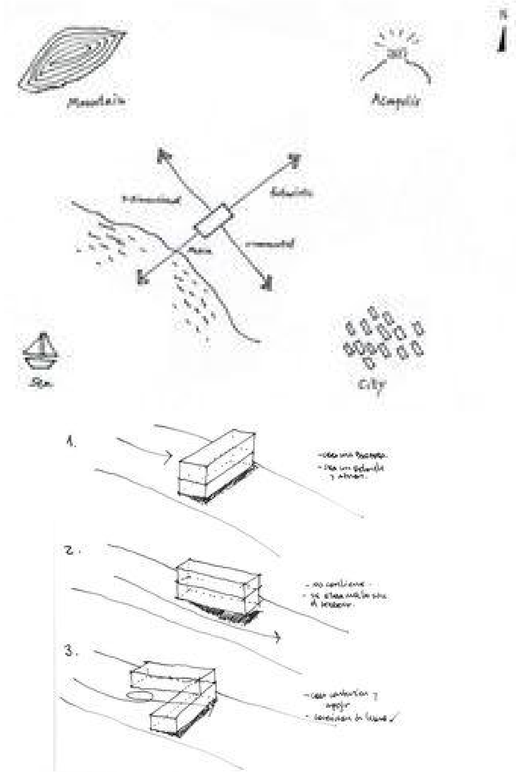
Architectural graphing is always looking for the simplest way of image editing, in which it is possible to clearly display the given shape, plan and read dimensions from it. Every drawing must be clear and unambiguous so that it can be interpreted by others as we originally envisioned it. An incorrect representation or a poorly read drawing will result in a wrong picture of the plan.
In architectural representation, we distinguish between 2-dimensional and 3-dimensional drawings, respectively, which have their own rules of graphing technology.

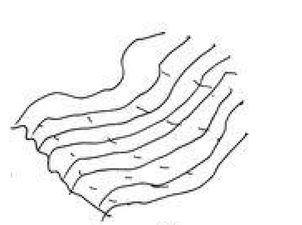
2D drawings are made with a projection graphing, where we distinguish between view and sectional drawing. Representations are technically completely identical, only there is a difference in their relative position to the depicted item. In case of a view, the image plane is usually located around the building (object), its position can be vertical or horizontal. In case of a sectional drawing, the image plane is usually goes through the building (object), its position can be vertical or horizontal. In case of 2D drawings, parallel projection rays are used, which display a given projection drawing on an image plane perpendicular to them. The extent of the image plane is infinite, so we determine its size so that we still get a relevant image of the given projection. This is called the parallel rectangular projection. It is dimensionally correct and shape-retaining, that is why we use it in architectural representation.
Views: site plan, facade
Sectional drawing: floor plan, section

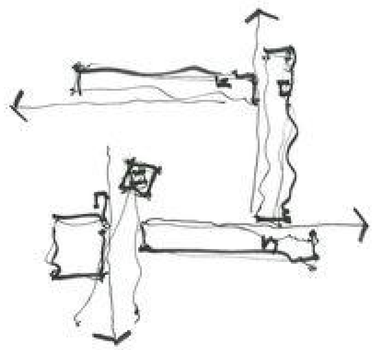


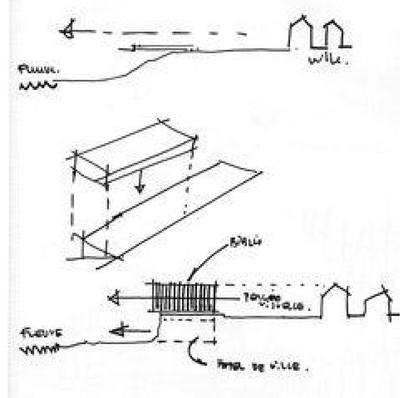

1
housing block
2
main street
3
water
open
4
terrace




Mountain
Acropolis
Sea
City
1.
2.
3.



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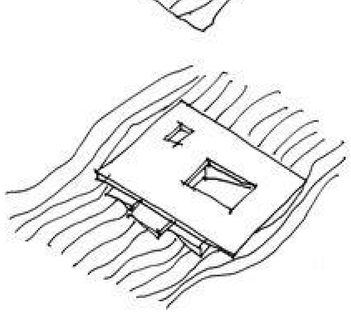
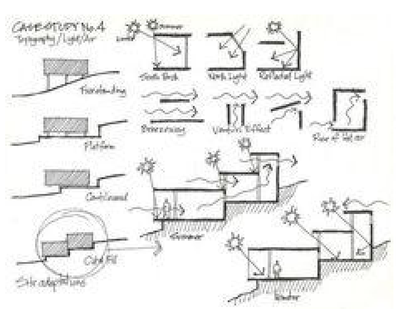
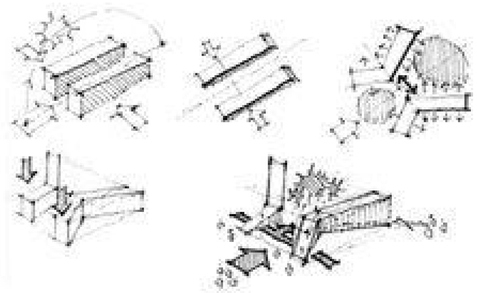
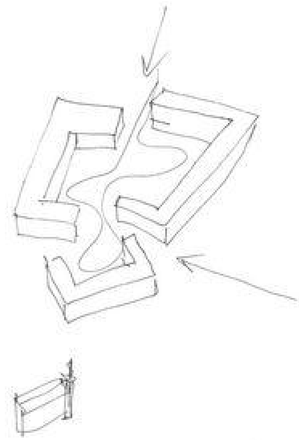



CASE STUDY No.4
Typography / Light / Air
Foundation
Platform
Courtyard
Site adaptations
Natural Light
Ventilation
Shelter





Site Plan_

what_ why_ what do_ how_

What is a site plan?

The site plan is a top view of the building you want to represent. Since it is a view, the image plane does not pass through the building, it is located above it. Since 2D drawings are made with a parallel perpendicular projection, in case of a site plan, the projection rays arrive perpendicular (therefore vertically) at the horizontal image plane (from above the building) i.e. we look from above at the building and its surroundings.

Why draw a site plan?

A site plan is a projection drawing that is suitable for showing the location of a planned building in the design area. This projection representation shows a context that has a fundamental influence on the building to be designed. From this it can be deduced why given building is planned exactly to a place. The site plan sheds light on basic relations and on the relationship between the planning area and the planned building, it also presents the features of the site, which the architect must take into consideration during planning. Horizontal external dimensions (distances) can be read from the site plan. Topographical and other features provide the basis for planning, so the first analysis' that help with planning are made with this scale and projection.


top view of the building

What do we display on the site plan?

On a site plan, we display everything we see from a top view about our building and its area, even underground elements that are not visible otherwise.

-contour lines and roof profiles of planned and existing building masses

-travel surfaces (road, sidewalk), terrace, retaining wall, swimming pool

-natural elements: vegetation (trees, shrubs, grassed surfaces) water surface, rock

-development area boundary line (plot boundary)

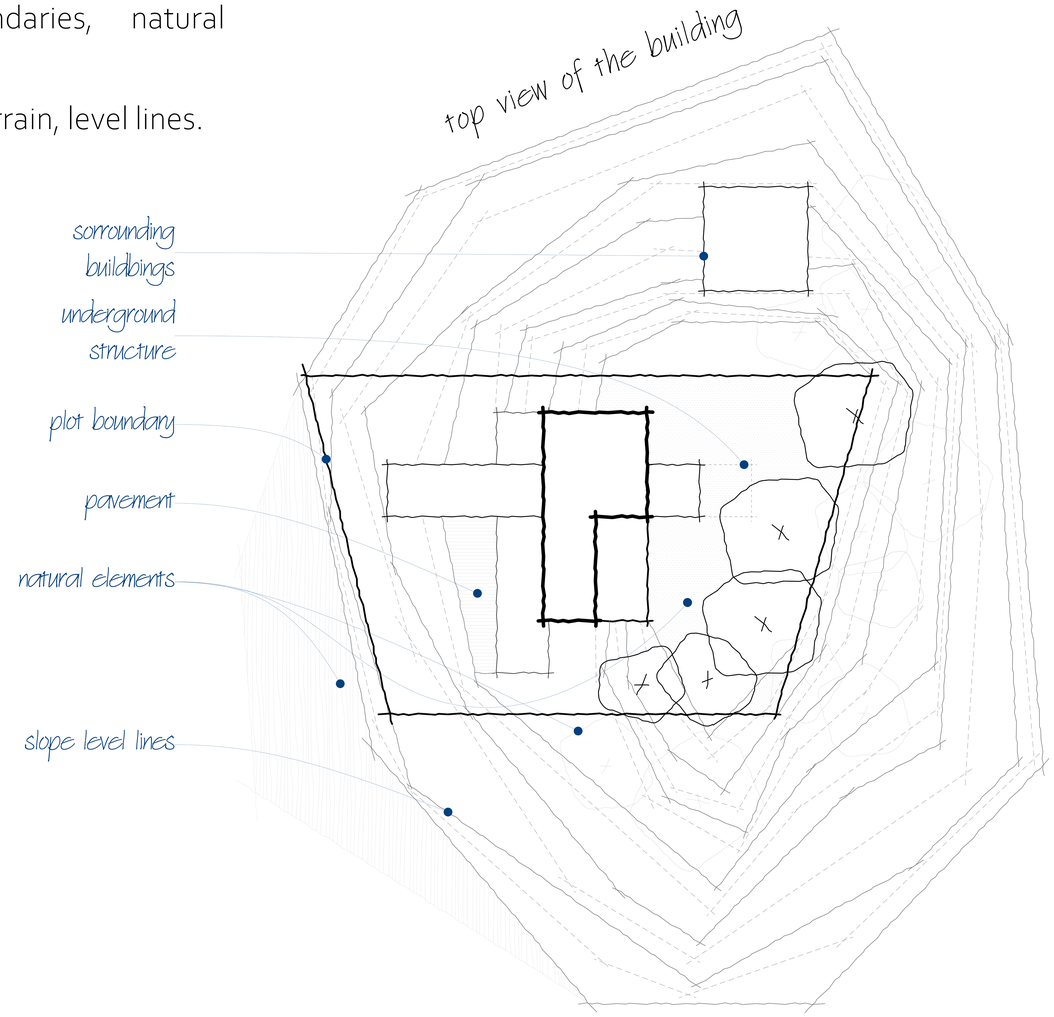
-sorrounding buildings, plot boundaries, natural elements.

