MOUNTAIN HOUSE: THE RADIANT ROOM

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Categories: Low Density, Project, TAAs, Technology and fabrication

Tags: Energetic Approach, Energy, Heat transfer, Housing, Madrid, Private housing, Project, Technological Approach, Thermodynamic flow, Thermodynamic practices, Thermodynamics

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A collection of *radiant rooms* explore the connections between the environment, a material conglomerate —concrete, projected cork and wood— and its inhabitants. This conglomerate performs either under the sun's radiation or under the effects of the wall-and-floor integrated radiant system, granting users comfort. These rooms can be opened during the summer months, enjoying the refreshing summer night breezes.

Material performance

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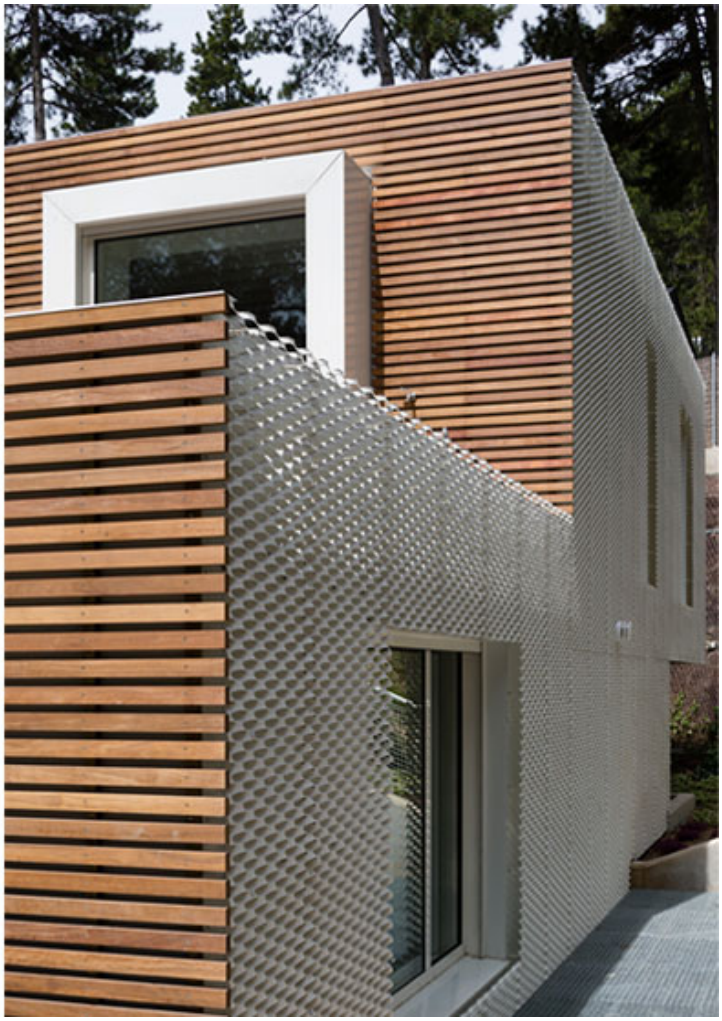

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A room with a view The commission started with a collection of rooms, which were scattered around the site looking for good views.

