APPENDIX B

Aesthetics Technical Report

DRAFT

Aesthetics Technical Report for the SDSU New Student Housing Project

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SUMMARY OF FINDINGS

California State University (CSU), San Diego State University (SDSU) proposes to construct seven new, 4- to 14-story residence towers and a 2-story food services building in the northwestern portion of the main SDSU campus. The New Student Housing Project (proposed project) would involve the expansion of on-campus student housing facilities to be located adjacent to the existing Chapultepec Residence Hall. Specifically, the proposed project would develop facilities to accommodate up to 2,566 student-housing beds in a series of residential towers that would be located on the existing Parking Lot 9 (formerly "U" Parking Lot) and the areas west and northwest of Parking Lot 9, surrounding the existing Chapultepec Hall. The proposed project would be developed over the years in three phases (i.e., Phase I, II, and III).

The Chapultepec area was selected due to the ability to create a new community next to Chapultepec Hall, its capacity to accommodate a greater increase in number of beds, the generally undeveloped nature of the site (and therefore lack of demolition costs and displacement of existing beds/uses), and the need for food and convenience services in the project site vicinity to serve both existing and new students. One of the goals of the proposed project is to increase on-campus student housing options by providing housing for approximately 2,600 additional students in a distinct neighborhood, thereby reducing the demand for student housing in the adjacent off-campus neighborhoods.

This technical report assesses the potential visual changes that would occur with proposed project implementation. The report provides information to support the environmental document (Draft EIR) prepared for the proposed project. The report contains the following information: the local and regional setting; a description of the proposed project; the methodology used to complete a visual assessment of the various project components; a discussion of existing scenic vistas, scenic highways, and visual character and quality including shading conditions, representative viewpoints, and lighting and glare; analysis under the California Environmental Quality Act (CEQA) significance thresholds; and resulting mitigation measure recommendations. The report concludes with a discussion of the level of significance after the proposed mitigation measures are implemented as part of the project.

The proposed project site is located adjacent to, and in the vicinity of, the 11-story Chapultepec Hall, 2-story Cholula Community Center, and existing surface parking lots (Parking Lots 9 and 10A). Land uses in the immediate surrounding area consist of residential uses, undeveloped canyon terrain, and campus athletic facilities. Low-density, single-family residential uses are located to the west of the project site within the College View Estates neighborhood. Multi-family residential uses largely occupied by SDSU students are located to the northeast on 55th Street. On-campus recreation facilities and public service (i.e., University Police) uses are

located to the east and south, and undeveloped, steep, and densely vegetated canyon terrain encompasses a portion of the project site and is located to the north.

The development proposed on the project site would display elements of the Spanish Colonial and Mission Revival architectural style that is prevalent in existing campus buildings; however, the proposed project would also introduce residential towers that display tall scale and wide bulk. There are no designated scenic vistas in the immediate project area and the SDSU campus is located within an existing developed community not generally known or noted for scenic vistas. Publicly accessible scenic vistas in the surrounding area where views of the project site are available are limited and consist primarily of prominent terrain located approximately 3 to 5 miles from the proposed project site in Mission Trails Regional Park. Given the expansive, panoramic nature of views available from trails and summits in Mission Trails Regional Park, the introduction of four- to fourteen-story residence halls on a 7.84-acre site at the northwestern corner of the main SDSU campus would not display spatial or scale dominance that would substantially affect views from identified scenic vistas. Therefore, the project would result in a less-than-significant impact to scenic vistas during construction and operation.

The change in the visual landscape for sensitive receptors, whom primarily consist of mobile viewers (e.g., motorists, pedestrians, bicyclists) traveling on Remington Road, and private viewers in the College View Estates neighborhood, was determined to be potentially significant. While the Phase II and Phase III development structures would be located across a canyon from residential land uses, due to their proposed bulk and scale, the Phase II and Phase III buildings would be taller than the residential structures and would create visible scale disparities and form and line contrast. The scale and architectural style of the Phase I development would be compatible with existing campus development in the immediate area, as would the scale and architectural style of the Phase II and Phase III development be compatible with the existing Chapultepec Hall. And, while the Phase II and Phase III development would result in changes to visual character and quality of the surrounding area, the bulk and scale of Phase II and Phase III development would be buffered from incompatible off-campus development in the immediate area by a canyon. Notwithstanding, impacts were determined to be potentially significant. Because there are no feasible mitigation measures that would block the surrounding viewpoints and reduce the anticipated impacts to existing visual character and quality of the site and surroundings to a less than significant level, impacts are significant and unavoidable.

Because the project site and proposed project structures generally would be obscured from view of motorists on I-8 (an eligible state scenic highway), impacts to scenic resources within a state scenic highway would be less than significant. Also, the proposed project would result in less than significant impacts to day and nighttime views as a result of new sources of substantial light and glare due to required compliance with existing exterior outdoor lighting and glare regulations.

New shadow conditions on December 21 (Winter Solstice), March 21 (Spring Equinox), and June 21 (Summer Solstice) associated with the proposed project would be below the significance threshold of three hours per day (on December 21 and March 21) between 9:00 a.m. and 3:00 p.m., and four hours per day (on June 21) between 9:00 a.m. and 5:00 p.m. On December 21, there would be increased shading from project structures at Receptor Sites R-W1, R-W2, R-W3, and R-W4 from 9:00 a.m. to 11:00 a.m. On March 21, one hour of increased shading from project structures would occur at Receptor Sites R-W1 and R-W2 between 9:00 a.m. and 10:00 a.m. and on June 21, no shadow from project buildings would be cast on identified Receptor Sites between 9:00 a.m. and 5:00 p.m. Therefore, the proposed project would not cast shade on shadow-sensitive uses for more than 3 hours between the hours of 9:00 a.m. and 3:00 p.m. between late October and early April or more than 4 hours between the hours of 9:00 a.m. and 5:00 p.m. between early April and late October. Therefore, impacts related to shadow conditions would be less than significant.

Lastly, project lighting levels (as measured at receptor sites) would be below the CEQA significance threshold for light trespass. Impacts to nighttime views due to the introduction of a new source of substantial light would be less than significant. The introduction of project lighting also would result in extremely low contrast ratios (i.e., below 10:1) and no new sources of glare would be experienced at receptor sites. Also, due to the scale of project structures, existing sources of glare, including sports field lighting, would be blocked from receptor sites located to the west of the proposed project site. Therefore, glare impacts associated with operation of proposed project lighting would be less than significant.

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1 INTRODUCTION

The purpose of this report is to analyze the potential aesthetics and visual quality related impacts under CEQA of the proposed project.

1.1 Regional and Local Setting

The SDSU campus is situated along Interstate 8 (I-8) about 8 to 10 miles from downtown San Diego (see **Figure 1, Regional Map**, and **Figure 2a, Vicinity Map**). The proposed project would be located on a 7.84-acre site at the northwest corner of the main SDSU campus. The campus is part of the College Area Community of the City of San Diego (City).

The proposed project would surround the existing Chapultepec Hall and would be developed west of existing SDSU academic buildings and north of campus athletic facilities. The site is bordered by Remington Road to the south, 55th Street to the east, and private properties to the north and west (see **Figure 2b, Project Area Map**). The land on which the proposed project would be developed is owned by SDSU and is located within the existing campus boundary. Undeveloped, steep, and densely vegetated canyon lands are contained within the proposed project and also are located to the north, east, and west (see **Figure 3, Project Site Topography**). Single-family residential development along Hewett Drive is located to the west of the site.

1.2 Project Description

The proposed project is the expansion of on-campus student housing facilities to be located adjacent to the existing Chapultepec Hall. Specifically, the proposed project would consist of the development of facilities to accommodate up to 2,566 student housing beds in a series of residential towers to be located on the existing Parking Lot 9 (formerly "U" Parking Lot) and centered around the existing Chapultepec Hall. See **Figure 2a, Vicinity Map**. The proposed project would be developed in three successive phases. Phase I would include construction of dormitory facilities to house up to 850 student housing beds on the existing Parking Lot 9, east of the existing Chapultepec Hall. Phase II would include construction of facilities to house up to an additional 850 beds in the area located to the west of the existing Chapultepec Hall. Phase III would include construction of facilities to house up to an additional 866 beds in buildings that would be located in the canyon behind Chapultepec Hall. The proposed project would consist of up to eight new buildings. One building would serve as a dining hall (2 stories), while the remainder of the buildings would consist of up to 4- to 14-story buildings of single-, double-, and triple-occupancy student housing units. The complex would include outdoor gathering spaces and green space. The proposed project would entail permanent removal of the existing Parking Lot 9; these parking spaces would not be replaced. See **Figure 2b, Project Area Map; Figure 3, Project Site Topography;** and **Figure 4, Proposed Site Plan**.

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2 METHODOLOGY

This section provides an overview of the methodology that was used to determine the potential change in the visual environment that would occur with the proposed project.

The visual assessment included review of relevant documents, aerial photographs, online mapping, and field surveys. Specifically, the proposed project's visual setting was developed using available information on visual resources in the project vicinity. The College Area Community Plan (City of San Diego 1989) was reviewed to gain a better understanding of the spatial distribution of land uses in the project area and to gather information regarding the prevalent urban design concepts present in the community. This review was supplemented through an examination of aerial photographs and online mapping tools which provided an updated image of the community, as well as through a review of the Visual Quality/Community Character Technical Report prepared for the San Diego State University Plaza Linda Verde Project (Dudek 2009) which provided information regarding the local setting, visual character of the SDSU campus, and sources of on- and off-campus lighting. Further, Dudek graphic designer Paul Caligiuri and environmental planner Josh Saunders conducted photographic field surveys of the proposed project site and surrounding community on March 1, 2017 and March 18, 2017, respectively. Observations were primarily recorded via photographs taken with Global Positioning System (GPS)-enabled personal devices (i.e., mobile phones).

Additionally, the visual assessment included a viewshed analysis to determine the area in which the proposed project components would be visible. The viewshed was determined through review of aerial photography, topographic maps, and field surveys. Representative views of the proposed project area were selected using the mass and scale of the existing 11-story Chapultepec Hall (located adjacent to the project site), and these views were recorded at on- and off-site locations.

The presence of scenic vistas in the surrounding area was determined through a review of the College Area Community Plan, aerial photographs, and topographic maps. Potential scenic vista locations were identified and photographed during field surveys. Eligible and officially designated state scenic highways were identified using the Caltrans Scenic Highway Program. Views from identified scenic highways were documented during the field survey.

A photographic inventory within the viewshed was completed to document the visual resources and visual setting and to illustrate the existing visual character of the project site and surrounding area. Aerial photography and the spatial distribution of land uses occurring within the surrounding area were used to identify sensitive receptors in relation to the project site. Public vantage points including roadways from which views to the project site were likely to be available were identified using aerial photography and topographic maps. Visibility to the project site from these identified vantage points was verified during the field survey. Existing views from select public vantage points were documented and photographed. Four public vantage points were selected as representative views of and towards the proposed project site that would be available to sensitive receptors in the surrounding area. These representative views included both on- and off-campus locations.

Visual simulations also were used as a tool in determining the change in the existing visual environment through use of field photography, digital terrain modeling, architectural floor plans and elevations, and true scale three-dimensional models to create accurate models of the proposed project. Visual simulations of the project were prepared from the four representative viewpoints referenced above.

Related to lighting and shade/shadow, Francis Krahe & Associates, Inc. prepared technical reports for the project evaluating existing and proposed nighttime lighting and daytime shading conditions that would be experienced at specific receptor sites at the project's western boundary, Hewlett Drive, and at the College View apartments parking lot that lines the east rim of the canyon and would encompass a portion of the project site. These reports are included as Appendix A and Appendix B to this technical report. Existing and proposed conditions information is incorporated in this technical report.

The above data was assembled to determine the potential visual impacts in relation to established significance thresholds. Visual changes and level of significance were evaluated based on the duration of the anticipated view (typically applicable to passing mobile viewers), line-of-sight in relation to whether interrupted, peripheral, or direct views would be substantially affected, distance of the view (foreground, mid-view or distant view), and number of viewers. The visual changes were then assessed to determine whether a significant impact (i.e., a substantial or potentially substantial, adverse change in the environment) would result for viewers located within the proposed project area in relation to California Environmental Quality Act ("CEQA") significance thresholds. In the event that a significant impact would result, mitigation measures are recommended to reduce the identified impact. An evaluation was completed to determine the level of significance following implementation of the proposed mitigation measures.

3 EXISTING CONDITIONS

This section describes the existing conditions in the project area and identifies the visual resources that could be affected by the proposed project. The existing environmental setting discussion below provides a general description of the project vicinity and the project site. Following the general description, the environmental setting is organized according to visual/aesthetic resources identified in Appendix G of the California Environmental Quality Act (CEQA) guidelines, i.e., scenic vistas, scenic highways, visual character and quality, etc.

3.1 Existing Environmental Setting

The proposed project is located along the Interstate 8 (I-8) corridor in southwestern San Diego County (**Figure 1**). The area is primarily urban in character and is developed with a variety of land uses including residential, commercial, recreational, and institutional. Open space in the area tends to be concentrated at Mission Trails Regional Park, a large expanse of undeveloped natural lands comprised of a variety of terrains and habitats, although open space also is distributed throughout the landscape via a relatively vast system of canyons. The natural terrain of the area includes several prominent mountains and hills as well as a network of mesas and canyons that drain to Mission Valley and the San Diego River. With a few exceptions, the majority of the development in the area has occurred on the mesa tops and within the San Diego River Valley (which includes Mission Valley), while canyon hillsides and drainage bottoms have remained somewhat natural.

The project site is located within the northern extent of the College Area community and is accessible by several roadways. In addition to I-8, which provides regional access, College Avenue, Montezuma Road, 55th Street and Remington Road provide local access to the project site. College Avenue is a four-lane roadway with a north/south orientation providing access from I-8 to the College Area to the south and the community of Del Cerro to the north. Montezuma Road is also a four-lane roadway, with an east/west orientation and a striped center median. North of Montezuma Road, 55th Street is a four-lane roadway with a north-south orientation and an occasional raised median, and Remington Drive is a two-lane east-west oriented roadway with a stripped center median through the SDSU campus. The off-campus segment of Remington Road located west of the project site and Hewlett Drive through the College View Estates residential community are not striped.

Situated in the northwestern extent of the main SDSU campus (**Figures 2a and 2b, respectively**), the site of the project and development in the surrounding area are located on the flatter, mesa tops, which, near I-8, tend to become elongated and narrower in form and ultimately separated from one another by steep canyon terrain. In addition, the developed portions adjacent to and on the proposed project site consist of the 11-story Chapultepec Hall, 2-story Cholula Community Center, and existing surface parking lots (Parking Lots 9 and 10A). Land uses in the immediate surrounding area consist of low-density, single-family residential uses to the west within the College view Estates neighborhood, medium-density residential (i.e., SDSU on-campus student housing) to the northeast, and on-campus recreation facilities and public service (i.e., University Police) uses to the east and south (see **Figure 2a**). Undeveloped, steep, and densely vegetated canyon terrain encompasses the Phase II and III development sites and is located to the west and north of Chapultepec Hall and the Phase I development site (see **Figure 2b**).

3.1.1 Scenic Vistas

Canyon and valley topography dominates the immediate project vicinity and scenic vistas generally are limited and consist primarily of views to and from prominent terrain located in Mission Trails Regional Park. Prominent terrain includes Cowles Mountain (elevation of 1,592 feet above mean sea level (amsl)), Pyles Peak (elevation of 1,379 feet amsl), Kwaay Paay (1,194 feet amsl), South Fortuna (1,094 feet amsl), and North Fortuna (1,291 feet amsl), which are located approximately 3.7, 4, 4.1, 4.3 and 5 miles, respectively, northeast of the project site. The locations of these peaks and the project site are depicted on **Figure 5, Mission Trails Regional Park: Scenic Vistas**. Chapultepec Residence Hall and the project site are visible from these peaks and these peaks tend to be visible from roadways near the project site, including Remington Road (between Hewlett Drive and Chapultepec Hall) and generally, from private residences located north of Remington Road in the College View Estates neighborhood. The summits of these peaks are accessible via the Cowles Mountain Trail and connecting Pyles Peak Trail, the Kwaay Paay Trail, and the North/South Fortuna Mountain Loop trail via the Fortuna Saddle and provide trail-based recreationists (primarily hikers but also trail runners and mountain bikers) broad, panoramic views extending to Mission Valley, downtown San Diego, southern San Diego County and Tijuana. Expansive and long views to the north and west also are available from these elevated vantage points.

While the broad and long views available from the summit trails identified above are relatively similar, the amount of foot traffic on and the visual character of the trails varies. The most popular of the trails, Cowles Mountain Trail, is accessible via a developed staging area ("Cowles Staging Area") and parking lot located at the intersection of Golf Crest Drive and Navajo Road (City of San Diego 2015a). From the staging area, hikers and trail runners climb the terrain in a general south to north alignment and a series of switchbacks provide ample viewing opportunities of the landscape to the south. Wood post and rail fencing line the trail and occasionally, mile markers and signs warning recreationists of trail-adjacent habitat restoration projects dot the trail. The trail experiences heavy traffic on weekends (generally from 30 minutes before sunrise to 30 minutes after sunset).

Despite its relatively mild elevation profile and proximity to Cowles Mountain, the Pyles Peak Trail generally experiences light use. The narrow and minimally marked trail traverses the western slopes of Cowles Mountain. Views from the Pyles Peak summit are similar to the wide, long views available from Cowles Mountain. However, due to a slightly lower elevation, the hills encompassing the northeastern portion of the Del Cerro neighborhood block the majority of the SDSU campus from view at Pyles Peak although the tall, rectangular form of Chapultepec Residence Hall is distinguishable in the southern landscape. The Kwaay Paay Trail, and the North/South Fortuna Mountain Loop are located in the central and northern portions of the regional park and consist of a narrow, steep trail and a relatively small summit area (Kwaay Paay) and a slightly wider trail traversing moderate to steep and occasionally, rock strewn, terrain. Views from the summit are panoramic and limited only by the presence of background mountainous terrain to the north, east, and south.

With respect to Remington Road, as eastbound motorists and pedestrians pass Hewlett Drive and approach Parking Lot 10A on campus, the terrain to the north falls and with the exception of several scattered tall palm trees, vegetation along the canyon rim is comprised of shrubs low to moderately tall in height. The general scarcity of particularly tall trees or other prominent vegetation along the canyon's rim results in views along an approximate 300-foot long segment of Remington Road that extend off-campus and include the dark ridgelines of prominent terrain in Mission Trails Regional Park (see Viewpoints D and F in Section 3.1.3, Visual Quality and Character, below). However, the view is available to mobile receptors (i.e., motorists and pedestrians) that tend to focus on visual elements along the Remington Road corridor (as opposed to off-site components) and the duration of the available view is brief (approximately 8 seconds assuming vehicular travel at the posted speed limit of 25 miles per hour). In addition, Remington Road is not a designated public view corridor per the College Area Community Plan or the City of San Diego General Plan. As the duration of the available view is brief and Remington Road is not a designated public view corridor, views from Remington Road along the project site frontage are not considered scenic vistas.

3.1.2 Scenic Highways

Located approximately 0.20-mile north of the project site, Interstate 8 (I-8) is an eligible state scenic highway from its western terminus to State Route (SR) 125 in La Mesa (Caltrans 2017). The posted speed limit on I-8 near the project area is 65 miles per hour. Motorists passing the elevated mesa landform where the main SDSU campus is located occasionally have, inferior angled views (i.e., views from a lower elevation to a particular object/structure in the landscape located at a greater elevation) towards campus due to the convergence of descending west- and east-facing canyon terrain, which creates narrow viewing windows to the south. Approximately 0.8-mile west of College Avenue, a viewing window is available to eastbound I-8 motorists however, the deck and concrete pylons of a bridge supporting the Green Line of the San Diego Trolley as it spans the canyon obscures the project site and adjacent Chapultepec Hall from view. At this location, the westbound travel lanes of I-8 are situated approximately 30 feet lower in elevation than the northbound travel lanes and thus, views to the south including views of Chapultepec Hall are unavailable due to intervening terrain.

In addition to I-8, three officially designated scenic highways are located within 5 miles of the project site (Caltrans 2017). Located approximately 4.6 miles to the north of the project site at Santo Road, SR-52 (from Santo Road east to Mast Boulevard) is an officially designated state scenic highway. Views to the project site from the approximately 5-mile long segment of SR-52 are obscured due to the presence of intervening terrain (i.e., mountainous landforms of Mission Trails Regional Park), elevated terrain between Sheppard Canyon and Murphy Canyon, and adjacent landscaping including tall eucalyptus trees. SR-125 from SR-94 to I-8 near La Mesa and SR-163 from the south to the north boundary of Balboa Park also have been officially designated as state scenic highways (Caltrans 2017); however, views to the project site from these state routes are obscured due to the presence of intervening terrain, development, and landscaping

3.1.3 Visual Character and Quality

The 7.84-acre project site encompasses existing Parking Lots 9 and 10A and undeveloped canyon terrain to the north and west of Chapultepec Hall at the northwest corner of the main SDSU campus (see **Figure 2b**). The site is located west of the Aztec Recreation Center, International Student Center, and the boxy and grey, two-story College View student apartment complex. As shown on **Figure 2b**, the College View apartments and two- to four-story student housing developments immediately east and west of 55th Street are not located within the SDSU Campus and Existing Campus Master Plan boundary. On-campus facilities to the south of the project site and south of Remington Road include the long, two-story SDSU Public Safety building featuring a small surface parking lot and a curvilinear turf frontage along 55th Street, and on-campus intercollegiate recreational facilities including Peterson Gym, Tony Gwynn Stadium, Aztec Softball Field, and Aztec Tennis Court Complex. Primarily undeveloped and densely vegetated canyon lands extend north from the project site to I-8. Parking Lot 10A, a 33-space surface parking lot lining the canyon edge, is included within the project boundary and is immediately adjacent to the Phase II development site. One- and two-story single-family homes located along Hewlett Drive within the College View Estates neighborhood are located to the west of the project site and more specifically, are immediately west of the Phase III development site. Additional one- and two-story homes within the College View Estates neighborhood are located west of Hewlett Drive and north and south of Remington Road on generally elevated mesa-top landforms.

One- and two-story single-family homes within the College View Estates neighborhood are located west of the project site along Remington Road, Hewlett Drive and other local roadways in the area (see **Figure 2b**). Several residences located north of Remington Road and along Hewlett Drive abut the steep canyon terrain across from the area planned to support Phase III. Mature street trees are a constant presence in this single-family residential neighborhood and private landscaping displays a variety of forms, colors and textures. Kept lawns, hedges and shrubs are intermixed with dense plantings of colorful flowers, dark green shrubs, and occasionally, grey and brownish red rock accent yards.

Off-campus residential uses located northeast of the project site and along 55th Street consist of several two and three-story apartment complexes primarily occupied by SDSU students. Apartment structures generally display grey or off-white colored facades and relatively long boxy forms accentuated by straight horizontal and vertical lines and repeating window and door elements. Street-facing facades tend to be articulated by horizontal rectangular masses that facilitate pedestrian movement between floors of structures and afford residents useable private space. Sidewalks are flanked by vehicles (street parking is permitted on 55th Street) and strips of green lawn. Landscaping consists of small spherical shrubs, spreading tropical plants and tall, narrow palm trees which, along with distribution line and poles, populate the skyline.

Recreation and limited public service uses populate the landscape located south of the project site. The Aztec tennis center, softball field, and Tony Gwynn Stadium are located to the south and are set back and buffered from Remington Road by sidewalk and landscape elements. A vine-covered fence and opaque outfield wall covered fencing obscure views to the baseball field from Remington Road. Stadium elements, including tall nighttime lighting structures, a large rectangular and electronic scoreboard, and the press box and seating areas are elevated and are briefly visible to passing motorists. The multi-story Aztec Recreation Center and University Police/Public Safety building are located to the south and southeast as is the large, boxy form and unarticulated, windowless facade of the Peterson Gym. The Fowler Athletics Center is located south adjacent to Peterson Gym and Viejas Arena is located to the east across 55th Street. Brightly colored and multi-story student housing encompassing Fraternity Row and the Piedra Del Sol Apartments are located south of Viejas Arena along Aztec Walk. Additional student housing and institutional uses are located further to the south along 55th Street.

Viewpoints

As explained in Section 2, Methodology, several locations from which receptors are afforded views of the proposed project site in the surrounding area were selected as representative viewpoints of the proposed project. These observation points (i.e., viewpoints) form the basis of the impact analysis as it relates to visual character and quality of the site and surrounding area, and are characteristic of the various viewing angles, distance zones, visibility conditions, and surrounding landscape context available at locations from which the proposed project would be visible. The viewpoints are captured in photographs taken of and towards the project during the photographic field survey. The location of these photographs and their relationship to the project site are depicted on **Figure 6, Viewpoint Locations**. The existing photographs taken at each viewpoint are included on **Figures 6a through 6c, Existing Site Views,** and a brief description of the view is provided below each image. Table 1 lists the identified viewpoints and provides location, approximate distance and orientation to project site, viewing angle/observer position, and general visibility conditions to the project site. A brief description of the view and visual character of the landscape also is provided below by viewpoint.

Table 1
Viewpoints and General Visibility

Viewpoints	Location	Approximate Distance/ Orientation to Project Site	Viewing Angle/ Observer Position	General Visibility Conditions to project site
A	55th Street	100 feet/northeast	Inferior	The project's Phase I development site (existing Parking Lot 9) is partially obstructed by campus landscaping. Chapultepec Hall is visible to the west but is partially screened by landscaping.
B	55th Street	175 feet/southeast	Normal	The project's Phase I development site is located approximately 10 feet lower in elevation than Viewpoint B and partially obstructed by campus landscaping. Chapultepec Hall is marginally visible through a small grove of eucalyptus trees.
C	Remington Road	Adjacent to project site	Normal	Southern boundary of project's Phase I development site is marked by tall eucalyptus trees. The majority of Phase I development site is obscured by local topography that abruptly descends north of Remington Road.
D	Remington Road	40 feet/south	Normal	Tall palm trees and dense shrubs are located on the project's Phase II development site which is located immediately north of Remington Road in the primarily undeveloped canyon. Clear views to Chapultepec Hall are available.
E	Parking Lot 10A	On project site	Normal	Similar existing characteristics on the Phase II development site are visible from Viewpoint D and E. Field lighting at Tony Gwynn Stadium is visible but the field is obscured by vegetation in the foreground.
F	Parking Lot 10A	On project site	Normal	The canyon encompassing the Phase II and Phase III development site dominate

Table 1
Viewpoints and General Visibility

Viewpoints	Location	Approximate Distance/ Orientation to Project Site	Viewing Angle/ Observer Position	General Visibility Conditions to project site
				the foreground and the lack of tall development to the north provides for long views to prominent terrain in Mission Trails Regional Park.
G	Remington Road	380 feet/west	Normal	The project's Phase II and Phase III development site are obscured by College View Estates neighborhood residential development and landscaping. Chapultepec Hall is visible but partially obscured by tall landscaping.
H	Remington Road	730 feet/west	Normal	The project's Phase II and Phase III development site are obscured by College View Estates neighborhood residential development and landscaping. Wings of Chapultepec Hall are visible but partially obscured by street trees.
I	Hewlett Drive	220 feet/west	Inferior	The project site is obscured by College View Estates neighborhood residential development, landscaping, and utilities. Chapultepec Hall is partially screened by landscaping but the tall and wide building is the dominant feature in the view.

55th Street (Viewpoints A and B)

Viewpoint A is located on 55th Street, approximately 100 feet to the northeast of Parking Lot 9, and provides an inferior angled views towards the Phase I development site. The view is the southwest towards Parking Lot 9 (parking lot signage and the sole entrance of 55th Street are visible) which is lined by tall and broad pine trees along the south and east perimeter (see **Figure 6a**). The parking lot is located east of Chapultepec Hall (the 11-story residence hall is partially visible in the Viewpoint A photograph and lends an element of scale to the scene) and south of Remington Road. The asphalt paved surface of Parking Lot 9 is situated approximately 12 feet lower than that of Remington Road.

Viewpoint B is located approximately 350 feet north of Viewpoint A and 175 feet southeast of the project site. Located on 55th Street, the view looks northwest towards broad pines trees along the east and southeast perimeter of Parking Lot 9, scattered mature eucalyptus trees along the lot's northern perimeter and a bougainvillea speckled chain link fencing running parallel to Remington Road (see **Figure 6a**). Again, Chapultepec Hall is partially screened from view by existing mature vegetation. From this particular vantage point, the surface of Parking Lot 9 is not visible. Instead, the Phase I development site is marked by tall, spreading trees that tends to decrease in density from east to west.

Representative viewer groups at Viewpoints A and B consist of motorists, pedestrians, and bicyclists.**Remington Road (Viewpoint C and D)**

Viewpoint C is located approximately 575 feet west of Viewpoint B and is situated on the sidewalk adjacent to the Cholula Community Center (on campus). The viewpoint is located on Remington Road and the east-oriented view looks towards the project's Phase I development site that currently supports mature landscaping and obscured terraced terrain. Overhead streetlights and electrical distribution lines supported by tall wooden poles are located in a regular pattern along Remington Road. The lack of student housing or other campus structures displaying moderate to tall form on Parking Lot 9 provides opportunities for views extending off-campus and to the developed hilly terrain of Del Cerro and the Cowles Mountain peak to the northeast (see **Figure 6a**).

Viewpoint D is located south of Parking Lot 10A and Remington Road and north of the Aztec Tennis Complex. The view looks to the northeast towards Parking Lot 10 A, the project's Phase II development site, and 11-story Chapultepec Hall. The Phase II development site currently supports descending canyon terrain that is densely vegetated with low to moderately tall mounded shrubs, tall and skirted fan palms, and large and broad pine trees. Unlike Chapultepec Hall, visible off-campus student housing to the northeast displays a low-vertical profile and does not attract attention in the view. The current lack of development in the canyon and on the project site provides viewing opportunities that extend off-campus to Del Cerro hillsides developed with residences and to prominent, mountainous terrain in Mission Trails Regional Park. The vertical, stacked form of Pyles Peak is detectable in the view (see Viewpoint D, **Figure 6b**).

Representative viewer groups at Viewpoint D consist of motorists, pedestrians, and bicyclists.**Parking Lot 10A (Viewpoint E and F)**

Viewpoint E is located along the northern perimeter of Parking Lot 10 and looks to the east towards the project site (i.e., Phase II development site). The densely vegetated and verdant, sloping terrain of the western portion of the project site dominates the view yet the cream-colored exterior, tall rectangular form, and repeating window patterns marking the west elevation of Chapultepec Hall also command attention (see **Figure 6b**). The thin line of metallic support poles topped with banks of stadium lighting rise from obscured bases while acknowledging the proximity of Tony Gwynn Stadium to Chapultepec Hall.

Viewpoint F looks north from the northern perimeter of Parking Lot 10 and illustrates the primarily undeveloped and densely vegetated character of existing canyon terrain that encompasses the western portion of the project site. The view also illustrates the proximity of existing off-campus residential lands accessible off Hewlett Drive to the project site (see **Figure 6b**). The view from Viewpoint E is long but is somewhat limited in extent by Chapultepec Hall to the east and tall and mature trees to the northwest. Still, prominent, mountainous terrain in Mission Trails Regional Park including Pyles Peak, Kwaay Paay, South Fortuna, and North Fortuna are visible as are the hazy, more distant silhouettes of Iron Mountain to the northeast (approximately 15 miles away) and Black Mountain (approximately 14 miles) to the north.

Representative viewer groups at Viewpoints E and F consist of motorists, pedestrians, and bicyclists.

Remington Road (Viewpoints G and H) Viewpoint G is situated along Remington Road in the College View Estates neighborhood. Approximately 0.15-mile west of Chapultepec Hall, Viewpoint E illustrates the visual character of single-story ranch-style homes and tall street trees that typify the College View Estates neighborhood (see **Figure 6c**). In addition, the existing view demonstrates the typical scale of residential development in the College View Estates neighborhoods in comparison with the large, rectangular mass and prominent, vertical scale of the 11-story Chapultepec Hall. Partially obscured by street trees, the cream-colored exterior and straight, horizontal and vertical lines of Chapultepec Hall are evident in the view.

Viewpoint H is located approximately 375 feet northeast of Viewpoint G and is situated on Remington Road in the College View Estates neighborhood. As with Viewpoint G, Viewpoint H illustrates the primarily single-story scale of neighborhood residential development and the prevalence of landscaped lots and street trees in the College View Estates neighborhood (see **Figure 6c**). Despite partial obstruction by tall and mature street trees, the tall vertical scale and rectangular form of Chapultepec Hall draw attention in east-oriented views.

Representative viewer groups at Viewpoints G and H consist of motorists, pedestrians, and bicyclists.

Hewlett Drive (Viewpoint I)

Viewpoint I is located on Hewlett Drive and looks to the east towards single-family residential development and an assortment of vehicles lining the descending terrain. The thin diagonal lines of electrical and communication lines and aligned along Hewlett Drive and lots appear to be moderately to densely landscaped with hedges, shrubs, and tall trees. East of Hewlett Drive, Chapultepec Hall rises above foreground residences and looms large in the visual environment (see **Figure 6c**). Hardy Tower is visible to the northeast but displays a shorter scale, and is visually subordinate to Chapultepec Hall because it is located further away.

