

# The Cluster Described

The building section is the single most important consideration of this thesis. For the idea of hillside housing in Los Angeles to work, the building as a sectional object had to maintain a believable and buildable reality. The challenge presented itself in the form and steepness of the hillside. The site has been demonstrated and discussed in great detail and to a lesser extent the building has been described in a sectional sense from a functional perspective.

To fully understand the section one must understand the frame and its necessity to the whole of the building. One must also agree that the frame could not be conceived using any other material, and thus maintains a

degree of viability as a result of this belief. This frame is not conceived only to achieve structural integrity, or to provide a convenience for the building trades. It is, primarily a tool, used to define space. When viewed at the scale of the individual piece belonging to a system, the frame is an element. At the scale of the entire cluster the frame is in fact a skeleton. It is this skeleton that forms the framework in which all internal habitation occurs. Not only does the frame describe space, offer a network of structure for the houses to be cradled within it offers a way of mitigating the hillside and the building. Along with Los Angeles's inherent beauty comes the curse of her habitat. Natural

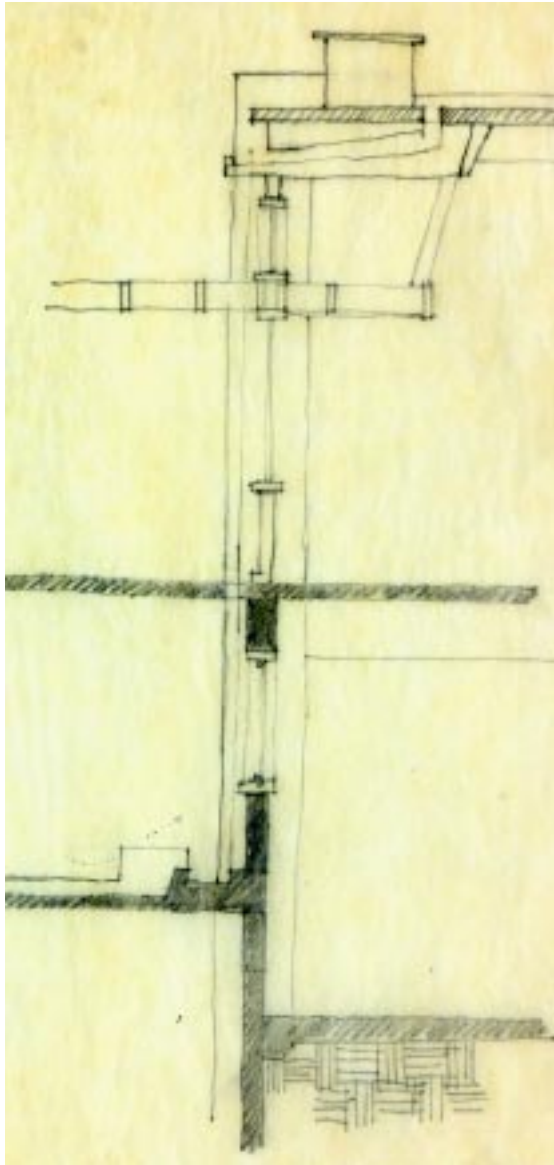
disaster of historic proportion occurs more often than one would care to admit. This forces the architect to react to the land in a responsible fashion.

To build on these hillsides is dangerous for many obvious reasons, among them earthquake, mud slides and fire. All of these realities were considered seriously when the choice of structural system for this Thesis was made. The most serious concern regards earthquake.