-terrain conditions: in case of sloping terrain, level lines.

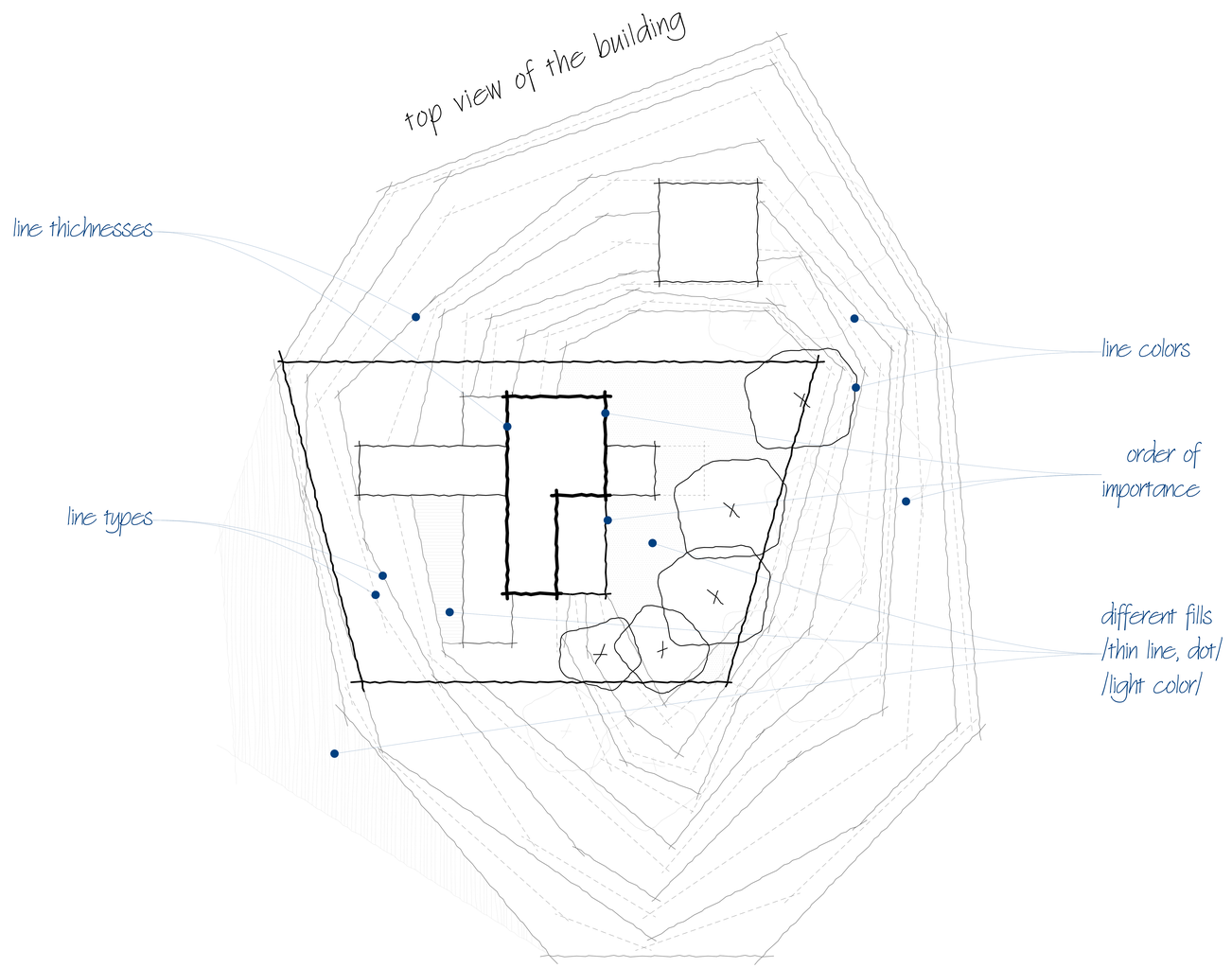
-invisible underground structures

How do we draw a site plan?

When creating a site plan, two types of criteria need to be coordinated in order to get a real, all-encompassing, easy-to-read drawing. In terms of perspective, elements closer to the image plane obscure those behind them that are farther from the image plane. In case of a site plan, for example, the canopy of trees may obscure some of the buildings below them, or certain areas of traffic surfaces, terraces, terrain lines.



So higher elements (closer to the image plane) obscure those below them (farther from the image plane). However, representation technically cannot allow important elements such as the building or part of it not to appear on the site plan. In addition to the order of visibility of the drawn elements, there is also an order of importance, which must also appear, so that it does not modify or make the other system of criteria unclear. To be able to meet both criteria at the same time, we need to use graphical tools.This includes different kinds of lines, line types, and fills, even different colors. Of all the architectural drawings, site drawinga are made in the smallest scale, (M1: 200. M1: 500, M1: 1000) as it has to present a large area. We are talking about a view on a small scale, where we see surfaces and line elements to be represented. Therefore, it is important to learn how to graphically represent stylized surfaces and to be able to apply different line types and thicknesses in order to create easy-to-understand site drawings with sufficient graphic dynamics.



Floor Plan_

what_ why_ what do_ how_

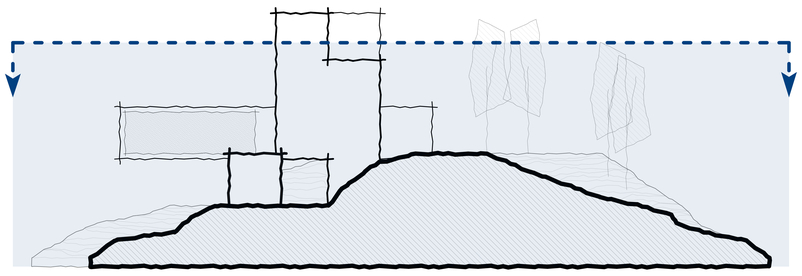
What is a floor plan?

The floor plan is a horizontal sectional drawing of the building to be represented. Since we are talking about a sectional drawing, the image plane passes through the building, intersects it. 2D drawings are made with a parallel perpendicular projection and in the case of the floor plan, the projection rays arrive perpendicular (meaning vertically) to the horizontal image plane (through the building) so we are looking at the intersecting surface of the building from above, removing the upper part.

Why draw a floor plan?

A floor plan is a sectional drawing that is suitable for showing the functional relationships of our planned building at a given level. It is important, that these functional relationships are understood not only for internal functions but also for external ones. Thus, the drawing of a floor plan does not stop at the representation of the external main walls, it is intended not only to show the connections of the interior spaces, but also the organic connection with the external and transitional spaces. From it we can read how certain interior functions belong to these transitional spaces (dining room + terrace) and how they relate to the green terrain of the plot.

The horizontal image plane is also infinite in this case, so we determine to what extent we want to take advantage of it, how far it is worth depicting on it. We make a floor plan of each level of the building so that we can read horizontal dimensions not only of the external walls and transition spaces of the building, but also of the internal space distribution. In architectural design, we think simultaneously in several dimensions, floor plans, sectional drawings, facades and masses. They all affect each other, they form and shape together. After analyzing the site plan, in response to it, the floor plan analysis follows, where we look for the appropriate place of the external and internal functions in relation to each other and their environment based on several aspects. This analysis includes an examination of the adjacent buildings, the design plot and its features, the position of the equator and forces relevant to other designs. At the same time, even when functions only appear yet as think bubbles and we look for their place, we have to interpret them in their section, because in many cases, due to terrain or other reasons, parts of the building has to be placed on different levels.