Shading

Remington Road and portions of the proposed project site (i.e., Phase I development site) encompass relatively flat mesa landforms. The Phase II and Phase III development sites contain canyon terrain that falls from south to the north. The developed areas of the proposed project site and the majority of the Phase II development site are located at a higher elevation than the student apartment complexes to the east and northeast and the single-family residential properties to the west, and northwest in the College View Estates neighborhood. The project area map is included as Figure 2b and existing site topography is depicted on Figure 3.

The proposed project site includes the 11-story Chapultepec Hall and SDSU Parking Lots 9 and 10A. As discussed in Appendix A, shadows cast by Chapultepec Hall on the winter solstice (December 21) represent the worst-case scenario regarding shading as the Northern Hemisphere tilt away from the sun is maximized and the sun occupies a low position in the sky. Due to its tall vertical profile and wide rectangular form, Chapultepec Hall creates shadows that extend to residential properties to the northwest following sunrise and lasting until approximately 10 a.m. (see Appendix A, Shading Technical Study for the SDSU New Student Housing Project). As the sun moves across the sky throughout the day, the angle and length of shadows cast by Chapultepec Hall change and at midday, shadows extend to undeveloped canyon terrain to the north. Around 2 p.m., shadows extend to the west-facing slope of canyon terrain to the northeast of the proposed project site and around 3 p.m., shadows from Chapultepec Hall are cast onto the College View Apartments parking lot. As the sun approaches the western horizon between 3 p.m. and 4 p.m., shadow lengths increase and extend to the College View Apartments and 55th Street and last until sunset.

3.1.4 Light and Glare

The proposed project site is located within and adjacent to an existing urban area that is exposed to nighttime lighting. Primary nighttime lighting sources near the project site include building interior lights (primarily stair lights and illuminated windows), Parking Lot 9 and 10A lighting installed at and near Chapultepec Hall, and sports field lighting associated with Tony Gwynn Stadium, the Aztec Softball Field, the tennis complex, soccer field, and football practice field. In addition, streetlights installed along Remington Road, and interior and exterior lighting installed on private residential property in the College View Estates neighborhood contribute nighttime lighting to the existing visual environment.

Sources of glare in the project area primarily consist of glass windows in campus and off-campus facilities and structures. The prevalent Mission Architectural style displayed by campus facilities typically incorporates cool-colored stucco façades and newer buildings, such as the stone-like paneled exterior of Fowler Athletics Center, which generally consists of non-reflective exterior surfaces and finishes.

3.2 Regulatory Setting

This section describes the applicable regulatory plans, policies, and ordinances relevant to the analysis of the proposed project.

3.2.1 Federal

There are no federal aesthetics or visual resource policies that would be applicable to the proposed project.

3.2.2 State

State Scenic Highway Program

Established in 1963 by the State Legislature and managed by the California Department of Transportation (Caltrans), the goal of the State Scenic Highway Program is to "preserve and enhance the natural beauty of California" by identifying those portions of the State highway system and adjacent scenic corridor that require special conservation treatment (Caltrans 2008). Highways included in the State Scenic Highway Program should "traverse an area of outstanding scenic quality, contain striking views, flora, geology, or other natural attributes" (Caltrans 2008). Caltrans designated both eligible and official state scenic highways. Eligible state scenic highways consist of state routes nominated for official designation by the local governing body with jurisdiction over the lands adjacent to the proposed scenic highway. In order to be identified as an "eligible" state scenic highway, a visual assessment of the proposed corridor and a Scenic Highway Proposal must be completed by the local jurisdiction and Caltrans must determine that the route meets scenic highway criteria. Official State Scenic Highway designation requires preparation of a Corridor Protection Plan containing measures, ordinances, zoning, and/or planning policies applicable to the area of land within the scenic corridor and the Plan must be deemed acceptable by Caltrans.

State scenic highways within five miles of the project site consist of an eligible state scenic highway (I-8) and three officially designated state scenic highways (SR-52, SR-125, and SR-163). The availability of views to the project site from these roadways is discussed in Section 3.1.2, above.

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations (CCR), also known as the California Building Standards Code, consists of regulations to control building standards throughout the State. The following components of Title 24 include standards related to lighting:

California Building Code (Title 24, Part 1) and California Electrical Code (Title 24, Part 3) The California Building Code (Title 24, Part 1) and the California Electrical Code (Title 24, Part 3) stipulate minimum light intensities for safety and security at pedestrian pathways, circulation ways, and paths of egress. All lighting for the proposed project will comply with the requirements of the California Building Code.

California Energy Code (Title 24, Part 6)

The California Energy Code (CEC) provides allowances for lighting power and lighting control requirements for various lighting systems, with the goal of reducing energy consumption through efficient and effective use of lighting equipment.

Section 130.2 sets forth requirements for Outdoor Lighting Controls and Luminaire Cutoff requirements. All outdoor luminaires rated above 150 watts shall comply with the backlight, up light, and glare "BUG" in accordance with IES TM-15-11, Addendum A, and shall be provided with a minimum of 40% dimming capability activated to full on by motion sensor or other automatic control. This requirement does not apply to street lights for the public right of way, signs or building façade lighting.

Section 140.7 requires that outdoor lighting power density allowances in terms of watts per area for lighting sources other than signage. The lighting allowances are provided by Lighting Zone, as defined in Section 10-114 of the CEC. Under Section 10-114, all urban areas within California are designated as Lighting Zone 3.

Section 130.3 requires that sign lighting controls with any outdoor sign that is on day and night must include a minimum 65 percent dimming at night. Section 140.8 of the CEC sets forth lighting power density restrictions for signs.

California Green Building Standards Code (Title 24, Part 11)

The California Green Building Standards Code, which is Part 11 of Title 24, is commonly referred to as the CALGreen Code. Paragraph 5.106.8 Light pollution reduction, provides that all nonresidential outdoor lighting must comply with the following:

- The minimum requirements in the CEC for Lighting Zones 1–4 as defined in Chapter 10 of the California Administrative Code; and
- Backlight, Uplight and Glare (BUG) ratings as defined in the Illuminating Engineering Society of North America's Technical Memorandum on Luminaire Classification Systems for Outdoor Luminaires (IESNA TM-15-11, Appendix G); and
- Allowable BUG ratings not exceeding those shown in Table A5.106.8 in Section 5.106.85 of the CALGreen Code (excerpt included in Appendix F); or
- Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

3.2.3 Local

SDSU Lighting Policy

SDSU's lighting policy strives to achieve safety and security on all walkways and parking areas while also accentuating unique architectural qualities of campus facilities (SDSU Physical Master Plan, Phase I, pp. 157–160). SDSU's lighting policy also voluntarily follows the adopted ordinances of the City of San Diego for any outdoor lighting upgrades in attempts to reduce potential lighting impacts on astronomical research occurring at the Palomar and Mount Laguna observatories.

The design concept for on-campus exterior lighting is to achieve consistency in the selection of light sources, light fixture, poles and material as a means to improve the visual quality of an installation and reduce occurrences of cluttered and chaotic landscapes. General criteria applicable to all on-campus lighting includes use of high pressure or metal halide fixtures where public safety or aesthetic issues are important, achieving the minimum light distribution requirements necessary to provide a safe night-time environment and use of lighting (and varying intensity levels of lighting) to help direct motorists and pedestrians to major entrances and parking lots (SDSU Physical Master Plan, Phase I, pp. 157–160).

City of San Diego General Plan

As a state agency, SDSU (California State University) is not subject to local land use and planning regulations, such as the City of San Diego General Plan, College Area Community

Plan, or city municipal ordinances, although, to the extent feasible, consideration is given to these documents as part of the analysis.

The Conservation Element of the City's General Plan (City of San Diego 2008a) contains policies that pertain to the natural landforms, including canyonlands that help make San Diego unique. Although SDSU is not subject to these policies, policies of the Conservation Element pertain to urban canyons and environmentally sensitive lands located outside the campus boundaries near the project site.

The goal of the General Plan Urban Design Element is to "guide development toward a desired scale and character that is consistent with the social, economic and aesthetic values of the City of San Diego (City of San Diego 2008b). The term "urban design" encompasses the physical features present in the landscape that help characterize the image of a street, neighborhood or community and consists of both natural and man-made features. Canyons and mesas are identified in the Urban Design Element as natural features that contribute to San Diego distinctive character.

City of San Diego - College Area Community Plan

The College Area community plan contains eight elements, several of which relate to visual quality and community character

These include the Urban Design Element, which contains recommendations concerning hillside and slope development.

City of San Diego Municipal Code

As indicated above, SDSU's lighting policy encourages consistency with the City of San Diego's outdoor lighting policies. The City of San Diego Municipal Code (LAMC) regulates lighting with respect to building lighting, transportation, street lighting and light trespass (i.e., the spillover of light onto adjacent light sensitive properties). The City also enforces the building code requirements of the San Diego Building Code, the California Building Code, the California Green Building Standards Code (CALGreen), and the California Electrical Code. The following sections of the Municipal code pertain to glare and lighting and are thus relevant to aesthetics:

Chapter 12, Article 142.0730 Glare Regulations

(a) A maximum of 50 percent of the exterior of a building may be comprised of reflective material that has a light reflectivity factor greater than 30 percent.

(b) Reflective building materials shall not be permitted where the City Manager determines that their use would contribute to potential traffic hazards, diminished quality of riparian habitat, or reduced enjoyment of public open space.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000

Chapter 14, Article 142.0740 Outdoor Lighting Regulations

(a) Purpose and Intent

(1) Outdoor lighting fixtures shall be installed in a manner that minimizes negative impacts from light pollution including light trespass, glare, and urban sky glow in order to preserve enjoyment of the night sky and minimize conflict caused by unnecessary illumination.

(2) Regulation of outdoor lighting is also intended to promote lighting design that provides for public safety and conserves electrical energy.

(3) It is the intent that, in addition to the regulations set forth in Section 142.0740, outdoor lighting fixtures shall be installed and operated in compliance with the following regulations, to the extent applicable:

(A) California Energy Code, California Code of Regulations, Title 24, Part 6;

(B) Green Building Regulations (Chapter 14, Article 10); and

(C) Electrical Regulations (Chapter 14, Article 6).

(c) General regulations that apply to all outdoor lighting:

(1) Outdoor lighting shall comply with the applicable California Energy Code lighting power requirement for the lighting zones identified on Map C-948 filed in the office of the City Clerk.

(2) Shields and flat lenses shall be required to control and direct the light below an imaginary horizontal plane passing through the lowest point of the fixture, except for:

(A) Residential entrance lights installed in accordance with the California Building Code and Electric Code requirements;

(B) Outdoor lighting fixtures less than 4,050 lumens including landscape lighting and decorative lighting;

(E) Lighting for sports and athletic fields;

(F) Outdoor illuminated signs.

(3) New outdoor lighting fixtures shall minimize light trespass in accordance with the Green Building Regulations where applicable, or otherwise shall direct, shield, and control light to keep it from falling onto surrounding properties. Zero direct-beam illumination shall leave the premises.

(4) Outdoor lighting shall not exceed nominal 4000 Kelvin Color Correlated Temperature (CCT).

(5) All outdoor lighting, including search lights, shall be turned off between 11:00 P.M. and 6:00 A.M. except:

(A) Outdoor lighting may remain lighted for commercial and industrial uses that continue to be fully operational after 11:00 P.M. such as sales, assembly, and repair; and for security purposes or to illuminate walkways, roadways, equipment yards, and parking lots subject to the following:

(i) Adequate lighting for public safety shall be maintained. Outdoor lighting shall otherwise be reduced after 11:00 P.M. where practicable.

(B) Outdoor lighting for the following is permitted to remain lighted after 11:00 P.M. and is exempt from the maximum Kelvin CCT and maximum lumen requirements specified in Section 142.0740(c)(4) and (c)(5)(A):

(i) Outdoor lighting used to illuminate recreational activities that are not in a residential zone may continue after 11:00 P.M. only when equipped with automatic timing devices and shielded to minimize light pollution.

(ii) Illuminated on-premises signs for businesses that are open to the public after 11:00 P.M. may remain lighted during business operating hours only. Illuminated off premises advertising display signs shall not be lighted after 11:00 P.M. Signs located both on-and off premises shall be equipped with automatic timing devices.

(iii) Outdoor lighting for automated teller machines and associated parking lot facilities and access areas shall be provided during hours of darkness in accordance with California Financial Code Sections 13040-13041.

(C) Outdoor lighting for illumination of the flag of the United States of America.

(6) On properties which are adjacent to or contain sensitive biological resources, any exterior lighting shall be limited to low-level lights and shields to minimize the amount of light entering any identified sensitive biological resource areas.

County of San Diego Light Pollution Code

As noted above, CSU/SDSU, as a state agency, is not subject to local planning regulations, including those of the County of San Diego. Additionally, such regulations are not applicable outside of the County's jurisdictional boundaries. As such, the County's Light Pollution Code is summarized below for informational purposes only.

The Light Pollution Code was developed by the County Department of Planning & Development Services and Department of Public Works in cooperation with lighting engineers, astronomers, land use planners from San Diego Gas & Electric (SDG&E), Palomar and Mount Laguna observatories, and local planning and sponsor groups to address and minimize the impact of new sources of lighting on nighttime views. The Light Pollution Code establishes shielding requirements per fixture by lighting type (i.e., outdoor lighting used for outdoor sales, eating areas, or advertisements (Class I), security lighting (Class II), and decorative lighting (Class III)) and according to location (Zone A or B) (County of San Diego 2009). For purposes of lighting requirements, the code separates the unincorporated portion of the County into two zones: Zone A and Zone B. Zone A includes all unincorporated lands located within a 15-mile radius of the Palomar or the Mount Laguna observatories, and Zone B includes all areas not included in Zone A (County of San Diego 2009). If the Light Pollution Code were applicable, the proposed project would be located in Zone B as the Mount Laguna Observation is located approximately 40 miles to the east.

3.2.4 Other

IESNA Recommended Practices

The Illuminating Engineering Society of North America (IESNA) recommends illumination standards for a wide range of building and development types. These recommendations are widely recognized and accepted as best practices and are therefore a consistent predictor of the type and direction of illumination for any given building type. For all areas not stipulated by the regulatory building code, municipal code or specifically defined requirements, the IESNA standards are typically used as the basis for establishing the amount and direction of light.

The IESNA 10th Edition Lighting Handbook defines Outdoor Lighting Zones relative to a range of human activity versus natural habitat. Table 26.4, Nighttime Outdoor Lighting Zone

Definitions, included in the Appendix D hereto, establishes the Zone designation for a range of existing lighting conditions, from low or no existing lighting to high light levels in urban areas. Table 26.4 is referenced by the California Energy Code Title 24 in section 10-114 of the CEC and section 140.7 relative to allowable energy use for outdoor lighting. In addition, the IESNA 10th Edition Lighting Handbook defines Recommended Light Trespass Limits in Table 25.5, included in the Appendix hereto, relative to the Outdoor Lighting Zones. The Recommended Light Trespass Illuminance Limits describe the maximum light trespass illuminance in Lux at the location where trespass is under review. As noted above, the CEC stipulates that all urban areas in California are designated as Lighting Zone 3. IESNA Table 25.5, lists a Pre-curfew 8 Lux (0.76 foot candles) maximum at the location where trespass is under review for Zone 3. This limit would apply to all building and exterior site lighting.

Further, according to the IESNA 10th Edition Handbook “glare occurs in two ways: when either the luminance[1] is too high, or luminance ratios are too high"[2]. The evaluation of too high luminance is determined by the maximum luminance of the visible light source. The second factor, “luminance ratios too high”, is evaluated by the ratio of the light source luminance as compared to the luminance within the field of view visible at an observer position. This ratio is referred to as Contrast, and is determined by the variation of luminance. For residential occupancies at night, “High,” “Medium,” and “Low” contrast are terms used to describe effect of the contrast ratios (the ratio of peak measured luminance to the average within a field of view) of greater than 30:1, between 10:1 and 30:1, and below 10:1, respectively. Contrast ratios above 30:1 are generally uncomfortable for the human eye to perceive[3] and may present an unacceptable condition for relaxation and enjoyment of a residence.

[1] Luminance describes the brightness of an illuminated surface. Luminance is a measure of reflected light from a specific surface in a specific direction over a standard area. It is measured in foot lamberts (candelas per square foot). A candela is defined as a measure of light energy from a source at a specific standard angle and distance. Metric equivalent for Luminance is candelas per square meter, or nits.

[2] IESNA 10th Edition, Section 4.10 Glare, page 4.25.

[3] IESNA 10th Edition, Section 4.10.1 Discomfort Glare, page 4.26

4 THRESHOLDS OF SIGNIFICANCE

The following significance criteria included in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.) assist in determining the significance of an aesthetic impact. Impacts would result if the project would:

1. Have a substantial adverse effect on a scenic vista.
2. Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway.
3. Substantially degrade the existing visual character or quality of the site and its surroundings.
4. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.
5. Cause a cumulative aesthetic impact.

Lighting

The determination of significance for lighting impacts is made with consideration given to the following factors:

- The change in ambient nighttime levels as a result of project sources; and
- The extent to which project lighting would spill off the project site and affect adjacent light-sensitive areas.

Based on these factors, the regulatory requirements identified in Section 3.2 above, and IESNA definition of glare, the project would have a significant light or glare impact on a sensitive receptor (residential uses or commercial or institutional land uses that require minimal night time illumination) if:

- Project lighting generates light emissions that produces a light intensity exceeding 0.74 foot-candles at the property line of a residence or other sensitive receptor; or
- Project lighting creates new high contrast conditions (contrast ratio over 30:1) visible from a field of view from a residential use or other sensitive receptor.

Shadow and Shading

The State of California does not regulate daylight shadows and the resulting effect on land uses, nor do the City of San Diego or County of San Diego have established thresholds governing shade or shadows. Guidelines for evaluating shading impacts are included in the Los Angeles CEQA Thresholds and the City and County of San Francisco CEQA guidelines (City and County of San Francisco 2012). In the absence of local thresholds, and because the project may create new daylight shadows that would be cast on residential land uses in the surrounding area, the thresholds and guidelines for these jurisdictions are utilized and are described below.

The Los Angeles CEQA Thresholds Guide (City of Los Angeles 2006) indicates project impacts would normally be considered significant if shadow-sensitive uses would be shaded by Proposed Project-related structures for more than 3 hours between the hours of 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or more than four hours between the hours of 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October).

In the City and County of San Francisco, there are two circumstances that could trigger the need for a shadow analysis: (1) If the proposed project would be over 40 feet tall, and could potentially cast new shadow on a property under the jurisdiction of the Recreation and Park Department, per San Francisco Planning Code Section 295; and/or (2) If the proposed project is subject to review under the California Environmental Quality Act (CEQA) and would potentially cast new shadow on a park or open space such that the use or enjoyment of that park or open space could be adversely affected.

While the project includes buildings greater than 40 feet tall, buildings would not cast shadow on property identified on the City's Parks and Recreation Department Park Facilities Map or on park or recreational (or publically accessible) open space. Therefore, the City and County of San Francisco CEQA guidelines were not considered as applicable to this project when compared to the City of Los Angeles guidelines. The City of Los Angeles guidelines were used because the conditions of the proposed project resembles those found in cities like Los Angeles. Specifically, the proximity of the proposed project to residential land uses (i.e., shadow-sensitive uses) and the expressed shade and shadow concerns of local residents resembles the potential conflict occurring between tall structures and existing nearby shadow-sensitive uses in denser cities and area. Shadow-sensitive uses are located west of the proposed project site and would potentially be exposed to shadows cast by project buildings. Therefore, the Los Angeles CEQA Threshold is used to evaluate shadow effects associated with proposed project structures.

5 IMPACT ANALYSIS

Would the project have a substantial adverse effect on a scenic vista?

There are no designated scenic vistas in the immediate project area and the SDSU campus is located within an existing developed community that is not generally known or noted for scenic vistas (See Figures 6a, 6b, and 6c, respectively). As stated in Section 3, Existing Conditions, publicly accessible scenic vistas in the surrounding area where views of the project site are available are limited and consist primarily of prominent terrain located approximately 3 to 5 miles from the proposed project site in Mission Trails Regional Park. The summits of these mountains are accessible by hiking trails and access roads in the regional park and provide broad panoramic views of Mission Valley, downtown San Diego, southern San Diego County, and Tijuana. Although distant and made from an elevated vantage point, views of the SDSU campus are available from these summit trails. Therefore, potential construction and operational impacts to existing views from these scenic vistas are analyzed in the following paragraphs.

Construction/Temporary Impacts

As detailed in Section 1, Project Description, construction of the proposed project would occur over three phases. Construction of each of the project components for the three phases generally would include a seven-step process that would begin with site preparation, demolition and grading, progress with building construction, installation of hardscape/landscape, trenching, and conclude with application of architectural coatings.

During construction of the project, views of the project site from recreational trails and summits in Mission Trails Regional Park would be dynamic as mobilization and site preparation activities would rapidly transition to establishment of building foundations and retaining walls. As construction progresses, steel framing and construction of exterior shells would occur. Temporary visual impacts associated with construction activities would be associated primarily with the influx of construction workers, equipment, and vehicles to the project site. Noticeable changes to the existing form, line, color and texture of the site would result from vegetation removal, grading activities, and progressive introduction of rectangular building frames and forms.

The visual effects of vegetation removal and grading would be noticeable to trail-based recreationists atop Cowles Mountain, Pyles Peak, Kwaay Paay and North and South Fortuna (and associated trails). Because these visual effects would occur more than 3 miles away and at ground level, site preparation and grading activities would not introduce elements that could block, screen or impede existing views from identified scenic vistas. The distance between scenic vistas and the project site and the superior viewing angle afforded to trail-based recreationists would result in visual contrasts resulting from new lines created by vegetation removal and lightly colored soils exposed by grading activities on the project site. As such, project activities would not be visually prominent and would not attract substantial attention.

As construction progresses, the distance between trails, summits, and project components would reduce the apparent size of project components. Further, the verticality and massing of building frames and envelopes would not be overly apparent from scenic vistas because these elements would be backscreened by terrain, vegetation and existing development. The back screening effect would reduce the visual prominence of frames and envelopes by affecting perceptions of scale and mass through juxtaposition of project components and existing landscape features. Backscreening would also aid frames and envelopes recede into the background landscape.

Vegetation and grading would not introduce elements capable of blocking or screening available broad, panoramic views from scenic vistas in Mission Trails Regional Park. Building frames and envelopes would be backscreened by terrain, vegetation and existing development that would reduce the visual prominence of frames and envelopes forms and lines.

Therefore, the project would result in a **less-than-significant** impact concerning adverse effects to scenic vistas in Missions Trails Regional Park during construction.

Operational/Permanent Impacts

Given the expansive, panoramic nature of views available from trails and summits in Mission Trails Regional Park, the introduction of four- to fourteen-story residence halls on a 7.84-acre site at the northwestern corner of the main SDSU campus would not display spatial or scale dominance that would substantially affect views from identified scenic vistas. In addition, the superior viewing angle afforded to trail-based recreationists and the distance between identified scenic vistas and proposed project structures on the SDSU campus would reduce the apparent scale and visual prominence of structures. Similar to Chapultepec Residence Hall, new residence halls would be visible from scenic vistas however, the back screening effect of background terrain, vegetation and existing development would reduce the visual prominence of new vertical and solid forms in the landscape. Further, proposed project structures would be located at a background viewing distance and at a lower elevation than trail and summit viewing locations. As a result, the proposed project would not block, screen, or impede the availability of expansive, panoramic views from scenic vistas. In the morning and evening hours, side lighting may enhance the visibility of the proposed residence halls by highlighting the lightly colored off-white color exteriors of structures against the backdrop of a collection of slightly darker and hazy colors in the landscape. However, these effects would not compromise the expansive, panoramic nature of views available from scenic vistas.

Therefore, the project would result in a **less-than-significant** impact to scenic vistas in Mission Trails Regional Park during operations.

Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

Construction/Temporary Impacts

Obstructed views of the project site are available from the eastbound I-8 travel lanes along an approximate 850-foot long viewing window created by descending canyon terrain that converges and facilitates drainage of higher elevation lands. From the westbound I-8 travel lanes, the project site would be obscured entirely by ascending (and densely vegetated) sloping terrain located in the interstate median that vertically separates the east- and west-bound travel lanes. I-8 is an eligible state scenic highway, but the City (and County) of San Diego has not yet adopted a Corridor Protection Plan regulating or conditioning land uses in the interstate viewshed.

While Phase II and III and Phase I Food Services Building sites would be obscured by intervening canyon terrain and the elevated, horizontal concrete deck of the San Diego Trolley Green Line, the Phase I residence hall development site would be briefly and marginally visible to passing eastbound I-8 motorists. Views from eastbound I-8 travel lanes to the Phase I development site would be made in passing and would be experienced at relatively high travel speeds. Assuming a travel speed of 65 miles per hour, the available viewing window along the east bound I-8 travel lanes would remain in the field of vision of eastbound interstate motorists for less than 10 seconds. Further, proposed Phase I residence halls would be constructed on an existing developed site (i.e., Parking Lot 9) and as such, construction activities would not encroach into the adjacent canyon and would not require the removal of canyon shrubs and trees.

Site preparation would entail the removal of existing landscaping trees lining the northern and southern perimeter of Parking Lot 9 however, and as viewed from the eastbound I-8 travel lanes, the removal of ornamental landscaping would not substantially damage the highway viewshed and would likely go unnoticed to motorists. Existing views to the south along eastbound I-8 near the project site are limited by abruptly ascending canyon terrain. This canyon terrain is obscured by a continuous, relatively tall concrete and rock accent retaining wall. The presence of this large, vertical retaining wall is concurrent with the segment of the elevated San Diego Trolley Green Line bridge structure that also works to limit the extent of available views to the south.

Construction activities at the project site would be screened from view of eastbound I-8 motorists by intervening terrain and the elevated bridge deck of the San Diego Trolley Green Line and existing views of canyon terrain and vegetation would largely remain intact during construction of the project.

Therefore, construction of the project would result in a **less-than-significant** impact to scenic resources within an eligible state scenic highway.

Operational/Permanent Impacts

Similar to the discussion above under Construction Impacts, views to proposed residence halls would be obscured by intervening canyon terrain and the elevated horizontal deck of the trolley bridge. The mesa top and corresponding east- and west-facing slopes of the terrain on which Hewlett Road and adjacent single-family residences are located upon extends out from Remington Road and effectively blocks views of Chapultepec Hall and the majority of the project site from interstate motorists. The terrain and the trolley bridge would also block views of Phase III and Phase II development sites. Views to the lower floors of Phase I Residence Halls would be available to passing motorists however; the transitory nature of the project components in southerly views from eastbound I-8 travel lanes would not substantially alter or damage the existing scenic qualities of the viewshed. Further, because these elements would be located on the existing Parking Lot 9 site, they would not alter the existing natural composition of the visible canyon landscape. Based on the screening effect of Chapultepec Hall and the presence of trolley bridge, the upper floors of the buildings proposed for development as part of Phase I are not anticipated to be visible to passing eastbound motorists. Furthermore, if the verticality of these structures is visible above the trolley bridge deck, effects to the scenic highway eligibility of I-8 would not be compromised as the structures would not result in substantial damage to particularly scenic resources within the viewshed.

The existing campus marque, located at the College Avenue off-ramp and existing multistory campus facilities including the Arts & Letters and the Arts North Buildings are located approximately 0.25-east of the project site. These existing features are skylined when viewed from the east- and westbound travel lanes of I-8 and are located in closer proximity to the interstate. The introduction of new structures that could potentially be briefly skylined when viewed from the eastbound I-8 travel lanes would not introduce a condition foreign to the existing environmental setting and interstate viewshed in the immediate project area.

Because the project site and proposed residence halls would be screened from views of eastbound I-8 motorists by intervening terrain and the elevated bridge deck of the San Diego

Trolley Green Line, the project would result in **less-than-significant** operational impacts to scenic resources within an eligible state scenic highway.

Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Construction/Temporary Impacts

During the initial stages of Phase I construction, temporary barricades and fencing would be installed around the development site and existing on-site uses including a small, semi-circular retail building, a multi-purpose building (i.e., Cholula Community Center), the parking area located immediately east of the Cholula Community Center, and Parking Lot 9 (including overhead lighting) would be demolished. Existing trees and shrubs along the perimeter of Parking Lot 9 and near the Cholula Community Center would be removed. While the subtraction of trees would reduce visual quality, this effect would be temporary, as landscaping elements would be restored to the site during the hardscape/landscape installation phase of construction.

Following vegetation removal, site grading would commence. During the approximate five-week grading period, equipment including excavators, crawler tractors, graders, loaders, scrapers, and dozers would operate on site; however, given the existing site topography and with the installation of fencing around the site perimeter, grading activities and associated construction equipment would be obscured from view of Remington Road motorists. Perimeter fencing would not be able to screen Phase I structural framework from view during the building phase of construction. As construction progresses, the structural framework would be replaced by building envelopes. This site transformation would be noticeable to receptors, and alterations would continue as hardscape landscaping is installed and architectural coatings are applied to building exteriors.

With the exception of demolition of existing uses, similar steps and alterations would occur during the construction of Phase II and Phase III development. The existing Chapultepec Hall would remain open throughout the duration of construction of all development phases and would not be altered by the proposed project.

Construction of Phase I development would not substantially degrade the existing visual character or quality of the site and its surroundings. The Phase I development site encompasses an existing surface parking lot lined by ornamental trees on three sides and abutting an existing structure (i.e., the Cholula Community Center) on the west. The site is located approximately 10 feet lower in elevation than the surface of Remington Road that parallels the parking lot boundary to the south. Given the existing developed character of the Phase I development site, the anticipated screening of grading activities from Remington Road due to the installation of temporary barricades and fencing, and the reintroduction of street trees and landscaping following building construction, construction of proposed residence halls and the food services building would not substantially degrade existing site character or quality. Further, existing 11-story Chapultepec Hall establishes a visual buffer between the Phase I construction site and off-site receptors and uses to the west. Therefore, construction of Phase I development would result in **less-than-significant** impacts concerning substantially degradation of the existing visual character or quality or the site and its surroundings.

The Phase II and Phase III development sites consist of undeveloped, vegetated canyon terrain generally located to the north of Remington Road and west of existing Chapultepec Hall. Specifically, the Phase II development site is located adjacent to Remington Road and Parking Lot 10A (the lot may be used for staging during construction) and Phase III consists of four building pads oriented in a splayed arrangement on canyon terrain. Contrast resulting from vegetation removal and grading activities would be visible and despite the brief duration of public views and the proximity of existing Chapultepec Hall to the Phase II and Phase III development sites, temporary construction impacts would be substantial. Construction would encroach into the canyon and would extend the built environment to this primarily natural appearing landscape. Removal of vegetation from the development sites would expose underlying soils and introduce lightly colored surfaces to the otherwise drab and dark canyon color palette. Further, removal of vegetation to limits of disturbance would create regular horizontal lines and forms that would contrast with the rugged and steep form of undeveloped canyon terrain.

In addition, the pouring of foundations would create rectangular and greyish forms and the introduction of construction equipment and vehicles to these areas would produce additional color contrast and introduce elements of constant movement. While visual contrast resulting from construction activities would be experienced primarily from residences located immediately west of the proposed project site on Hewlett Drive, residences on 55th Street that abut the eastern rim of the canyon, and residences lining mesa-top terrain located north of Interstate 8 on Del Cerro Boulevard, brief views to the Phase II and Phase III development sites are available to Remington Road motorists and pedestrians generally between Parking Lot 10A and Chapultepec Residence Hall. As both private stationary and public mobile viewers would experience the site transformations resulting from construction activities above, Phase II and Phase III would substantially degrade existing visual character or quality. Impacts would be **potentially significant**.

Operational/Permanent Impacts

General Visual Character

Development of the proposed project would result in a change in the visual appearance of the project site. The existing Cholula Community Center and Parking Lot 9 would be demolished to accommodate the project, which would add approximately 2,600 new student beds within seven residence halls in the northwestern corner of campus. Significantly, however, the 11-story Chapultepec Hall would remain. Thus, the proposed project would entail the introduction of multiple residential towers that would encroach into the canyon landscape. Phase III of the proposed project includes the construction of four buildings organized in splayed arrangement in the canyon behind Chapultepec Hall.

Figure 7, Architectural Renderings, illustrates the Phase I, II, and III development that would be viewed from Remington Road and 55th Street in the immediate vicinity of the project site. As shown in the architectural renderings, the new structures would be architecturally consistent with the Spanish Colonial and Mission Revival styles of the original SDSU campus buildings. The inclusion of large, lightly colored, relatively unadorned walls, roofs of reddish hued materials, arched window openings, and square towers is deliberate and would aesthetically link the proposed project's architecture to existing Spanish Colonial and Mission Revival styled structures on campus. The following is a description of individual structures that would be built as part of the proposed project.