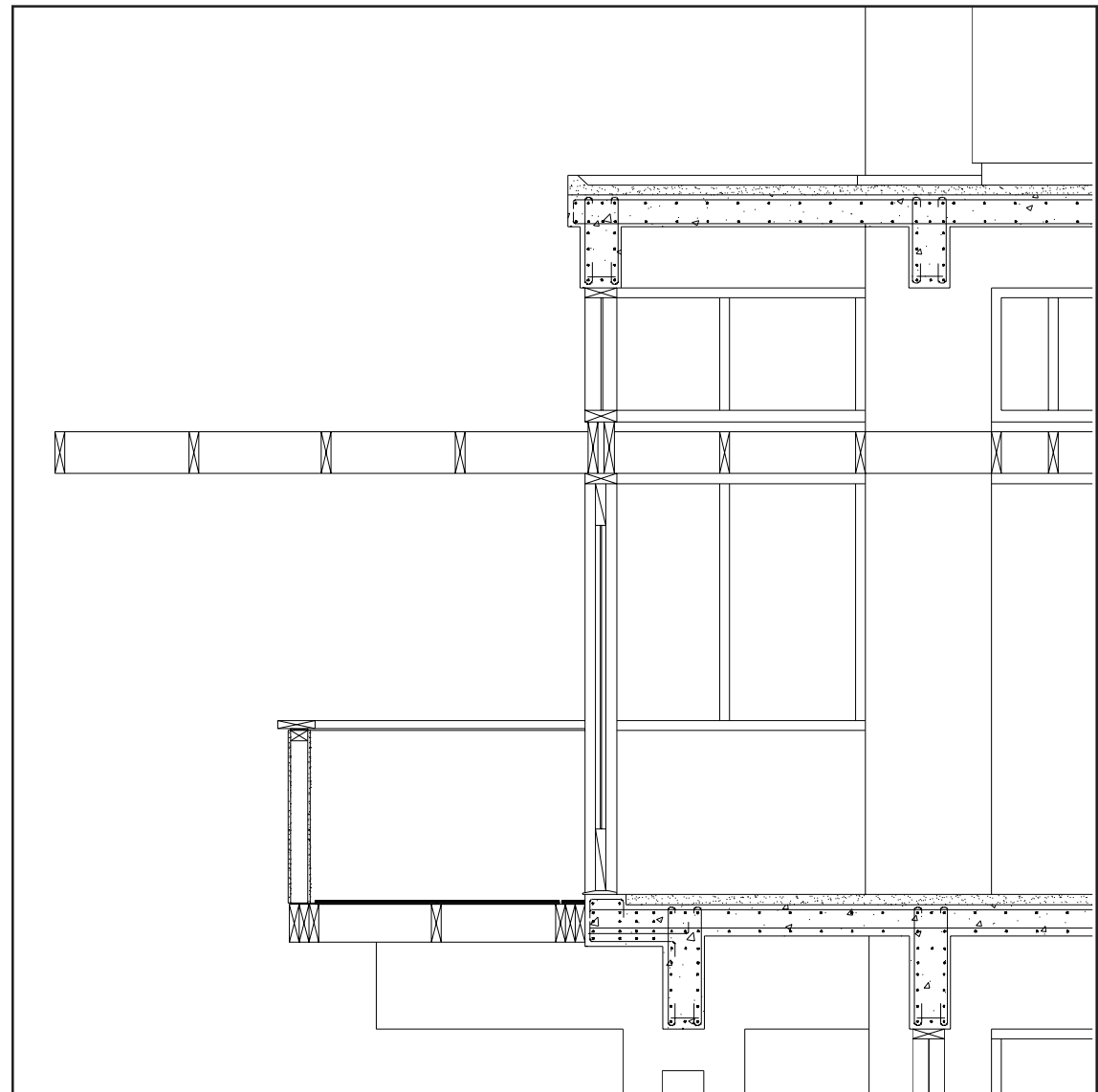
Typically concrete is not considered a viable structural material in an area prone to high earthquake activity. With that taken into consideration a strategy to overcome the inherent weaknesses of concrete as the

chosen building material was sought.