plot boundary

slope level lines

natural element

building wall

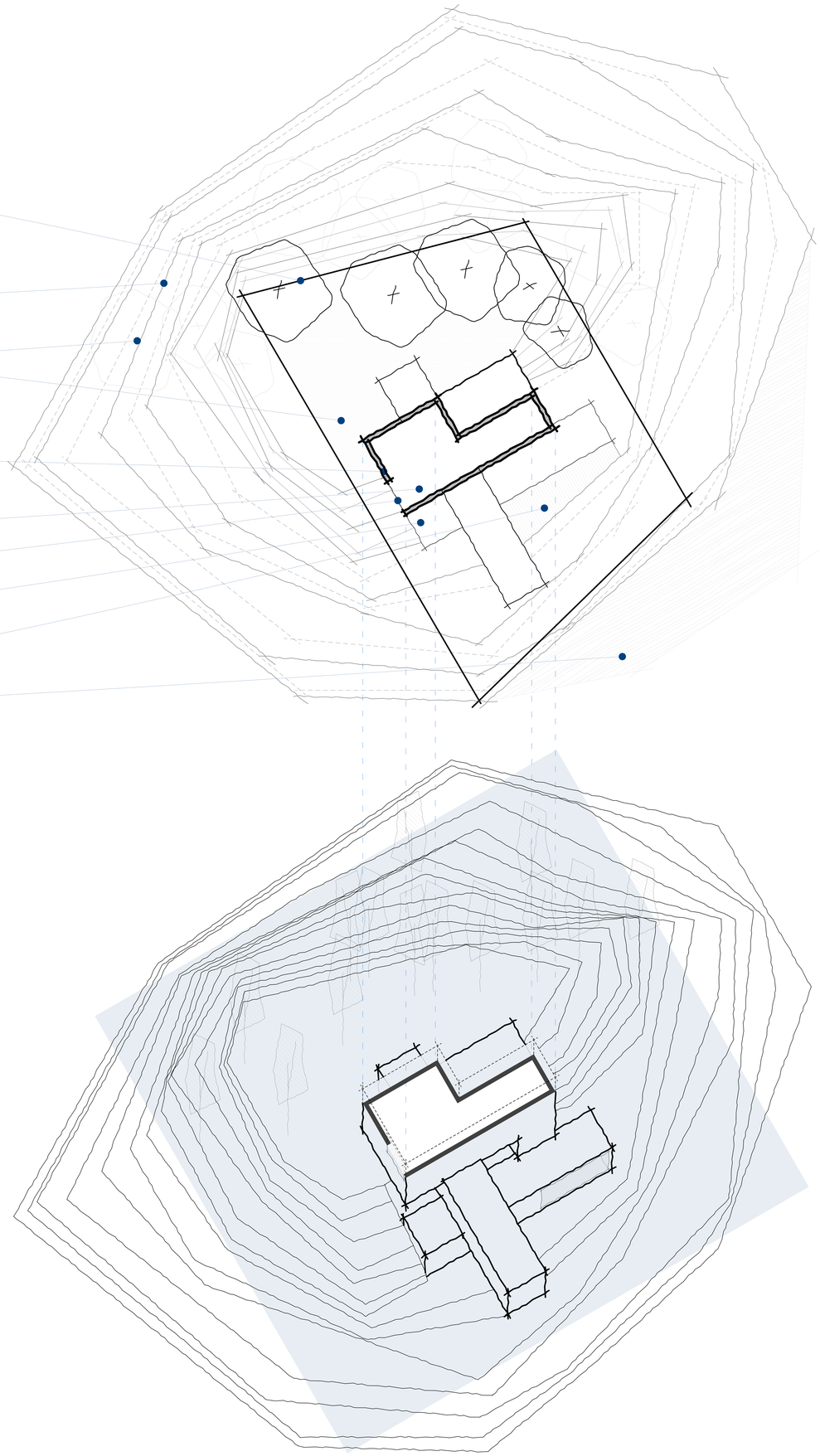
building inside

building window

building roof

pavement

natural element

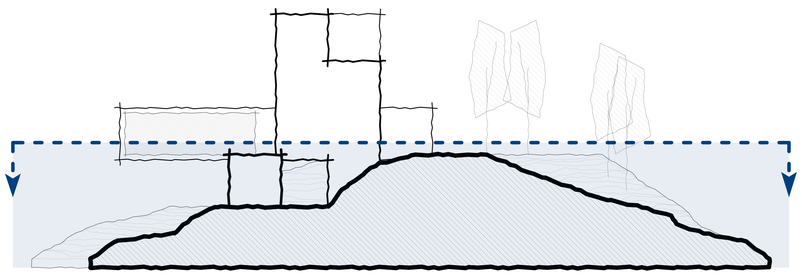


What do we display on the floor plan?

The floor plan is a horizontal sectional drawing of the building and its surroundings, where we see intersecting and not intersecting elements. So there will be parts of the building and its surroundings that the section plane penetrates and we draw an intersecting surface, and there will be parts that it passes over, so we only have to draw in view.

In addition, we also display elements on the floor plan that appear neither in section nor below the section plane in view. These elements are located above the section plane, so in the case of a floor plan we not only look downwards, but also certain elements of the upper, cut-off part of the cut mass must be drawn. These are the structural elements and planejumps above the section plane.

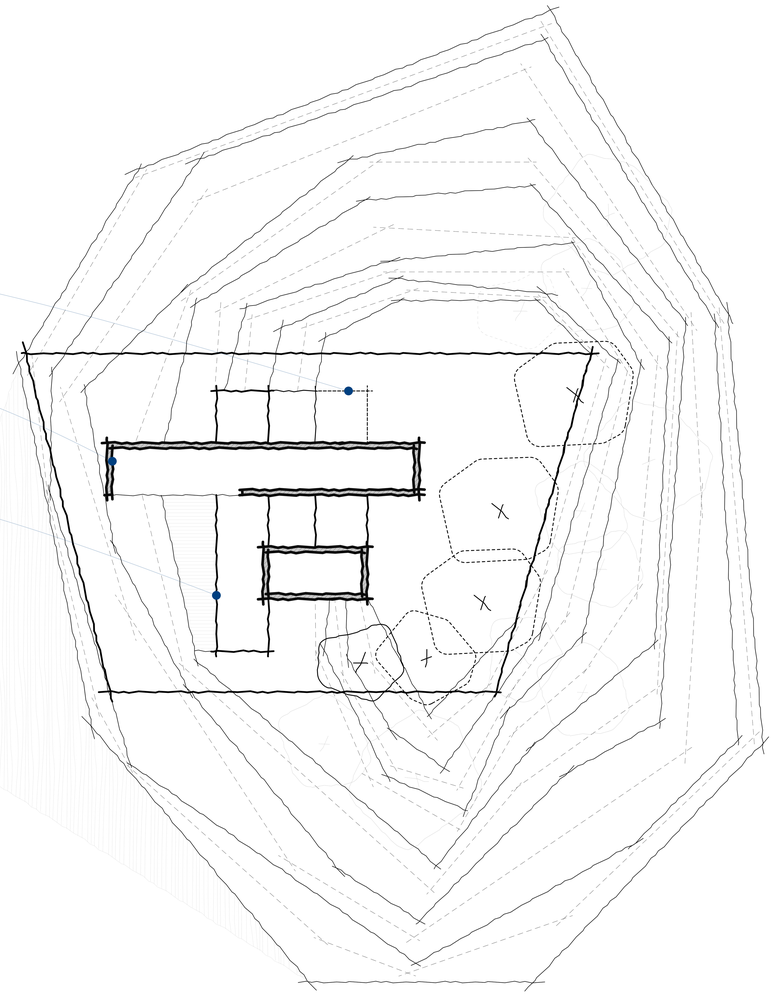
-sectioned structures: terrain, walls, pillars, doors and windows, stairs, roof, built-in furniture
-view elements: non-built-in furniture, sanitary ware, view terrain, stairs, roof, cladding surfaces, cornices, vegetation.
-invisible elements above the section plane: structural elements, plane jumps, boundary surfaces.

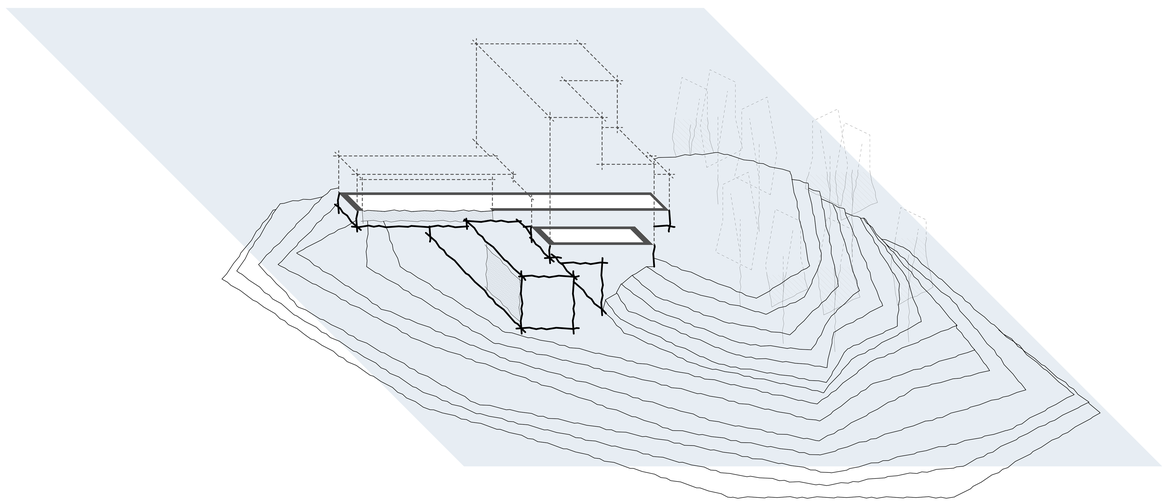


invisible elements
upper structure

sectioned
structure

view elements





How do we draw a floor plan?

In case of all architectural drawings, in addition to the correct representation, the dynamics of the drawings, i.e the hierarchy of lines and surfaces, are also important. In this ranking, the intersected surfaces always carry the most valuable information, which is why these surfaces are the ones that need to be seen first on the floor plan, all other information comes after. So the texture and lines of the intersected surfaces are most dominant in the drawing. By displaying these surfaces differently, we can provide additional information with respect to their material. Thus, intersecting structures made of different materials can be displayed with different textures, according to the scale of the given drawing. In general, the dominance of these intersecting surfaces lies in the strong contour lines and intense hatching. All other information in the drawing, like surfaces seen in the view, are highlighted with thinner and even fainter lines and textures. In case of textures, it is important to mention that in addition to the design and scale of the surfaces, the drawing dynamics is also influenced by the distance from the viewing plane. In representational order, after the elements seen in the view come the unseen structures above the section plane. These structural elements, delimiting surfaces, plane jumps and protruding elements are always shown only with dashed lines. To make the drawing clear, avoid using the dashed line elsewhere, or distinguish them by using longer and shorter dashed lines. Adhering to these, the essence of the floor plan, the engraved surface, stands out from the drawing. The individual style of drawing and representation greatly determines how this dynamic is realized. The inverse of the above-mentioned technique can also be functional (well-developed environment, empty intersecting surface) if the goal is achieved.

From a graphical point of view, it is important that not only the thickness of the lines have a ranking role, but also the type of lines.

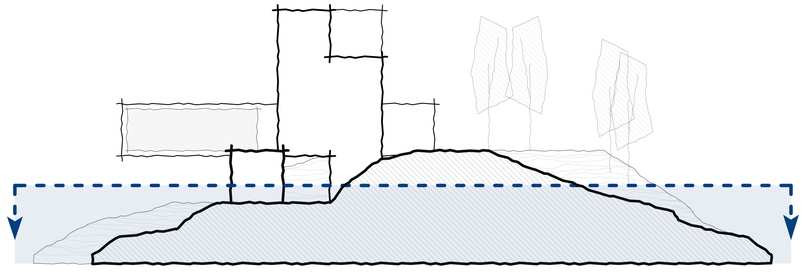
The solid line carries primary information, in case of sectional drawing and view, it is the boundary line, the contour line of an actually seen surface.