Phase I. **Figure 8a, Phase I Elevation - Residence Halls and Food Service Building**, provides a rendering elevation of Phase I development and illustrates the proposed bulk, scale, and character of residences halls and the food services building. **Figure 8b, Phase I Elevations – Food Service Building**, illustrates the intended character and proposed scale of the building. **Figure 8c, Phase I Section,** illustrates the topographical characteristics of the Phase I development site and depicts the development site's relationship to Remington Road.

Phase II. Phase II would be constructed west of Chapultepec Hall and would consist of up to 850 beds in a single structure of up to 188,000 GSF. This building would be up to 14 stories in height, with at least one below grade at Remington Road. **Figure 9, Phase I and Phase II Elevation,** depicts the proposed scale, form, and character of Phase I development and the Phase II residence hall. As shown on Figure 9, visible floors of Phase I and Phase II development are constructed at or above the grade of Remington Road.

Phase III. **Figure 10, Phase II and III Elevation,** depicts the proposed scale, form, and character of the Phase II and Phase III residence hall buildings. Existing Chapultepec Hall is visible in Figure 10 but Phase I development is screened from view. **Figure 11, Phase II and Phase III Section**, illustrates the Phase II and Phase III development sites' relationship to Remington Road and the underlying canyon terrain.

In addition, the proposed project would incorporate garden/courtyard areas as part of the proposed landscaping design (see **Figure 12, Proposed Landscape Plan**). These landscaped areas would serve to mediate the climate of the housing complex by providing both shade and insulation. The landscape plan also provides for tree-lined pedestrian walkways, a residential park, street tree plantings, bougainvillea covered arcades, a large fire pit, and outdoor seating areas for residents and SDSU students.

The architectural style proposed for the residence halls and food service building would generally be consistent with the existing campus structures designed in the Spanish Colonial and Mission Revival styles. The bulk and scale of Phase II and Phase III development would create strong form and line contrast in the landscape. Figure 7 presents architectural renderings of project structures as viewed from roadways in the surrounding area. The style, bulk, and scale of buildings as illustrated in the images appear consistent with prevalent architectural styles at SDSU and the renderings depict an altogether pleasant college campus aesthetic. However, Phase II development would be taller than the Phase I residences halls and existing Chapultepec Hall (see Figure 9).

The clustering of development around Chapultepec Hall would create a dense student housing community that would partially occupy the canyon terrain across from existing single-family residential uses. The proposed scale and mass of Phase I development would be consistent with that of Chapultepec Hall and on-campus apartments under construction on College Avenue. However, the proposed site layout would result in 14- and 11-story structures (i.e., Phase II and Phase III development) on undeveloped canyon terrain. These tall, rectangular towers would be located in close proximity to single-family residences in the College View Estates neighborhood. The resulting juxtaposition would create strong form and line contrast in the visual environment, and from certain vantage points in the surrounding area, Phase II and Phase III development would be imposing features that would tend to enclose available views. As a result, Phase II and Phase III development would substantially degrade the existing visual character or quality of the site and its surroundings. Impacts would be **potentially significant**.

Key Views

Key observation viewpoints of the project were selected to assist in the evaluation of effects to existing visual character and quality. Locations in the surrounding area from which views of the project would be available were identified prior to the photographic field survey. Once identified, candidate key observation viewpoint locations and were field verified to confirm orientation and visibility to the project site. Initial key observation viewpoints locations were modified and/or new locations were established based on field viewing conditions. Digital images from multiple candidate key observation viewpoints locations were collected and the landscape character of the project site and surrounding area were documented through digital imagery. Public routes into and out of the project viewshed were field reviewed multiple times to assess the experiential component that viewers would rely upon to form visual perceptions of the landscape and project environment. Key observation viewpoints differ from key views in that they are primarily used to assess the potential significance of project effects to existing visual character and quality. In contrast, viewpoints were used in the existing environmental setting discussion to establish the visual setting and illustrate visual resources in the project area.

Four key observation viewpoints were used in this aesthetics assessment. The locations of selected key observation viewpoints are presented on **Figure 13, Key View Locations**. **Figures 14** through **17** present static images of the project site from the selected public key viewing locations in the surrounding area where conditions generally afford clear visibility to the project site or development areas. Visual simulations are also included on **Figures 14** through **17** and present 3-D computer simulations of the project as anticipated to be experienced by viewers in the project vicinity. An evaluation of the existing visual character and anticipated project effects is provided by key view location below.

Key View 1

Key View 1, which is located on Del Cerro Boulevard, is located approximately 0.6-mile north of the project site on an elevated mesa landform developed with single-family residences. At Key View 1, a rare gap in residential development creates a brief opportunity for unobstructed views to I-8, the northern portion of the main SDSU campus, and residential development in the College View Estates neighborhood. **Figure 14, Key Observation Viewpoint 1: Del Cerro Boulevard**, depicts the existing conditions in the visual environment as viewed in southerly oriented views at Key View 1.

As shown in Key View 1, with the exception of 11-story Chapultepec Hall, which creates a bold, vertical form on the southern horizon, mesa-top campus development tends to decrease in scale from east to west. The presence of tall and wide Chapultepec Hall interrupts the generally consistent development pattern of east-to-west decreasing bulk and scale of campus development detectable in the view. Implementation of the proposed project (see Figure 14) would further interrupt the detectable pattern through the introduction of tall and broad residential towers on the project site. From Key View 1, Phase II and Phase III development would display height comparable to Chapultepec Hall; however, Phase II development would be taller than existing and proposed structures. Further, as viewed from Key View 1, the Phase II residential tower would minimize the bulk and scale displayed by existing single family residences in the College View Estates neighborhood buffered by a canyon from the proposed project and that tend to be partially obscured by mature trees and other private property landscaping. As experienced at Key View 1, implementation of the proposed project would cluster tall and wide towers that would dominate the view.

From Key View 1, Phase I development would display a bulk and scale consistent with that of existing campus development including the Fowler Athletic Center and the Calpulli Center (the flat roofline of these buildings are detectable in the Key View 1 landscape). However, Phase II and Phase III residential towers would create moderately strong form and line contrast and would result in assemblage of tall buildings across the canyon from low-density residential uses. As a result, impacts would be **potentially significant**.

Key View 2

Key View 2 is situated approximately 0.2-mile west of the proposed project site on Remington Road and provides a representative view of the College View Estates neighborhood that features primarily one-story residences on landscaped lots bordered by sidewalks and occasionally, by vegetated parkways (see **Figure 15, Key Observation Viewpoint 2: Remington Road**). While constructed at a similar scale, homes display a variety of exterior colors and a variety of landscape themes. While residential development visible from Key View 2 displays a consistent bulk and scale, the tall, vertical form of building wings associated with Chapultepec Hall rise above residences and neighborhood landscaping. Despite the presence of 11-story Chapultepec Hall in the view, the apparent scale of the building is reduced by distance and by the presence of tall and mature street trees, which tend to screen the lower floors for of the residence hall from view. Located east of Chapultepec Hall, the rest of the developed SDSU campus is obscured from view by elements in the foreground.

A visual simulation of the project is included on Figure 15. As shown in the visual simulation, Phase I development and all but the roofs of Phase III residence halls would be obscured by Chapultepec Hall and by intervening development and landscaping within the College View Estates neighborhood. The Phase II residence tower would be visible and due to its tall rectangular form and closer proximity to Key View 2 when compared to existing Chapultepec Hall, the tower would be a prominent feature. Moreover, Phase II development would rise above existing residential development and create visible scale contrast. However, the architectural details of the residence tower would be visible and the familiar pattern of arched windows and lightly colored exteriors prevalent in the Spanish Colonial and Mission Revival styles displayed by existing SDSU campus buildings would be evident. Through incorporation of familiar architectural styles, the project would create a visual link between new development and existing on-campus development constructed in similar styles. Further, the repeating rows of windows and straight, horizontal and vertical building lines of the new residence hall would generally mimic those of existing Chapultepec Hall. Still, the proposed scale of the Phase II development would be taller than the single-story residences occupying the immediate foreground of the Key View 2 and along with Chapultepec Hall, the Phase II residence tower would dominate the view. As a result, the Phase II residential tower would create moderate form contrasts and impacts would be **potentially significant**.

Key View 3

Situated on Hewlett Drive and representative of existing views afforded to motorists and residents on Hewlett Drive, Key View 3 is located approximately 250 feet west of the project site (see Figure 13 for location). As shown in **Figure 16, Key Observation Viewpoint 3: Hewlett Drive** existing conditions image, the immediate foreground of the view consists of single-family residences (1- and 2-story) on landscaped lots. A series of electrical distribution and communication lines are present and create dark straight and diagonal lines that are slightly chaotic. Landscaping on private property includes tall trees and shrubs and orderly hedges. Located approximately 500 feet away, the tall form, large and wide mass, and straight lines of Chapultepec Hall command attention and the scale of the 11-story residence tower contrasts with the comparatively low, 1- to 2-story scale of single-family residential homes on Hewlett Drive (approximately 20 homes are located on Hewlett Drive).

A visual simulation of project development as would be experienced from Hewlett Drive is included on Figure 16. When viewed from Hewlett Drive, the proximity, bulk, and scale of the Phase III development would entirely screen Phase I development from view. Chapultepec Hall would be partially screened from view by Phase III development. As shown in the visual simulation, the tall, rectangular wings of Phase III residence towers and the form of the 14-story Phase II residential tower would create a high level of contrast in scale when viewed against existing residential development in the foreground. Phase II and Phase III development appear to reach into the obscured canyon that would buffer the proximate existing residential development. The buildings would be substantially taller than existing structures in the residential neighborhood and would dominate the view. As a result, impacts associated with Phase II and Phase III development would be **potentially significant**.

Key View 4

As shown on Figure 13, Key View 4 is located on 55th Street approximately 160 feet east of the project site. The view is oriented to the west and looks along the 55th Street and Remington Road corridor and towards existing Chapultepec Hall. From Key View 4, Chapultepec Hall is partially obscured by a small cluster of eucalyptus trees located along the southern boundary of Parking Lot 9 (see **Figure 17, Key Observation Viewpoint 4: 55th Street**). In addition to these features, telephone poles, streetlights, and occasionally, street trees, mark the 55th Street/Remington Road corridor. While Chapultepec Hall is the only visible building in the Key View 4 landscape presented on Figure 17, the Aztec Recreation Center is located 50 feet to the east and the SDSU Public Safety building is located 150 feet to the south.

From Key View 4, the Phase I food service building and residence halls would line the Remington Road corridor and would introduce buildings to a site currently occupied by a surface parking lot and perimeter landscaping. Further, and as depicted on Figure 17, the project would entail the implementation of the proposed landscape plan that, as viewed from Key View 4, would create a consistent landscape theme along the Remington Road corridor. Although the Phase I site currently does not support buildings, the removal of vegetation and introduction of residence halls and the proposed food service building would produce an overall moderately low visual contrast in the landscape. In addition to contributing to a cohesive landscape theme through the repetition of existing planting materials along the Remington Road corridor, Phase I development would display a form and scale that would be compatible with existing Chapultepec Hall. Moreover, the sequencing of building scale along the corridor from the Phase I development site to Chapultepec Hall would be gradual and coherent.

The sequence of building scale from Chapultepec Hall to the Phase II residence hall would be steady, as building scale would continue to increase from east to west. Due to the proximity of Phase I development and the presence of Chapultepec Hall, the Phase III residence towers would be entirely obscured from view at Key View 4. While Phase I development would create low visual contrast as viewed from Key View 4, the proposed scale of Phase II development would create moderate form contrast but due to distance and the presence of tall structures and vegetation in the foreground, the proposed 14-story building would not dominate the scene. Also, given the lack of low-profile structures and uses in the landscape, overall contrast associated with the introduction of the 14-story building would be softened. As viewed from Key View 4, the built environment would appear to gradually increase in scale from east to west and would display a consistent architectural style and tone. Therefore, when experienced from Key View 4, Phase I and Phase II development would not substantially degrade the existing visual character or quality of the site and its surroundings. Impacts would be **less-than-significant**.

Key Views Impact Summary

Given the impacts described above under General Visual Character and the potentially significant aesthetic impacts associated with the implementation of proposed project elements as experienced at Key Views 1, 2, and 3, the project (and more specifically, Phase II and Phase III development) would substantially degrade the existing visual character or quality of the site and its surroundings. The architectural style proposed for the residence halls and food service building that are part of Phase I development would generally be consistent with the existing campus structures designed in the Spanish Colonial, and Mission Revival styles; however, the bulk and scale of Phase II and Phase III development would generally create moderate to strong form and line contrast in the landscape. Further, when viewed from certain vantage points in the area, the clustering of Phase II and Phase III development would dominate (or co-dominate) views. Therefore, operation of the proposed project's Phase II and Phase III development would result in **potentially significant** impacts to the existing visual character or quality of the site and its surroundings.

Shading

For purposes of this analysis, a significant shading impact would occur if shadow-sensitive use areas (where sunlight is important to its function) would be shaded by project-related structures for more than three hours between the hours of 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April), or for more than four hours between the hours of 9:00 a.m. and 5:00 p.m. Pacific Daylight Time (between early April and late October). A description of shadow conditions associated with existing development on the proposed project site is provided in Section 3.1.3, above. As further discussed in Appendix A, existing shadow conditions were documented at receptor site locations surrounding the project site to comprehensively define the range of existing shadow conditions. Receptor sites are utilized to evaluate the maximum potential impacts that may result from shadow onto residential properties and sensitive sites surrounding the proposed project site to the north, east, south, and west. The receptor site locations are within close proximity of project development, have views of the project site, and are considered existing residential use properties or may be located adjacent to existing residential use properties. The existing viewing and shading conditions at the receptor site locations are summarized below in Table 2.

Table 2
Receptor Sites: Existing Viewing Conditions to Project Site and Daily Shadows

Receptor	Proximity to Project Site	Viewing Conditions	Shadow Conditions
R-W1[1]	Within project boundary (i.e., at western extent of Parking Lot 10A) [1]	Direct view of project site to the east with no obstructions.	Early morning shadow from existing building on project site and trees to the east
R-W2[2]	Within western extent of project boundary[2]	Direct view of project site to the east with obstructions from tall trees.	Early morning shadow from existing building on project site and trees to the east

R-W3	Approximately 230 feet west of Project Site near 5417 Hewlett Drive	Direct view of project site to the east with obstructions from trees.	Early morning shadow from existing building on project site and trees to the east
R-W4	Approximately 100 feet west of Project Site near 5441 Hewlett Drive	Direct view of project site to the east with obstructions from trees.	Early morning shadow from existing building on project site and trees to the east
R-E1	Immediately north of project boundary in College View Apartment	Direct view of project site to the west with no obstructions.	Late afternoon shadow from existing building on project site and trees to the east

[1] While located within the project boundary, R-W1 is adjacent to the residential property line at 5312 Remington Road immediately west of Parking Lot 10A. Viewing and shadow condition at this location approximate conditions at the adjacent residential property.
2. While located within the project boundary, R-W2 is adjacent to the residential property line located at 5312 Remington Road. Viewing and shadow condition at this location approximate conditions at the adjacent residential property.

The analysis below summarizes the results of the calculations (0 indicates no shading, and 1 indicates full shading) for each hour of the day on December 21 (i.e., the Winter Solstice), June 21 (i.e., the Summer Solstice), and for the calendar year. On June 21, the least extent of shading conditions for the calendar year generally occurs. On March 21, the Spring Equinox, and September 21, the Fall Equinox, the path of the sun is aligned with the equator. On these two dates the length of the day and the altitude of the sun in the sky is midway between the minimum altitude and duration on December 21, and the maximum altitude and duration on June 21. Shadows created on these two dates represent the mean of the range of both length of the shadows and the time duration of the shadow.

Shading Conditions on December 21 – Winter Solstice

Table 3, below, summarizes the results of the existing shading calculations (0 indicates no shading, and 1 indicates full shading) for each daytime hour of the day on December 21, the Winter Solstice. Grey table cells indicate that shadow is received at the Receptor Site.

Table 3
Existing Shading, Winter Solstice (December 21)

Receptor	Existing Extent of Shadow							Analysis
	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.
R-W2	0.0	0.0	0.0	0.0	0.0	1.0	1.0	No morning shading from Chapultepec Hall and project site after 9:00 a.m. Afternoon shading from non-project site topography to the west
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.
R-W4	1.0	0.0	0.0	0.0	0.0	0.0	1.0	Limited morning shading from Chapultepec Hall and project site. Afternoon shading from non-project site topography to the west
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.

Source: Appendix A

In summary, the existing 11-story Chapultepec Hall casts limited morning shadow onto the properties along Hewlett Drive. More specifically, the existing hall casts shadow on Receptor Site R-W4 for one hour for 9:00 a.m. to 10:00 a.m. but does not cast shadow on the other receptor sites after 9:00 a.m. **Figures 18a and 18b, Existing Shadow Conditions – Winter Solstice** illustrate the angle and length of shadow cast throughout the day under existing conditions on December 21. As depicted in the figures, morning shadow cast by Chapultepec Hall moves to the east of the residential properties on Hewlett Drive by 10 a.m. These receptors also experience shading in the afternoon but afternoon shading iscaused by the existing topography.

Table 4, below, summarizes the results of the proposed shading calculations (0 indicates no shading, and 1 indicates full shading) for each daytime hour of the day on December 21, the Winter Solstice. Within Table 3, the tan table cells indicate increased shading hours as compared to the existing shading conditions on December 21 presented in Table 3 above.

Table 4
Proposed Shading, Winter Solstice (December 21)

Receptor	Proposed Extent of Shadow							Analysis
	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	
R-W1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Morning shading from project between 9:00 a.m. and 10:00 a.m. No afternoon shading between 12:00 p.m. and 3:00 p.m.
R-W2	1.0	1.0	0.0	0.0	0.0	1.0	1.0	Morning shading from project between 9:00 a.m. and 11:00 a.m. Afternoon shading from non-project site topography to the west.
R-W3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Morning shading from project between 9:00 a.m. and 10:00 a.m. No afternoon shading between 12:00 p.m. and 3:00 p.m.
R-W4	1.0	1.0	0.0	0.0	0.0	0.0	1.0	Morning shading from project between 10:00 a.m. and 11:00 a.m. Afternoon shading from non-project site topography to the west.
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	No morning shading from the project after 9:00 a.m. Afternoon shading from project and topography to the west.

Source: Appendix A

Due to the introduction of additional building bulk and scale to the project site, the angle and length of shadows cast by the proposed project would alter existing shadow conditions. As under existing conditions, shadows created by project development would be cast on properties to the west, north, and east of the project site. Anticipated shadow conditions resulting from implementation of the proposed project are illustrated on **Figure 19a and 19b, Proposed Shadow Conditions – Winter Solstice**. As noted in Table 3 and Figures 19a and 19b, there is increased shading associated with project structures at Receptor Sites R-W1, R-W2, R-W3, and R-W4 from between 9:00 a.m. and 11:00 a.m. Receptor Site R-W1 would experience one hour of increased shading on December 21 (and throughout the months of December, January, and February) from 9:00 a.m. to 10:00 a.m. R-W2 would experience two hours of increased shading on December 21 (and throughout the months of December, January, and February) between 9:00 a.m. and 11:00 a.m. Increased shading would occur at R-W3 on December 21 and each morning between 9:00 a.m. and 10 a.m. during the months of December and January. Increased shading would also occur at R-W4 on December 21 (and through the month of December) from 10:00 a.m. to 11:00 a.m. but new shading would not occur during January and February. Receptor Site R-E1 experiences increased late afternoon shading from project development from 3 p.m. to 4:00

p.m. Receptor Sites R-W1, R-W2, R-W3, and R-W4 experience afternoon shading from topography to the west of the project site. The maximum increase in shading time on December 21 from the project is two hours (9:00 a.m. to 11:00 a.m.) at Receptors Site R-W2.

Therefore, new shading associated with operation of the proposed project would not shade shadow-sensitive uses for more than 3 hours between the hours of 9:00 a.m. and 3:00 p.m. Pacific Standard Time (between late October and early April) and would be **less-than-significant**.

Shading Conditions on June 21 – Summer Solstice

Table 5, below, summarizes the results of the existing shading calculations (0 indicates no shading, and 1 indicates full shading) for each daytime hour of the day on June 21, the Summer Solstice.

Table 5
Existing Shading, Summer Solstice (June 21)

Receptor	Existing Extent of Shadow									Analysis
	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	4:00 p.m.	5:00 p.m.	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site from 9:00 a.m. to 5:00 p.m.
R-W2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site from 9:00 a.m. to 5:00 p.m.
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site from 9:00 a.m. to 5:00 p.m.
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site from 9:00 a.m. to 5:00 p.m.
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site from 9:00 a.m. to 5:00 p.m.

Source: Appendix A

Figures 20a and 20b, Existing Shadow Conditions – Summer Solstice illustrate the angle and length of shadow cast throughout the day under existing conditions on June 21. As shown in Table 5 above and Figures 20a and 20b, the existing buildings within the proposed project site including Chapultepec Hall do not cast shadow onto the Receptor Sites between the hours of 9:00 a.m. and 5:00 p.m. on June 21.

Table 6, below, summarizes the results of the proposed shading calculations (0 indicates no shading, and 1 indicates full shading) for each daytime hour of the day on June 21, the Summer Solstice. In Table 6, the tan table cells indicate increased shading hours as compared to the existing shading conditions on June 21 presented in Table 4 above.

Table 6
Proposed Shading, Summer Solstice (June 21)

Receptor	Proposed Extent of Shadow									Analysis
	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	4:00 p.m.	5:00 p.m.	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project from 9:00 a.m. to 5:00 p.m.
R-W2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project from 9:00 a.m. to 5:00 p.m.
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project from 9:00 a.m. to 5:00 p.m.
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project from 9:00 a.m. to 5:00 p.m.
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project from 9:00 a.m. to 5:00 p.m.

Source: Appendix A

Anticipated shadow conditions on June 21 resulting from implementation of the proposed project are illustrated on **Figures 21a and 21b, Proposed Shadow Conditions – Summer Solstice**. As demonstrated in Table 6 and Figures 21a and 21b, the proposed project would not shade shadow-sensitive uses between the hours of 9:00 a.m. and 5:00 p.m. on June 21. Because the project would not cast shade shadow-sensitive uses for more than 4 hours between the hours of 9:00 a.m. and 5:00 p.m. on June 21, impacts would be **less-than-significant**.

Shading Conditions on March 21and September 21 – Spring and Fall Equinoxes

Table 7, below, summarizes the results of the existing shading calculations (0 indicates no shading, and 1 indicates full shading) for each daytime hour of the day on March 21, the Spring Equinox. Because similar shading conditions are anticipated on the Fall Equinox (September 21), the Table 6 calculations are also applicable to the Fall Equinox.

Table 7
Existing Shading, Spring Equinox (March 21)

Receptor	Existing Extent of Shadow							Analysis
	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.
R-W2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Chapultepec Hall and project site between 9:00 a.m. and 3:00 p.m.

Source: Appendix A

Figures 22a and 22b, Existing Shadow Conditions – Spring Equinox illustrate the angle and length of shadow cast throughout the day under existing conditions on March 21 and September 21. As shown in Table 7 and Figures 22a and 22b, the existing buildings on the project site do not cast shadow on Receptor Sites between 9:00 a.m. and 3:00 p.m.

Table 8, below, summarizes the results of the proposed shading calculations (0 indicates no shading, and 1 indicates full shading) for each daytime hour of the day on March 21 (and September 21), the Spring (and Fall) Equinox. Tan table cells indicate increased shading hours as compared to the existing shading conditions on March 21 presented in Table 7 above.

Table 8
Proposed Shading, Spring Equinox (March 21)

Receptor	Proposed Extent of Shadow							Analysis
	9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	
R-W1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Morning shading from project from 9:00 a.m. to 10:00 a.m. No shading from project between 10:00 a.m. and 3:00 p.m.
R-W2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Morning shading from project from 9:00 a.m. to 10:00 a.m. No shading from project between 10:00 a.m. and 3:00 p.m.
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project between 9:00 a.m. and 3:00 p.m.
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project between 9:00 a.m. and 3:00 p.m.
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from project between 9:00 a.m. and 3:00 p.m.

Source: Appendix A

Anticipated shadow conditions on March 21 resulting from implementation of the proposed project are illustrated on **Figures 23a and 23b, Proposed Shadow Conditions – Spring Equinox**. As demonstrated in Table 8 and Figures 23a and 23b, implementation of the project would result in on hour of increased shading at Receptor Sites R-W1 and R-W2 between 9:00 a.m. and 10:00 a.m. on March 21 and throughout the month of March. Project-related shading would not be received at these properties in the month of April. No other project-related shading would be experienced at Receptor Sites on March 21 between 9:00 a.m. and 3:00 p.m. and R-W3, R-W4, and R-W5 would not receive project-generated shade between 9:00 a.m. and 3:00 p.m. in the months of the March and April.

As demonstrated in Tables 4, 6, and 8, project-generated shadows would not be cast onto Receptor Sites for more than three hours between 9:00 a.m. and 3:00 p.m. Pacific Standard Time between late October and early April, or for more than four hours between 9:00 a.m. and 5:00 p.m. Pacific Daylight Time(between early April and late October. Therefore, impacts would be **less-than-significant**.

Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Based on the regulatory requirements identified in Section 3.2 above, and IESNA definition of glare, the project would have a significant light or glare impact on a sensitive receptor (residential uses or commercial or institutional land uses that require minimal night time illumination) if:

- project lighting generates light emissions that produces a light intensity exceeding 0.74 foot-candles at the property line of a residence or other sensitive receptor; or
- project lighting creates new high contrast conditions (contrast ratio over 30:1) visible from a field of view from a residential use or other sensitive receptor.

Lighting

Construction of the proposed project would generally occur during daytime hours and would not typically require nighttime lighting. However, nighttime lighting necessary for security purposes may be installed on site and during winter months when hours of daylight are reduced, therefore portable construction lights may be used. Temporary, short-term lighting impacts associated with construction activities would be limited to these lighting sources. Sensitive receptors in the surrounding area potentially affected by nighttime construction lighting and susceptible to diminished nighttime views consist solely of nearby residents. More specifically, residential land uses are located to the west of the project site in the College View Estates neighborhood, to the north of the project site and north of I-8 in the community of Del Cerro, and along 55th Street to the east of the project site. Although nighttime lighting sources including interior lighting at Chapultepec Hall, parking lot lighting, street lighting, and field lighting are located on the project site and operate in the vicinity, the construction lighting could affect existing nighttime views in the project area and/or generate glare if not properly shielded and directed/focused onto construction areas.

However, as discussed in Section 3.2.3 above, SDSU's lighting policy voluntarily follows the adopted ordinances of the City of San Diego to reduce potential lighting impacts on astronomical research occurring at the Palomar and Mount Laguna observatories. The City’s outdoor lighting regulations require the use of shields and flat lenses to control and direct outdoor lighting and on properties adjacent to sensitive biological resources, the City requires that lighting be limited to low-levels and shielded to minimize the amount of light trespass, (see Chapter 14, Article 142.0740 (c) Outdoor Lighting Regulations). Because use of lighting during construction would comply with City of San Diego outdoor lighting regulations that require methods to control and direct outdoor lighting as a means to minimize light trespass, use of lighting on the project site during construction would not adversely affect nighttime views in the area. Impacts would be **less-than-significant**.

A description of nighttime lighting conditions associated with existing development on the project site is provided in Section 3.1.3, above. As further discussed in Appendix B, existing nighttime lighting conditions were documented at receptor site locations surrounding the project site to comprehensively define the range of existing lighting conditions and views from the surrounding properties and streets to the project site. Illuminance (fc) and luminance (cd/m^2) were measured at each Receptor Site in accordance with the procedures outlined in Section 7.1 Methodology of Appendix B, Lighting Technical Report for the SDSU New Student Housing Project. Views of the project site from the adjacent streets are evaluated to determine the visibility of the proposed project site and the surrounding lighting conditions.

The illuminance listed in Table 9 below summarize the measured illuminance at the receptor sites in the project vicinity. The measured illuminance data are consistent with an urban lighting condition, with relatively high illuminance at the street and sidewalk within the public right of way, and high illuminance within the private properties for safety and security. Further, many of the adjacent commercial properties include illuminated signs that contribute to a relatively bright night environment.

Table 9
Summary of Existing Illuminance Measurements at Receptor Sites

Receptor[2]	Illuminance (footcandles; fc)		Analysis
	Horizontal[1]	Vertical[1]	
R-W1	0.341	0.103	Low illuminance from adjacent parking lot lighting, measured at the north edge of Parking Lot 10A, within the western region of the Project site.
R-W2	0.015	0.180	Low illuminance, measured in the canyon near residential property line at 5312 Remington Road, west Project site property line.
R-W3	0.243	0.062	Low Illuminance, measured at 5417 Hewlett Drive west of the Project site west property line, within the Hewlett Drive right-of-way.
R-W4	0.017	0.039	Low Illuminance, measured at 5441 Hewlett Drive rear patio west of the

			Project site west property line
R-E1	0.351	-	Moderate illuminance, measured at parking area of 5429 55th Street, east of the Project Site.

Source: Appendix B

1 Horizontal Illuminance measurements are recorded with the light meter held horizontally and the sensor at 180 degrees to the nadir at 3 feet above grade. Vertical illuminance measurements are recorded with the light meter in the vertical position and the sensor located 90 degrees from nadir at 3 feet above grade. For the proposed project, the vertical illuminance data is presented to identify the sum of all existing illuminance at the receptor sites from the direction of the proposed project site. The existing lights at the proposed project site and at the surrounding streets vary in height from grade mounted flood lights to medium height light poles at approximately 25 feet above grade. This range of variation in height produces an angle of incidence to the light meter of less than 10 degrees for receptor sites at 125 feet from the proposed project site and less than 5 degrees at distances above 300 feet. Because of these conditions, the vertical illuminance measurements are used in Appendix B to summarize incident illuminance at the receptor sites and is a more conservative measurement than perpendicular illuminance data.

2 Receptor sites are identified on Figures 18a, 18b, 19a, and 19b.

New interior and exterior lighting would be introduced to the proposed project site by project development. In addition to interior building lighting and exterior building lighting installed for security and general illumination purposes, new lighting fixtures and elements would be provided for the proposed plaza and courtyard areas, arcades, pedestrian walkways, recreation areas, and other outdoor common areas.

The light trespass from the Project Lighting is evaluated by calculating illuminance (fc) at the Receptor Site locations. The resulting illuminance from the project lighting is presented in Table 10. The results of the analysis demonstrate that light trespass associated with the operation of project lighting would be below the significance threshold of 0.74 fc. In addition, it should be noted that project lighting must conform to the requirements of CALGreen, which stipulates the light from project building and general site lighting must not exceed 0.74-fc at the project boundary, which for purposes of this analysis, is identified as the adjacent property line to the west, south, east, and north of the project site. Vertical planes W1, W2, W3, W4, E1, and E2 are located at the adjacent property line to present the calculated illuminance from the project lighting (see Table 10, below). While these vertical planes are substantially closer to the proposed project site than the sensitive residential receptor locations, the applicable threshold requires a project to demonstrate that lighting levels at the project boundary do not exceed 0.74-fc.

The calculations for Project Lighting illuminance include the lighting equipment required to provide the appropriate illumination for this facility, which would be designed to provide site and interior lighting as required by code and by best practice.

Building Lighting must comply with the light trespass limits stipulated by CALGreen, and will therefore require a method to restrict reflected light from the proposed project to illuminance less than 0.74-fc at the vertical planes. If necessary to meet light trespass limits. methods to limit the illuminance at vertical planes may include lights directed away from the adjacent property lines, architectural shading structures, vertical louvers, shading systems deployed while the lights are active, or addition of an architectural screen to further shield the light from a project.

The summary of the illuminance calculations data is presented below in Table 10, which shows that all lighting levels (as measured at receptor sites), would be below the CEQA significance threshold, therefore resulting in a **less-than-significant impact**.

Table 10
Summary of Proposed Illuminance Measurements at Receptor Sites

Receptor	Threshold E_v (fc)[1]	Project Illuminance (E_v (fc))			Analysis
		Maximum	Minimum	Average	
R-W1	0.74	0.10	0.00	0.02	Below Threshold
R-W2	0.74	0.20	0.00	0.09	Below Threshold
R-W3	0.74	0.60	0.10	0.22	Below Threshold
R-W4	0.74	0.50	0.00	0.13	Below Threshold
R-E1	0.74	0.70	0.00	0.15	Below Threshold
R-E2	0.74	0.50	0.00	0.20	Below Threshold

Source: Appendix B

1Incident light (fc) from a source degrades in proportion to the inverse square of the distance from the source to the location where lighting is under review. The illuminance Ev (fc) incident at any given distance D (ft) from an illuminated surface S (ft^2) with uniform surface luminance of L (cd/m2) is calculated by the following formula:

$$Ev = \frac{L \times S}{10.76 \times D^2}$$

This formula illustrates the reduction in illuminance at any location as the distance increases from a source surface. The largest area light sources produce the greatest distance from the Project where the illuminance will be equal to or greater than 0.74 footcandles.

Glare

Glare is visual discomfort experienced from high luminance or high range of luminance. For exterior environments at night, glare occurs when the range of luminance in a visual field is too large. The light energy incident at a point is measured by a scale of footcandles or lux, and is described in the technical term Illuminance. This incident light is not visible to the eye until it is reflected from a surface, such as pavement, wall, dust in the atmosphere or the surface of a light bulb.