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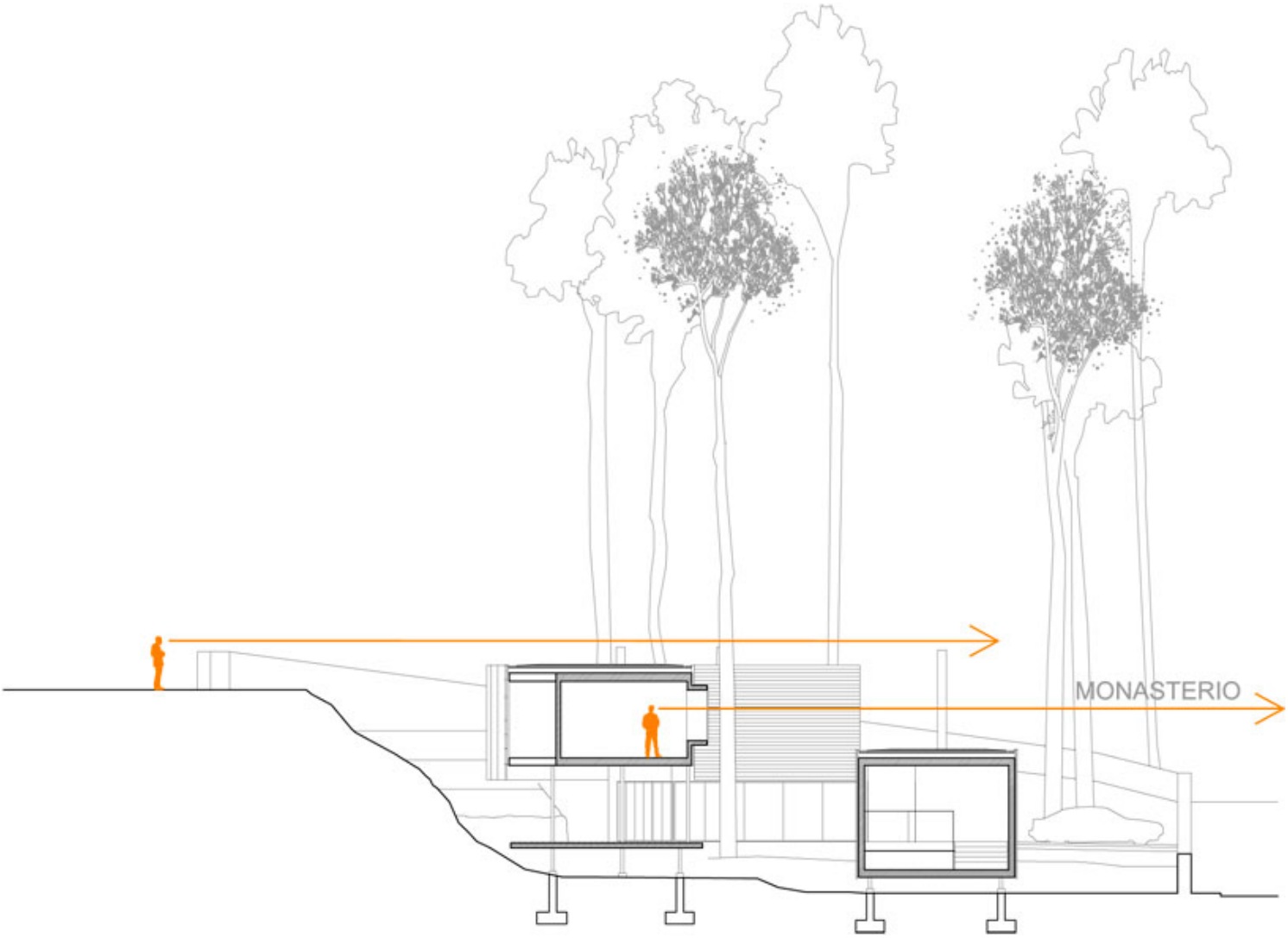

Radiation Radiation is a process of energy transfer by which energy is transmitted through electromagnetic waves, not needing a material medium to transfer heat.

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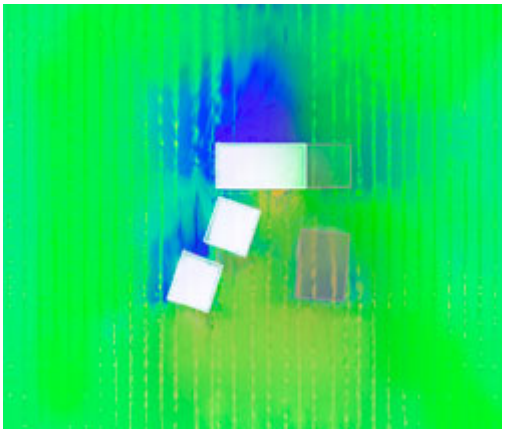

Radiant rooms Sun radiation penetrates the room through the window which, through direct radiation and greenhouse effect, heats-up the concrete floor and walls, storing energy. Insulation, through external wood cladding, prevents stored heat from dissipating. Combining window radiation collection with interior thermal storage and outdoor thermal insulation, the thermal performance of the room is enhanced.