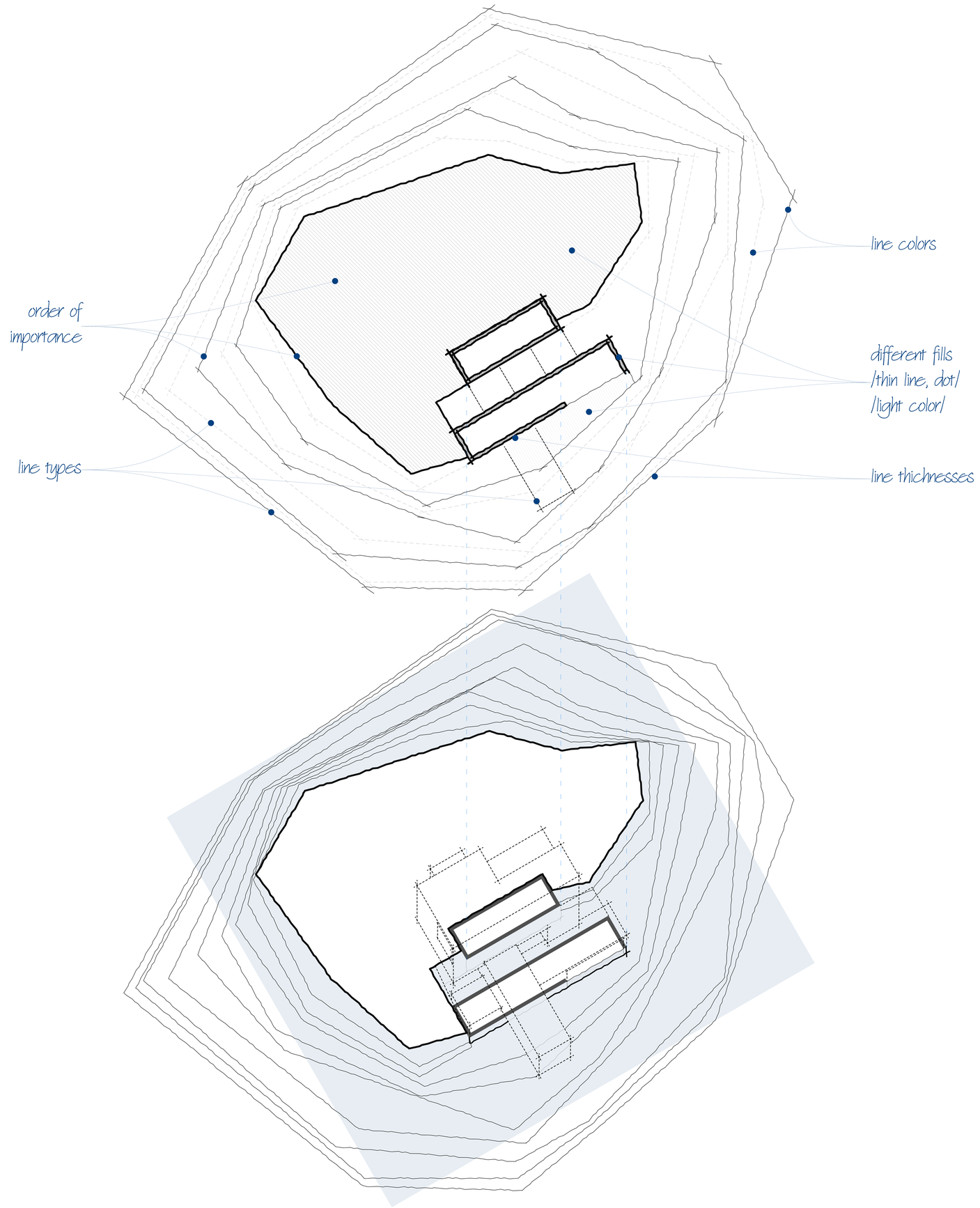
The dashed line is a secondary information carrier, it represents the invisible edges and contours.

Dotted lines represent the axis and centerline, as well as the location of the section plane on the floor plans.

Dotted line, can be used to draw secondary contours and edges.

We make a floor plan of each level of the building. The position of the floor plan section plane is relatively fixed, in each case it is 1 m above the inner floor plane of the given floor plan level, but in the meantime it intersect all the openings. In this case, the height of the section plane changes, jumps up or down to the appropriate representation level of the door, and then passes through it again at a height of 1 meter.




line colors
order of
importance
different fills
/thin line, dot/
/light color/
line types
line thichnesses

Sectional drawing_

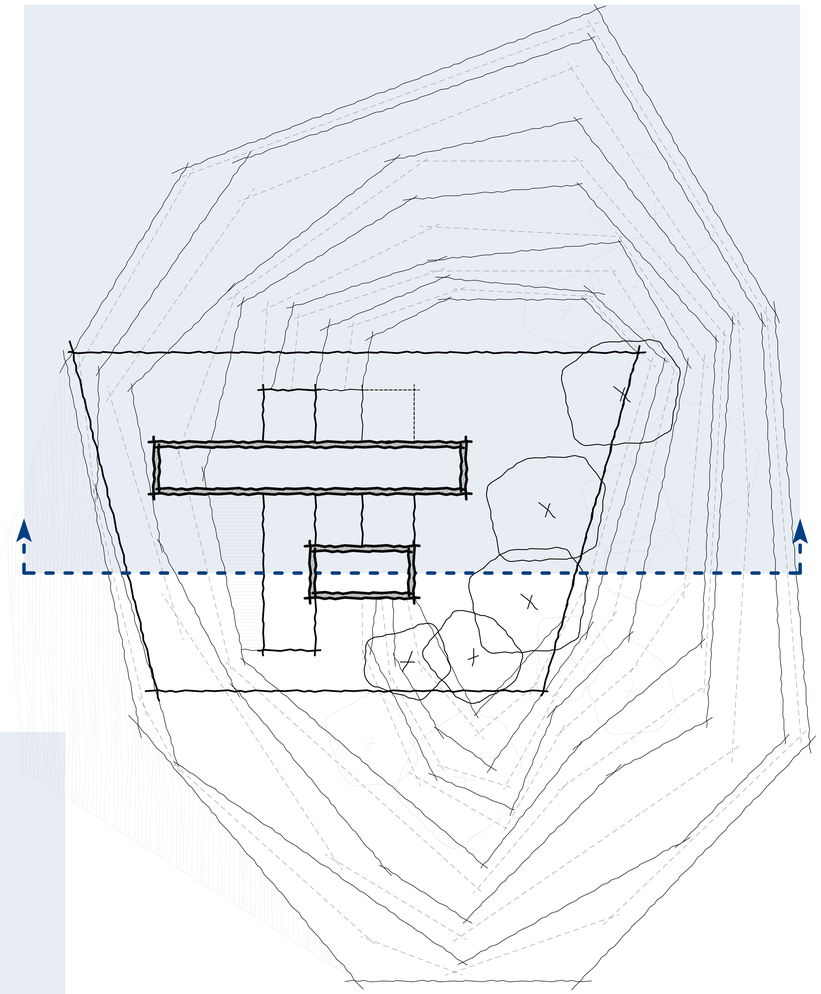
what_ why_ what do_ how_

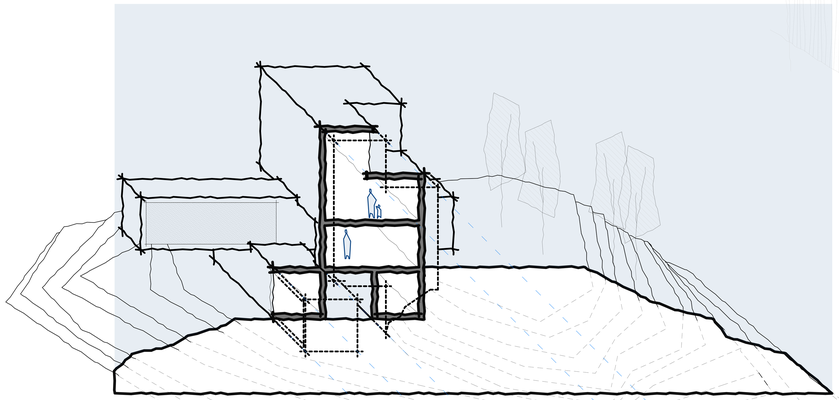
What is an sectional drawing?

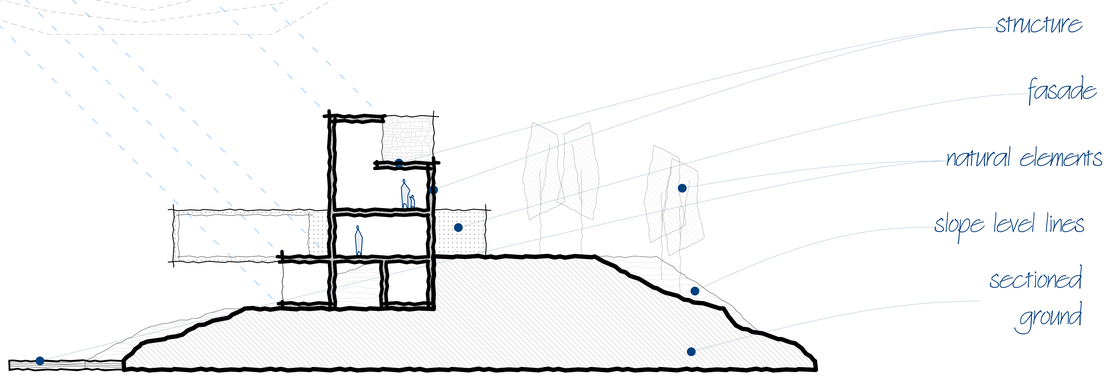
A sectional drawing is a vertical sectional-drawing of the building and its surroundings to be represented. Since we are talking about a sectional drawing, the image plane passes through the building and its surroundings, intersects it. 2D drawings are made with a parallel perpendicular projection, in the case of a sectional drawing the projection rays arrive horizontally (therefore perpendicular) at the vertical image plane (through the building), in other words perpendicular to it, so we look at the intersecting surface of the building and its surroundings from the side. Not only the position of the section plane should be determined, but also its direction, i.e., which side of our intersected element we are looking at.

Why draw a sectional drawing?

The sectional drawing: is the mode of representation that shows the vertical connection system of the building not only inside the building, but also in relation to the external spaces beyond the external partition walls. Because the sectional drawing is an infinitely long image plane and in its given position everything goes through it, the designer must determine the dimensions of the drawing to be plotted so that it contains all the necessary information. The sectional drawing is the projection that shows the structural relations of the building, how things are built on each other and their system of relation. In addition, the vertical composition of the functional relationships of the building and the vertical transport possibilities are also revealed in the position of the given section plane. Height readings can be read from a sectional drawing, but horizontal distances can also be measured. In the case of sloping terrain, it is essential to make a section parallel to the direction of fall in order to make the movement of the terrain visible and measurable. We need such sectional drawing to see how our building can fit into the existing slope and what landscaping is needed. The sectional drawing is also suitable for making a sun test according to the given equator, ie it reveals to what extent the interiors and functions must receive lighting and heat load in a certain season, or if it is necessary to use shading structure.






structure
fasade
natural elements
slope level lines
sectioned ground

What do we display in the sectional drawing?