As further discussed in Appendix B, existing nighttime lighting conditions were documented at receptor site locations surrounding the project site to comprehensively define the range of existing glare conditions and views from the surrounding properties and streets to the project site. The visual evaluation of High, Medium and Low Contrast describes the perception of how bright a visible object appears to the surrounding objects within any given field of view and context. High Contrast indicates a potential glare condition for residential use receptor sites. Table 11 below summarizes the measured luminance at each Receptor site along with qualitative descriptions of the existing conditions. The qualitative summary includes notations regarding the brightness of visible light sources and surrounding illuminated surfaces within the field of view to the proposed project site from the Receptor sites. As detailed below in Table 11, receptors near the project site are currently exposed to high contrast/glare conditions during nighttime hours that are generated by existing lighting on the project site (interior lighting, parking lot lighting), and off-site sports field and parking lot lighting.

Table 11
Summary of Existing Luminance and Glare

Receptor	Luminance		Contrast Ratio[1] (Max/Average)	Analysis
	Average	Maximum		
R-W1	3.82	2043.06	534.4:1	High Contrast/Glare from existing lights within the project site and sports field (i.e., Tony Gwynn Stadium) and parking lights in the background. Direct view of project site to the east with no obstructions.
R-W2	3.81	823.80	216.1:1	High Contrast/Glare from existing lights within the project site and existing parking lot and sports field lights in the background. Direct view of project site to the east with obstructions from trees.
R-W3	0.89	389.80	439.1:1	High Contrast/Glare from existing site and building lighting within the project site. Direct view of project site to the east with obstructions from trees.
R-W4	8.39	827.30	98.6:1	High Contrast/Glare from existing lighting within the project site and parking and security lights in the

				distance at 55th Street. Direct view of project site to the east with some obstructions from trees.
R-E1	3.22	1724.00	534.7:1	High Contrast/Glare from existing site and building lighting within the project site and sports field and parking lighting in the background. Direct view of project site to the west.

Source: Appendix B

1 For residential occupancies at night, “High,” “Medium,” and “Low” contrast are terms used to describe effect of the contrast ratios (the ratio of peak measured luminance to the average within a field of view) of greater than 30:1, between 10:1 and 30:1, and below 10:1, respectively. Contrast ratios above 30:1 are generally uncomfortable for the human eye to perceive and may present an unacceptable condition for relaxation and enjoyment of a residence.

Project lighting would be visible from the residential Receptor Sites to the west, north west, and northeast of the project site. The requirements defined in California Green Building Standards Code (Title 24, Part 11), Table 5.106.8, for Lighting Zone 2, stipulates backlight, uplight, and glare requirements for all exterior lighting to reduce the brightness visible from adjacent properties. For Zone 2, the maximum allowable glare ratings is G2, which allows up to 375 zonal lumens. The 375 lumen maximum light output is comparable to an approximately 30 cd/m^2 surface luminance for a light source area approaching 1 m^2. To provide a conservative analysis a maximum permitted Project Lighting luminance of 60 cd/m^2 is used in the Contrast Ratio Glare analysis. The Contrast Ratio of the Project Lighting to the average measured existing luminance is presented in Table 12 below, which indicates extremely low contrast ratios (i.e., below 10:1), and no new sources of glare. Further, due to the scale of project structures, existing sources of glare, including sports field lighting, would be blocked from receptor sites located to the west of the proposed project site. As such and based on the calculations in the Lighting Technical Report, glare impacts associated with operation of proposed project lighting would be **less-than-significant**.

Table 12
Project Lighting Luminance (cd/m^2) – Analysis of Existing Conditions and Project Lighting

Receptor	Description	Existing Measured Luminance (cd/m2		Project Lighting Luminance (cd/m2)	Contrast Ratio (Project Max/Existing Average)	Analysis
		Average	Maximum	Maximum		
R-W1	roadway; commercial adjacent	306	1900	60	0.2:1	Low Contrast, No Glare

R-W2	residential adjacent	615	2937	60	0.1:1	Low Contrast, No Glare
R-W3	roadway; residential adjacent	57	330	60	1.0:1	Low Contrast, No Glare
R-W4	residential adjacent	176	1541	60	0.3:1	Low Contrast, No Glare
R-E1	roadway; residential adjacent	87	498	60	0.7:1	Low Contrast, No Glare

Source: Appendix B

Further, with the exception of glass windows, the architectural design of the proposed project would not use reflective building materials such as stainless steel. The Spanish Colonial and Mission Revival styles generally consists of non-reflective exterior surfaces and finishes and are not known for incorporating large expanses of glass or metal exteriors. Additionally, the proposed project would be required to demonstrate compliance with SDSU's Physical Master Plan to ensure structures would not contain large expanses of reflective glass or reflective metal surfaces that would cause undue glare to passing mobile viewers and/or present a visual hazard to adjacent land uses during construction or permanently. With considerations of architectural building materials and implementation of associated regulations, impacts related to glare would be **less-than-significant**.

Would the project result in cumulative visual resource impacts?

Existing Visual Character and Quality of the Site and its Surroundings

The effects of the proposed project, when considered with other projects in the cumulative study area (i.e., the College Area community), would result in a cumulative impact to the existing visual character and quality of the site and its surroundings. While there are no known development projects proposed in the cumulative study area that would both display bulk and scale comparable to project development and be located adjacent to 1- to 2-story single-family residences, the proposed project (in combination with Chapultepec Hall) would and have created similar visual contrast in the local landscape. Further, the project's visual effects are generally localized and entail anticipated building bulk and scale contrasts when comparatively evaluated against development in the adjacent College View Estates residential neighborhood. The contrasts created by the project are most apparent when experienced from the adjacent College View Estates neighborhood and with the context of the prevalent low-profile and low-density development pattern established there. Therefore, when combined with Chapultepec Hall, the introduction of the proposed project would contribute to a cumulative impact to the visual character of the College Area community through the creation of bold rectangular forms and strong visual contrasts that would not be visually compatible with adjacent low-profile residential development. As such, the proposed project would contribute to a significant cumulative effect.

Lighting

As detailed above, SDSU's lighting policy is to voluntarily follow the adopted ordinances of the City of San Diego to reduce potential lighting impacts on astronomical research occurring at the Palomar and Mount Laguna observatories. Because use of lighting during construction would comply with City of San Diego outdoor lighting regulations that require methods to control and direct outdoor lighting as a means to minimize light trespass, use of lighting on the project site during construction would not adversely affect nighttime views in the area. Impacts were determined to be less than significant. Similarly, projects in the cumulative study area including projects on the SDSU campus would comply with existing regulations established by the City of San Diego to direct and control lighting to minimize light trespass onto adjacent properties. Further, the construction of the proposed project is unlikely to overlap with projects considered in the cumulative study area such that temporary construction lighting levels would combine to adversely affect nighttime views. Therefore, through compliance with existing regulations governing the operation of nighttime lighting, a cumulative visual resource impact concerning construction lighting would not occur.

The proposed project would result in demolition of existing uses on the Phase I development site and the construction of new 4- to 14-story structures on the Phase I, II, and III development sites in the northwestern corner of the main SDSU campus. In addition to the proposed project, all proposed and planned development located on the SDSU campus would be reviewed for compliance with the lighting policies contained in SDSU’s Physical Master Plan (SDSU Physical Master Plan, Phase I, pp. 157–160) to ensure compatibility with the existing campus environment and surrounding community. Off-campus development in the College Area Community would similarly be reviewed for compliance with the City of San Diego’s outdoor lighting policies including policies regarding light trespass. Given that both the proposed project and development in the cumulative study would minimize opportunity for light trespass, the operational lighting associated with cumulative development would not combine to create a significant cumulative lighting impact that would substantially affect nighttime views in the area.

Shading

The introduction of proposed bulk and scale to the project site would exacerbate existing shadow conditions associated the Chapultepec Hall. Project structures would expand the areas located west of the project site cast in shadow between sunrise and 10 a.m. and would extend existing shadow conditions to reach residences that are not currently subject to shading conditions. Similar to the proposed project and existing Chapultepec Hall, the construction of 6-story mixed use buildings along College Avenue and north of Montezuma Road may cast shadow onto adjacent land use however, adjacent areas are primarily develop with non-shade sensitive uses. Further, shading is a very localized phenomenon; the shading that would occur as a result of the recently constructed structures along College Avenue would not affect the residences west of the proposed project site, therefore a cumulative shading effect would not occur. As such, the proposed project would not contribute to a significant cumulative effect concerning shading of adjacent land uses.

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6 MITIGATION MEASURES

Conventional mitigation measures, such as the installation of trees to obscure the buildings and reduce the potential visual impacts, would not be effective in this case due to the height of the buildings. A reduction in the height of Phase II development to mimic the height, bulk, and scale of adjacent Chapultepec Hall would address the high level of change caused by the introduction of the Phase II residence hall and the single-family residences buffered by the canyon and reduce impacts to less than significant. Similarly, a redesign of Phase III development also would be necessary to reduce potential impacts to a less-than-significant level. Therefore, other than project redesign to reduce the height of the Phase II and Phase III buildings, there are no feasible mitigation measures that would reduce anticipated impacts to existing visual character and quality of the site and surroundings to a less than significant level.

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7 LEVEL OF SIGNIFICANCE AFTER MITIGATION

As discussed above, impacts to scenic vistas were determined to be less than significant and as such, no mitigation measures are required.

Impacts to scenic resources within a state scenic highway would be less than significant and, as such, no mitigation measures are required.

As explained above, other than redesign of the proposed project, there are no feasible mitigation measures available that would reduce potential impacts to existing visual character and quality of the site and surroundings associated with Phase II and Phase III development to a less than significant level. Therefore, impacts to existing visual character and quality associated with Phase II and Phase III would be significant and unavoidable. As to Phase I, impacts to existing visual character and quality associated with Phase I development would be less than significant and, therefore, no mitigation measures are required.

Impacts to shading and shadow would be less than significant and, as such, no mitigation measures are required.

Impacts to day and nighttime views due to the introduction of new sources of substantial light and glare would be less than significant and, therefore, not mitigation measures are required.

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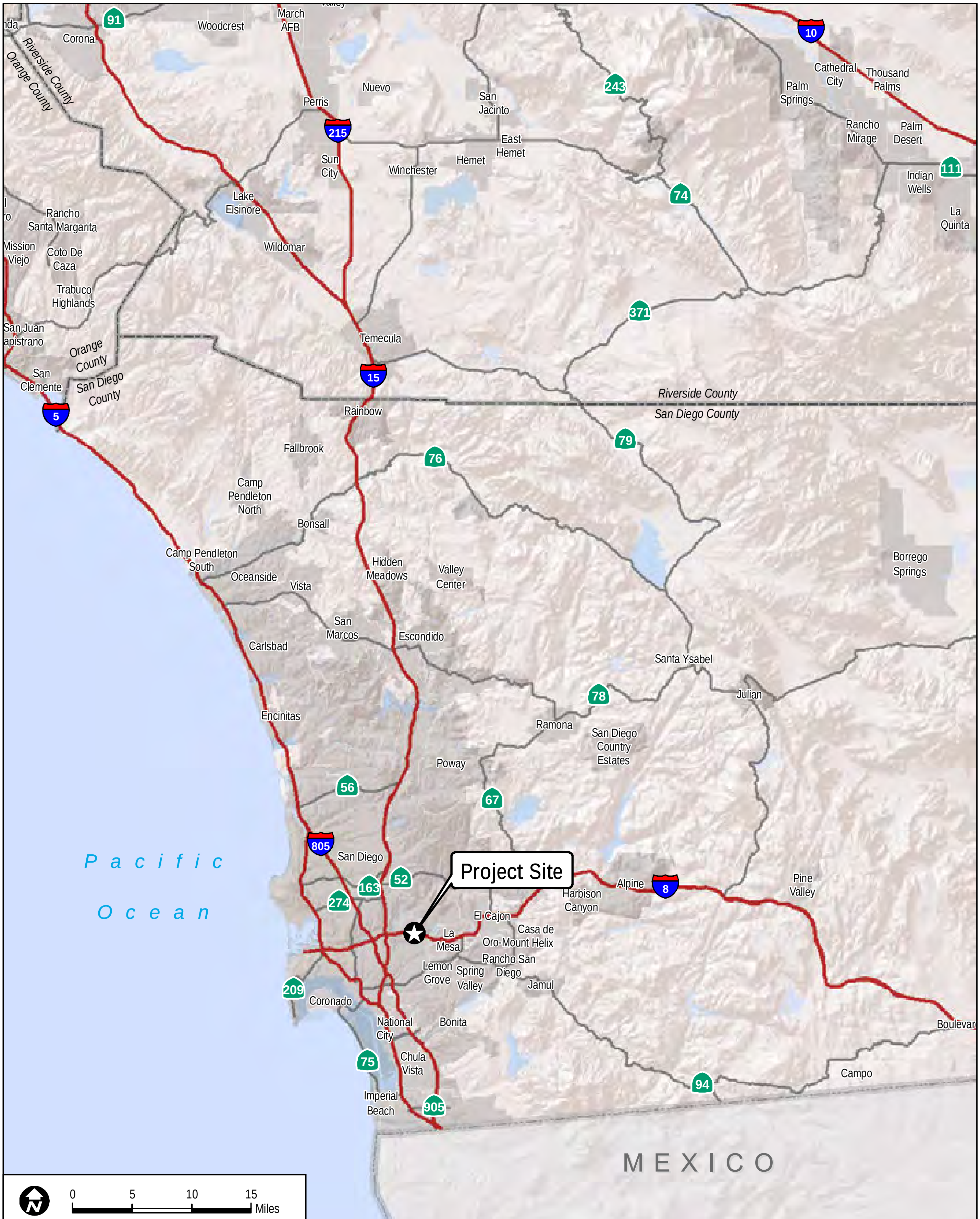

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Figure 1
Regional Map

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Figure 2a
Vicinity Map

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SDSU New Student Housing Project
Aesthetics Technical Report

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Figure **2b**

Project Area Map

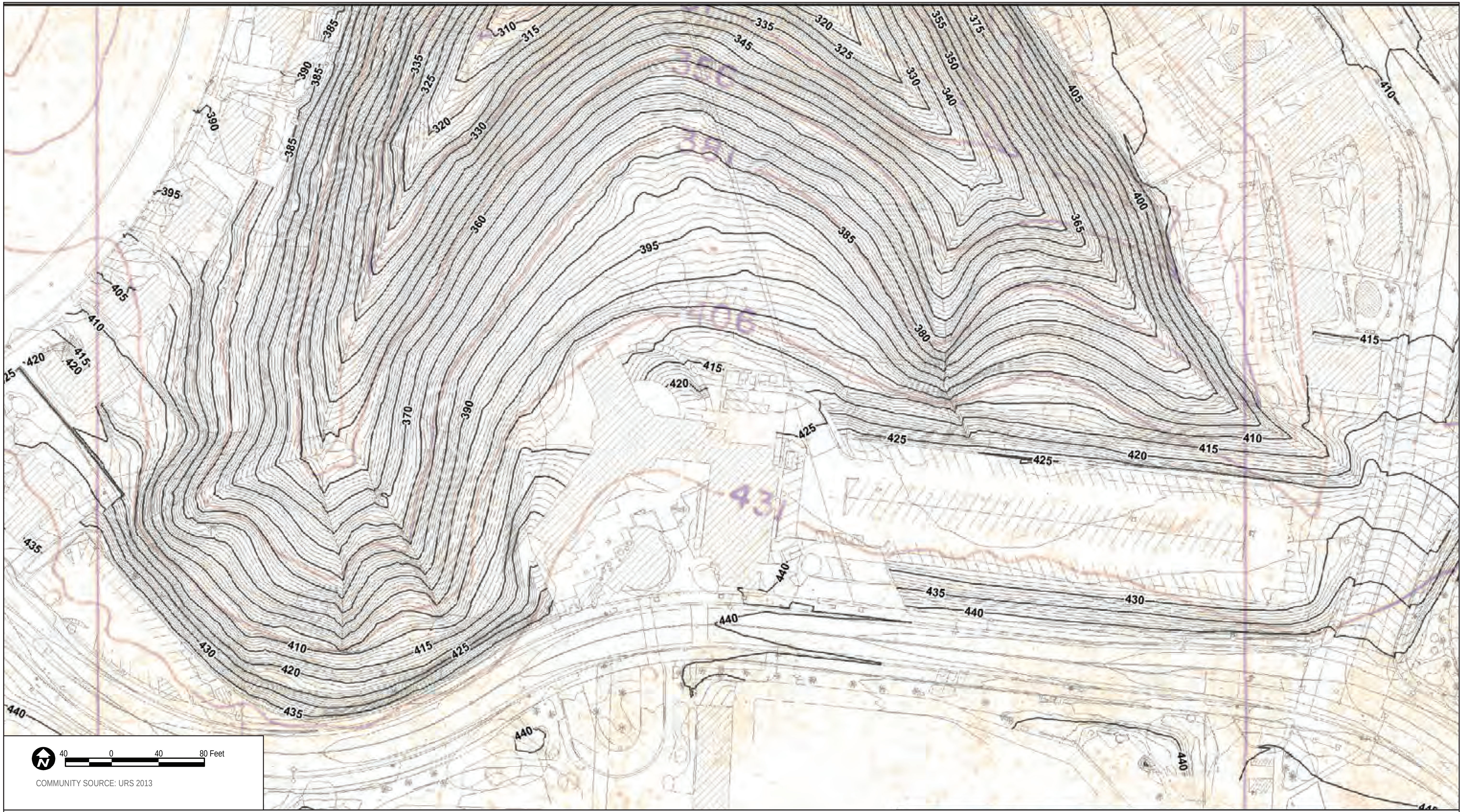

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Figure 3
Project Site Topography

SAN DIEGO STATE UNIVERSITY

Figure 4
Proposed Site Plan

Figure 5
Mission Trails Regional Park: Scenic Vistas

SAN DIEGO STATE UNIVERSITY

Figure 6
Viepoint Locations

Viewpoint A - Looking southwest from 55th Street towards Parking Lot 9/Phase I Development Site

Viewpoint B - Looking northeast from 55th Street towards Parking Lot 9/Phase I Development Site

Viewpoint C - Looking east along Remington Road towards Phase I Development Site

Source: DUDEK 2017

Viewpoint D - Looking northeast from Remington Road towards Parking Lot 10A and Phase II Development Site

Viewpoint E - Looking east from Parking Lot 10A towards Phase II Development Site

Viewpoint F - Looking north from Parking Lot 10A towards Phase III Development Site

Source: DUDEK 2017

Viewpoint G - Looking east from Remington Road (College View Estates) towards Phase I Development Site

Viewpoint H - Looking east from Remington Road (College View Estates Neighborhood) towards Chapultepec Hall

Viewpoint I - Looking east from Hewlett Drive (College View Estates) towards Chapultepec Hall

Source: DUDEK 2017

View from 55th Street to Phase I Food Services Building and Residence Halls, Phase II visible along Remington Road and beyond Phase I and Chapultepec Hall (obstructed)

View from 55th Street to Phase I Food Services Building and Residence Halls and Phase III Residence Hall (partially obstructed) in the distance

View from Remington Road to Phase II Residence Hall and Phase I Residence Halls

View from Remington Road to Phase II and Phase III Residence Halls

Source: Carrier Johnson 2017

South Elevation

Source: Carrier Johnson 2017

East Elevation

North Elevation

Phase I Residence Hall- Section

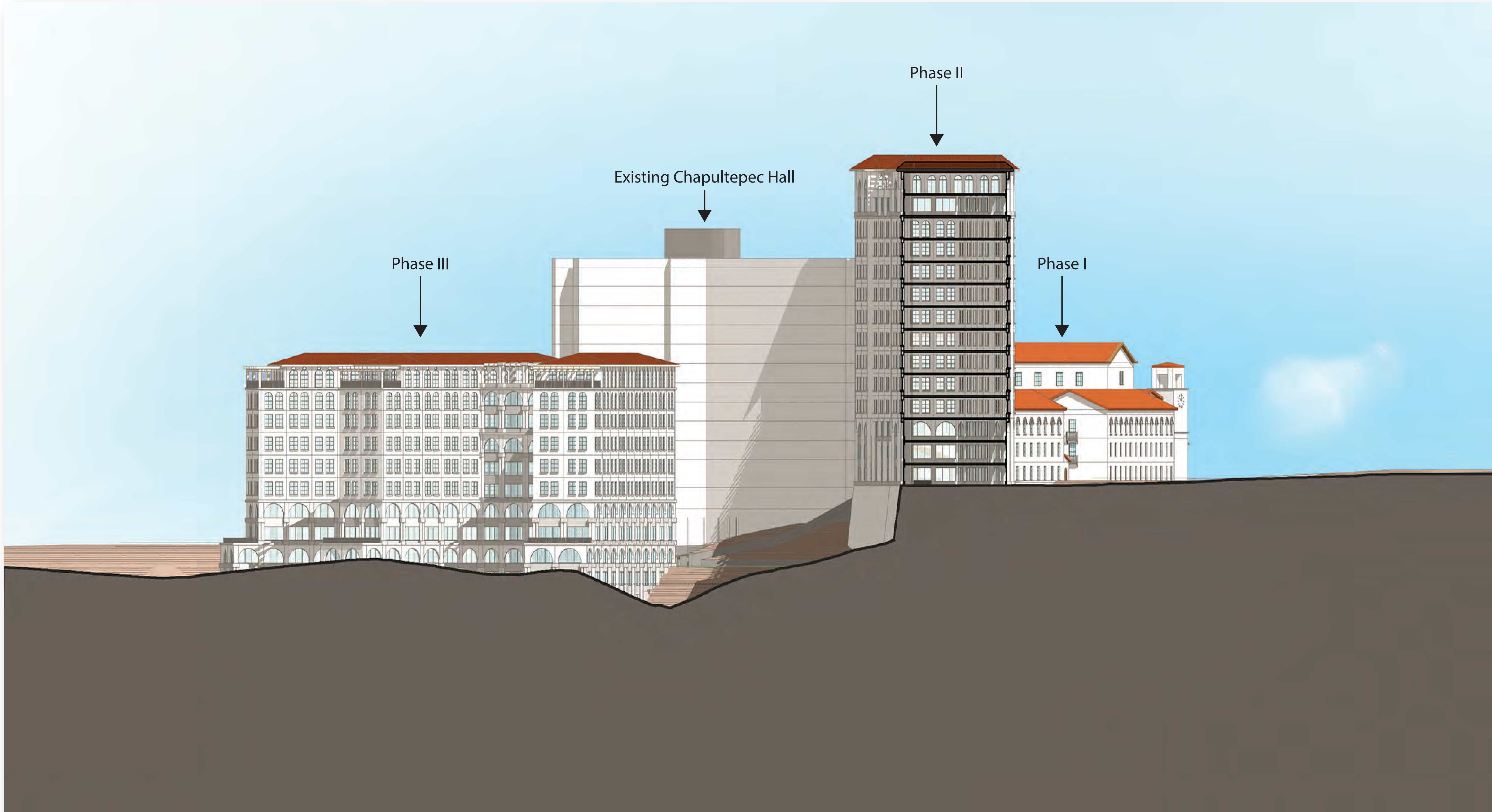
Source: Carrier Johnson 2017

South Elevation

Source: Carrier Johnson 2017

West Elevation

Source: Carrier Johnson 2017



Source: Carrier Johnson 2017

E: CARRIER JOHNSON 2013

Figure **12**

Proposed Landscape Plan

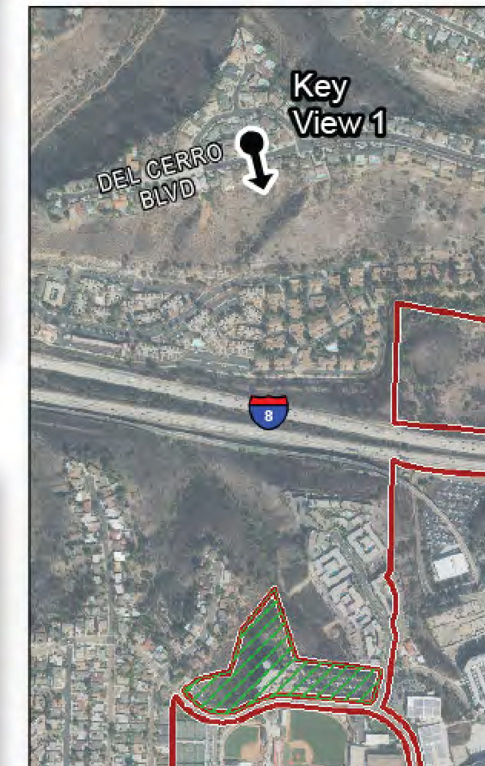
SDSU New Student Housing Project
Aesthetics Technical Report

San Diego State University

Figure 13
Key View Locations

Existing Conditions - view looking south from Del Cerro Boulevard towards Chapultepec Residence Hall (approximately 0.6 mile away)

Visual Simulation of Proposed Project

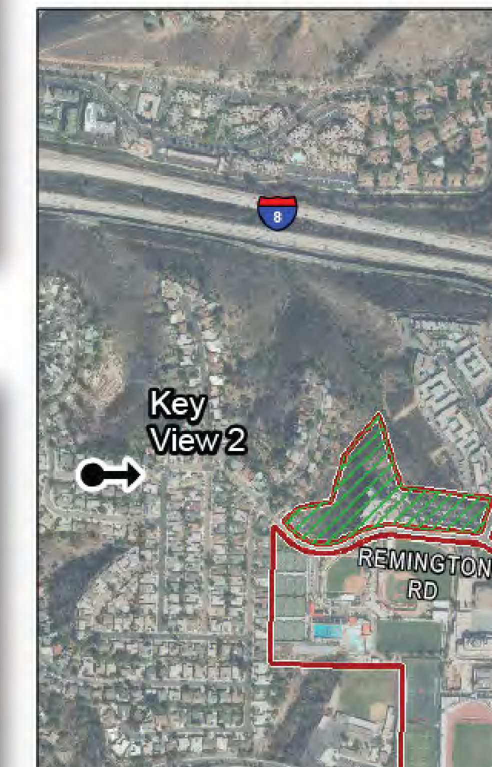


Key map

Source: Carrier Johnson 2017

Existing Conditions - view looking east from Remington Road towards Chapultepec Residence Hall (approximately 0.3 mile away)

Visual Simulation of Proposed Project



Key map

Source: Carrier Johnson 2017

Existing Conditions - view looking southeast from Hewlett Drive to Chapultepec Residence Hall (approximately 500 feet away)

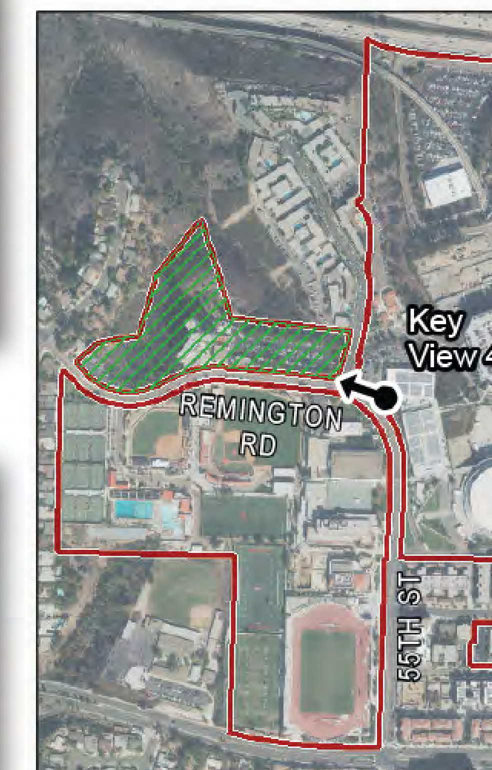
Visual Simulation of Proposed Project

Source: Carrier Johnson 2017

Key map

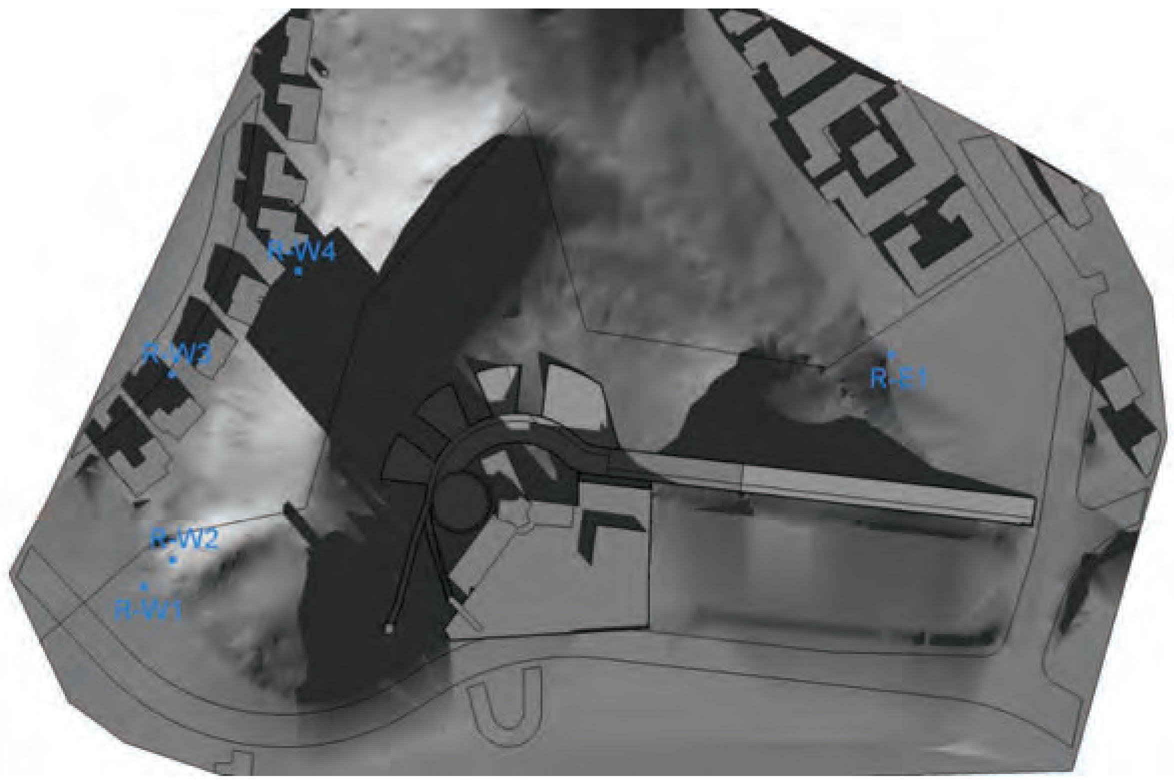
Existing Conditions - view from 55th Street looking west towards Chapultepec Residence Hall (approximately 0.15 mile away)

Visual Simulation of Proposed Project



Key map

Source: Carrier Johnson 2017



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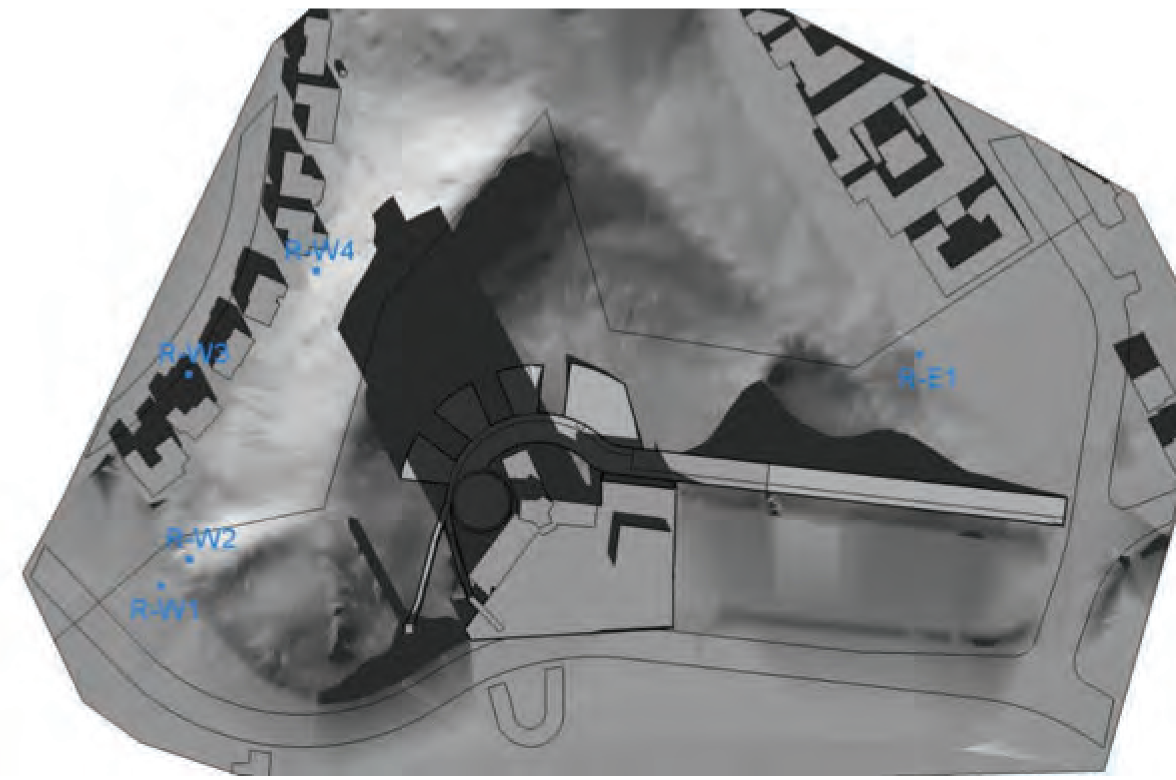

