

Appendix A

Shade and Shadow Study



WEST 3RD STREET & PACIFIC AVENUE SHADOW REPORT

CITY OF LONG BEACH



CREATED BY: 8TH WAVE
CREATED FOR: ENSEMBLE REAL ESTATE INVESTMENTS
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8TH WAVE

707.615.0060 | INFO@8THWAVE.CO

WEST 3RD STREET & PACIFIC AVENUE SHADOW REPORT

ENVIRONMENTAL SETTING

The issue of shade and shadow pertains to the blockage of direct sunlight by project buildings affecting adjacent properties. Shading is an important environmental issue because the users of certain land-uses, such as residential, recreational/parks, churches, schools, outdoor restaurants, and pedestrian areas have some reasonable expectations for direct sunlight and warmth from the sun. These land-uses are termed “shadow-sensitive.”

Shadow lengths are dependent on the height and size of the building from which they are cast and the angle of the sun. The angle of the sun varies with respect to the rotation of the earth (i.e. time of day) and elliptical orbit (i.e. change in seasons). The longest shadows are cast during the winter months and the shortest shadows are cast during the summer months.

Winter and Summer Solstice, and Equinox

“Solstice” is defined as either of the two points on the ecliptic (i.e., the path of the earth around the sun) that lie midway between the equinoxes (separated from them by an angular distance of 90°). At the solstices, the sun’s apparent position on the celestial sphere reaches its greatest distance above or below the celestial equator, about 23 1/2° of the arc. At winter solstice, about December 22, the sun is overhead at noon at the Tropic of Capricorn; this marks the beginning of winter in the Northern Hemisphere. At the time of summer solstice, about June 22, the sun is directly overhead at noon at the Tropic of Cancer. In the Northern Hemisphere, the longest day and shortest night of the year occur on this date, marking the beginning of summer. Measuring shadow lengths for the winter and summer solstices represents the extremes of the shadow patterns that occur throughout the year. Shadows cast on the summer solstice are the shortest shadows during the year, becoming progressively longer until winter solstice when the shadows are the longest. Shadows are shown for winter solstice and summer solstice, cast from 9:00 A.M. to 3:00 P.M. (winter) and 9:00 A.M. to 5:00 P.M. (summer).

“Equinox” is defined as either of two points of intersection of the sun’s apparent annual path and the plane of the earth’s equator, that is, a point of intersection of the ecliptic and the celestial equator. At the equinoxes day and night are the same duration as the sun’s transit falls on the equator. Shadows cast on the equinoxes are intermediary between the solstices. Shadows are shown for the spring equinox from 9:00 A.M. to 3:00 P.M. and the fall equinox from 9:00 A.M. to 5:00 P.M.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

From the City of Long Beach Downtown Plan Draft EIR: For a project to generate a significant shadow impact, it must increase shadows cast upon shadow-sensitive uses. Shadow impacts are considered significant if shadow-sensitive uses would be shaded by proposed structures for more than 3 hours between late October and early April (including Winter Solstice), or for more than 4 hours between early April and late October (including Summer Solstice).

The City of Long Beach Downtown Plan Draft EIR defines a sensitive-use as:

“Facilities and operations sensitive to the effects of shading include solar collectors; nurseries; primarily outdoor-oriented commercial uses (e.g., certain restaurants); or routinely useable outdoor spaces associated with recreational, institutional (e.g., schools), or residential land uses. These uses are considered sensitive because sunlight is important to their function, physical comfort, and/or commerce.”

Therefore, for the purpose of this study the threshold outlined above has been used.

Building heights were based on the three-dimensional digital model provided by the project architect. The dimensions, setbacks, and placement of existing buildings were estimated based on design documents, ground photographs and aerial photographs of the project vicinity.

Areas of shadow are based upon the duration each colored area remains shaded by the proposed project.

PROJECT IMPACTS

Spring Shadows

As shown in Figure 1, the proposed project will shade areas for more than 3 hours to the north-west and north-east during the Spring Equinox. During the transit of the sun, from 9:00 A.M. to 3:00 P.M. PST., shadows from proposed project site will fall on-site and on parking areas and commercial uses to the west. The proposed project will not significantly increase shading on sensitive uses.

Summer Shadows

As shown in Figure 2, the proposed project will shade areas for more than 4 hours primarily to the east during the Summer Solstice. During the transit of the sun, from 9:00 A.M. to 5:00 P.M. PDT, shadows from the proposed project site will fall upon the adjacent parking areas, and adjacent commercial uses. The proposed project will not significantly increase shading on sensitive uses.