The method of drawing a sectional drawing is very similar to the floor plan, since in both cases the representation of a sectioned building and its surroundings is the point, only the position of the section plane is different.

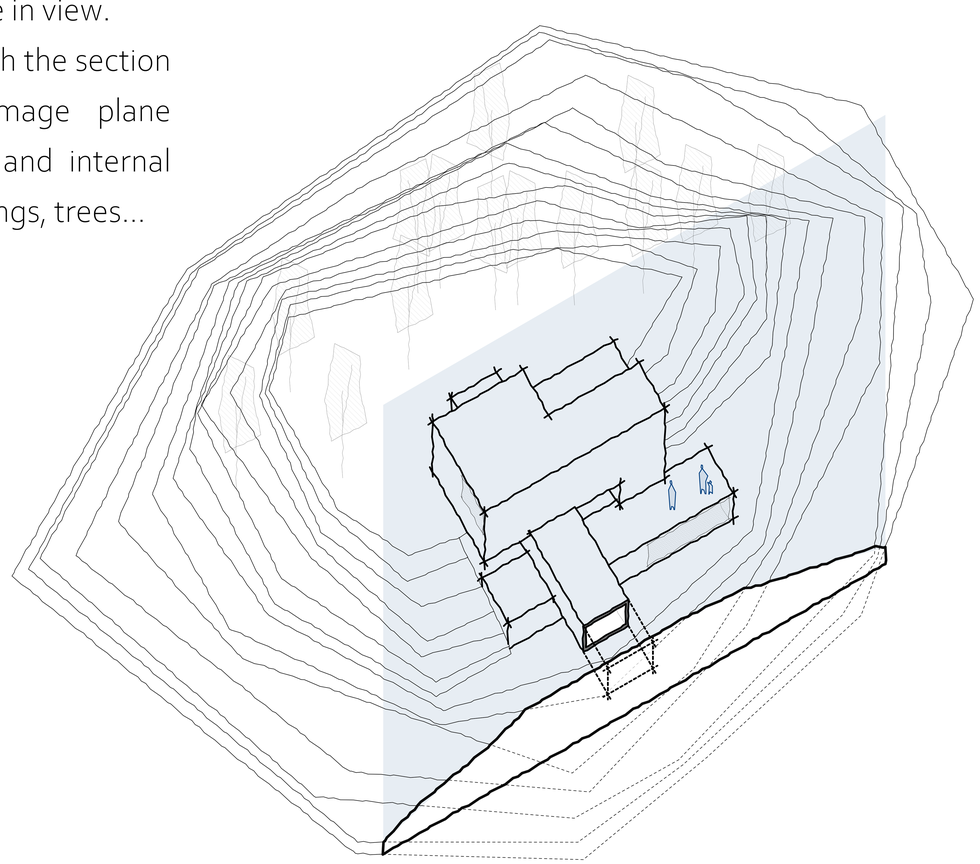
When making a sectional drawing of a building and its surroundings, the section plane must always pass through a part of the building, cutting it. As a result, there will be surfaces in the drawing that we see as intersected surfaces from the building and its surroundings, and there will be ones that are in view.

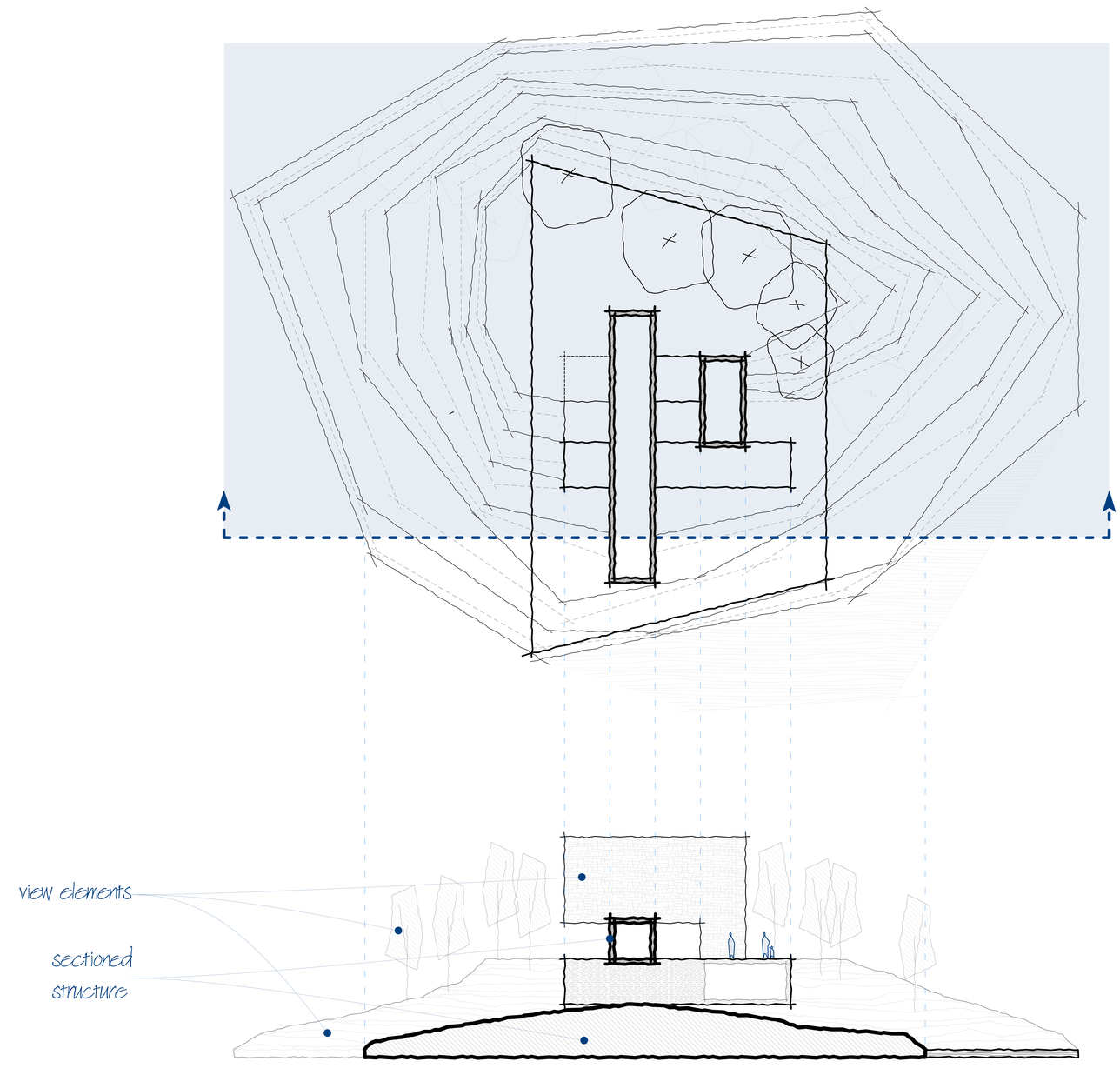
In those parts where it does not pass through the section plane, but in the direction of the image plane (determined by us) we can see external and internal surfaces, space movements, adjacent buildings, trees...

Since we determine not only the location but also the direction of the section plane, elements seen and intersected in the direction must be drawn.

Intersected structures: foundations (excluding point foundation items), walls, ceilings, beams, roof structure, stairs, ramps, doors and windows, soil, built-in furniture

Elements seen in the view: adjacent building, facade of own building, planar displacement, doors and windows, people, vegetation, terrain