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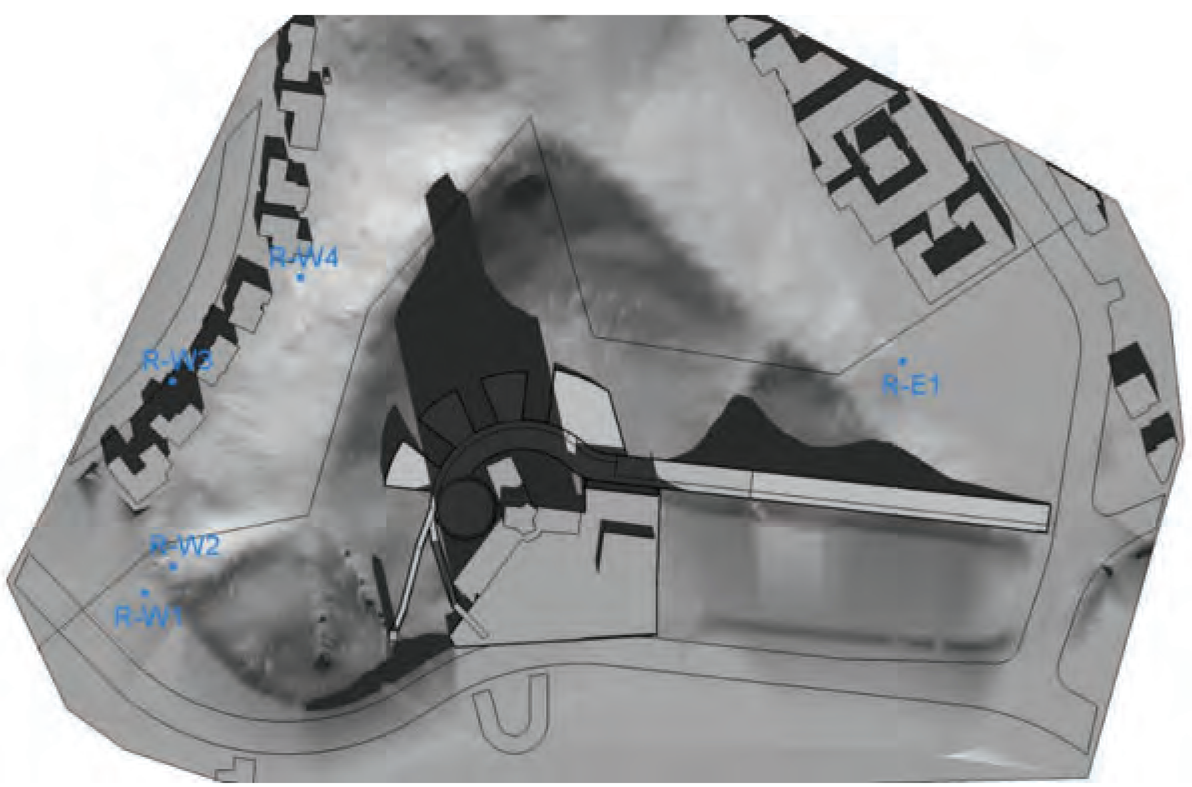

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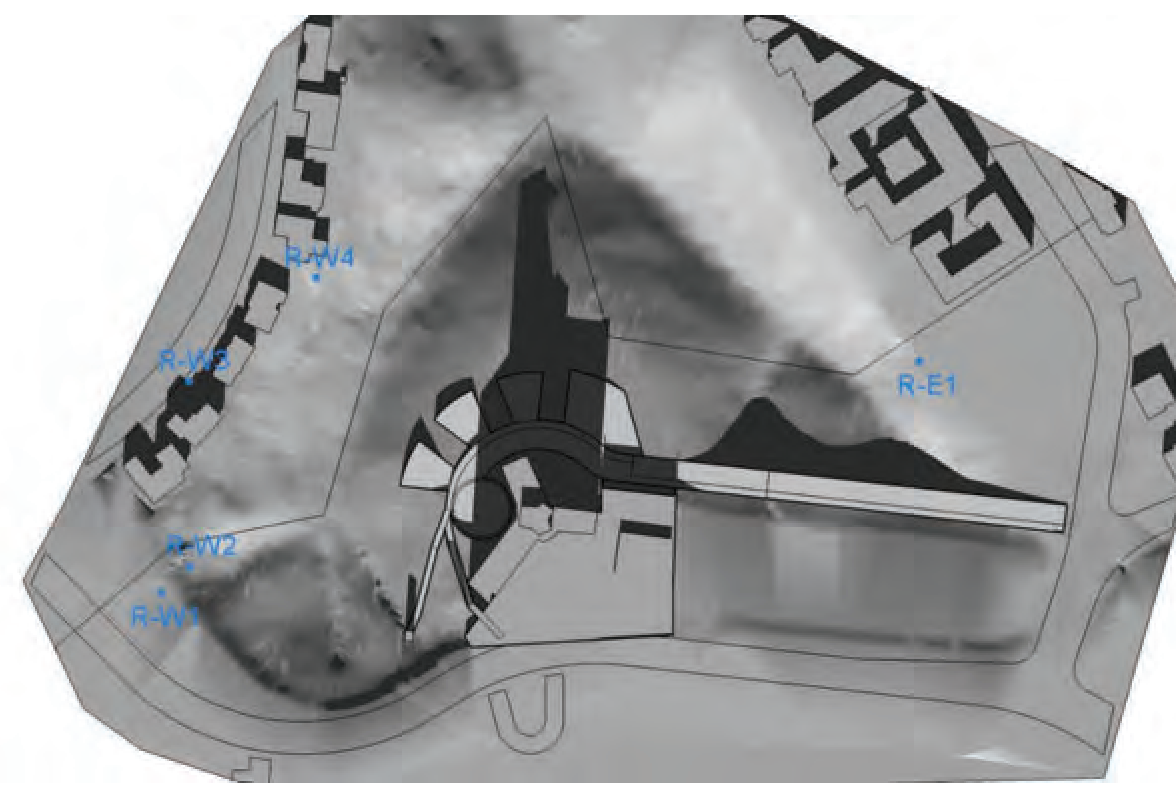

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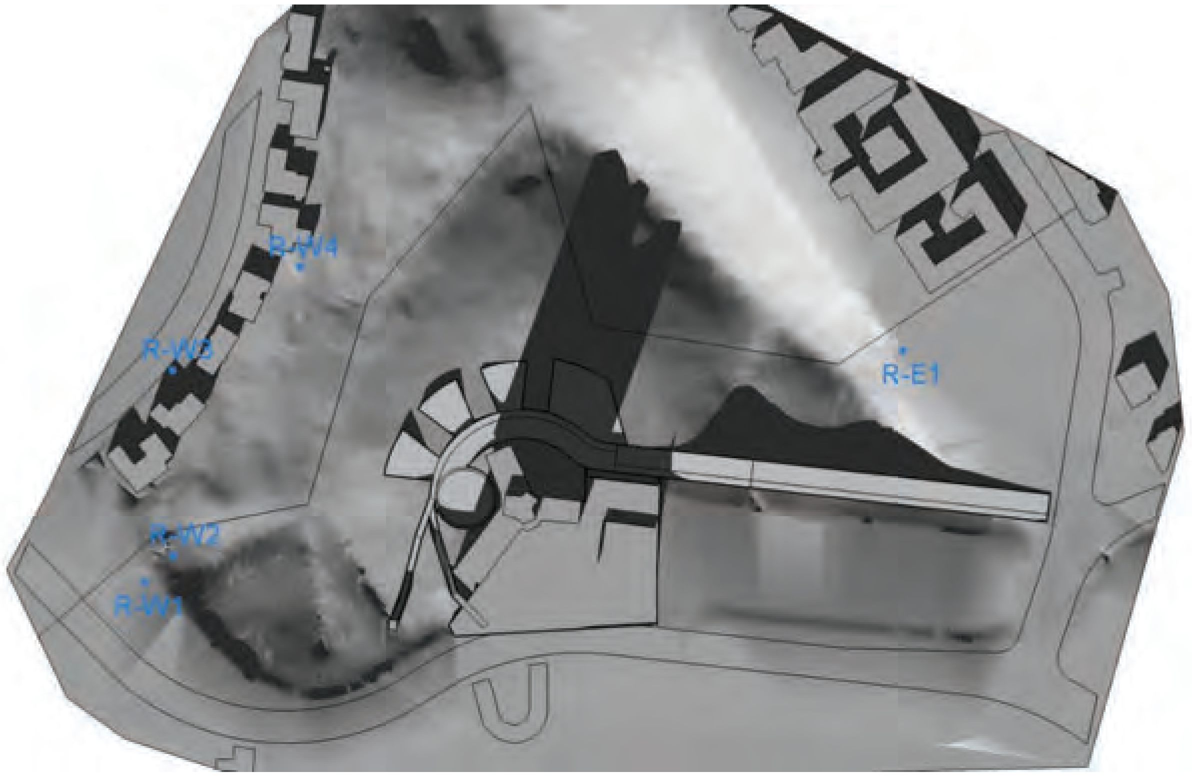
Source: Francis Krahe & Associates 2017



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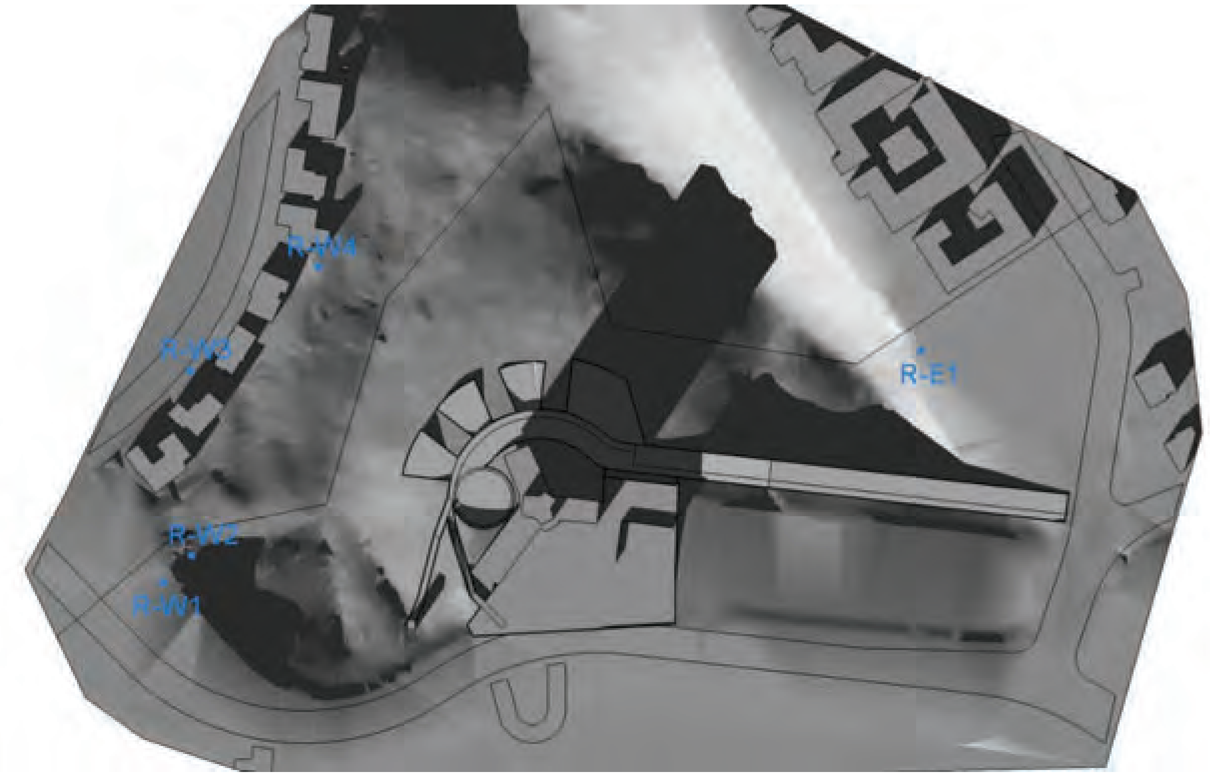

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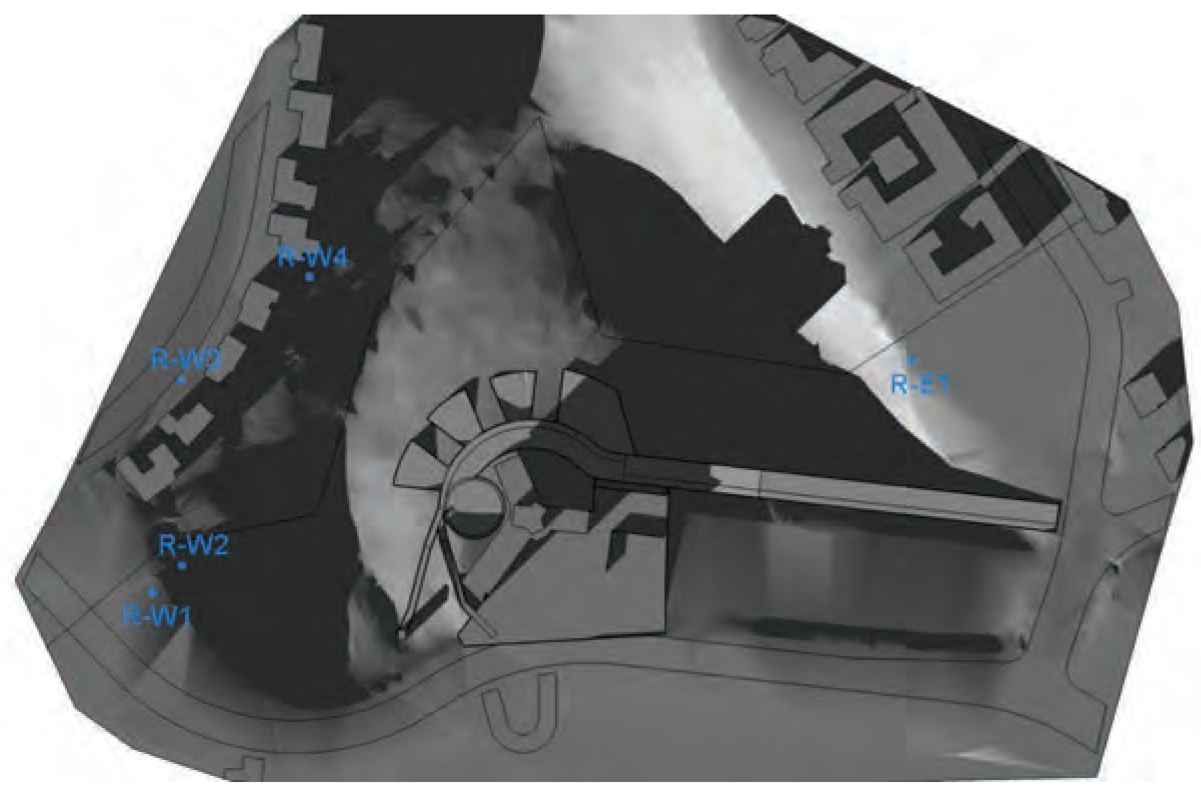

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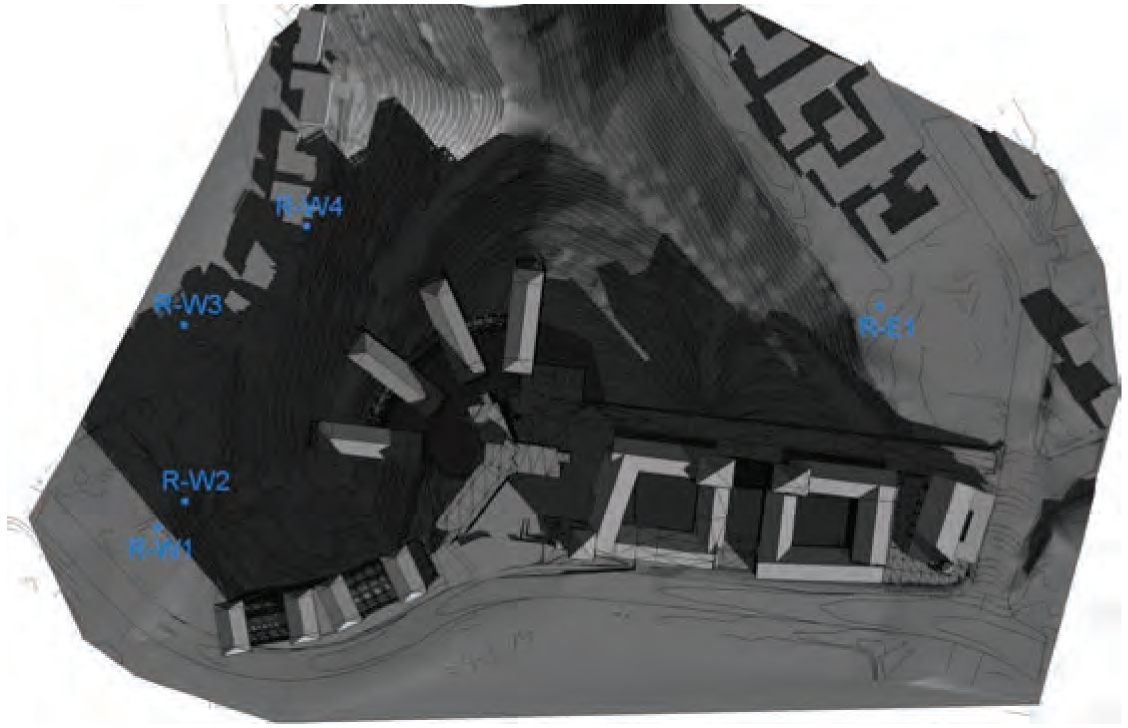
Source: Francis Krahe & Associates 2017

Figure 18b
Existing Shadow Conditions – Winter Solstice



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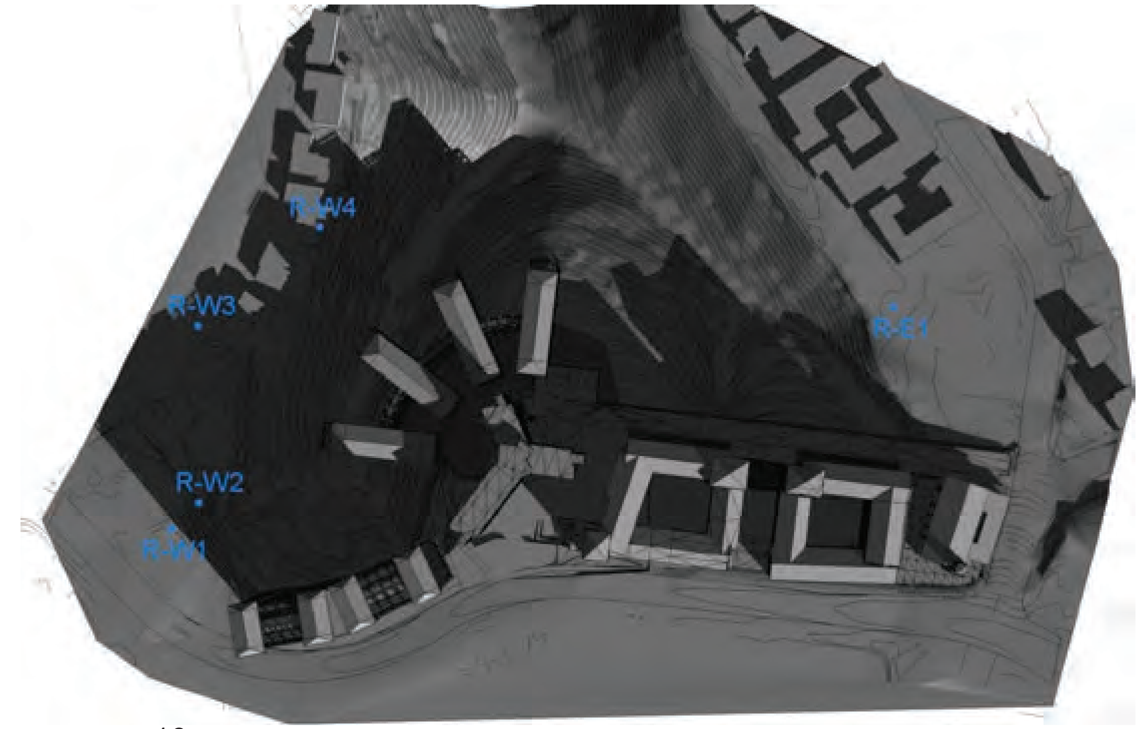

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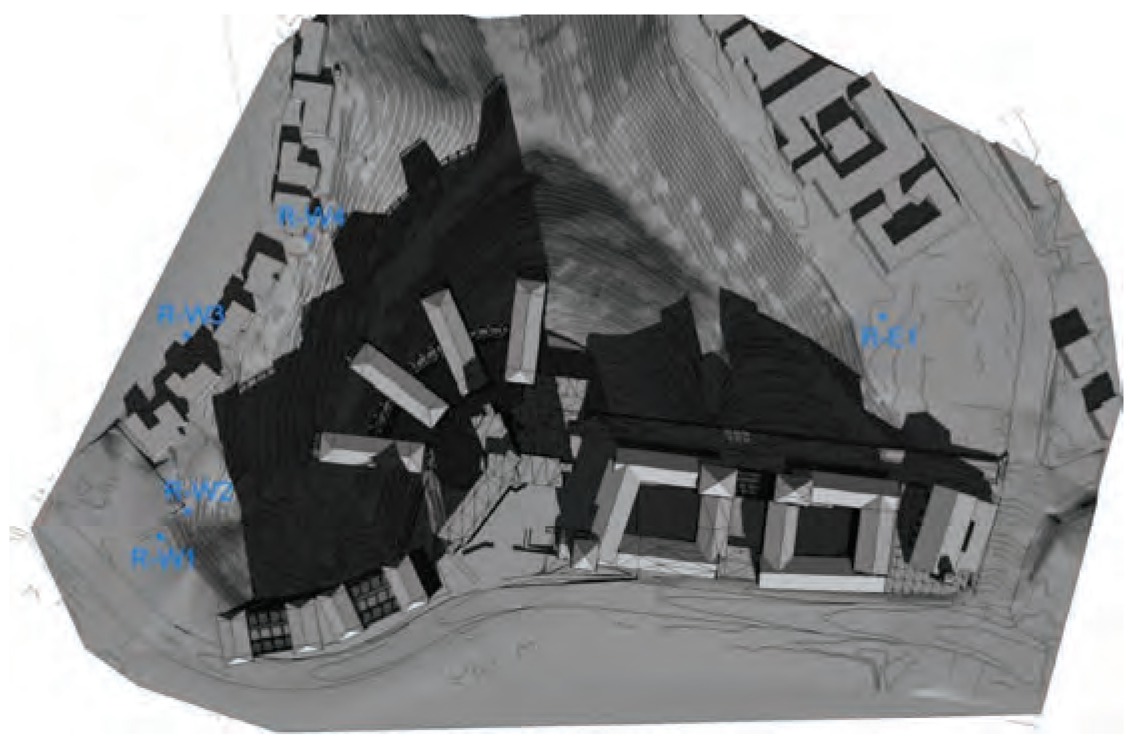

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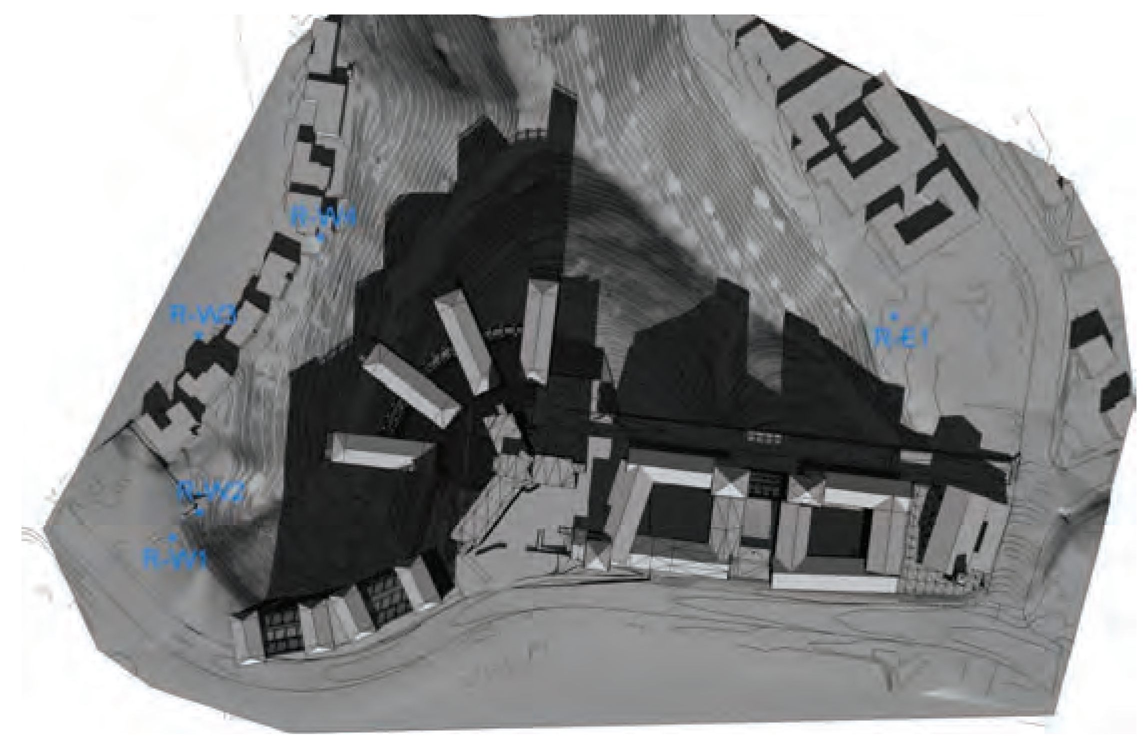

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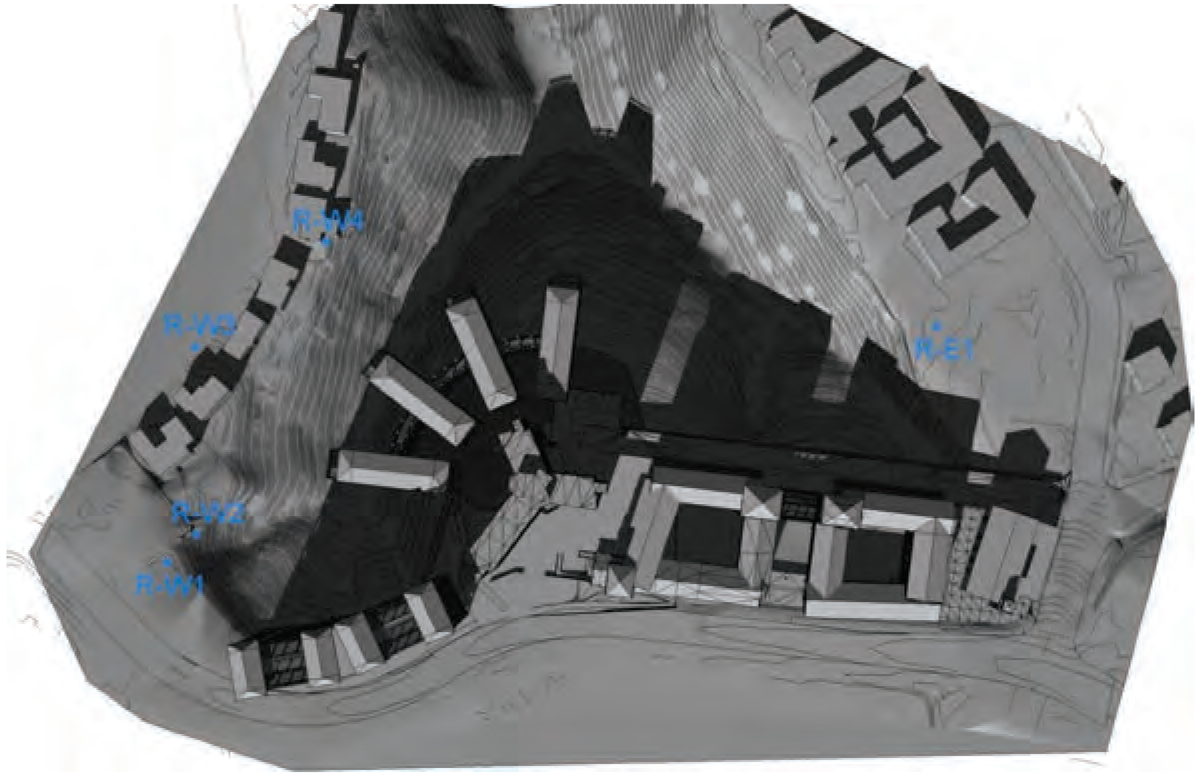

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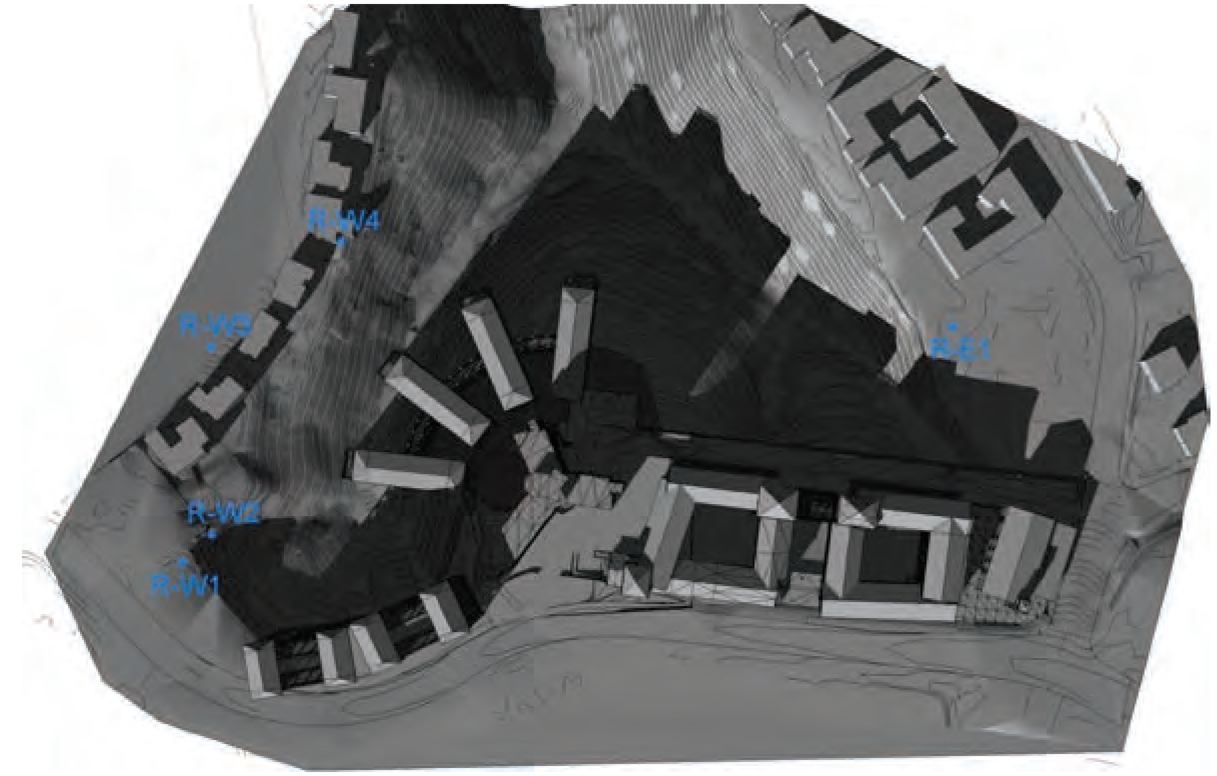

