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Stavros Mavrakis

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W2

ecoweb 2011 Athens

Underground_sunpath

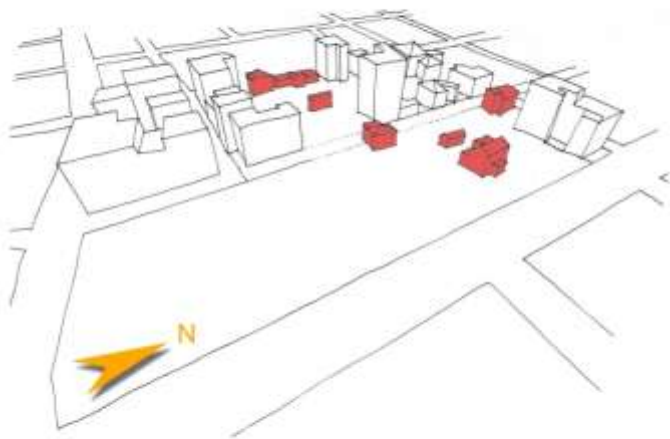


location

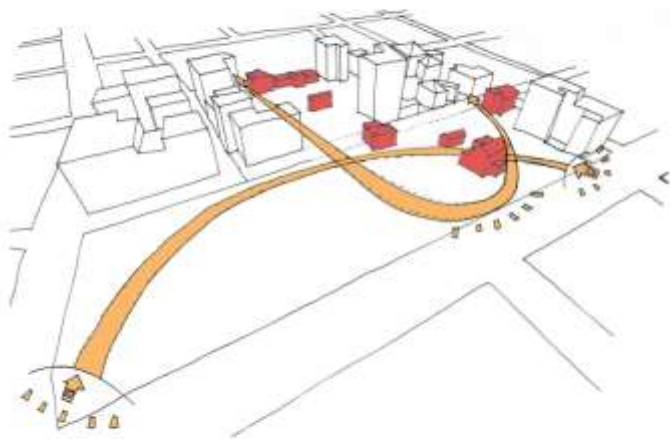
- Patissia
- Villa Klonaridi's
- total area 16.8 acres

main goals

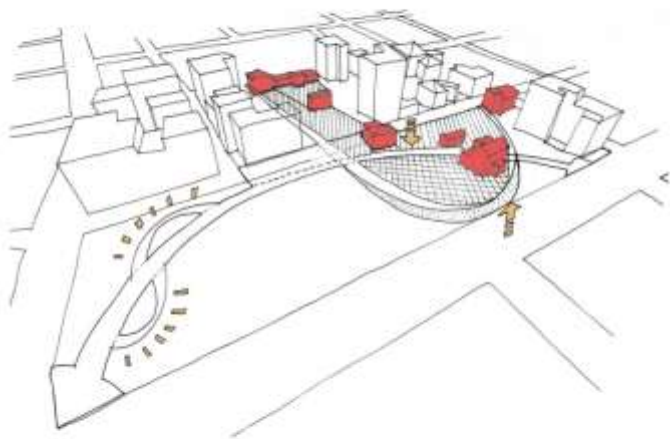
- social rehabilitation
- accommodation of municipality services
- increasing park area
- energy retrofitting of listed & existing buildings
- design a new zero CO₂ emissions public building



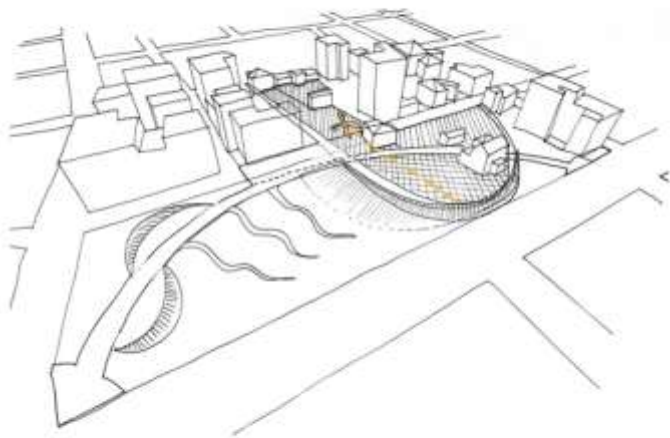
- 6 buildings for public use
- 2 main axes for access
- creating a hard boundary to the avenue & soft extensions, combining recreational uses
- cutting the square in 2 pieces
- submerging amphitheater & building
- masterplan