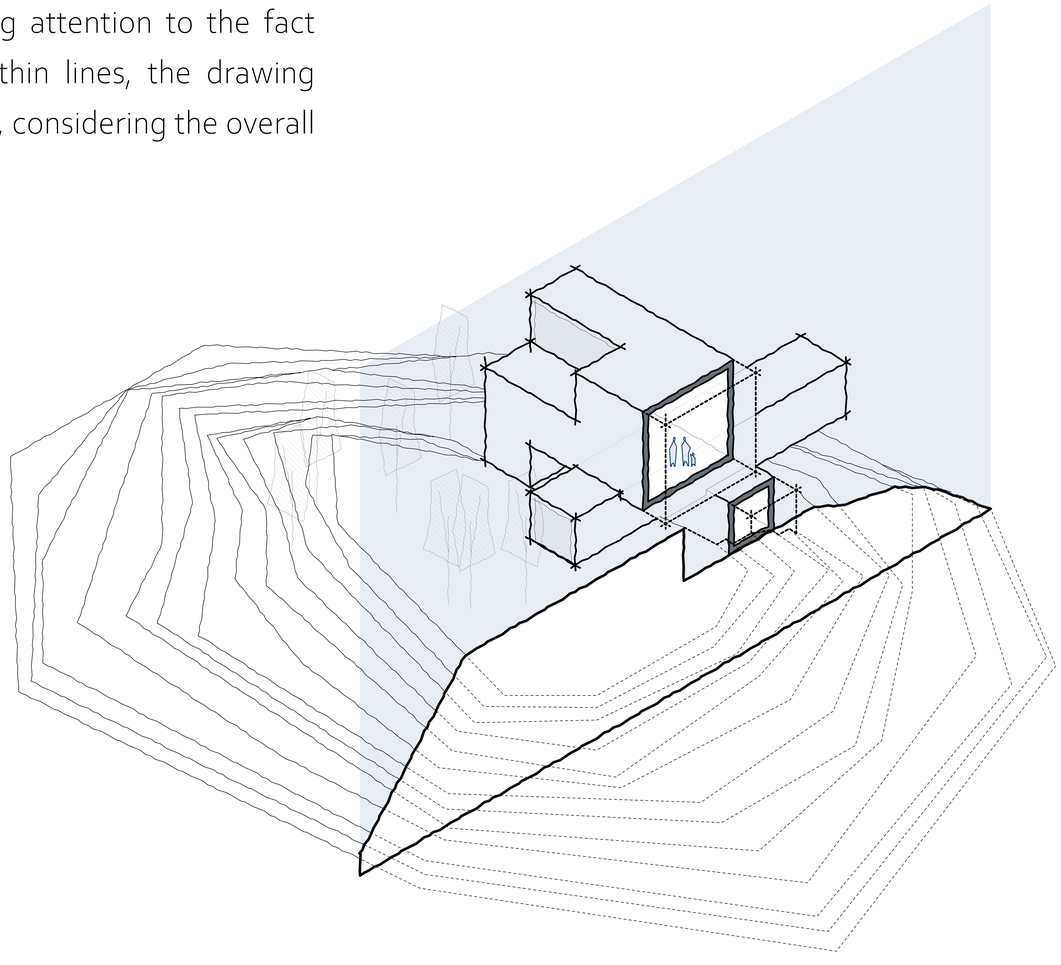



view elements
sectioned
structure

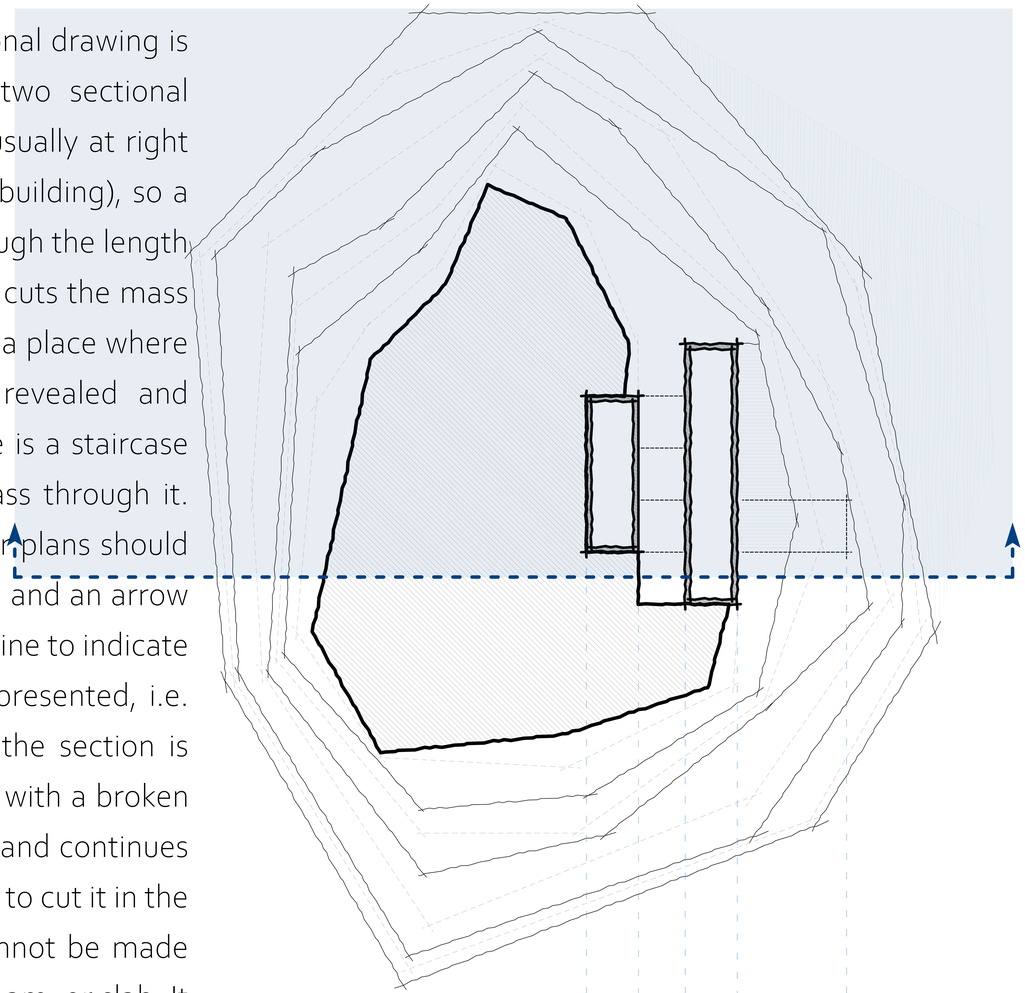
How do we draw a sectional drawing?

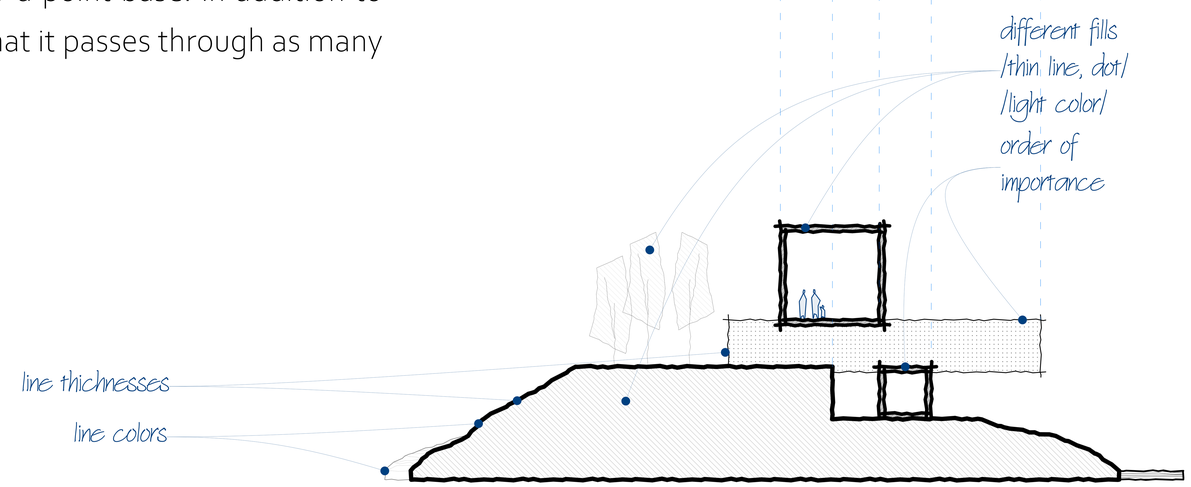
The graphical method for drawing a sectional drawing is largely the same as the floor plan, for in both cases we represent surfaces that are intersected and seen in view. A sectional drawing contains a lot of information, and we have to rank them with well-chosen graphic tools and techniques. The most valuable and important data is provided by the sectioned surfaces, so they should be the most visible in the drawing. This is followed by all lines and textures seen in other views. For textures seen in a view, we always try to display a drawing of a real surface. These surfaces are represented in a stylized, simplified way, while also paying attention to the fact that in addition to the use of thin lines, the drawing density of the surface is accurate, considering the overall graphic dynamics of the drawing.

The thickness of the lines used should also reinforce the drawing hierarchy, so thicker lines and denser textures tend to belong to sectional surfaces, while thinner lines and less dominant fills belong to view sections. Environmental elements, such as vegetation and man, should also be depicted when making sectional drawing. When drawing trees, care must be taken to match their size and graphic to the overall drawing dynamics. The primary role of human representation is to facilitate the interpretation of the scale and size of a building without having to read dimensions from the plan.



For proper understanding at least 2 sectional drawing is needed for an architectural plan. The two sectional drawings are at an angle to each other (usually at right angles, but depends on the shape of the building), so a longitudinal section is made that cuts through the length of the building and a section is made that cuts the mass crosswise. The building needs to be cut in a place where structurally important connections are revealed and exciting spatial connections show. If there is a staircase in the building, a section must always pass through it. The location of the section line on all floor plans should be marked with a thick dashed dotted line and an arrow should be determined at both ends of the line to indicate which side of the sectioned surface is represented, i.e. where our section is facing. The line of the section is usually straight, but you can use a section with a broken line. In this case, the section plane breaks and continues on a different route in the building in order to cut it in the most exciting places possible. Section cannot be made by passing it lengthwise through a wall, beam, or slab. It is also forbidden to intersect point-like structural elements, such as a pillar or a point base. In addition to this, try put the section so that it passes through as many openings as possible.





Facade drawing_

what_ why_ what do_ how_

What is a facade ?

The facade is a side view of the building you want to represent. Since it is a view, the image plane does not pass through the building, it is located beside it. Since 2D drawings are made with a parallel perpendicular projection, in case of a facade, the projection rays arrive perpendicular on the vertical image plane (beside the building) i.e. horizontally, so we look at the building and its surroundings from the side.

Why draw a facade ?

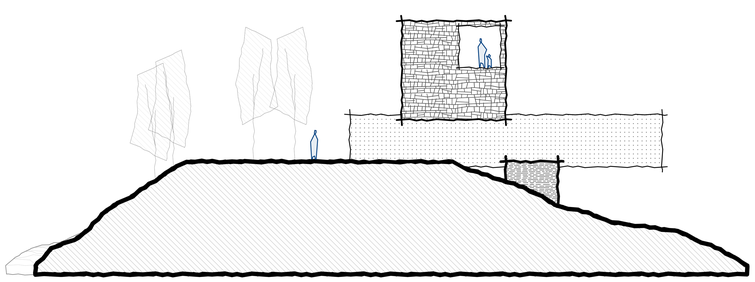
The facade is such a projection drawing that shows the surfaces of our building from the outside. In this case, the image plane is infinitely long, so we need to determine how big of a drawing we are making. Although the facade is not an sectional drawing, but a side view of the building, there will still be an element that needs to be depicted in an intersection, as it actually intersects it. This element is the soil, or in some cases the water surface. Our section plane does not pass through the building, but it still cuts off the ground.Thus, in addition to showing the exterior surfaces of our building, the facade drawing is also suitable to represent the relationship of our mass to the terrain. From the facade drawing we can read about the cladding of the different external walls, the division of doors and windows and the relation of masses to each other. In this context, the facade may be a 2-dimensional drawing, but it helps deducing the 3-dimensional view and mass appearance of the building. We can read the external dimensions of the building from the facades both in height and width.

What do we display on the facade ?

The facade is a view, it does not intersect our building, so we only depict surfaces and edges seen in a view. Exceptions to this are soil and water surfaces, as though we are talking about a view, these elements are intersected.