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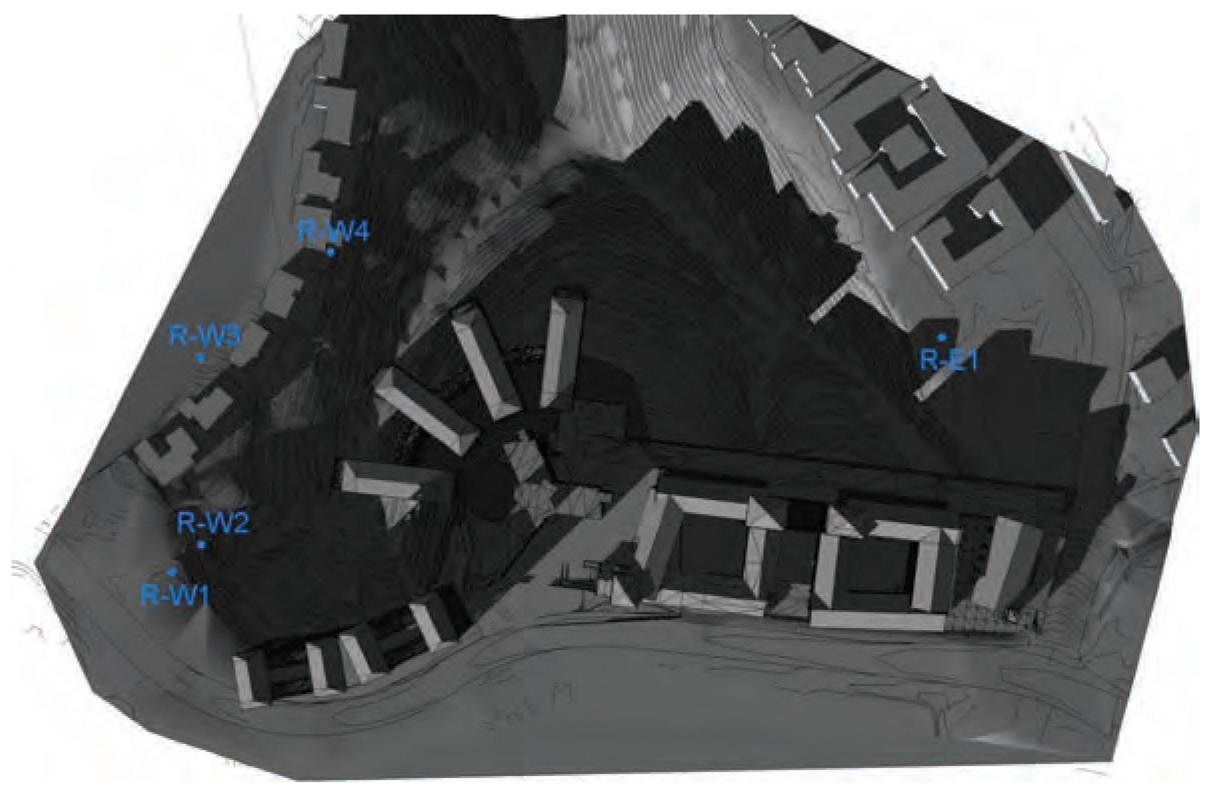

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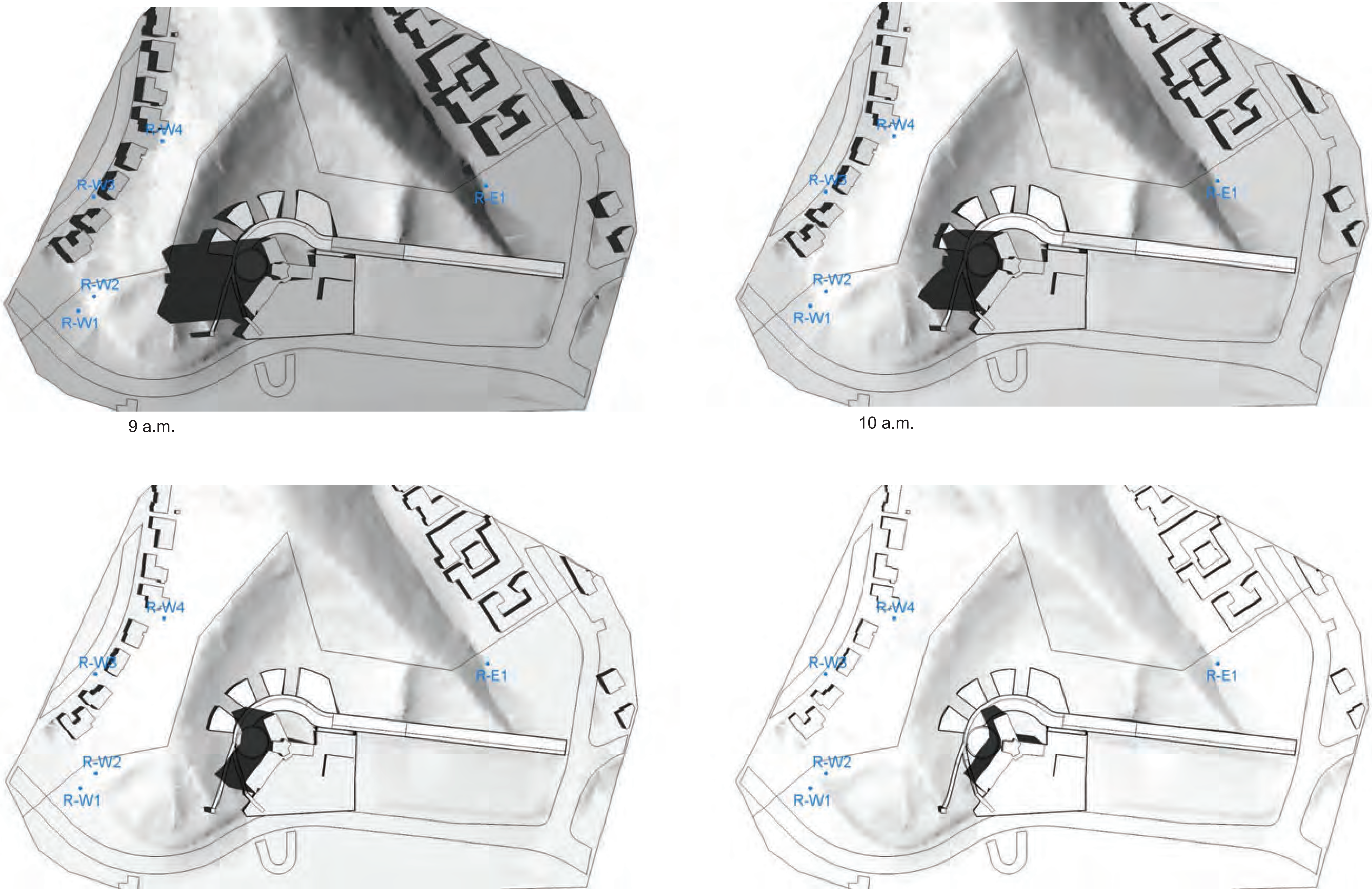
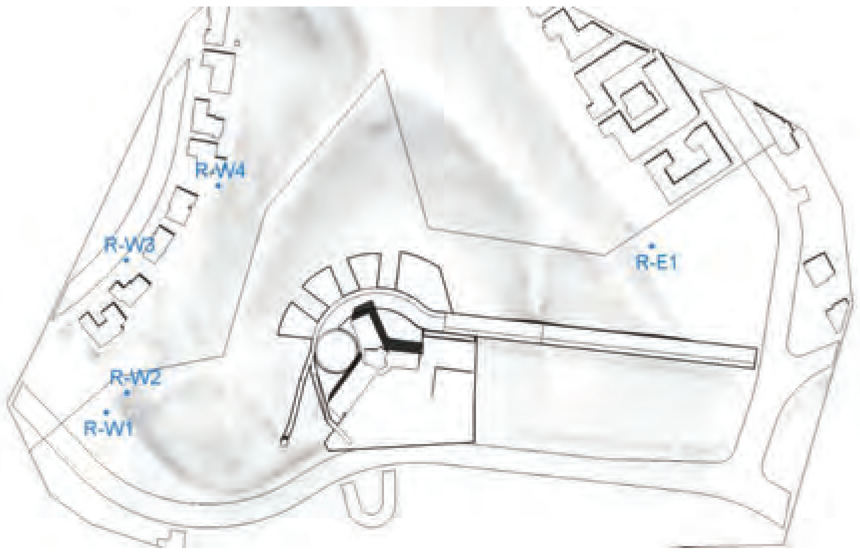
Source: Francis Krahe & Associates 2017

Figure 19b
Proposed Shadow Conditions – Winter Solstice



Source: Francis Krahe & Associates 2017

Figure 20a
Existing Shadow Conditions – Summer Solstice



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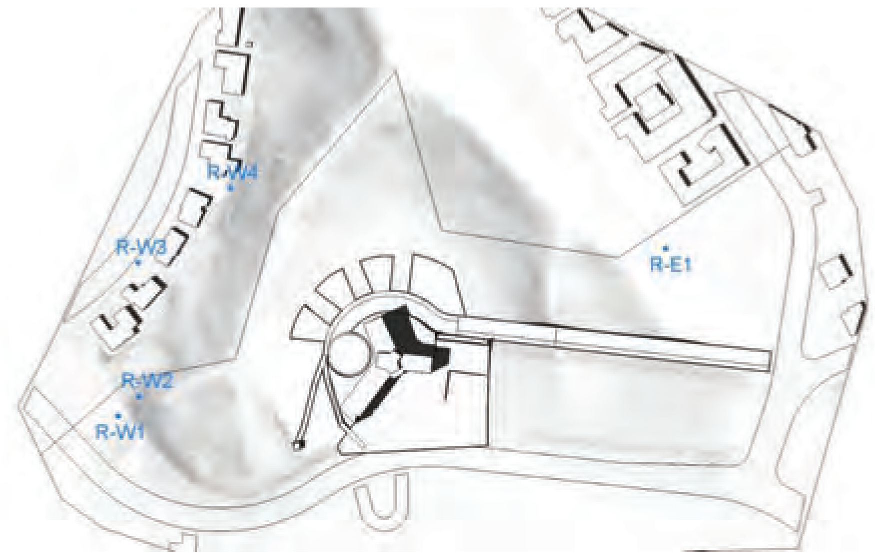

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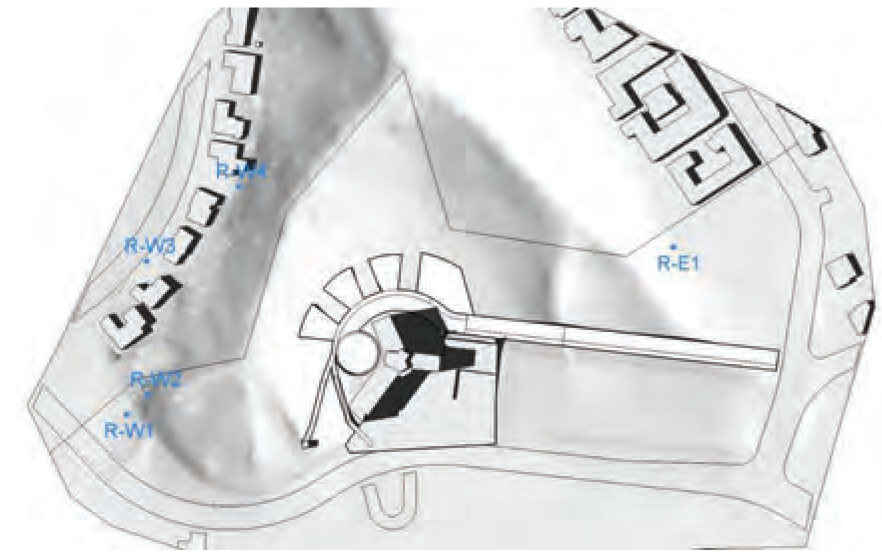

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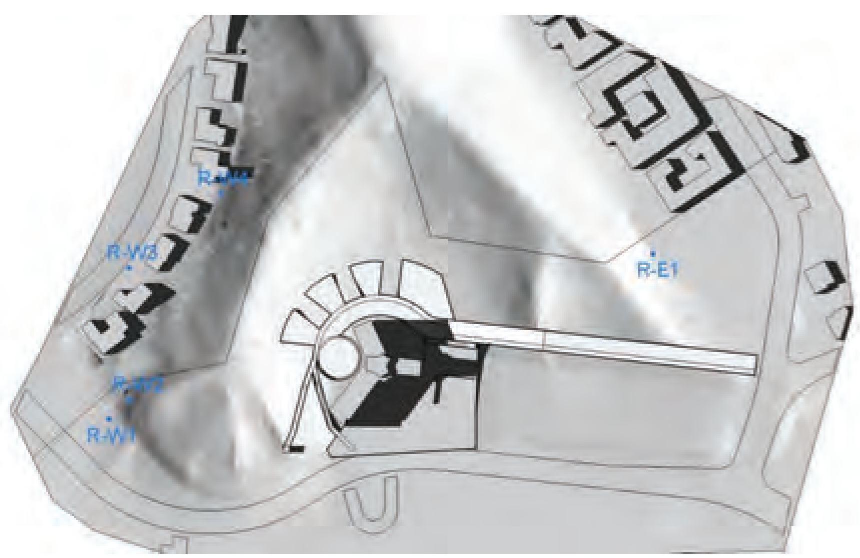

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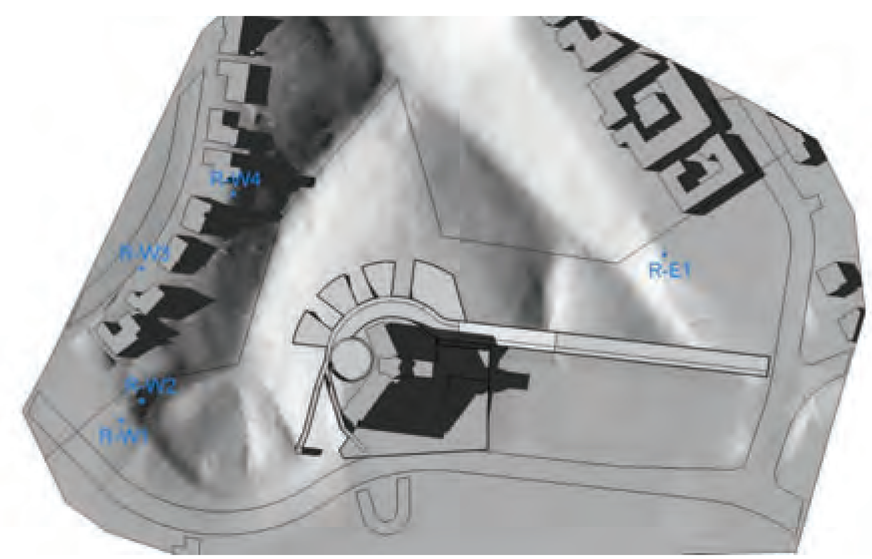

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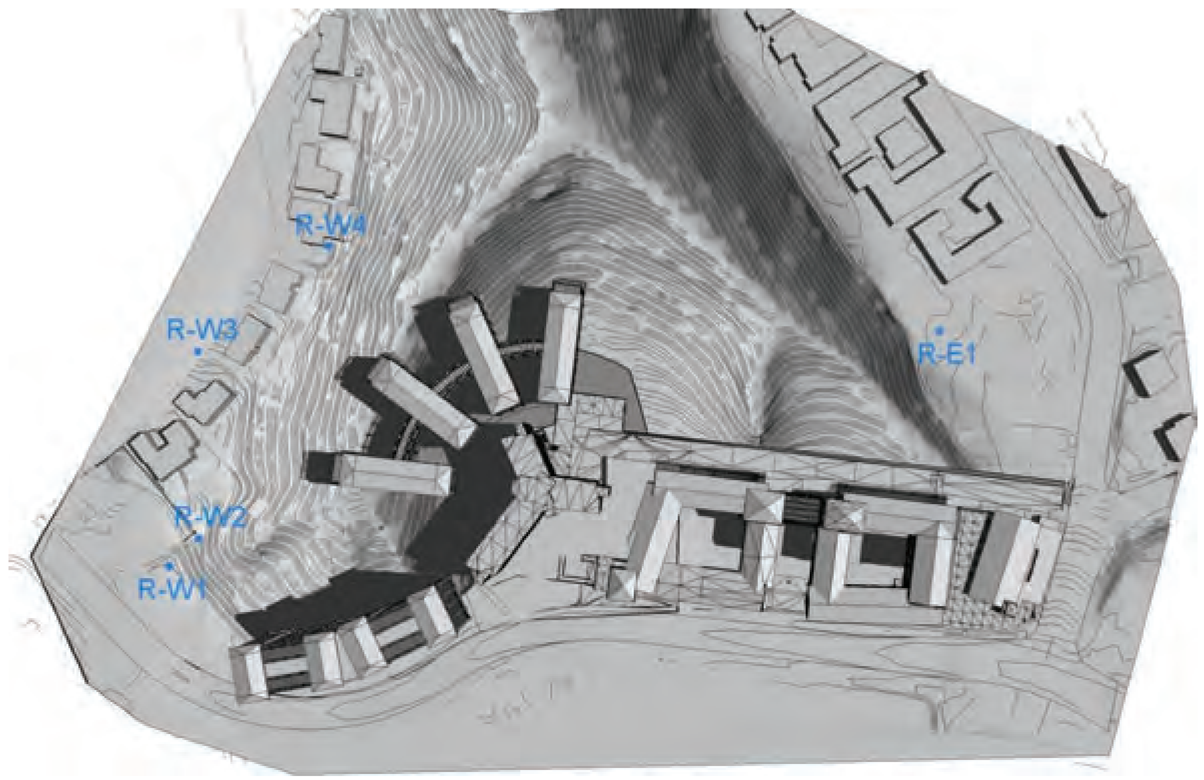

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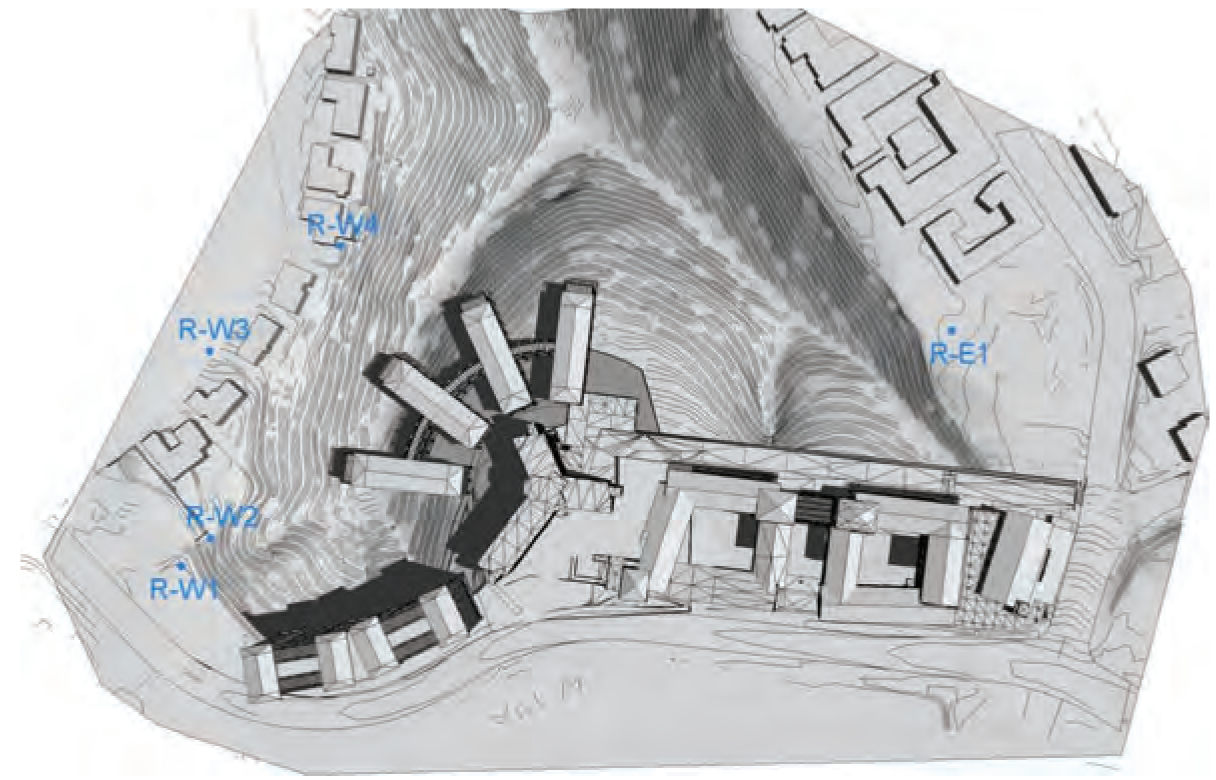

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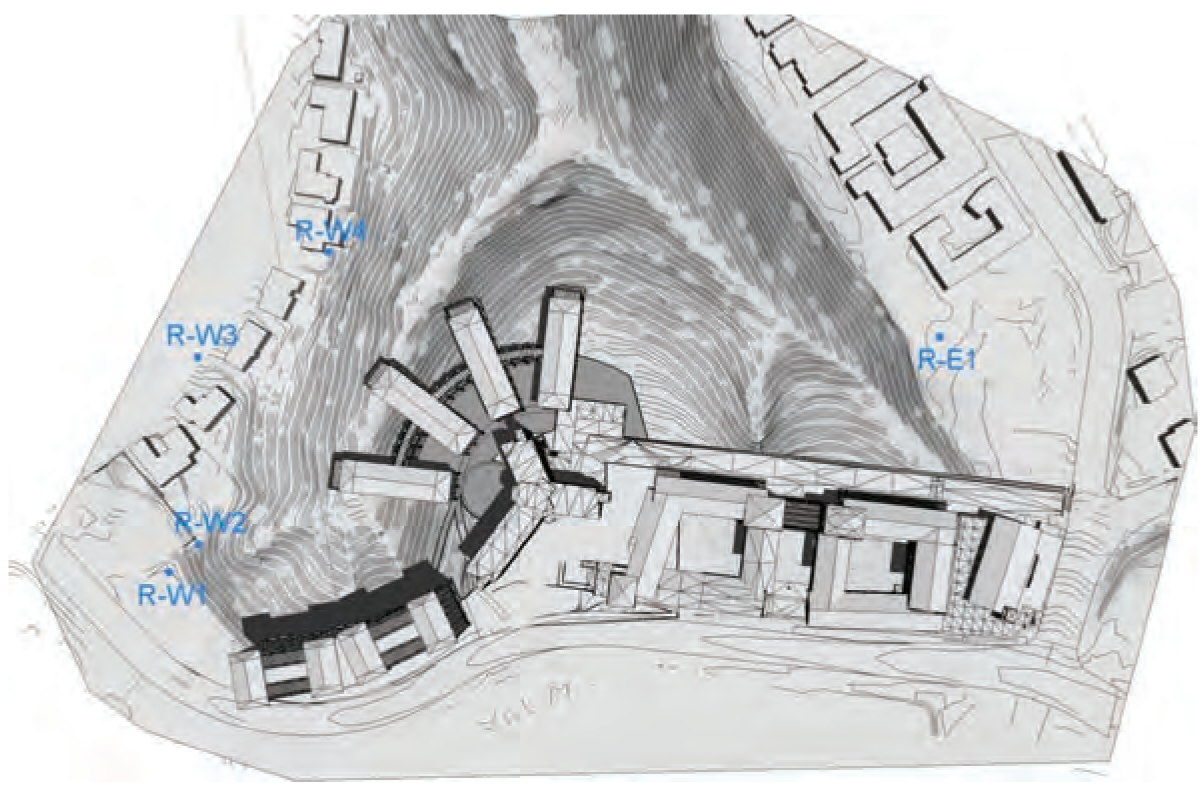

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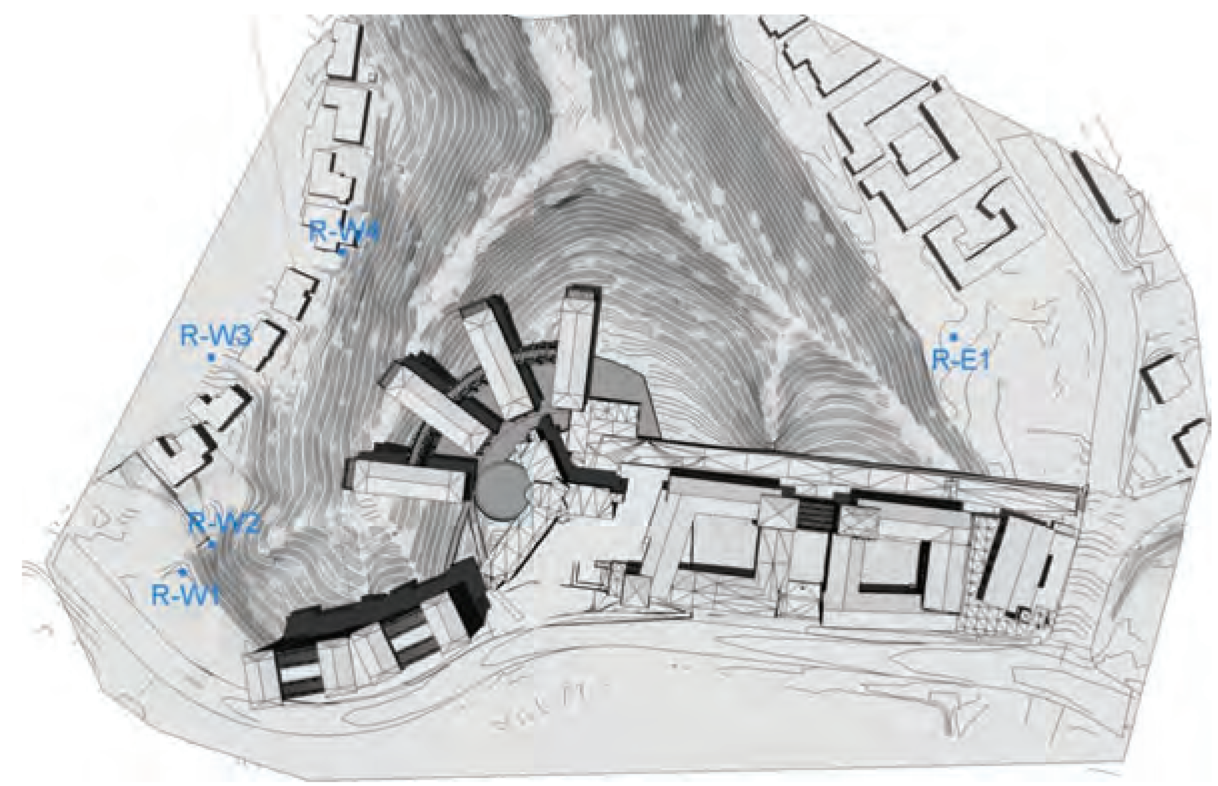

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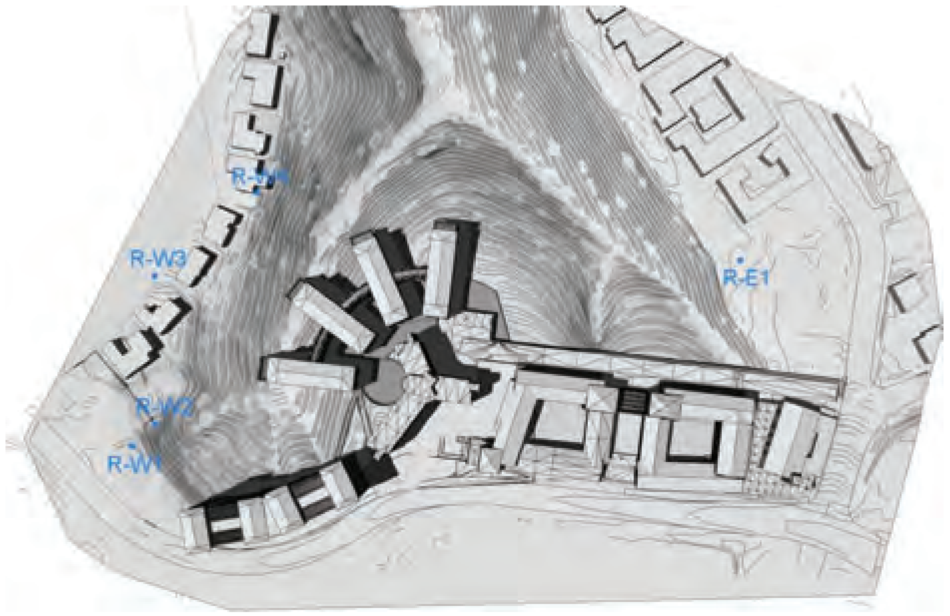

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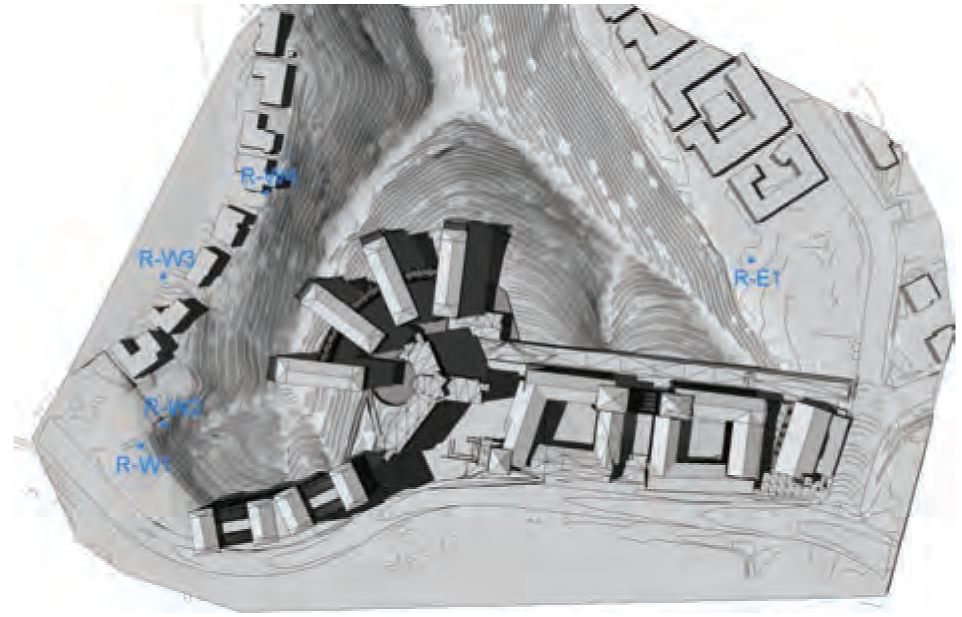

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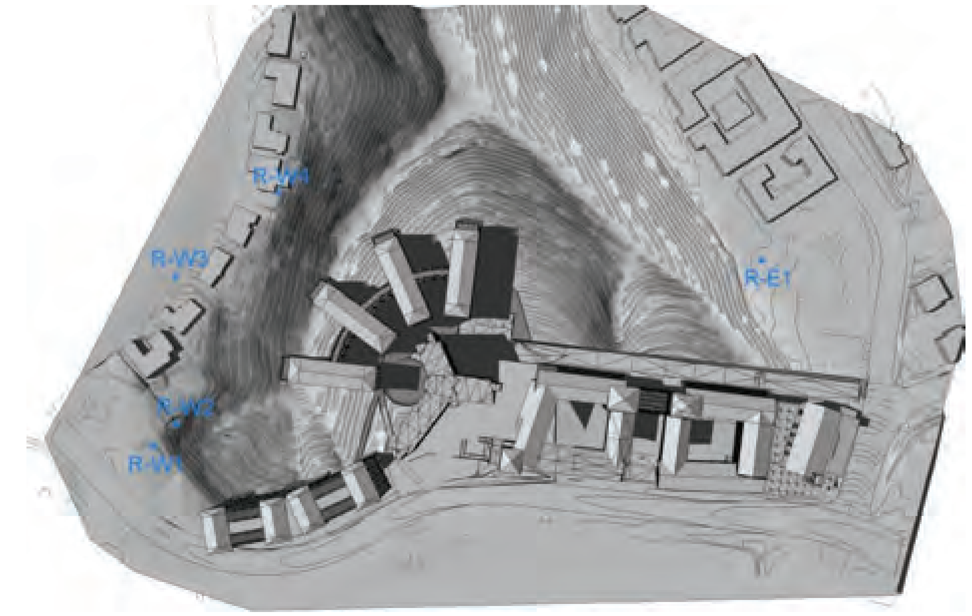

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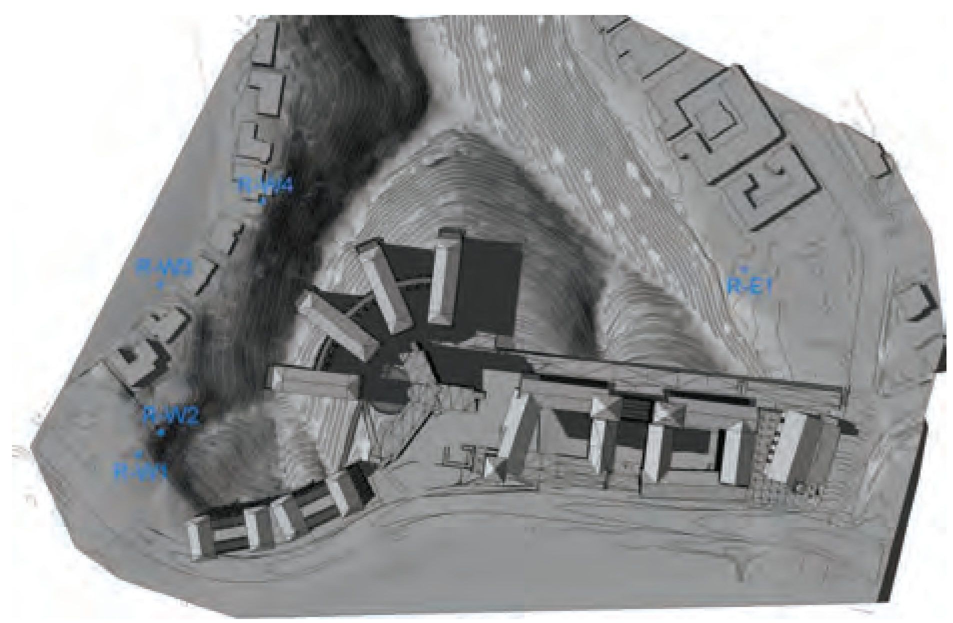