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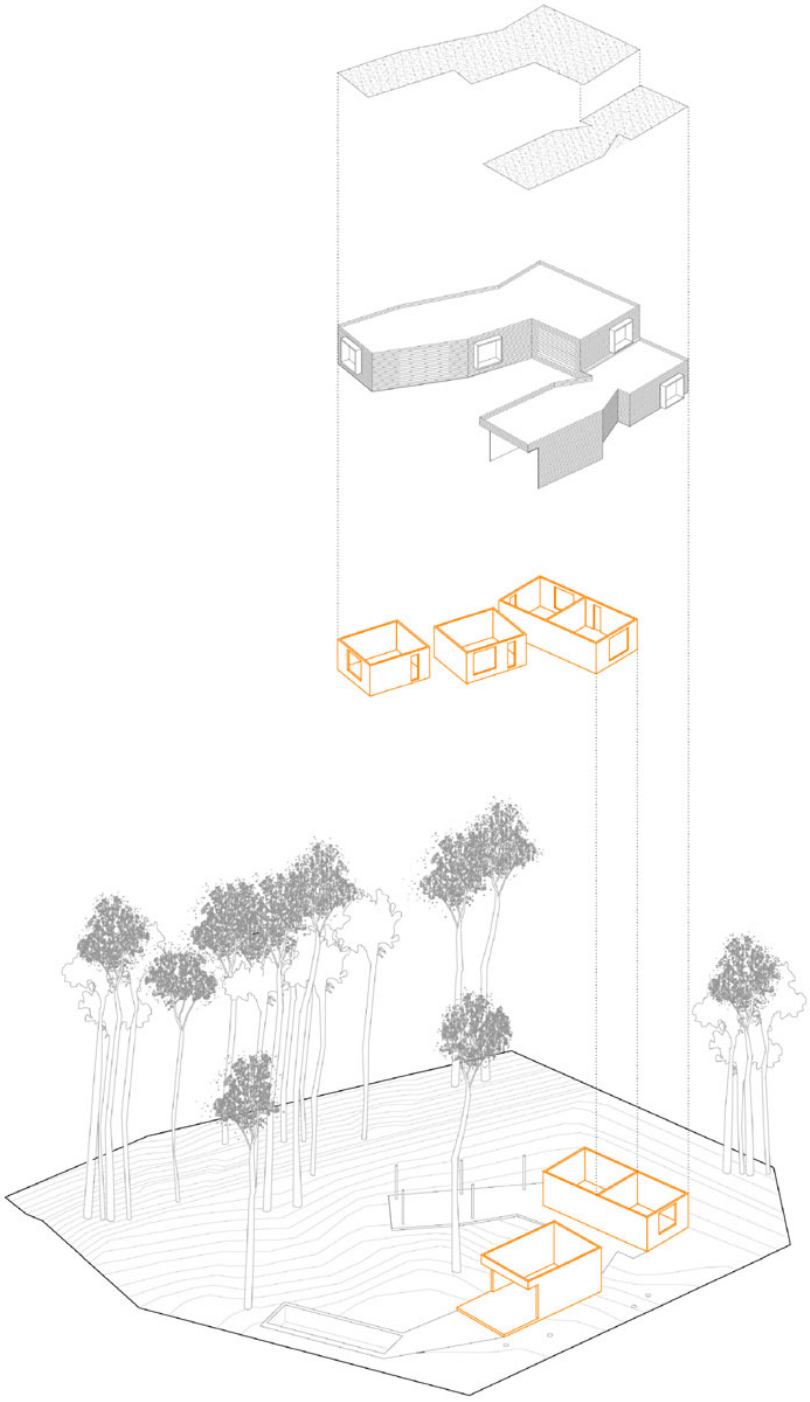