Elements seen in the view: building exterior wall surfaces with cladding, openings, roof exterior, vegetation, topography, adjacent buildings

Elements seen in section: soil, water surface, adjacent buildings.



fasade materials

doors, windows

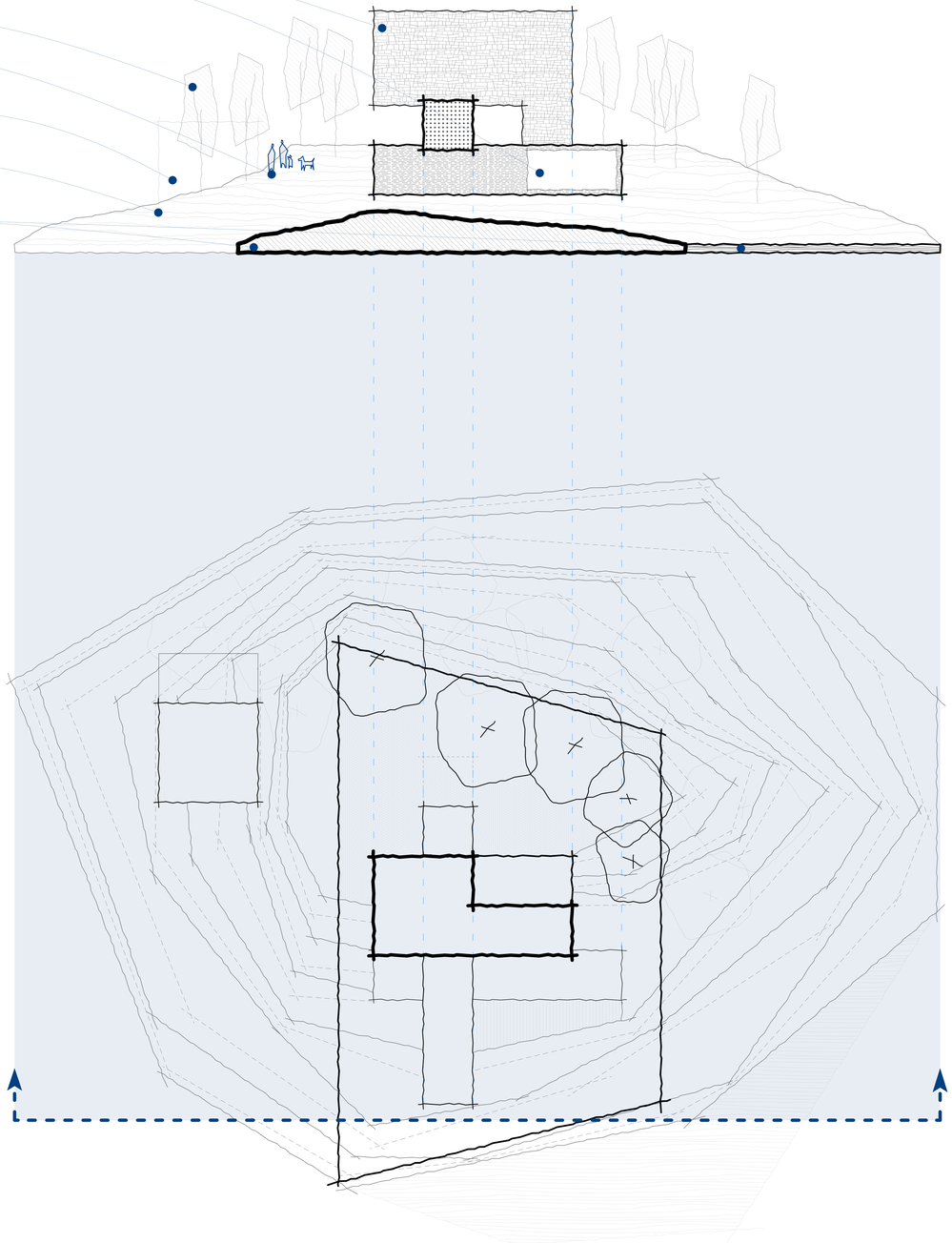
natural elements

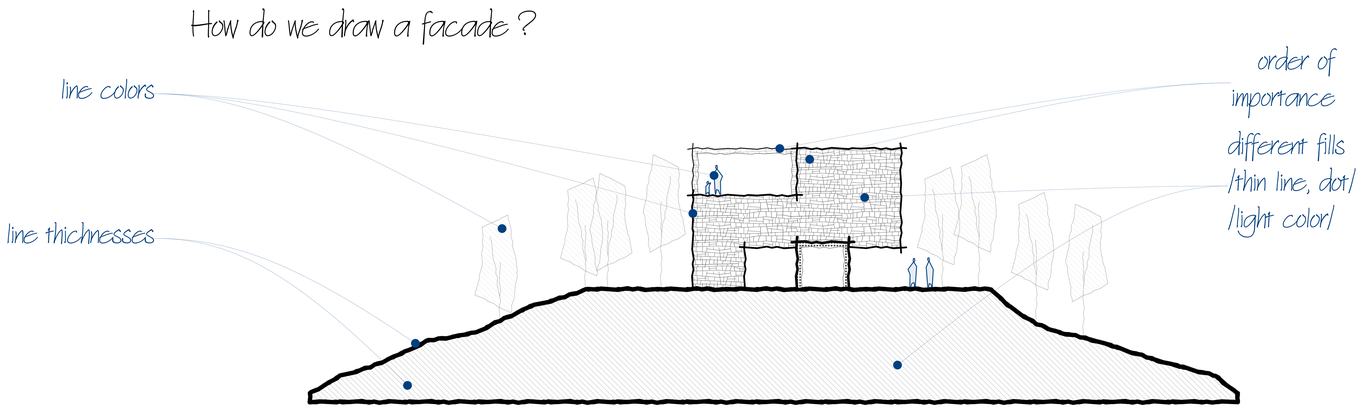
people

sorrounding buildbings

slope level lines

sectioned ground, water



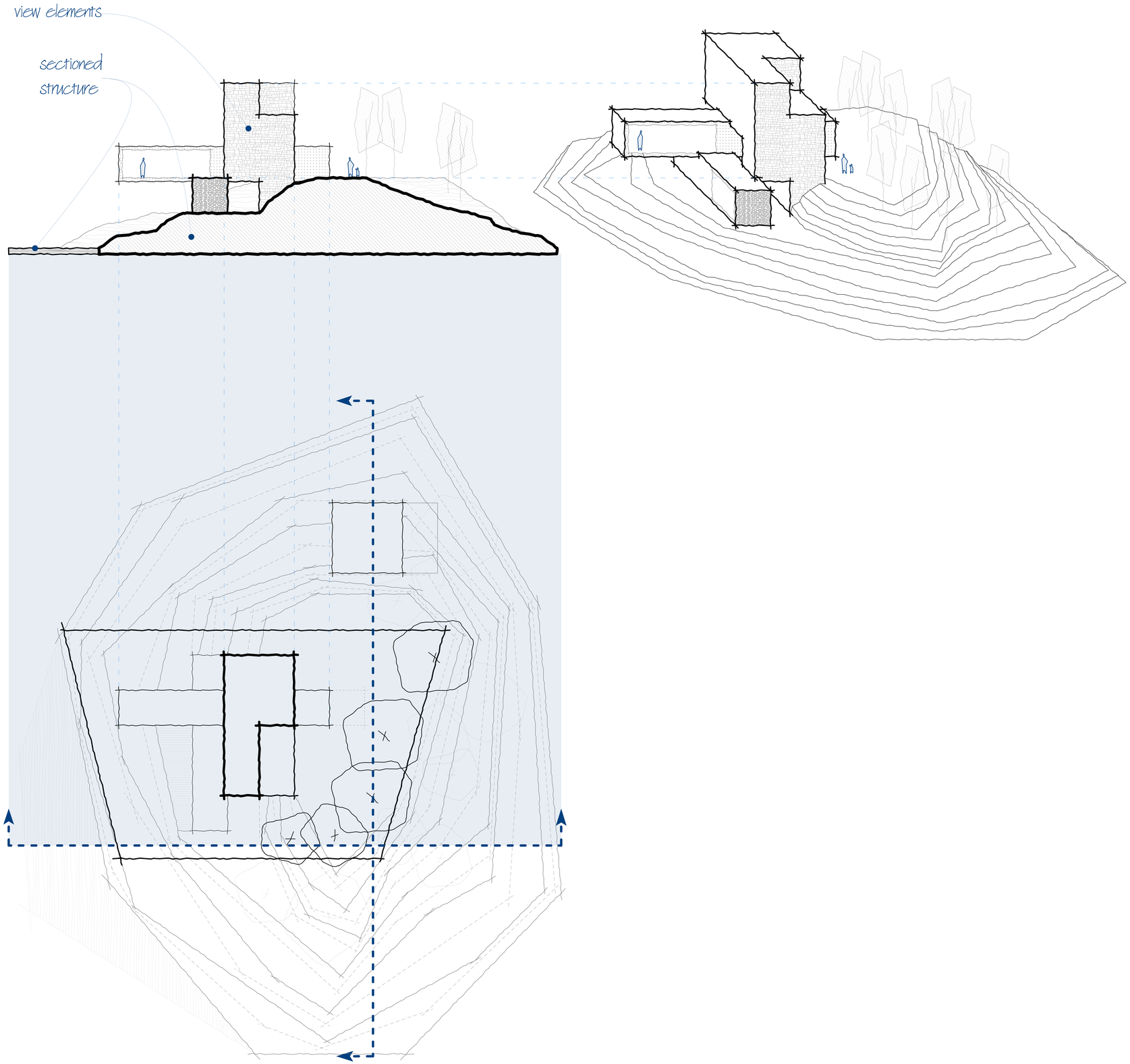


The method of drawing a facade is most similar to that of a site plan, as we depict a significant part of real, seen surfaces and lines. The difference is the soil and water surface shown in the section. Even in the case of facade drawing, it is essential to achieve the appropriate drawing dynamics, i.e. that the drawing has depth. In this case, the drawing depth is not only determined by the order of importance of the information carried by items. The distance from the facade image plane is a significant consideration, as there may be surfaces of the building that are closer to or just further away from the section plane of the facade. So, just as in the case of a site plan, the hierarchy of the drawing representation is determined by two types of criteria, these must be aligned.

Most important regarding the information carried by the drawing is the contour line of the intersected soil, i.e. the line where our intersecting plane penetrates the soil. We always draw this with the thickest line, as it shows the line of our terrain relative to the facade. The intersecting surface of the soil is in most cases marked by dense hatching.