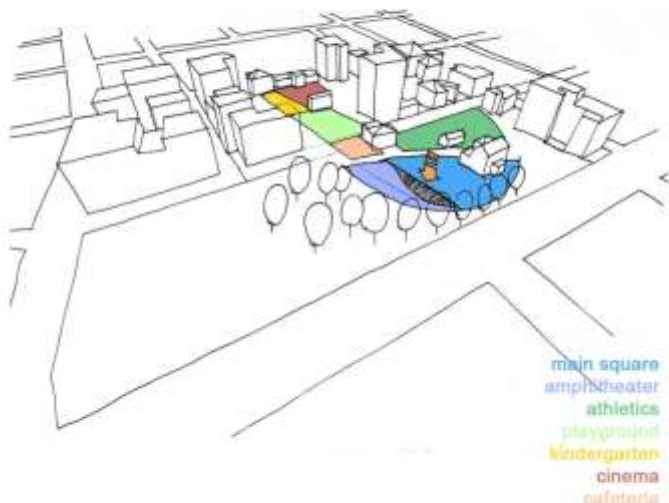
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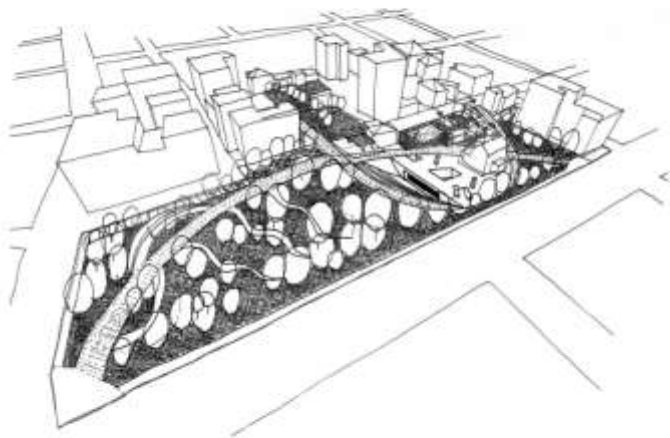
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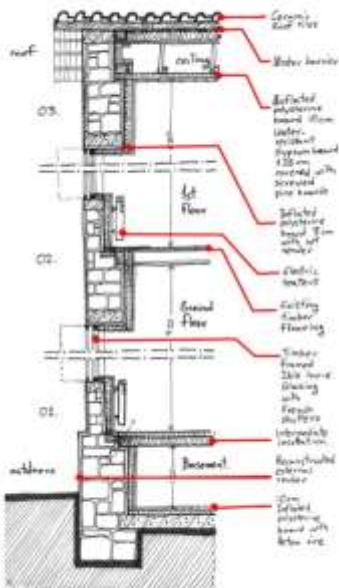
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Theotokopoulou 34



Villa Kionardis



- full internal insulation for roof, external walls, floor to the ground
- replacing windows with timber framed double low-e glazing
- light roof tubes for daylight distribution
- heating & cooling via heat exchange pump with fan coils
- ceiling fans
- BMS for control of artificial light via CFL
- tree planting (deciduous on the south elevation & evergreen on the north)



cinema



cleaning department



library



municipal police

- full external building envelope insulation (avoiding thermal bridges)
- replacing windows with aluminum double low-e glazing with thermal break
- openable skylights at the top for natural light & ventilation
- extensive roof planting
- creation of greenhouse extensions (openable & ventilated)
- passive solar heating
- ceiling fans
- heating, cooling & hot water via heat exchange pump with fancoils
- tree planting (deciduous on the south elevation & evergreen on the north)