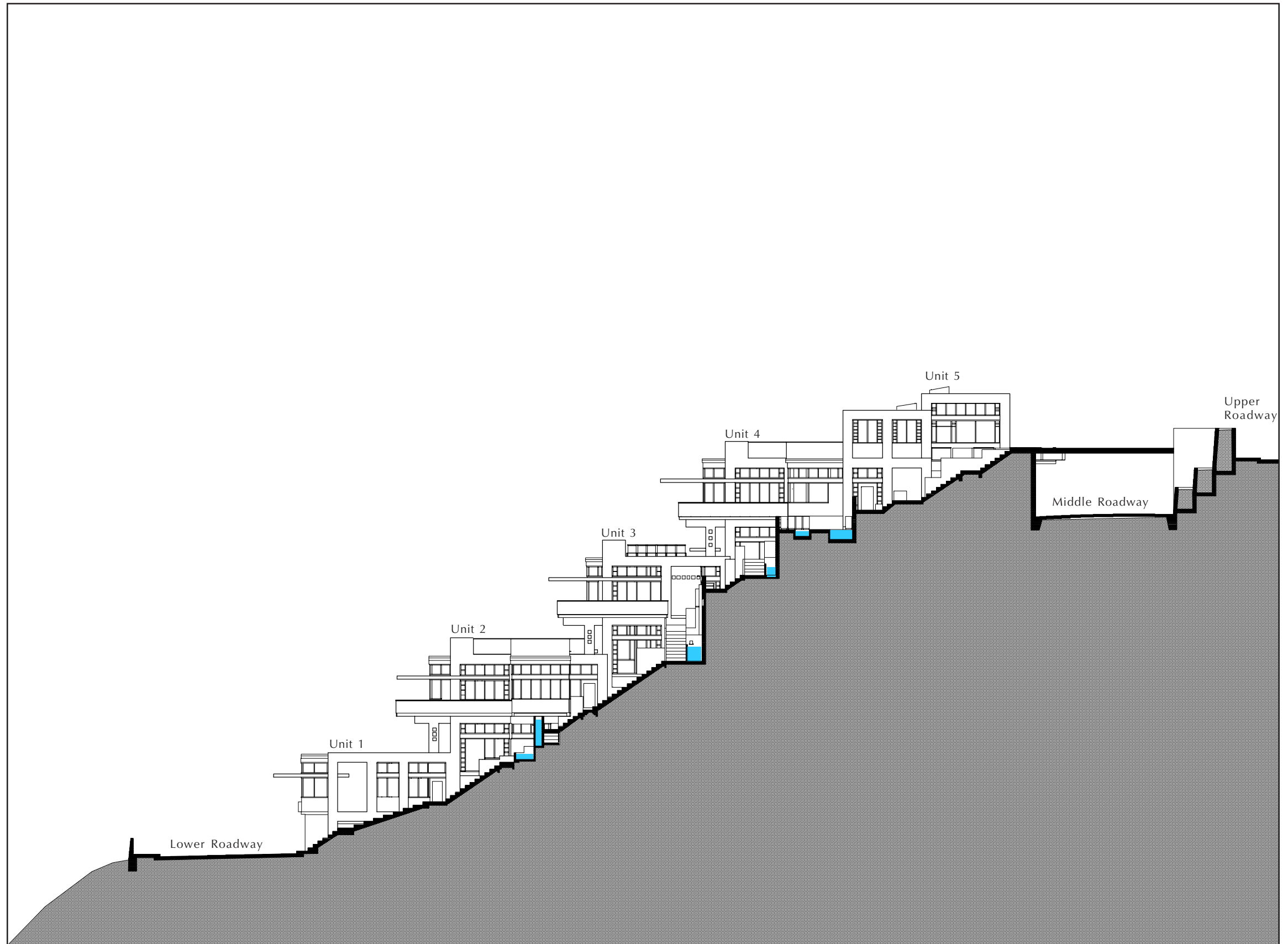
Concrete is a material of great compressive strength. However its tensile properties leave much to be desired in a location where shearing of structural members can easily be caused by earth movement. The obvious solution is to load the concrete with a wealth of reinforcing. Even this cannot protect from the most dangerous possibility — total structural failure. Therefore, it was decided to use a method of concrete construction called continuous moment resistant frame. In this system all reinforcing joints are welded instead of simply being wired together. This adds significantly to the overall strength of the structure and limits the possibility of



*A early wall section study.*



*Enlarged detail section taken through the extended bedroom and balcony of the Unit 4 master bedroom suite.*



*A section through the staircase courtyard showing the lower, middle and upper roadways.*

complete building collapse during a major earthquake.