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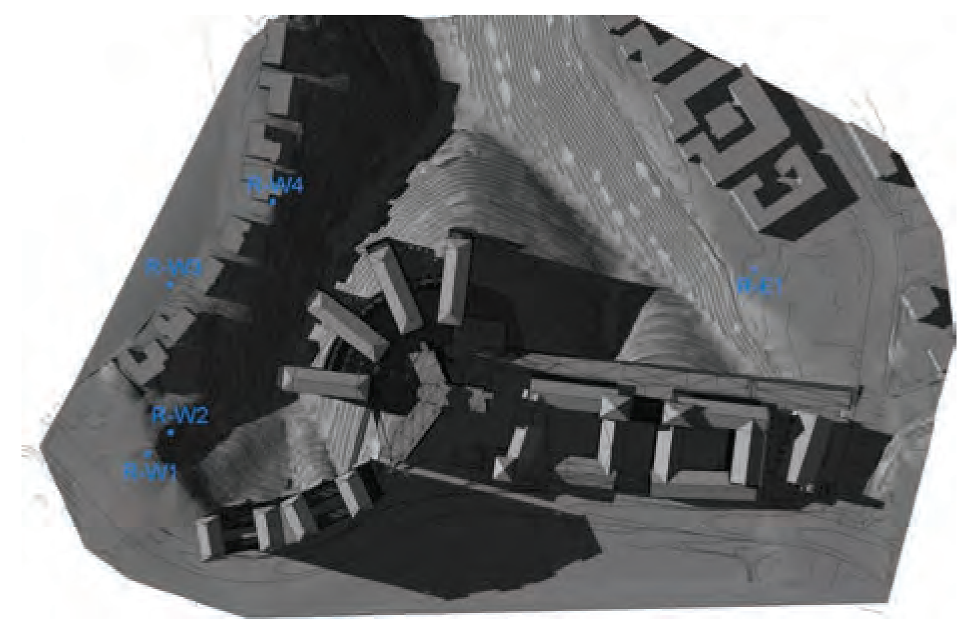

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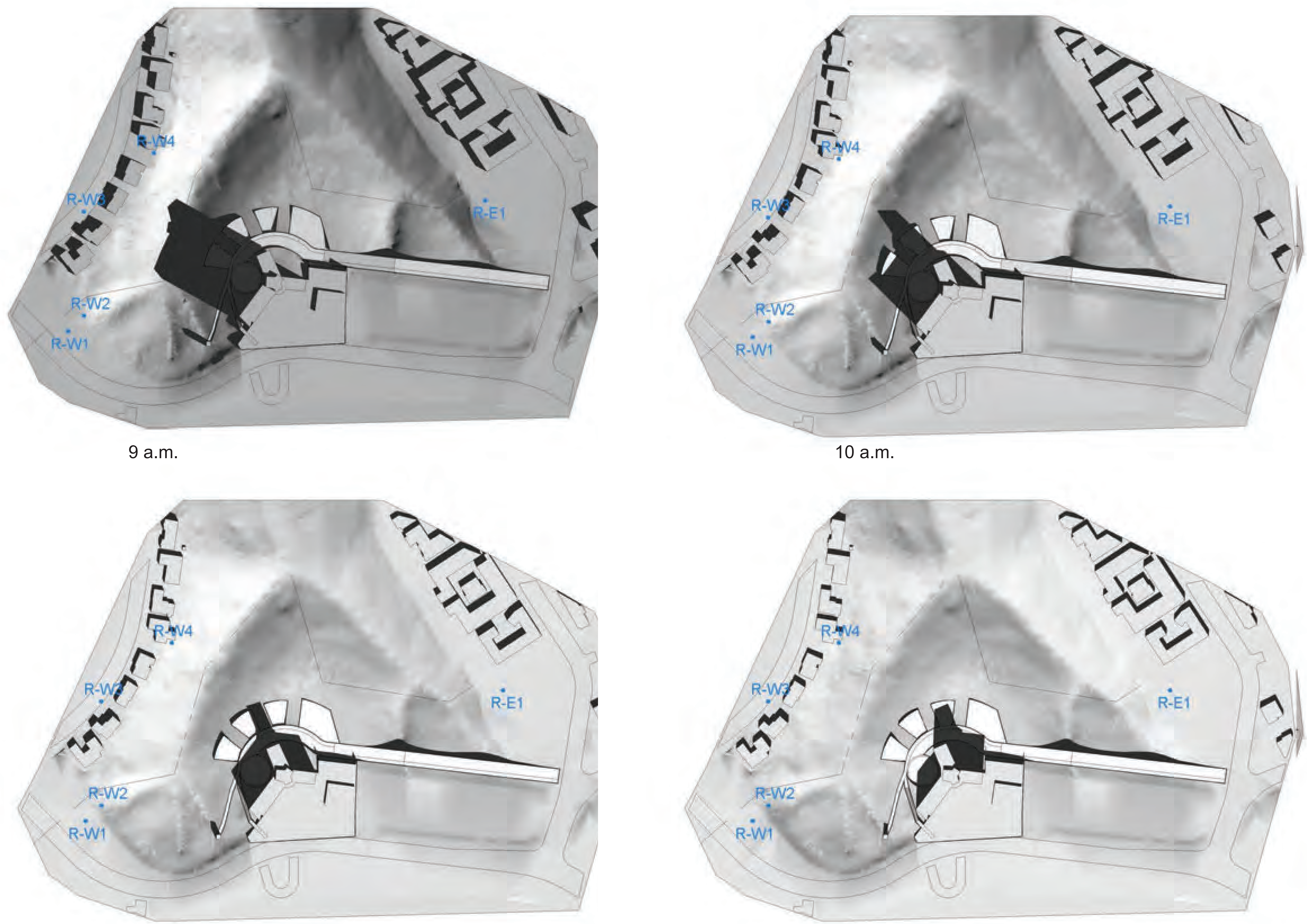
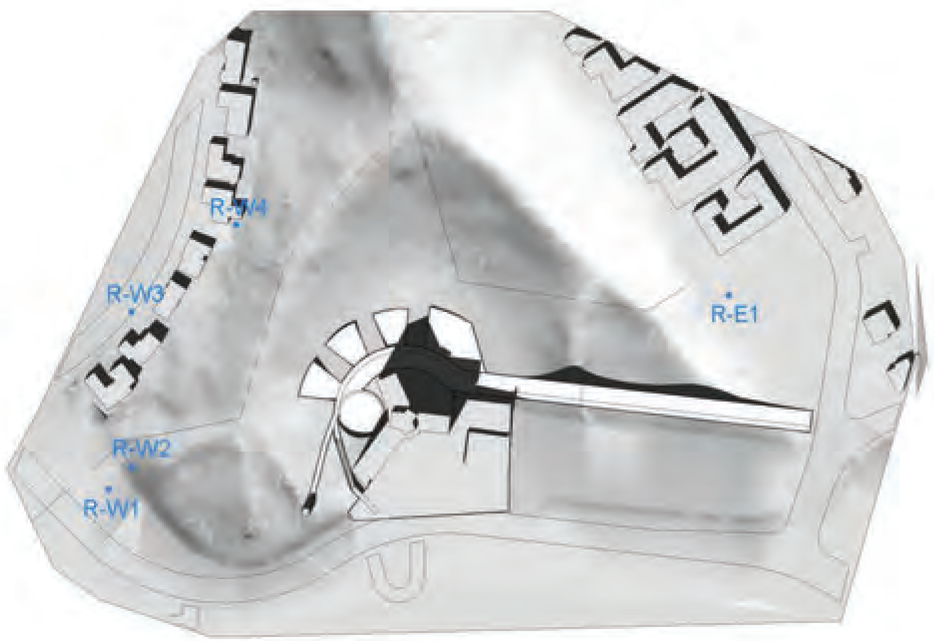


Source: Francis Krahe & Associates 2017

Figure 22a
Existing Shadow Conditions – Spring Equinox



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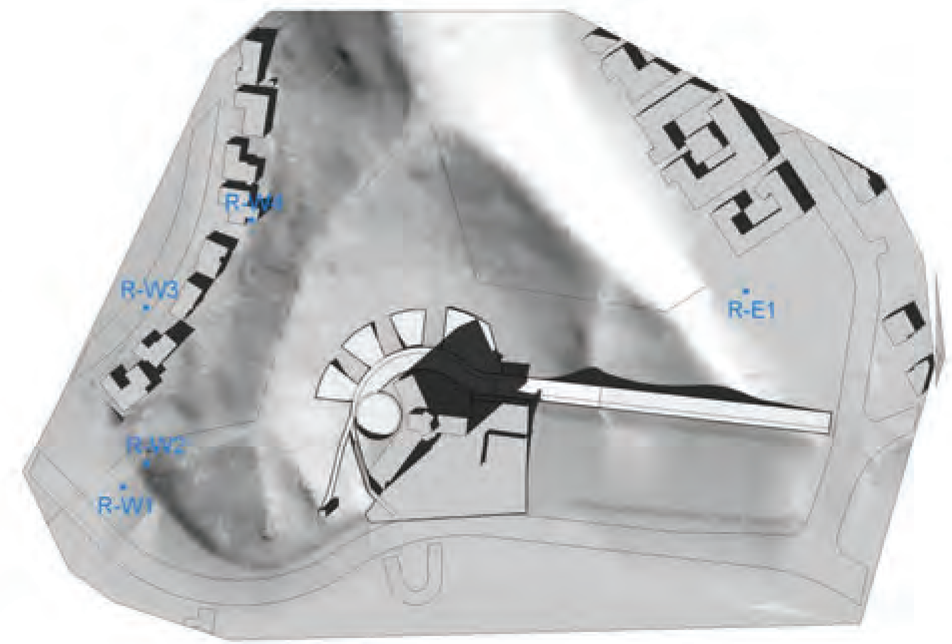

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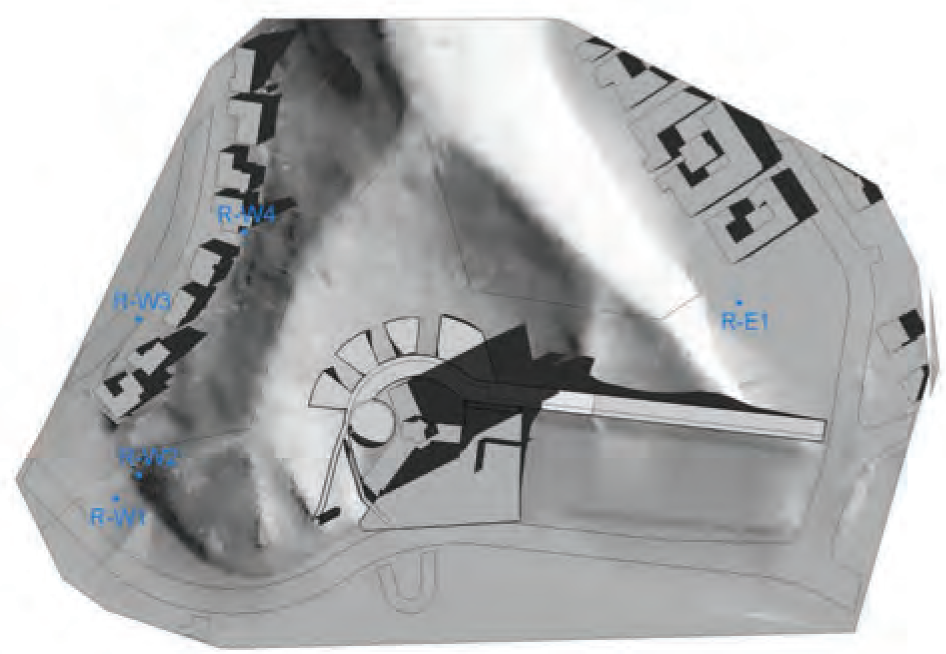

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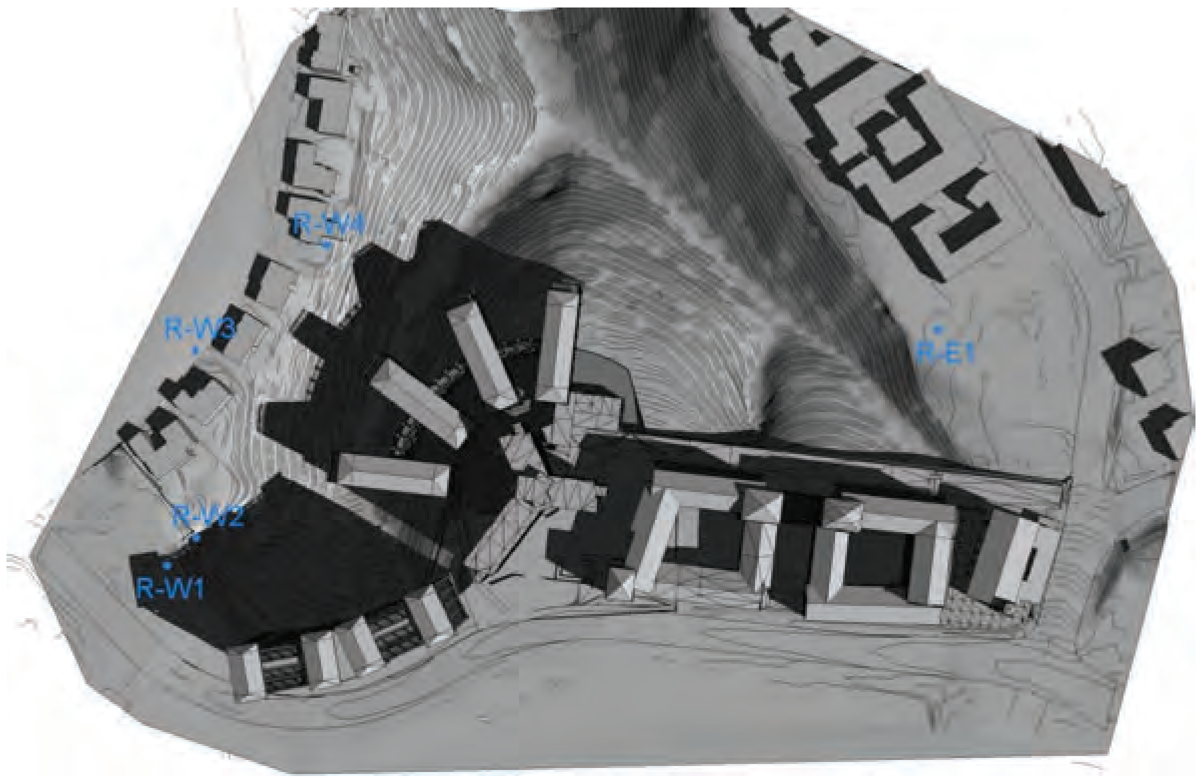
Source: Francis Krahe & Associates 2017

Figure 22b
Existing Shadow Conditions – Spring Equinox



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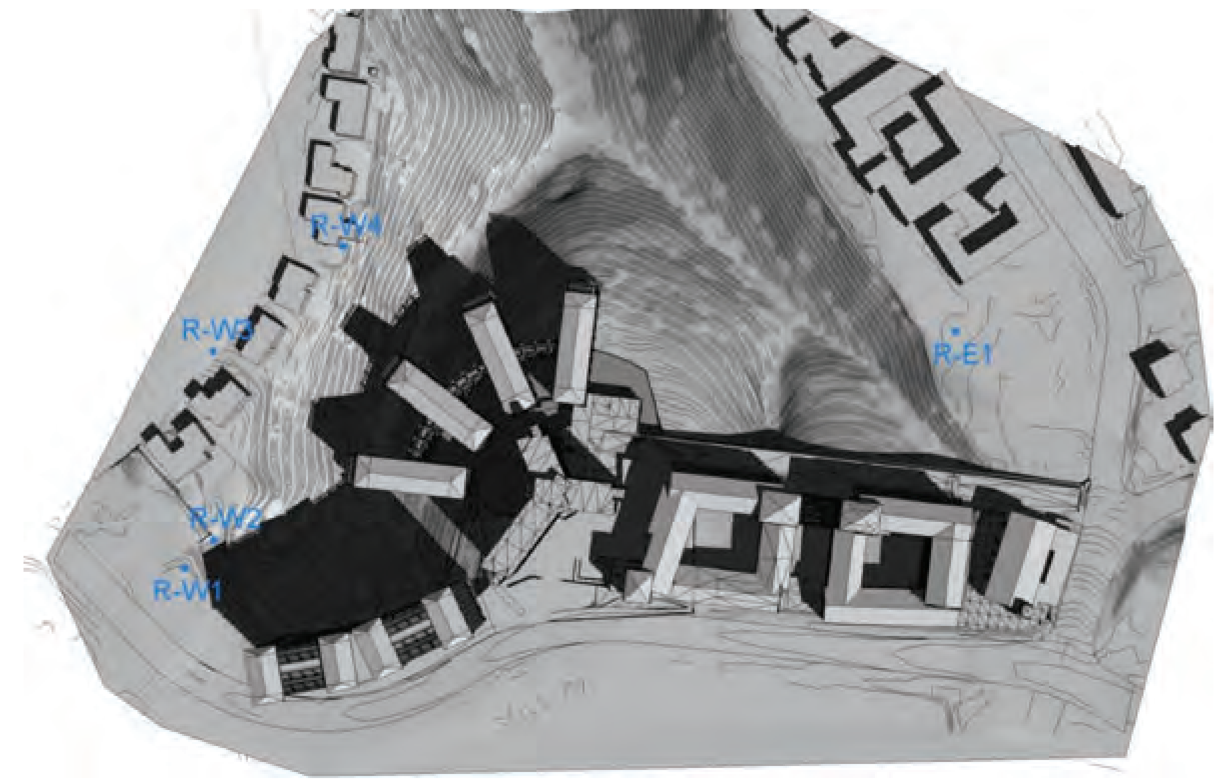

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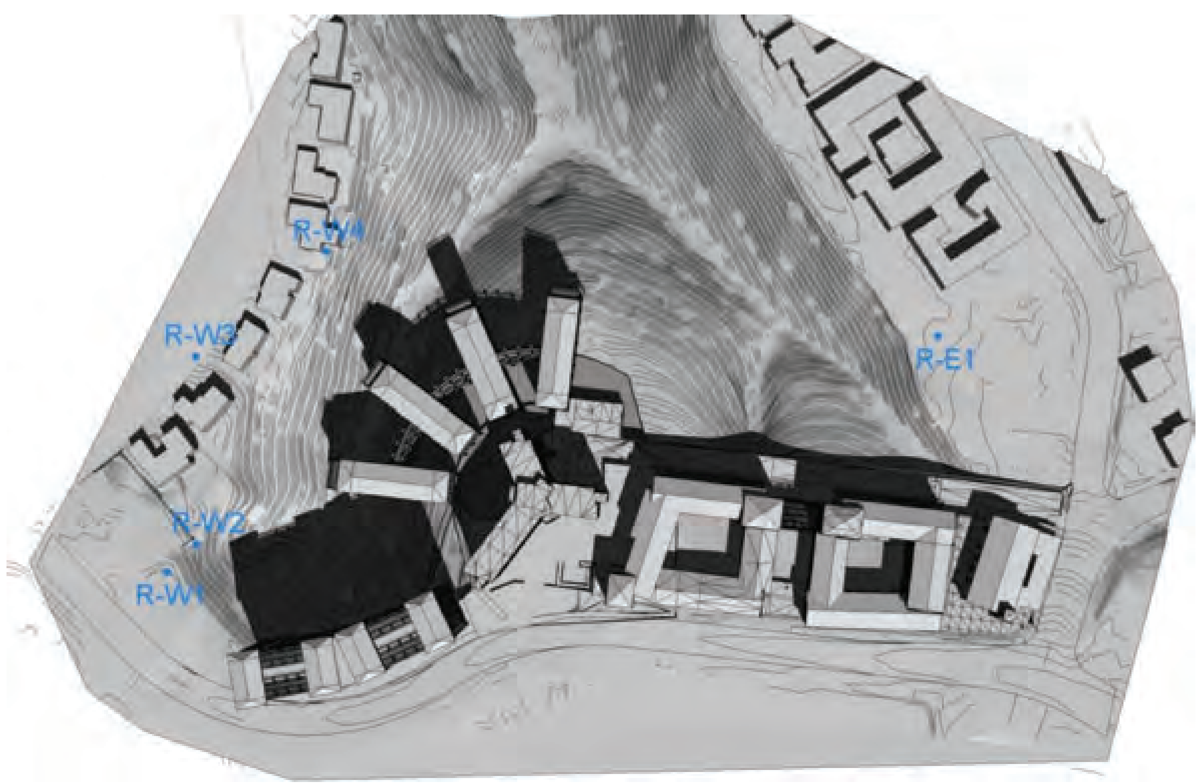

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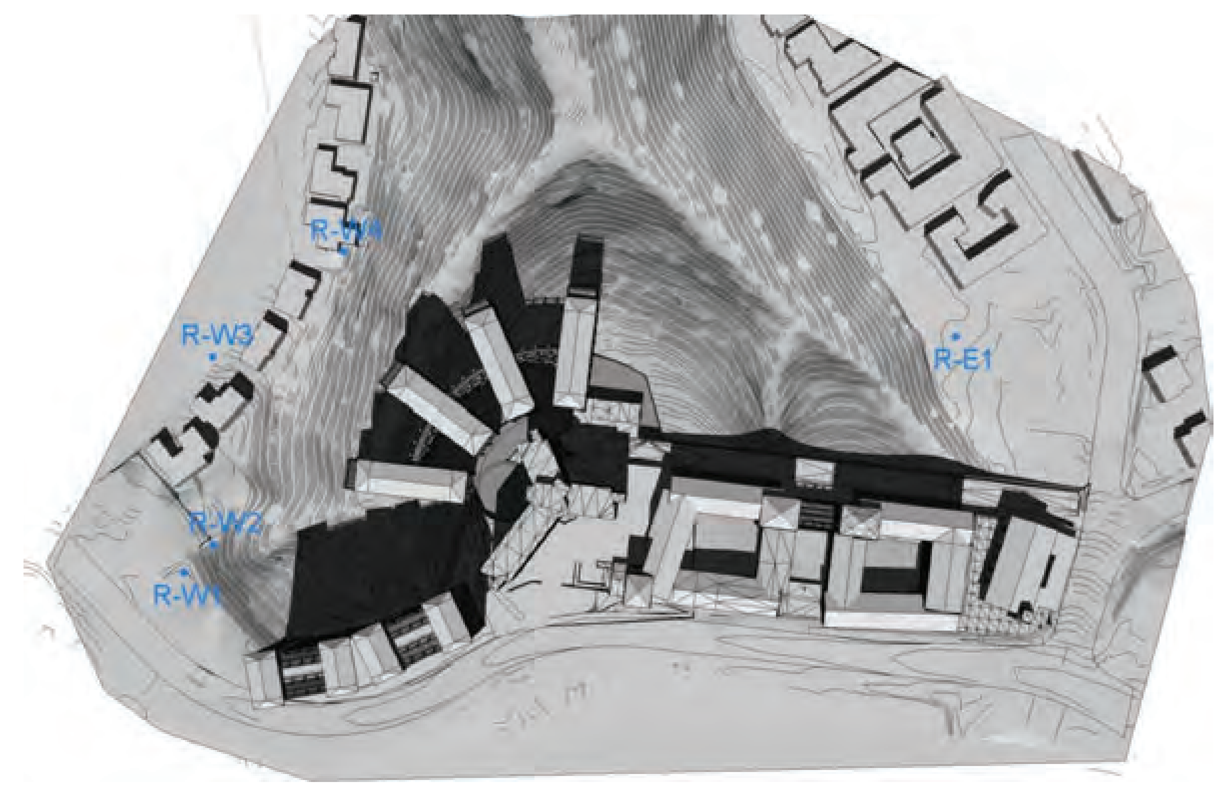

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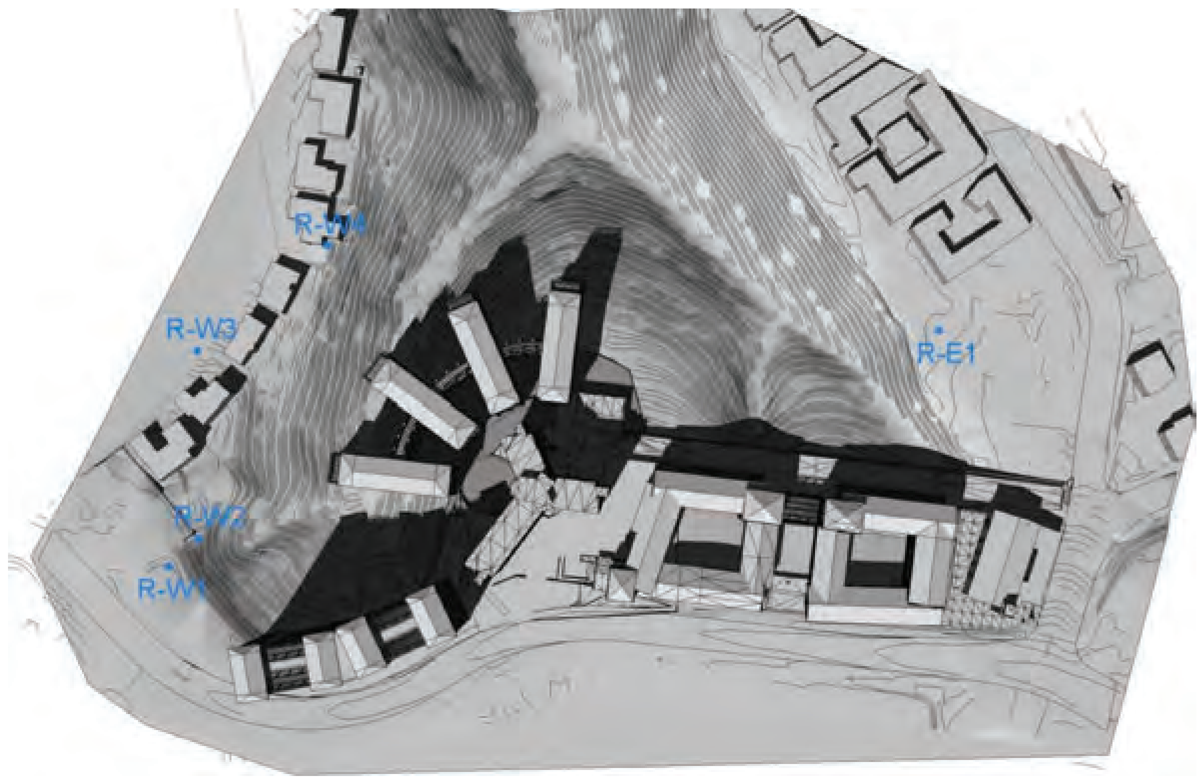
Source: Francis Krahe & Associates 2017

Figure 23a
Proposed Shadow Conditions – Spring Equinox



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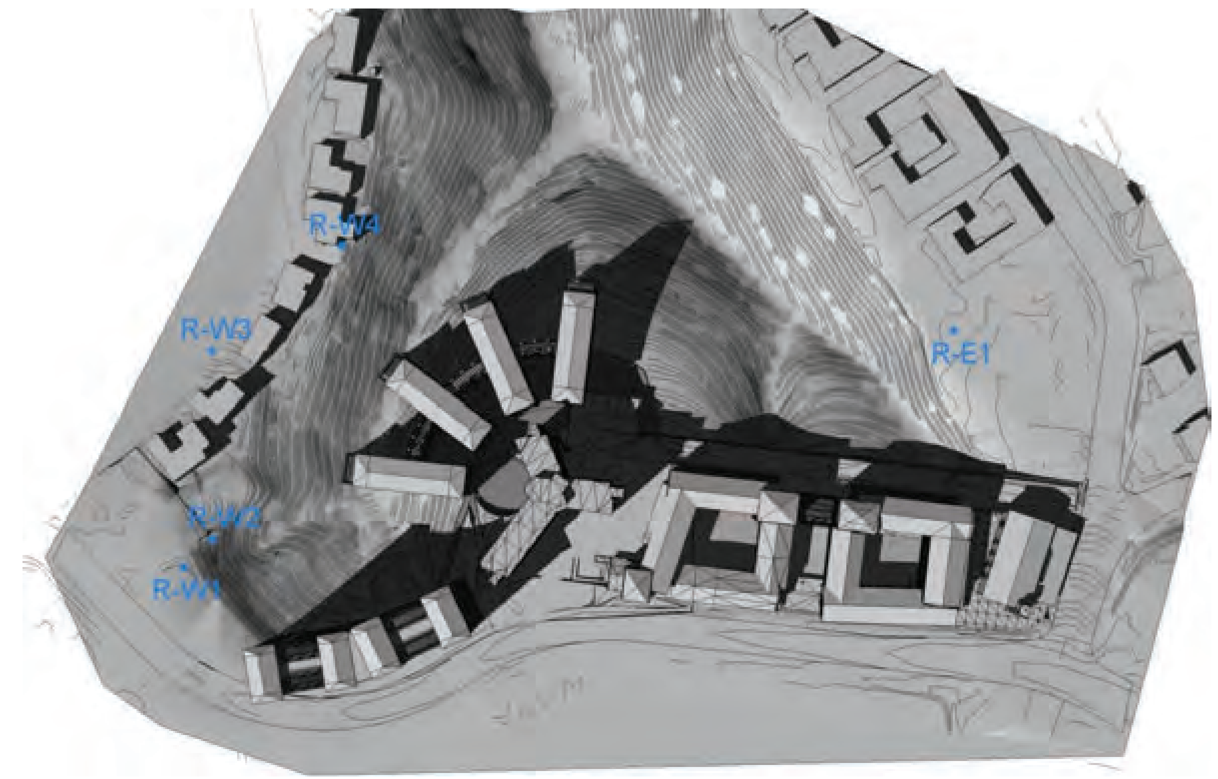

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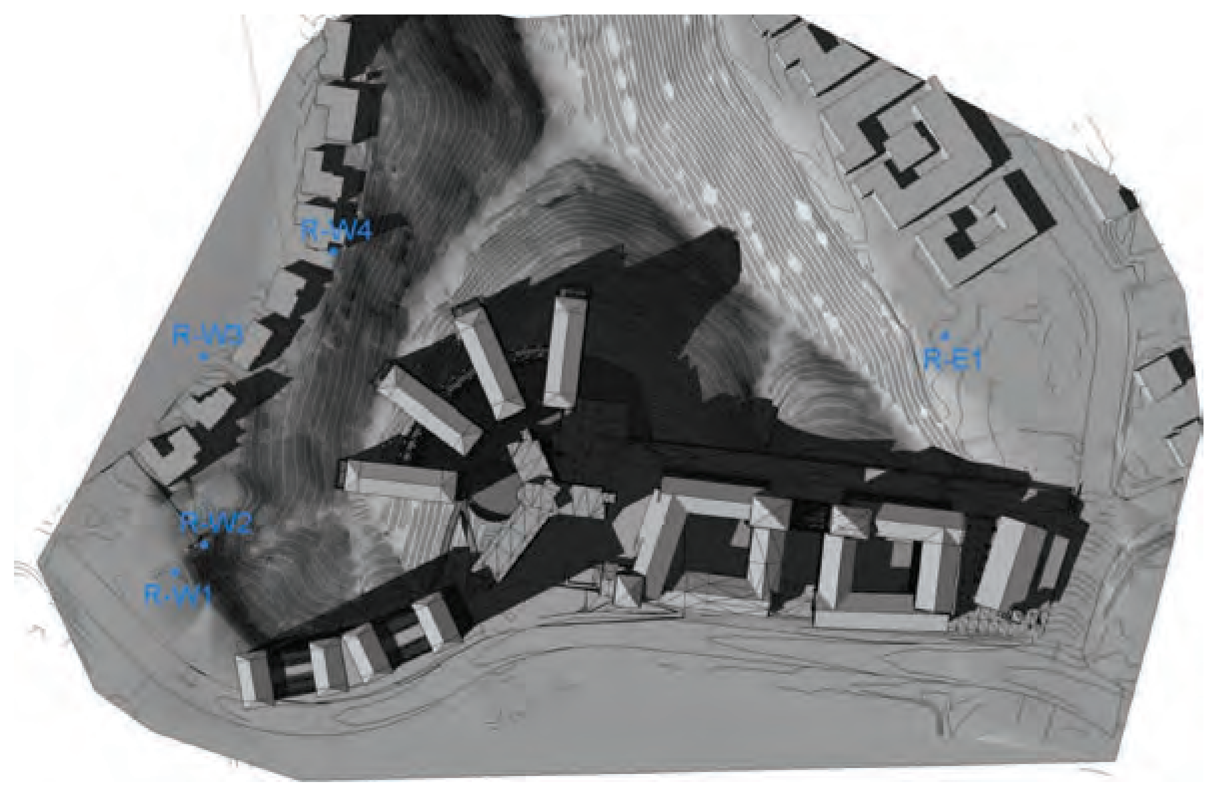

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Source: Francis Krahe & Associates 2017

APPENDIX A

Shading Technical Report

SHADING TECHNICAL REPORT

for the

San Diego State University

NEW STUDENT HOUSING PROJECT

San Diego, California

Francis Krahe & Associates, Inc.