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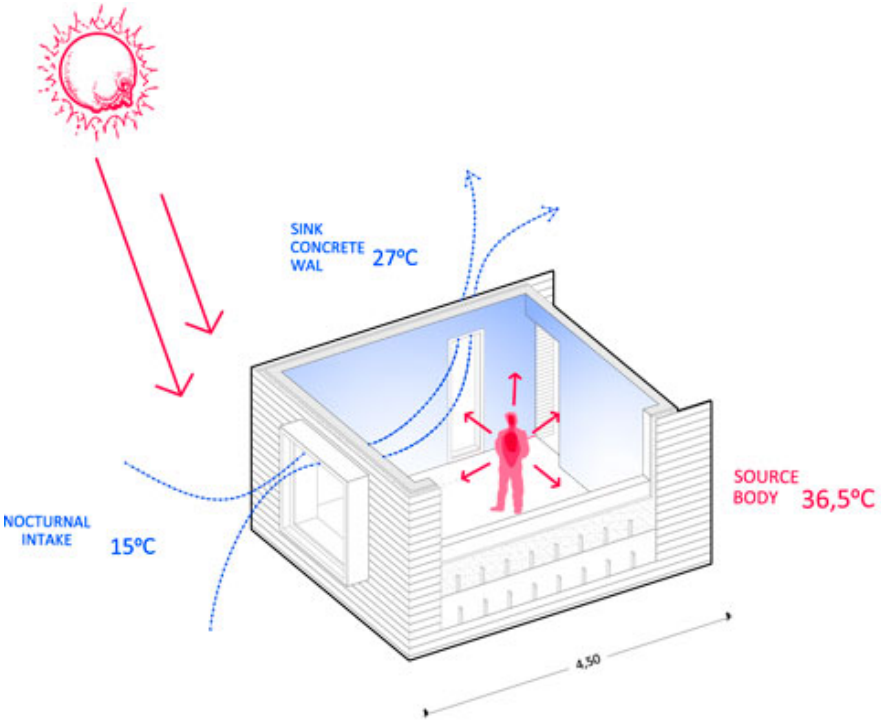
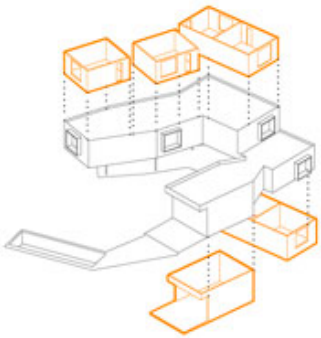
Concrete wooden-clad rooms Reinforced-Concrete, has a high thermal effusivity (2036 $s^{1/2}W/m^2$ 0C) and therefore has a high thermal storage capacity. On the other hand wood and projected cork have a low thermal effusivity (500 $s^{1/2}W/m^2$ 0C) and therefore are good insulator. The combination of both maximize energy storage, minimizing winter losses.





year COMPLETED 2012
site EL ESCORIAL-SPAIN
program SUMMER HOUSE
climatic typology
targeted climatic constraint
environmental needs VENTILATIVE NOCTURNAL COOLING
tphisiological process

TAAs + Javier García-Germán

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Negotiate between solar radiation and views The project negotiates between the forest views and the sun orientation. According to Edward Mazria, a solar window with “variations to the east or west of south, up to 30^{o}, will reduce performance only slightly”.

Summertime Solar rooms, in summertime, cast a pattern of shadows which, in combination with the pine trees, offer comfortable ambient for summer activities.

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MORPHOLOGY, PARAMETRIC APPLICATION: SOLAR PASSIVE versus VISTAS

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Active systems The use of active radiant surfaces seeks to champion same thermodynamic strategies for active and passive systems, looking for a synergy between form, material systems, environmental systems and user performance.