This is followed by the drawing of the external surfaces and facades of our planned building. The emphasis here is on the display of the facade surfaces, as the goal is a stylized representation of the housing we actually see. Stylization and simplification are needed because, on facade drawings made at different scales, for example, tiles with a smaller texture, such as bricks, are difficult to construct in their actual, scale-correct size. Doing so would in many cases give us a very dense, almost unrecognizable surface, which is not graphically permissible. The essence of stylized cover drawing is that we do not draw the given housing one by one, but we simplify the representation in such a way that its real appearance can be recognized or perceived in its density and characteristic division.

In terms of order of visibility, naturally, the position in relation to the picked facade section plane is decisive. The closer surfaces are drawn more strongly, the more distant ones are drawn more faintly, with which we can give a kind of spatiality to a 2-dimensional drawing. This spatiality is given by the proper use of line thicknesses and the correct, stylized design of surface textures.


view elements
sectioned
structure

Axonometric projection_

what_ why_ what do_ how_

What is axonometry?

Axonometry means measurement along axes.

Axis: an imaginary line about which a body rotates

Metrum: measure

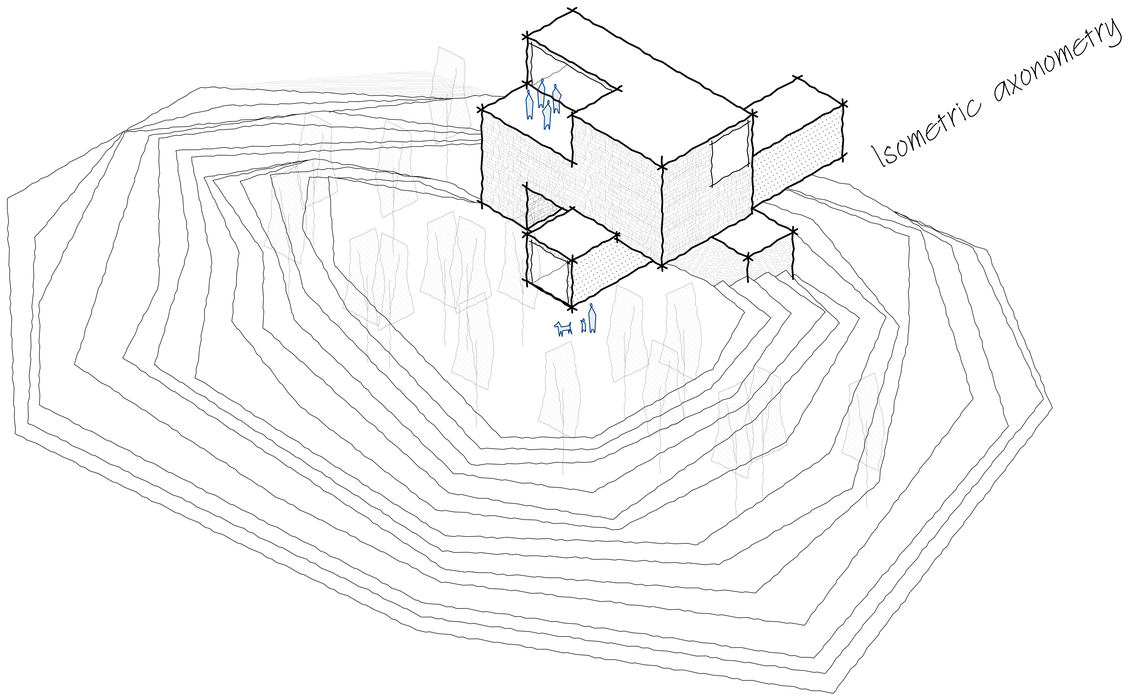
An axonometric representation is a 3-dimensional representation where we measure and represent with the help of an axial cross, based on coordinates, where the axis, which is the height of the object, is always drawn as vertical and pointing upwards. In architectural representation, perpendicular axonometry is used, where the projection rays are perpendicular to the image plane, and the body to be represented is projected on the image plane together with the defined coordinate system. In the axonometric representation of buildings, in reality, parallel edges remain parallel in the drawing as well, in contrast to the perspective representation.

Why draw axonometry?

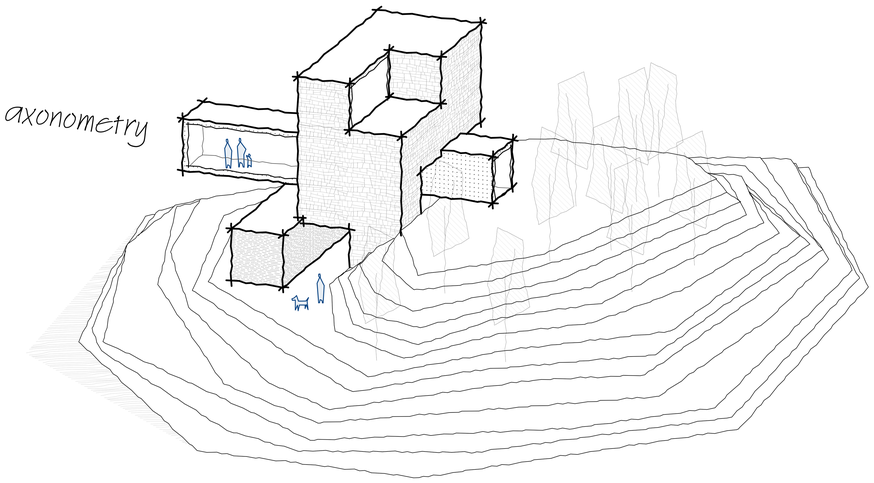
3-dimensional drawings made in axonometry are suitable for obtaining an accurate and measurable image of the building to be represented. With this editing mode, we can quickly create a 3-dimensional image of the building, which is best suited for presenting diagrams of mass formation and concept. With axonometric representation, we can make an axonometric section or even an exploded view of a building. In an exploded view, the building can be disassembled into its constituents in the defined axonometric axis cross.

What do we display on axonometry?

In most cases, a 3-dimensional drawing is made to show the exterior of our building. Accordingly, we need to draw all the information contained in the mass formation of the building, its external surfaces, and its environment. The building will also have openings, various coverings, terraces, vegetation and people. In axonometric representation, even more attention should be paid to the representation of stylized surfaces and the appropriate scale of environmental elements.



Isometric axonometry



Conventional axonometry

How do we draw axonometry?

The following four axes are most commonly used in architectural representation.

One-size-fits-all axonometry: when we measure real dimensions on all axes, there is no shortening.

-Isometric axonometry: the image of the axes forms an angle of 120 ° with each other. Across the axle, the shortenings are equal in all directions. The advantage is that it is easy to edit, the disadvantage is that we get many overlapping edges, points.

Dimetric, two-dimensional axonometry: when we measure with shortening on one of the 3 axes, we take dimensions on the other two.

-Conventional axonometry: the recording of the axis cross begins with the Z axis and the O point located on it. The X and Y axes can be edited from point O with a 7: 8 and 1: 8 drop ratio. Along the X and Z axes, the shortening is the same, one unit, along the Y, half the dimensions are edited. Its advantage is that it is easy to interpret and only seldom do we get overlapping points and edges.

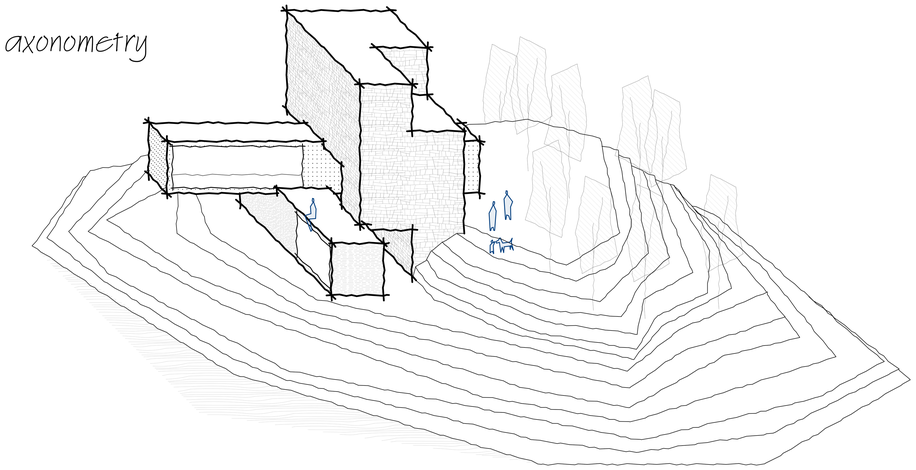
In this representation mode, a top view image of the building is seen without distortion, so editing begins with drawing the floor plan.

-Frontal axonometry: in this axonometry, the front view image of the body to be represented is displayed in real size. Since the image of the X and Z axes is perpendicular to each other, the front view image mounted here is the same as the facade projection. Dimensions on the X and Z axes are measured, no shortening. The position of the Y axis can vary, the easiest way to edit is when it is in 45 ° to the water level, in this case we halve the actual size.

-Horizontal axonometry: in this crosshair, the item's floor plan image is seen in real size, without distortion, there is no shortening because the X and Y axes are perpendicular to each other. The Y axis is also vertical in the present case, but the height dimensions are shortened. The image plane defined by the X and Y rectangular axes is 45 ° or 60 ° -30 ° to the horizontal.

The method of drawing an axonometry is most similar to that of a facade, as we depict a significant part of real, seen surfaces and lines. Axonometry drawing is essential to achieve the appropriate drawing dynamics, i.e. that the drawing has depth. In this case, the drawing depth is not only determined by the order of importance of the information carried by items. The emphasis is on the display of the facade surfaces, as the goal is a stylized representation of the housing we actually see. Stylization and simplification are needed because, on facade drawings made at different scales, for example, tiles with a smaller texture, such as bricks, are difficult to construct in their actual, scale-correct size. Doing so would in many cases give us a very dense, almost unrecognizable surface, which is not graphically permissible. The essence of stylized cover drawing is that we do not draw the given housing one by one, but we simplify the representation in such a way that its real appearance can be recognized or perceived in its density and characteristic division. Shortening is important in the cover drawing of axonometric drawings, which gives a real spatial feel.

Frontal axonometry



Horizontal axonometry