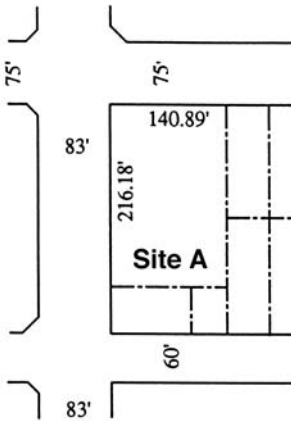


space beneath it is to be a garden where people habitually go to relax or even to spend some part of their working day outside their offices.

Contradictions between sun and wind in courtyards of either orientation are resolved by using the interstitium. Adjustable structures can expand upward during hot summer months, catching ocean breezes from the west and simultaneously shading the courtyard. During winter, when the sun is lower and there is less need for ventilation in the courtyard, the cover withdraws, opening the courtyard again to the sky. In most cases, by providing ample space for such a structure to float freely, the interstitium offers a way to give year-round comfort by low-energy means. But orientation and surroundings make all the difference.

Comparing Four Site Orientations



Site A: Actual Los Angeles site in mixed-use neighborhood. (North is up.)

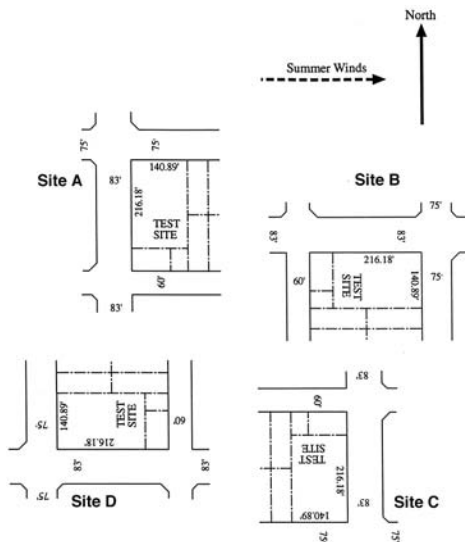
An actual Los Angeles site in a mixed-use neighborhood provides a range of conditions to demonstrate how migration and transformation can provide comfort in courtyards. The site, a corner lot measuring 141 by 216 feet (43 by 66 m) is bounded on two sides by streets and on the opposing two sides by adjacent mixed-use properties. A proposed office building for the site has an elongated courtyard measuring 47 by 122 feet (14.3 by 37.2 m). Depending on overall building dimensions, a perimeter of usable office space approximately 50 feet deep (15.2 m) surrounds the courtyard. Streets and lots are oriented on the cardinal points following the US Land Ordinance of 1785.

Envelope rules include shadow fences of 20 feet (6 m) at commercial properties across streets to north and west of the site, and 10 feet (3 m) on adjacent mixed-use lots to the east and south. Cutoff times for the envelope provide neighboring properties with 6 hours of direct sunshine, 9 a.m. to 3 p.m., at all seasons. Those

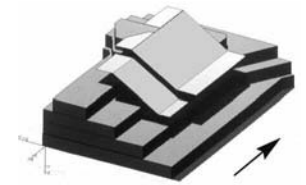
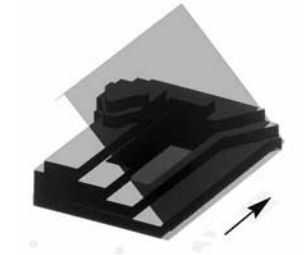
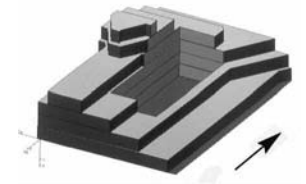
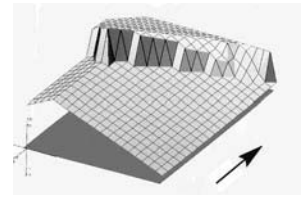
same cutoff times will produce a much higher envelope in summer than in winter, thus defining the interstitium.

The winter envelope is the main reference for the fixed building mass and for the up-and-down interstitium. A courtyard building that follows this winter envelope is high on the west and north, lower on the east and south. The interstitium, bounded on top by a much higher envelope, slopes as a single imaginary plane following the different sun geometry of summer. Within this space between the building and the higher plane of the summer envelope is the interstitium that accommodates the seasonal courtyard cover.

A more complete understanding of the importance of orientation comes from imagining the actual site (Site A) systematically rotated on the cardinal points. With each rotation, adjacent conditions change, altering the direction and distance that shadows can be cast off site and thus the envelope's size and shape. Changed too is the courtyard orientation, affecting how and when sun and wind can enter.



Rotation of Site A:
Starting on the upper left and moving clockwise. (North is up.)



Site A: (Top) Winter solar envelope;
(2nd from top) Building mass to maximize space of winter envelope;
(3rd from top) Summer envelope defines upper limit of interstitium;
(Bottom) Adjustable courtyard cover.
(Viewed from the southeast.)