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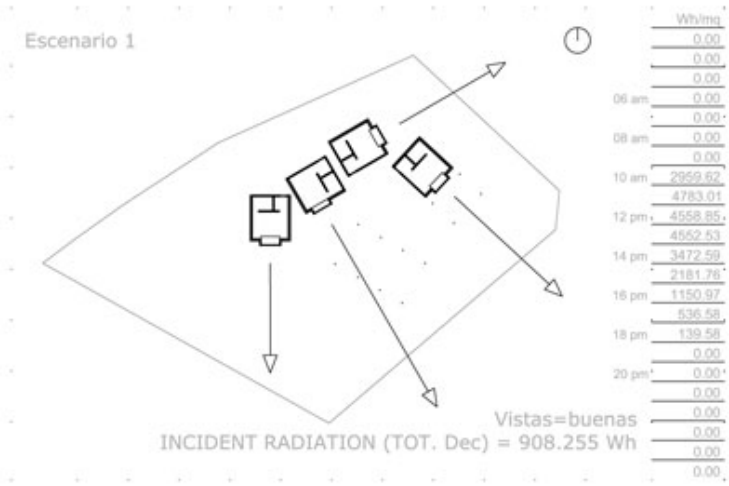
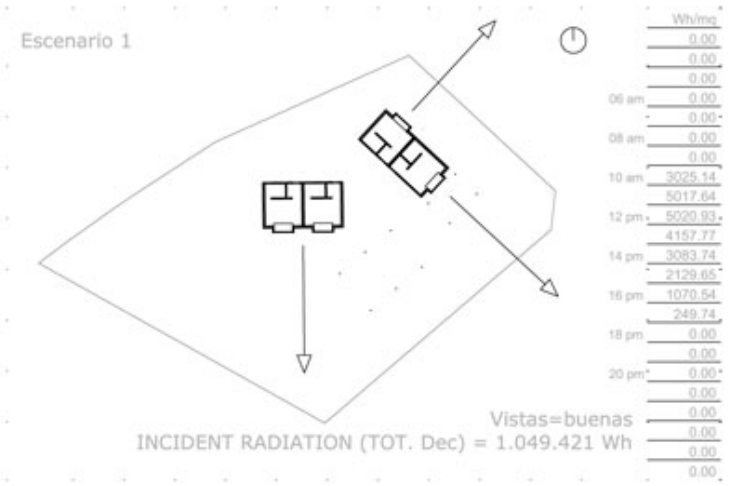
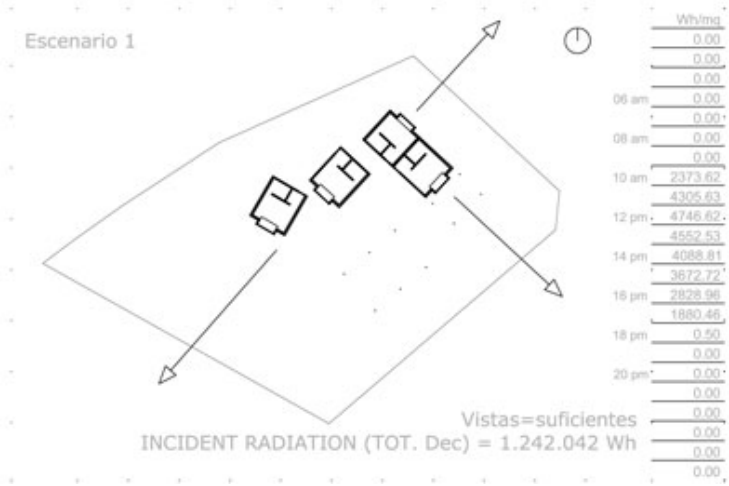
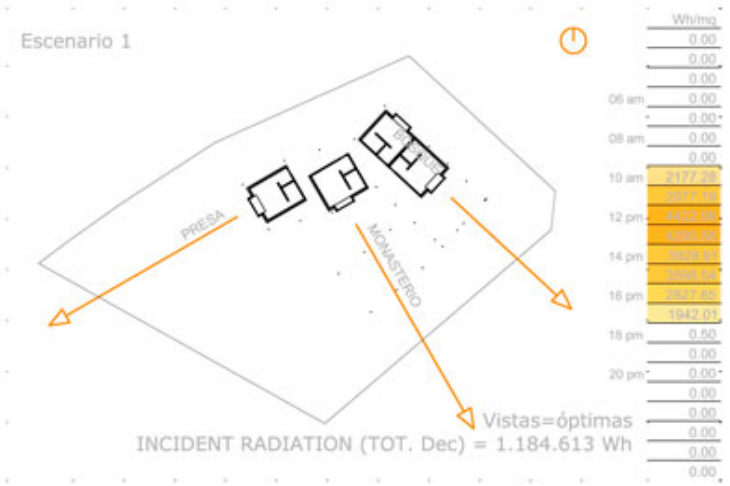
MORPHOLOGY:
SOLAR PASSIVE versus
VISTAS