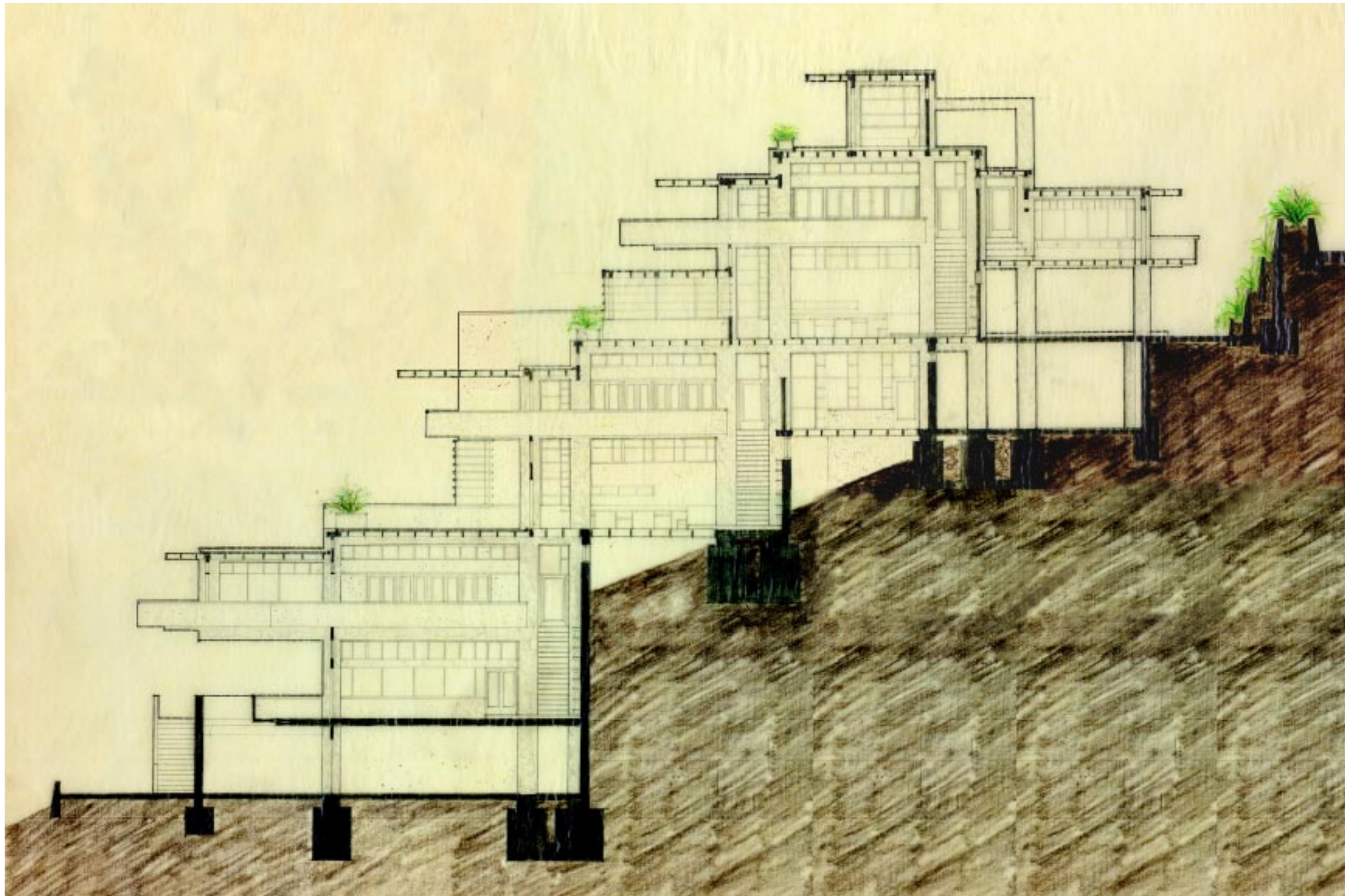
In addition to the idea of continuous reinforcing is the idea of continuous structure. Rather than visualizing each bent of the frame as individual objects each is perceived as one of a whole system. Each actually relying on the other for additional support.