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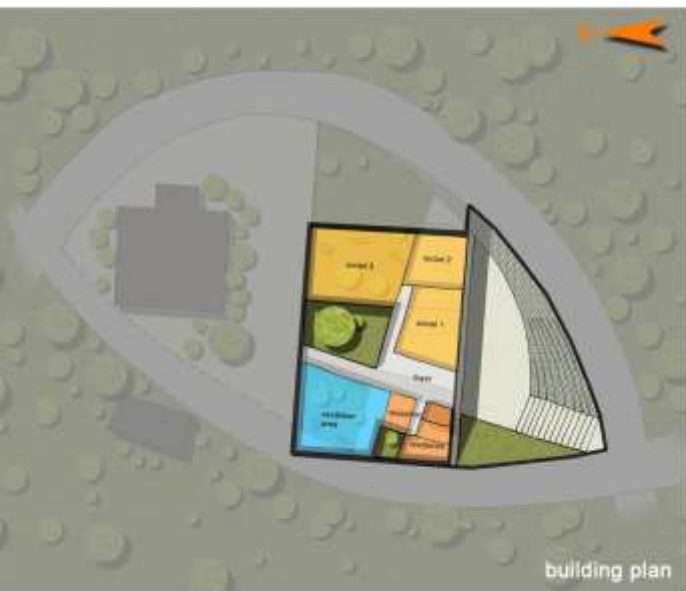


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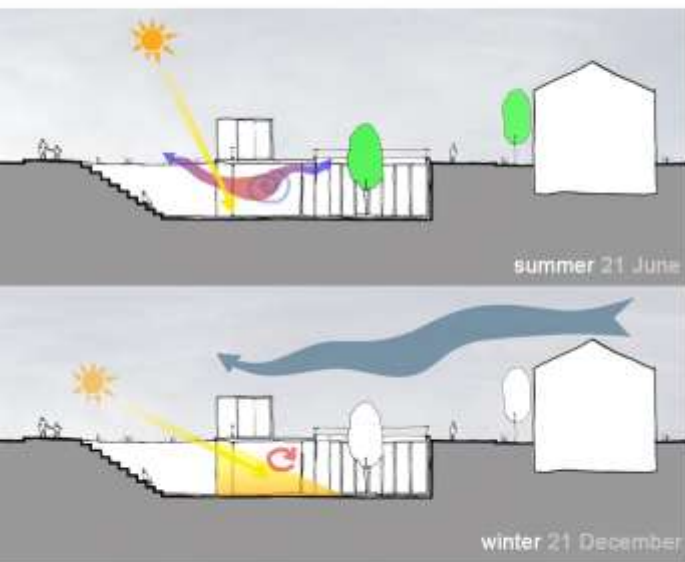


- main square for movements, meeting point, open air facilities & public green
- highlights the harmonious collaboration between existing & new buildings
- encourages broad socialisation through cultural events

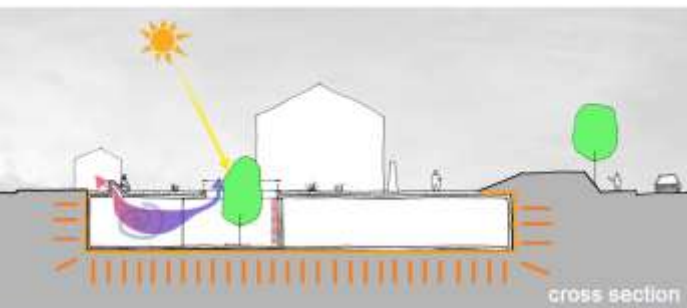


building plan

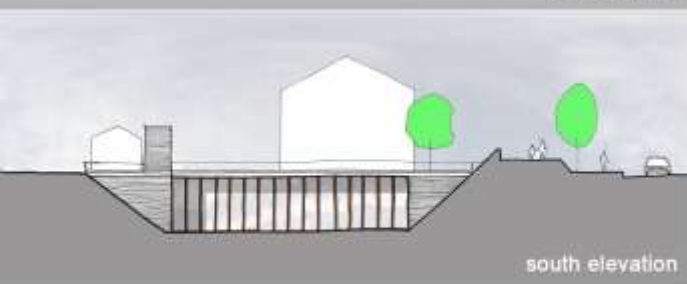
- thermal inertia
- external insulation (no thermal bridges)
- horizontal movable shading on south elevation, vertical on east/west
- glazed south elevation, limited north windows
- passive solar heating
- cross & stack natural ventilation
- even daylight distribution
- light coloured paving materials
- ceiling fans
- underfloor heating system via heat exchange pump
- fan coil cooling
- collecting the rainfall water to a cistern for watering the park