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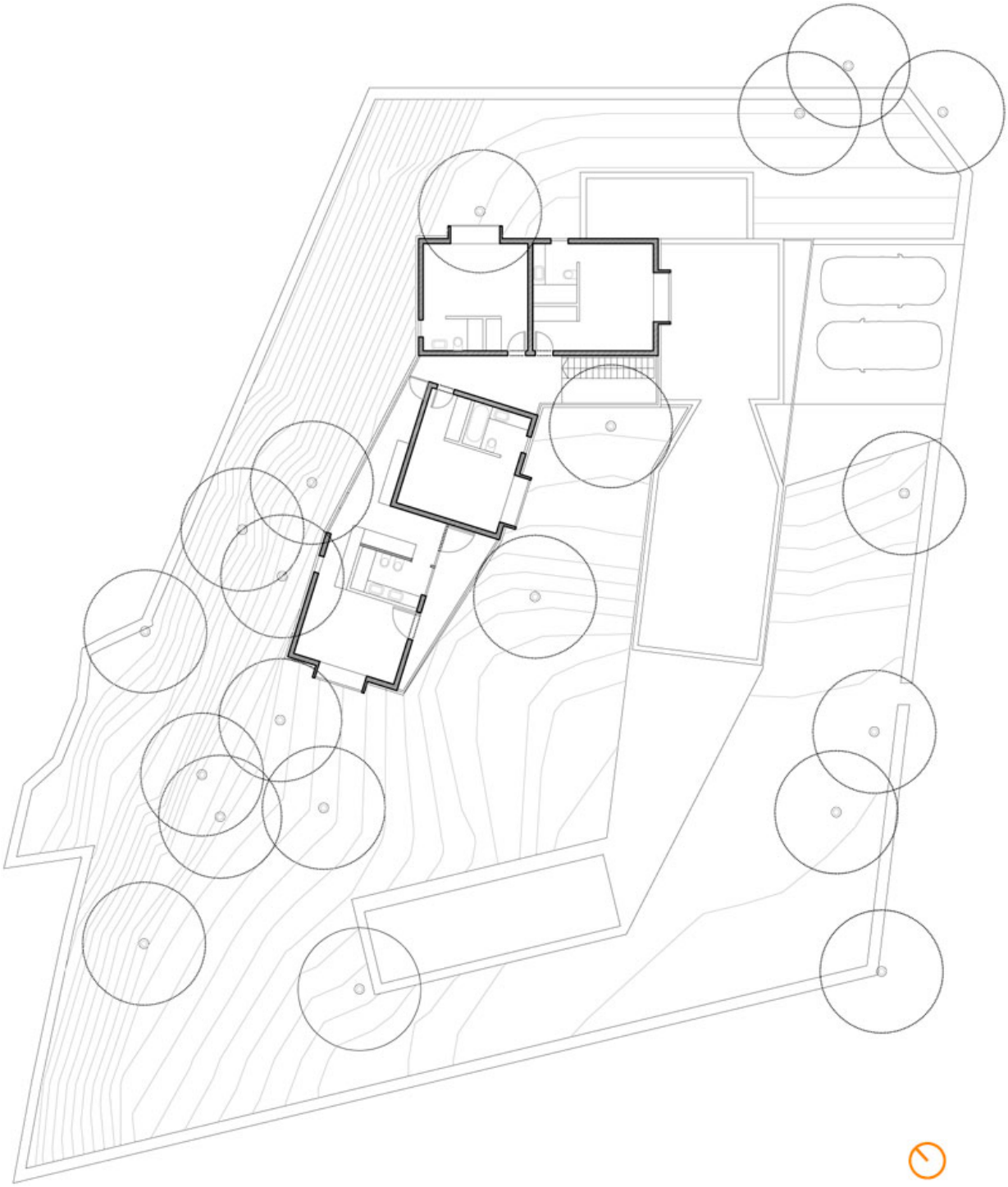