Each bent in the system is interlocked to the others by a series of footings (below grade), retaining (earth) walls and beams at all other locations of intersection. The final joining of the structural elements occurs in the floor plane. Here each slab is tied to the frame by poured in place while using a similar reinforcing connection as used in the bents.

This in effect creates an extremely strong horizontal zone of shelves that marches up the hillside cradling each house within.

To further protect the inhabitant from a serious injury during a major earth moving event is the choice wood as a secondary structural element. This element however has no true sectional characteristics, provides

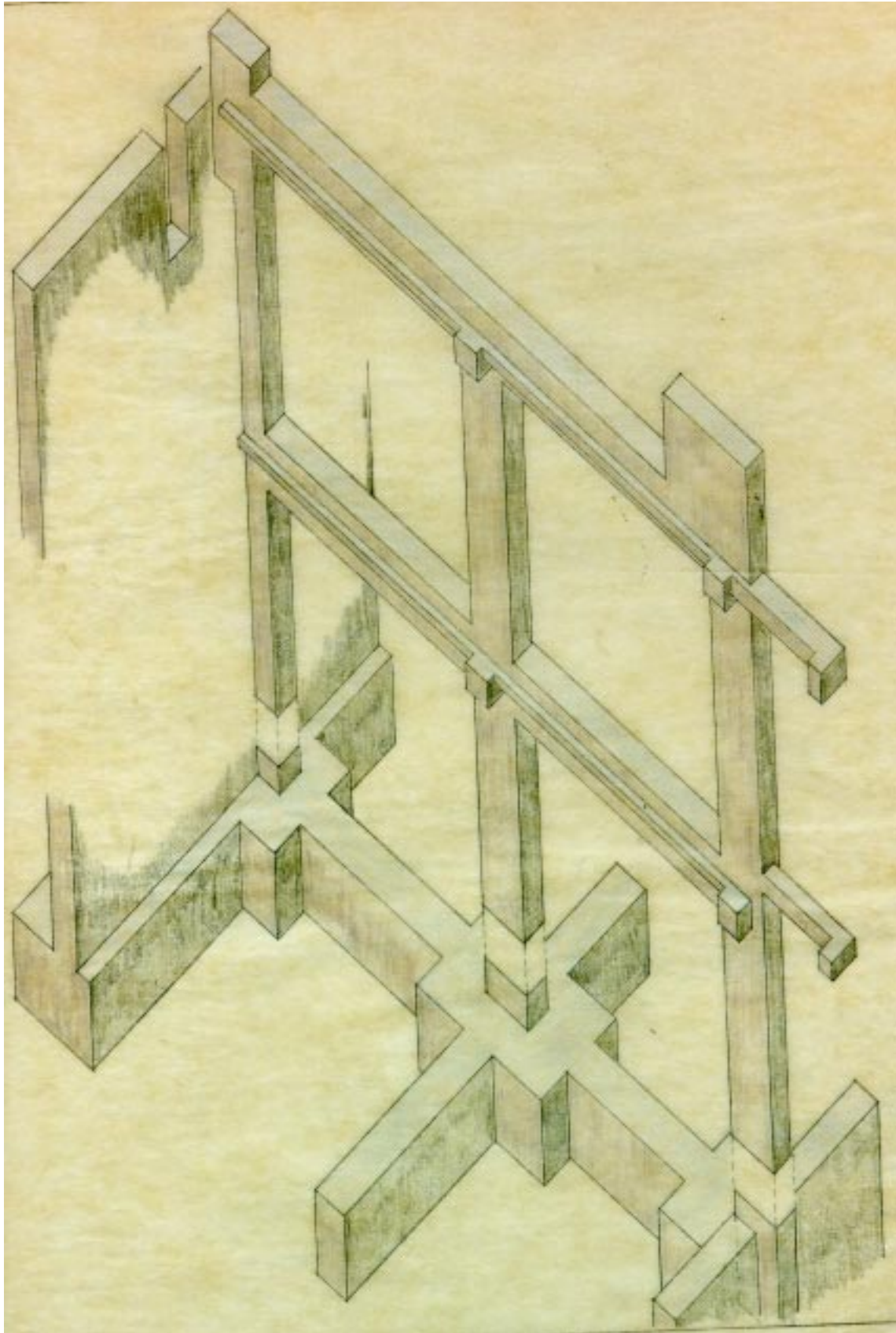
no true structural support in any condition. It is used instead to form enclosure (window wall) and sun screening (trellis.) Wood is an inherently flexible material that has proved to perform well during earthquake events. As a result of this history wood was the material of choice for these elements within the building.