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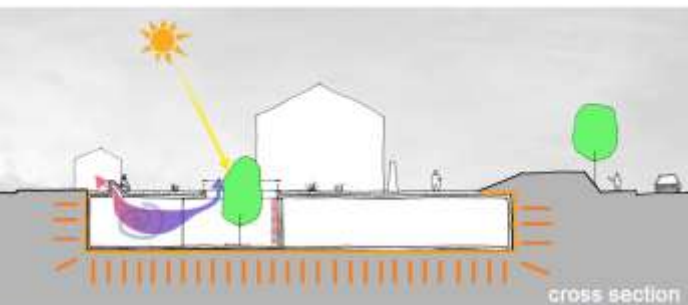


cross section

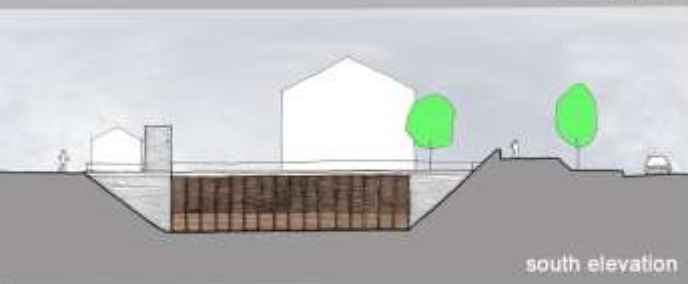


south elevation

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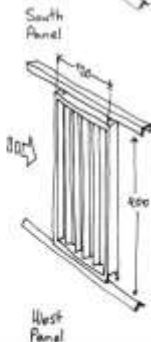
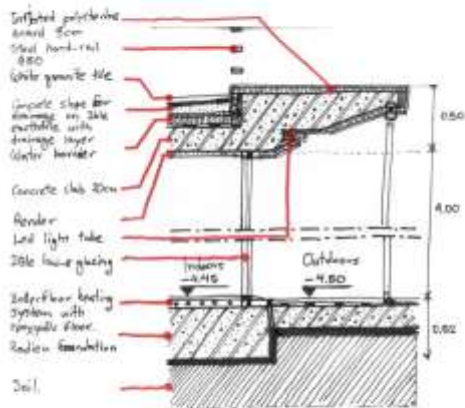


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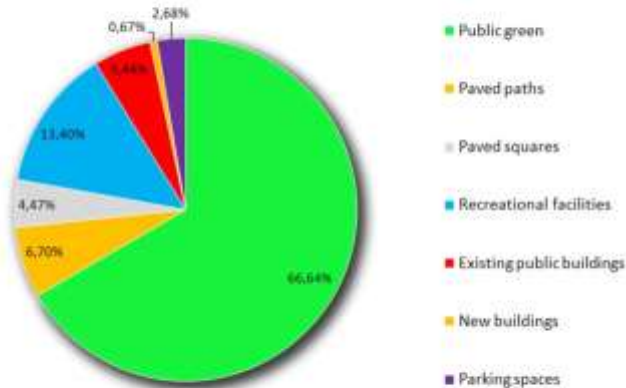




day image



night image



A large amount of the consumed energy (cooling, heating, artificial lighting & appliances) will be covered by the photovoltaic arrays, which are located at discreet places around the park.

Assuming approximately 70 kWh/m²/year for all used buildings and also that they will have less than 50 % of daytime occupancy

$>35 \text{ kWh/m}^2/\text{y} \times 1419 \text{ m}^2 = 49.665 \text{ kWh}$

Thus 4 arrays of 10kWp of PV are more than adequate to cover the total energy needs

W2

thank you
ευχαριστούμε

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ecoweek 2011 Athens

Underground_sunpath