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Bedrooms level

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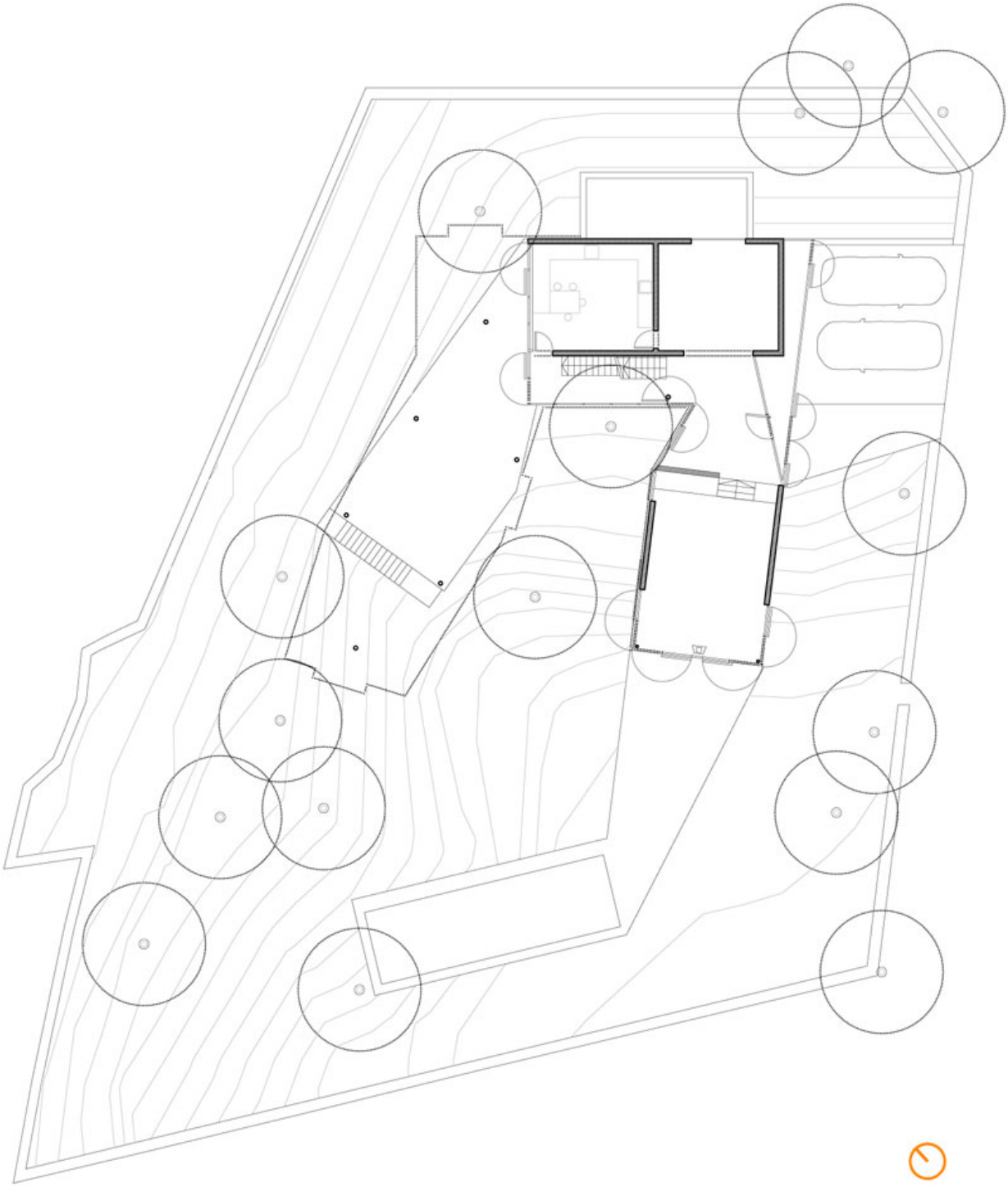