Fall Shadows

As shown in Figure 3, the proposed project will shade areas for more than 4 hours primarily to the north-east during the Autumn Equinox. During the transit of the sun, from 9:00 A.M. to 5:00 P.M. PDT, shadows from the proposed project site will fall upon the adjacent parking areas, and commercial uses to the east. The proposed project will not significantly increase shading on sensitive uses.

Winter Shadows

As shown in Figure 4, the proposed project will shade areas for more than 3 hours primarily to the north-west during the Winter Solstice. During the transit of the sun, from 9:00 A.M. to 3:00 P.M. PST, shadows from proposed project site will fall upon streets, sidewalks, parking areas, and commercial uses to the northwest and north. The proposed project will not significantly increase shading on sensitive uses.

CONCLUSIONS

Shadows cast by this project will not significantly increase the shaded area or shade duration of sensitive uses. Under the above significance threshold, as set forth in the City of Long Beach Downtown Plan Draft EIR, the project will have a less than significant shade impact.

West 3rd Street & Pacific Avenue Shadow Study



Figure 1, Spring Shadows
9:00 A.M. - 3:00 P.M.
Pacific Standard Time

West 3rd Street & Pacific Avenue Shadow Study



Figure 2, Summer Shadows
9:00 A.M. - 5:00 P.M.
Pacific Daylight Time

West 3rd Street & Pacific Avenue Shadow Study

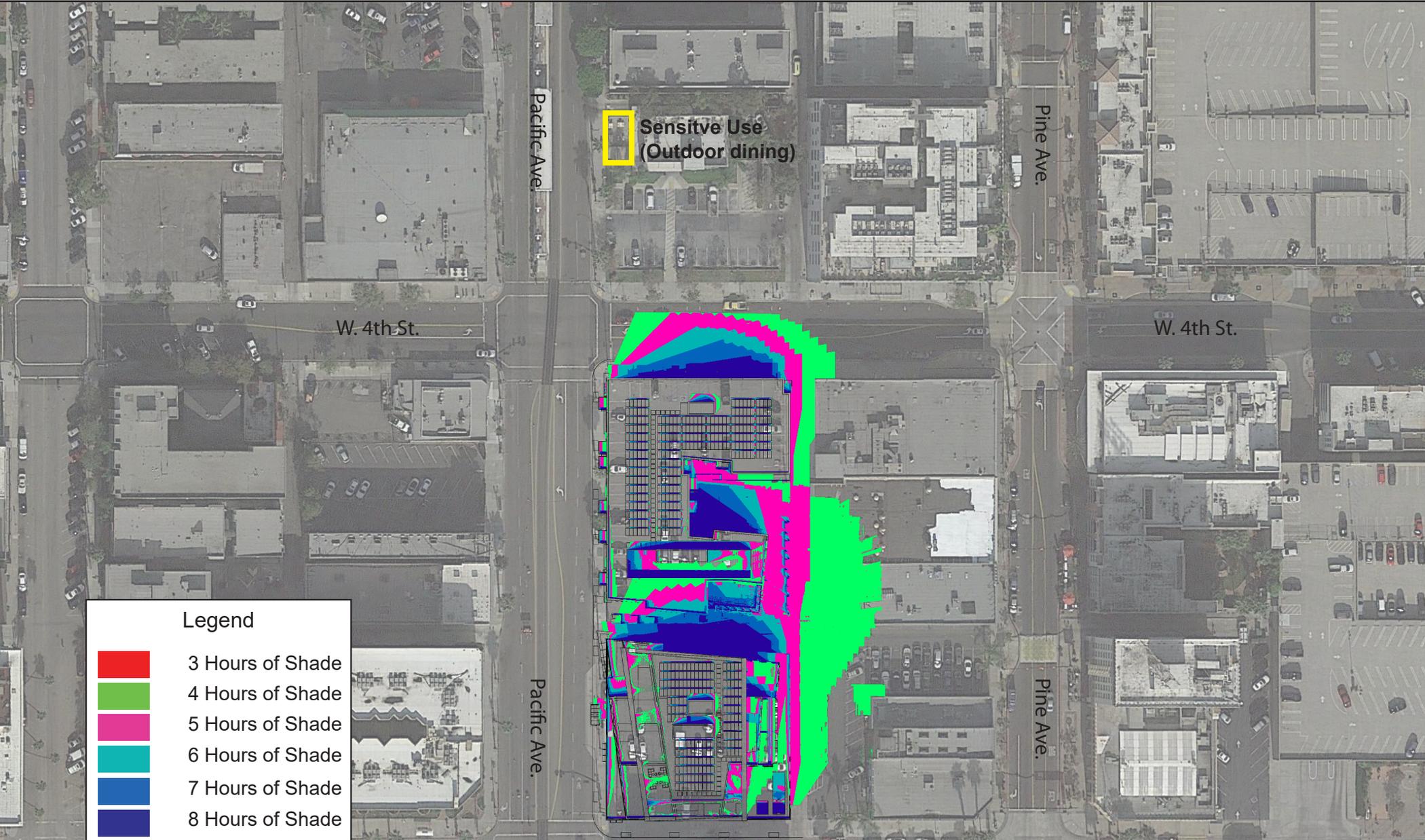


Figure 3, Fall Shadows
9:00 A.M. - 5:00 P.M.
Pacific Daylight Time

West 3rd Street & Pacific Avenue Shadow Study

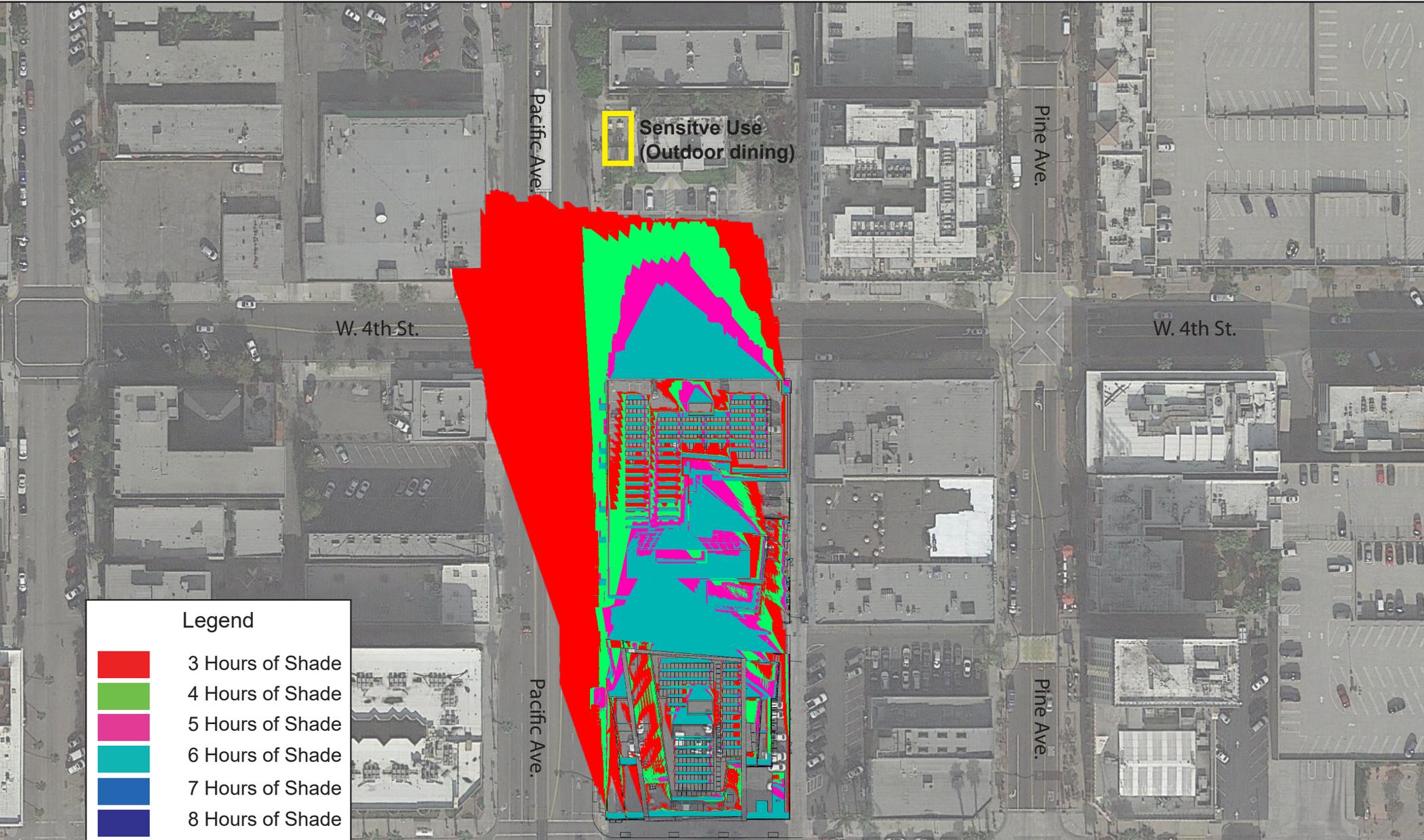


Figure 4, Winter Shadows
9:00 A.M. - 3:00 P.M.
Pacific Standard Time