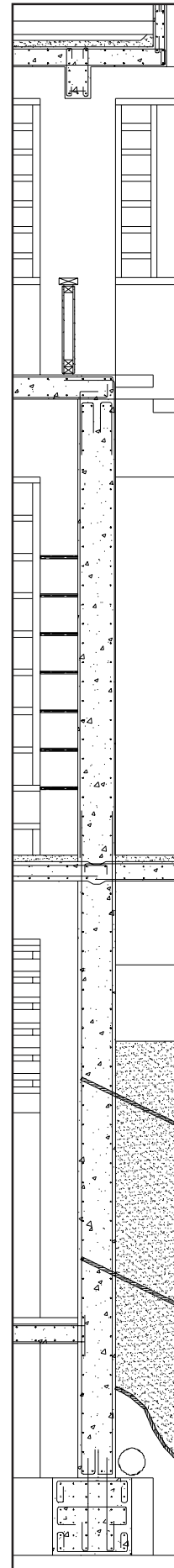
*A full building section, this originates from the second design scheme. In this version of the cluster there are only 3 units plus a home office. The section shows a promenade/roadway at the lowest level, and three additional roads as the cluster progresses up the hill. The frames are concrete here, however, the space between is spanned with wood and decking.*



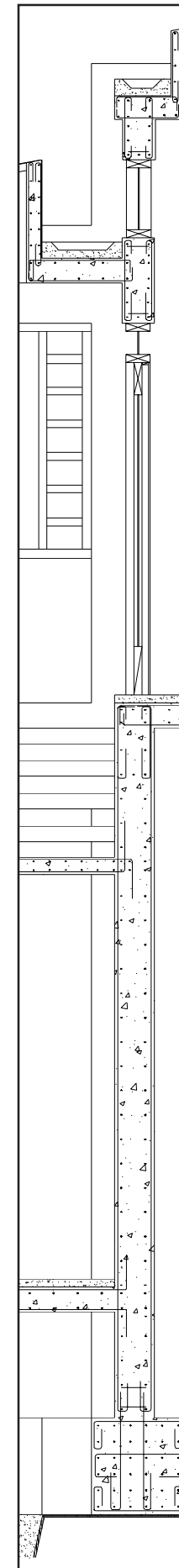
A section through the final cluster design. The section is taken between the second and third frame looking toward the gardens of the units.