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Garden level

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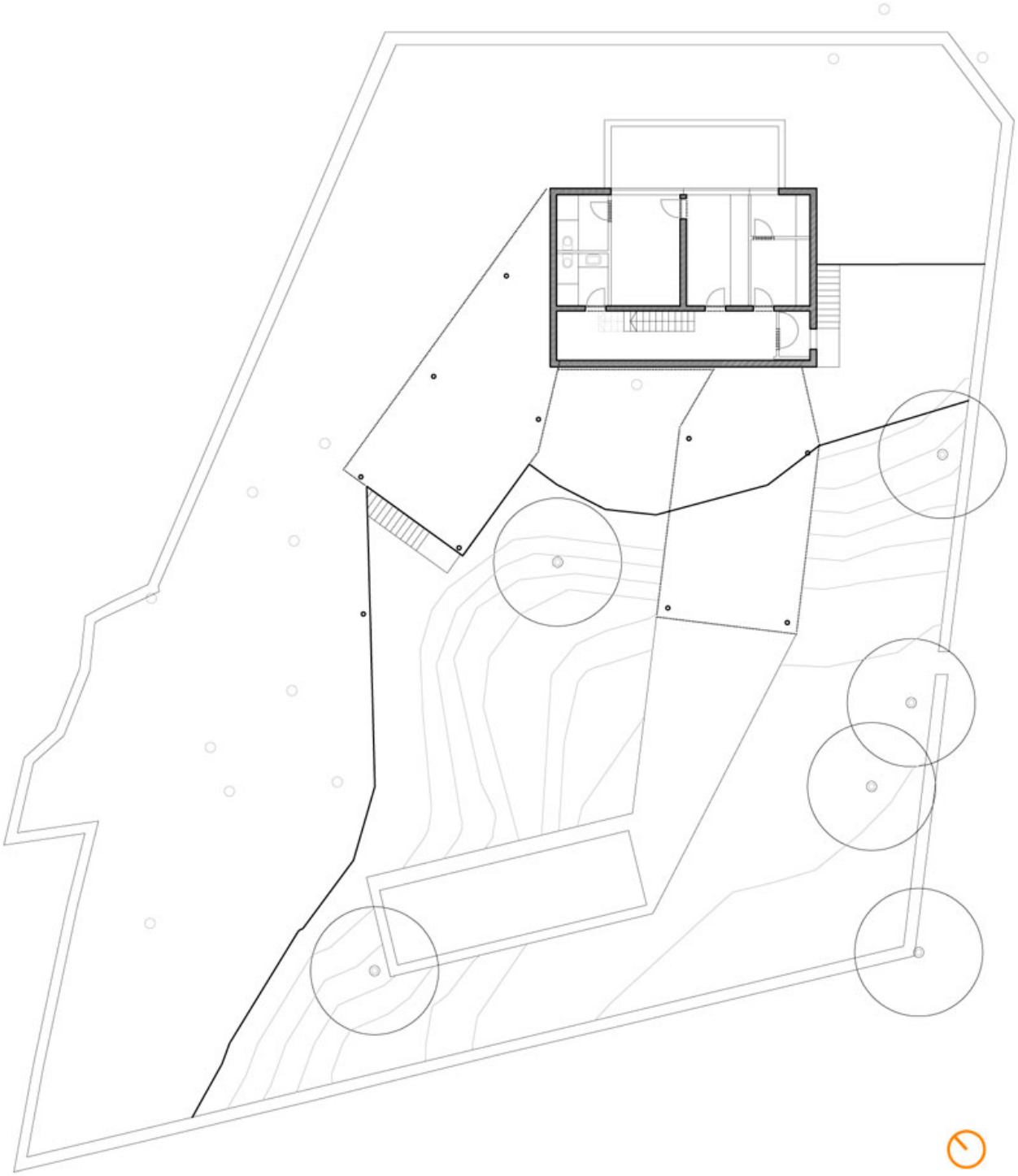

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Underground level

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