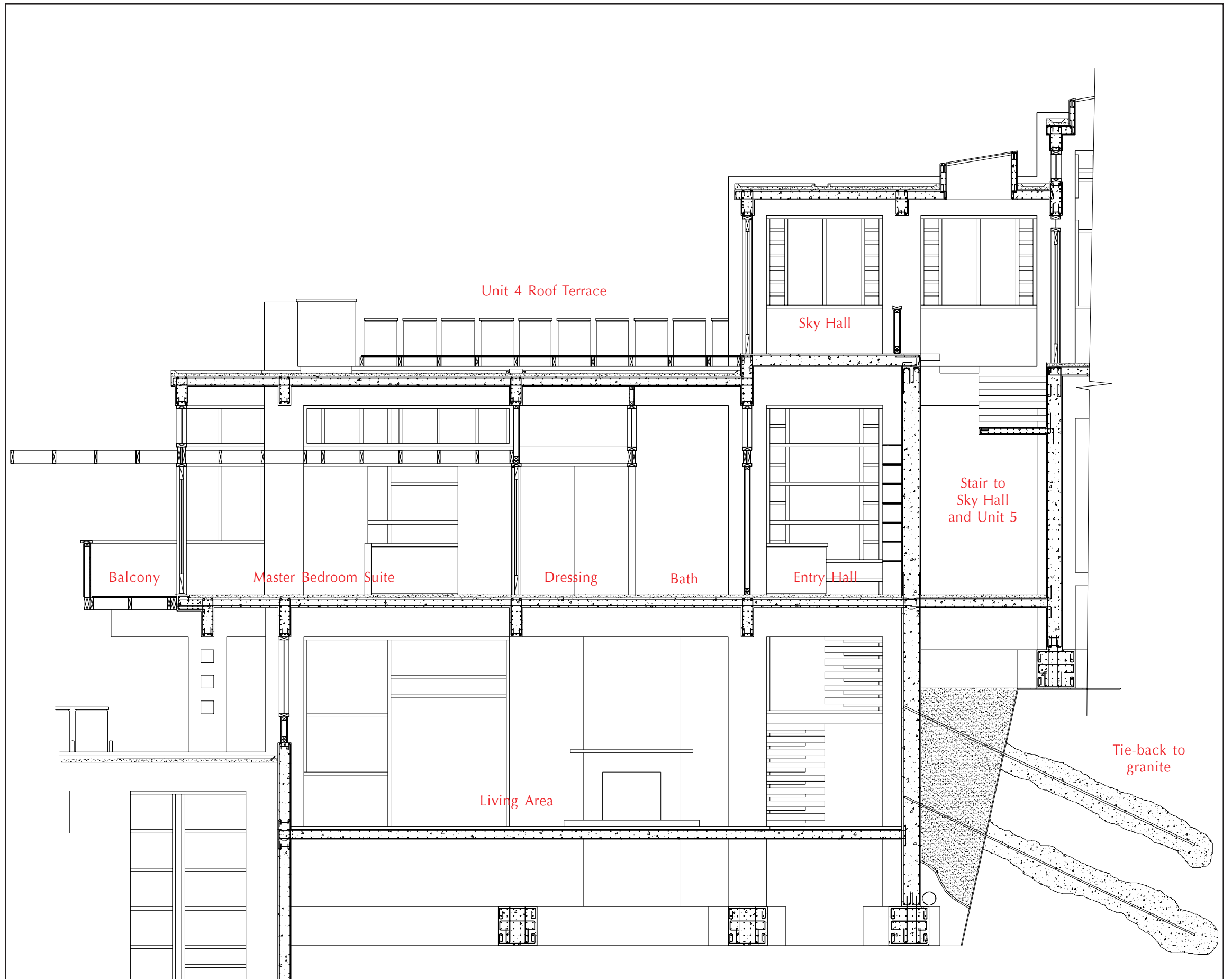
*Early study sketch of the frame and connecting beams.*



*A typical section at the retaining wall.*



*Wall section between Unit 4 and 5*



Building section taken between frame 3 and frame 4 within Unit 4.