Architectural Lighting Design

304 South Broadway, Suite 500

Los Angeles, California 90013

Phone 213.617.0477
Fax 213.617.0482

April 11, 2017

SDSU NEW STUDENT HOUSING PROJECT, SHADING TECHNICAL REPORT

List of Tables

List of Figures

1. Introduction

1.1 Executive Summary

This Shading Technical Report (Report) by Francis Krahe & Associate Inc. analyzes the architectural building and site lighting (Project Lighting) to be installed within the proposed SDSU New Student Housing (Project), which is located within the San Diego State University Campus at Remington Road in San Diego, California (Project Site). The Project Site is bounded by Hewlett Drive to the west, Interstate 8 to the north, 55th Street to the east, and Remington Road to the south. The Project includes new student residence halls consisting of approximately 2,560 beds, and a separate 2-story building consisting of approximately 15,000 gross square foot food services building (dining hall), as well as associated landscaping, limited parking facilities, and on-site amenities including pedestrian pathways. As proposed, the Project would be built in three phases. The proposed site design accommodates and incorporates the massing and architecture of Chapultepec Hall so that this existing building within the Project site would be consistent with and would complement the new development.

This Report defines the existing daylight shadow conditions within and surrounding the Project Site, reviews the applicable metrics for evaluation of the impact of shadows on sensitive sites, and models the proposed Project building mass and height to evaluate the potential shading impacts on surrounding properties.

The methods of analysis utilized for this evaluation are based upon the recommended practices established by the Illuminating Engineering Society of North America (IESNA) for the practice of illumination engineering design and application as well as measurement of light sources and illuminated surfaces. The Project building massing is analyzed to determine the impact of daylight shadows onto adjacent properties.

In summary, the Report's analysis of Project determined that the shadows resulting from the Project building massing would not exceed applicable thresholds, and therefore, the shadow impacts resulting the proposed Project would be less than significant.

1.2 Project Description

The Project analyzed in this Report consists of the proposed Project Daylight Shading (Project Shading) evaluated with respect to the architectural height and mass of the Project as described in Appendix A. The Project Shading evaluates the building massing to predict the shadow projected onto adjacent properties and to evaluate the illuminance at these locations. The calculations for Project Daylight illuminance conservatively assume maximum daylight with no cloud cover and no obstruction from trees or landscape.

1.3 Summary of Methodology

The extent of shading from the Project onto an adjacent property is dependent upon the height and size of the Project buildings, the angle of the sun, and the elevation of the Project as compared to the adjacent properties. The angle of the sun varies with the rotation of the earth by time of day and by the elliptical orbit of the earth around the sun, which creates the change in seasons.

At the Project Site, the longest shadows are created during the winter months when the sun is low in the sky, and the shortest shadows are cast during the summer months when the sun is high in the sky. The longest shadows are cast on December 21, which is referred to as the Winter Solstice, as the sun reaches its most southerly excursion relative to the equator, directly above the Tropic of Capricorn in the Southern Hemisphere. The shortest shadows coincide with June 21, the Summer Solstice, as the sun reaches the most northerly excursion relative to the equator, directly above the Tropic of Cancer in the Northern Hemisphere. The path of the sun is aligned with the equator two days per year on March 21, the Spring Equinox and September 21, the Fall Equinox. On these two dates the length of the day and the altitude of the sun in the sky is midway between the minimum altitude and duration on December 21, and the maximum altitude and duration on June 21. Shadows created on these two dates represent the mean of the range of both length of the shadows and the time duration of the shadow.

Solar data for Winter Solstice, Summer Solstice, and the Equinox are included in Appendix B, including the average illuminance from the sun, the solar angle (vertical angle above the horizon line)., and the solar azimuth (position relative to due north).

The extent of shading from the Project onto adjacent properties is analyzed on the date of the winter solstice and equinox, from 9:00 AM until 3:00 PM, and on the summer solstice from 9:00 AM until 5:00 PM. The dimensions of the Project Shading is calculated from the known position of the sun projected onto the Project Building height and dimensions, which casts the corresponding shadow onto the adjacent properties.

Shading impacts within this Report are evaluated based on the following technical criteria:

Shading: Project building mass creates shadow conditions for more than 3 hours between the hours of 9:00 AM and 3:00 PM Pacific Standard Time between late October and early April, or more than four hours between the hours of 9:00 AM and 5:00 PM Pacific Daylight Time between early April and late October.

2. Regulatory Framework

Daylight shadows and the effect on land uses are not statutorily regulated by the State of California, and no other regulations governing shade or shadows are applicable to the proposed Project Site or Proposed Project. Guidelines for evaluating shading impacts are included in the Los Angeles CEQA Thresholds and the City and County of San Francisco CEQA guidelines.

The Los Angeles CEQA Thresholds Guide indicates project impact would normally be considered significant if:

SS-1 Shadow-sensitive uses would be shaded by Proposed Project-related structures for more than 3 hours between the hours of 9:00 AM and 3:00 PM Pacific Standard Time (between late October and early April), or more than four hours between the hours of 9:00 AM and 5:00 PM Pacific Daylight Time (between early April and late October).

The standard above has been widely utilized in Los Angeles for approximately ten years to evaluate the impact of project shading.

In the City and County of San Francisco, there are two circumstances which could trigger the need for a shadow analysis:

(1) If the proposed project would be over 40 feet tall, and could potentially cast new shadow on a property under the jurisdiction of the Recreation and Park Department, per San Francisco Planning Code Section 295; and/or

(2) If the proposed project is subject to review under the California Environmental Quality Act (CEQA) and would potentially cast new shadow on a park or open space such that the use or enjoyment of that park or open space could be adversely affected.

California Code of Regulations, Title 24

2.1 Title 24 of the California Code of Regulations (CCR), also known as the California Building Standards Code, consists of regulations to control building standards throughout the State. The following components of Title 24 include standards related to sunlight shadows:

2.2 City of San Diego Municipal Code

The City of San Diego Municipal Code (LAMC) regulates lighting with respect to building lighting, transportation, street lighting and light trespass (i.e., the spillover of light onto adjacent light-sensitive properties). The City also enforces the building code requirements of the San Diego Building Code, the California Building Code, the California Green Building Standards Code (CALGreen), and the California Electrical Code.

Applicable regulations include the 2016 version of the San Diego Building Code, the California Building Code, CALGreen, and the California Electrical Code.

The San Diego Municipal Code includes the following sections pertaining to illumination:

Chapter 14, Article 142.0730 Glare Regulations

(a) A maximum of 50 percent of the exterior of a building may be comprised of reflective material that has a light reflectivity factor greater than 30 percent.

(b) Reflective building materials shall not be permitted where the City Manager determines that their use would contribute to potential traffic hazards, diminished quality of riparian habitat, or reduced enjoyment of public open space.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000

3. IESNA Recommended Practices

The Illuminating Engineering Society of North America (IESNA) recommends illumination standards for a wide range of building and development types. These recommendations are widely recognized and accepted as best practices and are therefore a consistent predictor of the type and direction of illumination for any given building type. For all areas not stipulated by the regulatory building code, municipal code or specifically defined requirements, the IESNA standards are typically used as the basis for establishing the amount and direction of light.

The IESNA 10th Edition Lighting Handbook defines best practices for the calculation of daylight illuminance from the sun, and methods of analysis for solar shading calculations. These standards form the basis of the calculation algorithms which generate the illuminance data and the shading patterns included within this Report.

4. Significance Threshold

Appendix G of the CEQA Guidelines does not include a provision with regard to sun shading. The evaluation of the impact of sun shading affects the visual quality of the sensitive site, and the question that pertains to light shading is as follows:

Would the project create an adverse shadow condition during the day affecting adjacent residential properties or other light sensitive uses, such as parks, agricultural uses, or solar panels.

In the context of this question from the CEQA Guidelines, the determination of significance shall be made on a case-by case- basis, considering the following factors:

- The change in ambient light levels as a result of the Project; and
- The extent to which Project affects adjacent light-sensitive areas.

Based on these factors, the regulatory requirements identified above, the Los Angeles CEQA Thresholds Guide is used as a basis for the significance threshold.

The Project would have a significant light impact on a sensitive receptor (residential uses or commercial or institutional land uses) if:

- Project building mass creates shadow conditions for more than 3 hours between the hours of 9:00 AM and 3:00 PM Pacific Standard Time (between late October and early April), or more than four hours between the hours of 9:00 AM and 5:00 PM Pacific Daylight Time (between early April and late October).

5.1

5. Existing Conditions

Introduction

The existing conditions adjacent to the Project Site are suburban in nature, and include existing single family, low rise residences along Remington Road and Hewitt Drive to the west, northwest and southwest, multi-family low rise residences to the northeast, and the SDSU Campus to the south and south east. There is significant open space immediately adjacent to the Project Site on the west, northwest, and northeast Project property lines.

The topography of the Project Site and the adjacent Remington Road is a relatively flat bluff top, at higher elevation than the residential properties to the east, northeast, west, and north west of the Project Site.

The existing Site includes the 11 story Chapultepec Residence Hall at 5400 Remington Road and SDSU Parking lots 9 and 10A. The existing Chapultepec Residence Hall creates shadows which extend to the west, north, and east over the duration of each day.

Existing light and shadow conditions are documented at receptor site locations surrounding the Project Site to comprehensively define the range of existing light and shadow conditions and views from the surrounding properties and streets to the Project Site. Illuminance (fc) and extent of shadows were noted at each Receptor Site in accordance with the procedures outlined in Section 6.1 Methodology, subsections 6.1-1 and 6.1-2 below. Views of the Project site from the adjacent streets are evaluated to determine the visibility of the Project and the surrounding light and shadow conditions.

The existing conditions data is analyzed in comparison to the Project Shading, as part of the evaluation of the Project's potential impacts. The following section provides a detailed description of each receptor site location and elaborates on the conditions within each receptor site.

5.2 Receptor Site Locations

Receptor sites are utilized to evaluate the maximum potential impacts that may result from light or shadow onto residential properties and sensitive sites surrounding the Project Site to the north, east, south, and west. The Residential Receptor site locations are within close proximity of the Project, have views of the Project Site, and are considered existing residential use properties or may be located adjacent to existing residential use properties.

The following criteria are used to select potential Receptor Site locations:

- Future Project Visibility – Potential receptor sites are analyzed that provide direct view of the Project Site and or areas of greatest shadow.
- Proximity – Potential receptor sites at a minimum distance to the Project are analyzed. These locations are selected because light intensity decreases[1] exponentially with distance, locations at a greater distance will experience less light intensity than nearby locations.

Figure 2 illustrates the Project location shaded in red and the surrounding adjacent residential property locations near the Project Site are shaded yellow. Receptor sites are identified with an R prefix followed by an abbreviation for the direction from the Project site (E = East for example), and numbered consecutively.

Receptor Site R-W1: At the west property line of the Project Site near the eastern edge of the residential property line of 5312 Remington Road. Receptor Site R-W1 is located to evaluate the Project at the property line to the west. Site R-W1 is within Project Site within Parking Lot 10A, at the

[1] *The Inverse Square Law shows that the intensity of light diminishes at the square of the distance traveled. See the definition in Section 2, Glossary of Lighting Terminology for additional discussion.*

north edge of the parking lot. Distance to the Project west exterior façade is approximately 155 ft.

Receptor Site R-W2: At the west property line of the Project Site, at the eastern edge of the residential property at 5312 Remington Road. Receptor Site R-W2 is located to evaluate the Project at the nearest residential property line to the west. Site R-W2 is within the canyon adjacent to the Project Site property line. Distance to the Project west exterior façade is approximately 158 ft.

Receptor Site R-W3: West of the Project Site at the northwest property line of 5417 Hewlett Drive, at the eastern edge of the Hewlett Drive right of way. Receptor Site R-W3 is located to evaluate the Project at the residential property to the west. Distance to the Project Site is approximately 222 ft. Distance to the Project west exterior façade is approximately 228 ft.

Receptor Site R-W4: West of the Project Site at 5441 Hewlett Drive, at the rear patio of the residence. Receptor Site R-W4 is located to evaluate the Project at the residential property line to the west. Receptor Site R-W4 is located at the southeast corner of 5441 Hewlett Drive. Distance to the Project Site is approximately 119 ft. Distance to the Project west exterior façade is approximately 166 ft.

Receptor Site R-E1: East of the Project Site, at the west edge of the parking area of 5420 55th Street. Receptor Site R-E1 is located to evaluate the Project within the adjacent properties to the east of the Project Site. Distance to the Project Site is approximately 178 ft. Distance to the Project east exterior façade is approximately 212 ft.

Figure 1: The Project and surrounding locations where lighting is under review

5.3 Criteria

As established in Section 3, the following factors were used to assess the existing conditions at each receptor site

Table 1. Existing Conditions Lighting Criteria

Criteria	Metric	Procedure
View	Observed existing conditions	Observed conditions with respect to the view to the Project Site from the receptor site in terms of project coverage in the field of view, the context of the view including obstructions, and the visibility of structures within the Project Site.

Criteria	Metric	Procedure
Shadow	Observed existing conditions	Observed and calculated conditions with respect to the extent of building or topographical shading.

5.4 **Analysis of Receptor Site Survey Data**

The existing Project Site conditions and observations are summarized below in relation to the evaluation factors established in Section 4, Significance Threshold:

View: The visual evaluation of visibility of the Project Site from each Receptor site along with qualitative descriptions of the existing conditions. The qualitative summary includes notations regarding any obstructions or adjacent structures that may affect the shadows at the Receptor Site.

Shadow: The Shadow data from the Receptor sites summarized in Table 2 below indicates the existing conditions include shadows from the existing buildings on the Project site during the early morning, and shadows from the topography later in the afternoon.

Table 2: Existing Conditions

Receptor	View	Shadow
R-W1	Direct view of Project Site to the east with no obstructions.	**Early morning shadow from existing building on Project Site and trees to the east**
R-W2	Direct view of Project Site to the east with obstructions from tall trees.	**Early morning shadow from existing building on Project Site and trees to the east**
R-W3	Direct view of Project Site to the east with obstructions from trees.	**Early morning shadow from existing building on Project Site and trees to the east**
R-W4	Direct view of Project Site to the east with obstructions from trees.	**Early morning shadow from existing building on Project Site and trees to the east**
R-E1	Direct view of Project Site to the west with no obstructions.	**Late afternoon shadow from existing building on Project Site and trees to the east**

Observations from Residential Receptor Sites

Receptor Site R-W1:

Site R-W1 is located adjacent to the west property line of the Project Site near the eastern edge of the residential property line of 5312 Remington Road. Receptor Site R-W1 is
5.5 located to evaluate the Project at the property line to the west. Site R-W1 is within the north boundary of SDSU Parking Lot 10A, within the Project Site. Distance to the Project
5.5-1 west exterior façade is approximately 155 ft.

Figure 2: R-W1 Day View:

Date of Measurements: February 23, 2017 2:00 PM; Weather Conditions: Clear

As shown in Figure 2 Receptor Site R-W1 has a clear view of a large portion of the Project
5.5-2 Site and includes a prominent view of the existing Chapultepec Residence Hall at 5400 Remington Rd, west façade, and partial south facade. Trees and dense landscape obscure the view to the north of the Receptor Site.

Receptor Site R-W2:

Receptor Site R-W2 is located at the west property line of the Project Site, at the eastern edge of the residential property at 5312 Remington Road. Receptor Site R-W2 is located to evaluate the Project at the nearest residential property line to the west. Site R-W2 is within the canyon adjacent to the Project Site property line. Distance to the Project west exterior façade is approximately 158 ft.

As shown in Figure 4, Receptor Site R-W2 has an obstructed view of the Project Site and the existing Chapultepec Residence Hall at 5400 Remington Rd, west façade, with trees in the foreground. Trees and dense landscape obscure the view to the north and south of the Receptor Site.

Figure 3: R-W2 day view:

5.5-3 Date of Measurements: February 23, 2017, 2:15 PM; Weather Conditions: Clear

Receptor Site R-W3:

Receptor Site R-W3 is located west of the Project Site at the northwest property line of 5417 Hewlett Drive, at the eastern edge of the Hewlett Drive right of way. Receptor Site R-W3 is located to evaluate the Project at the residential property to the west. Distance to the Project Site is approximately 222 ft. Distance to the Project west exterior façade is approximately 228 ft.

As shown in Figure 4, Receptor Site R-W3 has a clear view of the existing Project Site including the Chapultepec Residence Hall at 5400 Remington Rd, north and west façades. The view is partially obscured by tall trees to the north and south.

Figure 4: R-W3 day view:

5.5-4 Date of Measurements: February 23, 2016, 3:17 PM; Weather Conditions: Clear

Receptor Site R-W4:

Receptor Site R-W4 is located west of the Project Site at 5441 Hewlett Drive, at the rear patio of the residence. Receptor Site R-W4 is located to evaluate the Project at the residential property line to the west. Receptor Site R-W4 is located at the southeast corner of 5441 Hewlett Drive. Distance to the Project Site is approximately 119 ft. Distance to the Project west exterior façade is approximately 166 ft.

As shown in Figure 5, Receptor Site R-W4 has a clear view of the existing Project Site including the Chapultepec Residence Hall at 5400 Remington Rd, north, west facades, and a partial view of the east façade. The view is obscured to the south by tall trees.

Figure 5: R-W4 day view:

5.5-5 Date of Measurements: February 23, 2016, 2:45 PM; Weather Conditions: Clear

Receptor Site R-E1:

Receptor Site R-E1 is located east of the Project Site, at the western edge of the parking area of the residential property at 5420 55th Street. Receptor Site R-E1 is located to evaluate the Project within the adjacent properties to the east of the Project Site. Distance to the Project Site is approximately 178 ft. Distance to the Project east exterior façade is approximately 212 ft.

As shown in Figure 6, Receptor Site R-E1 has a clear view of the Project Site including the existing Chapultepec Residence Hall at 5400 Remington Rd, east façade, and the surrounding on grade parking lots and open space within the Project Site.

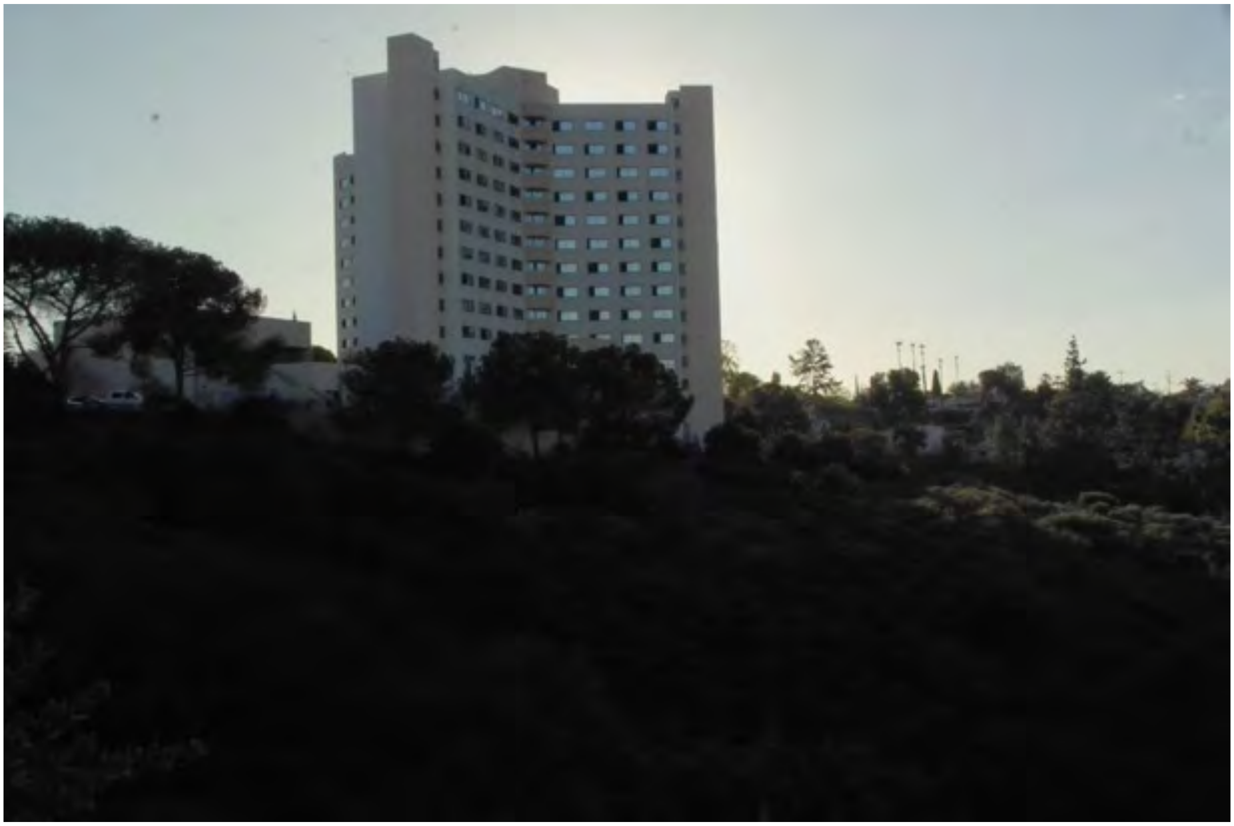

Figure 6: R-E1 day view:

Date of Measurements: February 23, 2017 4:00 PM; Weather Conditions: Clear

5.6 **Analysis of Existing Shadow Conditions**

The existing buildings and topography are modeled to analyze the existing daylight
5.6-1 shadow patterns at and surrounding the Project Site.

Winter Solstice, December 21

The existing Project Site is located south of the sensitive receptor sites, therefore the shading conditions on December 21, the Winter Solstice, represent the greatest extent of shading conditions for the calendar year.

Table 3 summarizes the results of the calculations for each hour of the day from 9:00 AM until 3:00 PM on December 21, with the shadow patterns illustrated in Figures 7 through 13 below. These illustrations indicate the extent of shadows within the Project site, and on the adjacent properties. The Receptor site are noted on each Figure.

The sun rises on December 21 at 6:47 AM. From 9:00 AM until approximately 10 AM the existing Chapultepec Residence Hall at 5400 Remington Rd casts an early morning shadow onto the properties along Hewlett Drive (W4) to the northwest of the Project. This shadow moves to the east of the properties on Hewlett Drive by 10 AM.

Shading occurs at the Receptor Sites W2 and W4 in the afternoon from the existing topography to the west of the Project Site.

Table 3: Existing Shading, Winter Solstice, December 21

Receptor	Existing Extent of Shadow Winter Solstice - December 21 Pacific Standard Time							Analysis
	9	10	11	12	1	2	3	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.
R-W2	0.0	0.0	0.0	0.0	0.0	1.0	1.0	Afternoon shading from non Project Site topography to the west
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.
R-W4	1.0	0.0	0.0	0.0	0.0	0.0	1.0	Early morning shading from Project Site. Afternoon shading from non Project Site topography to the west
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.

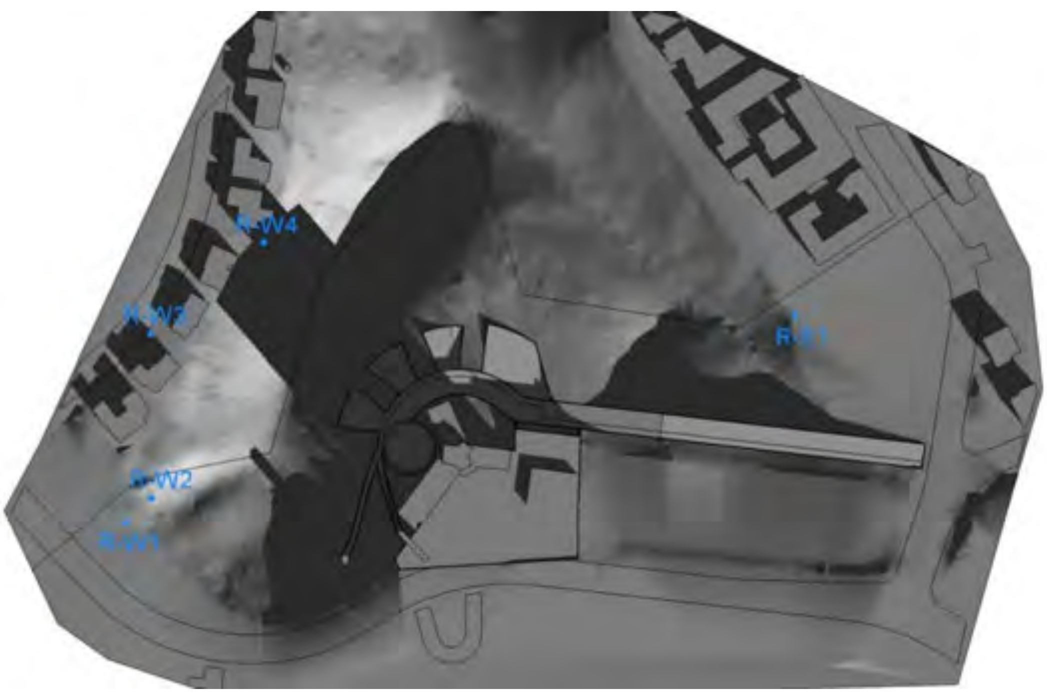

Figure 7: Existing, December 21, 9 AM

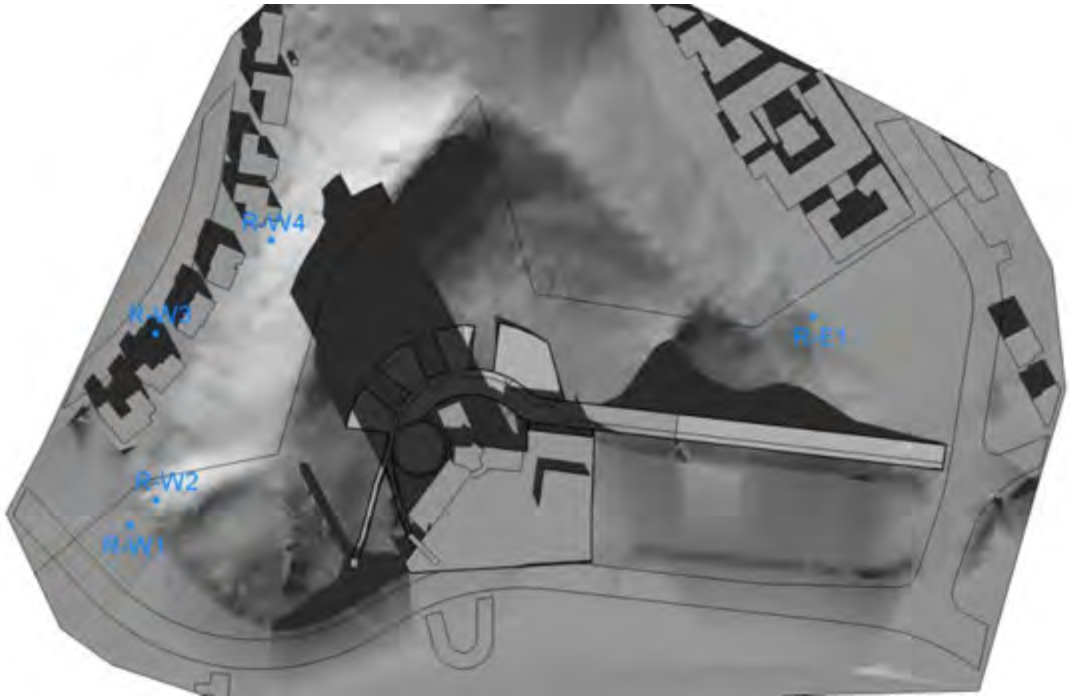

Figure 8: Existing, December 21, 10 AM

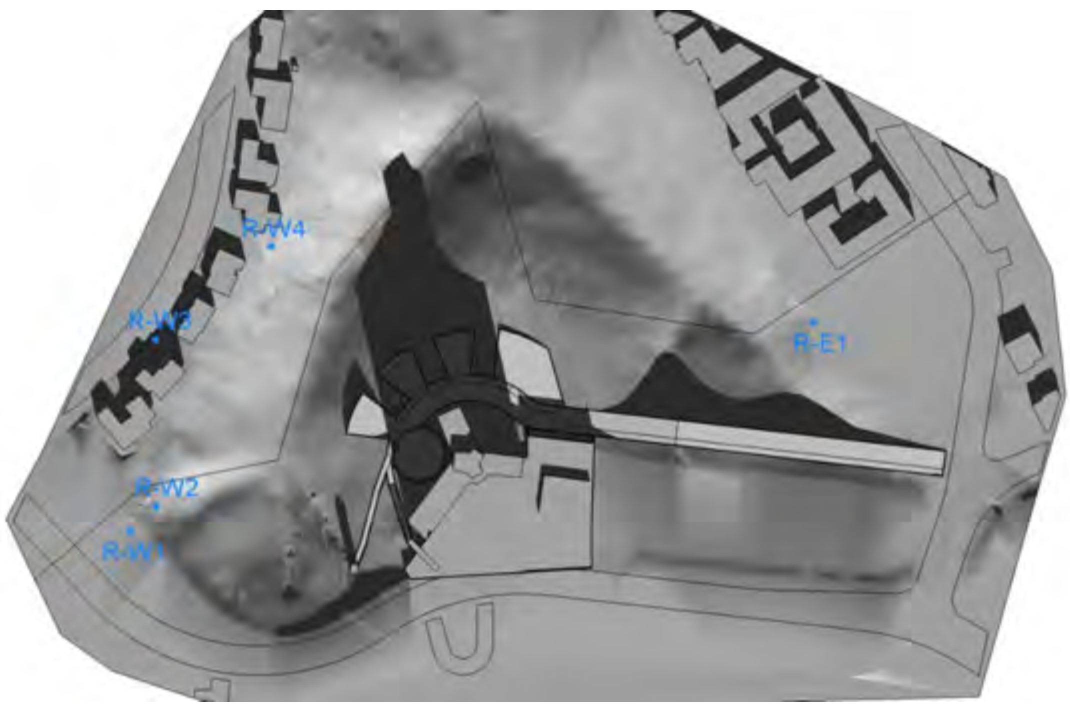

Figure 9: Existing, December 21, 11 AM

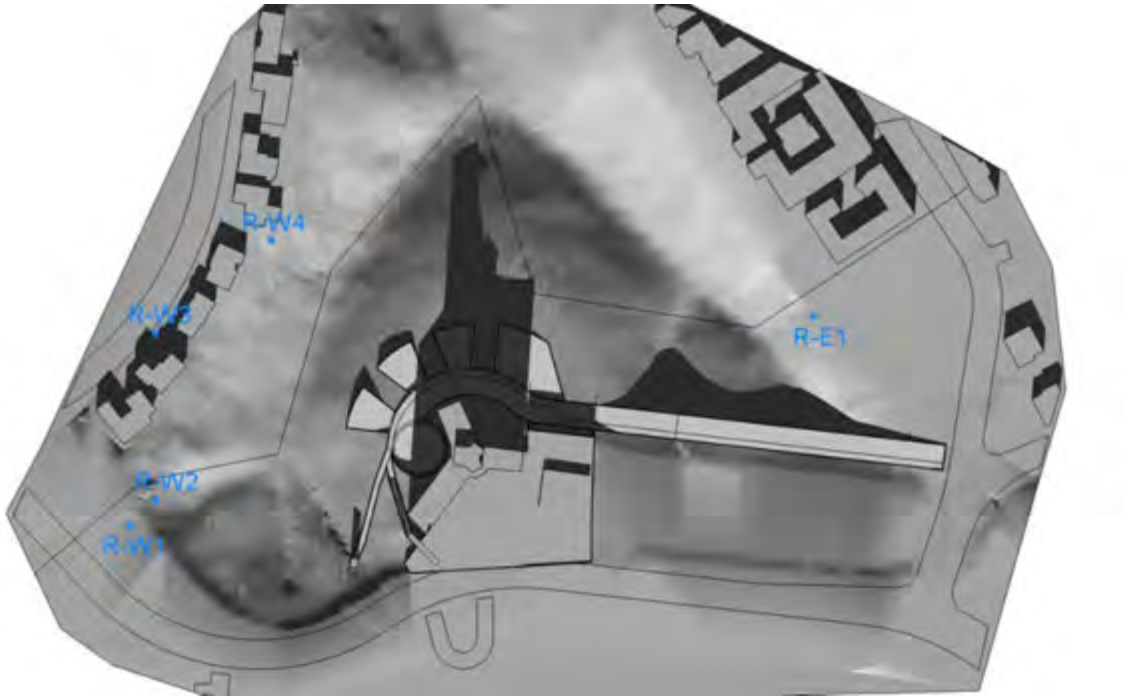

Figure 10: Existing, December 21, 12 PM

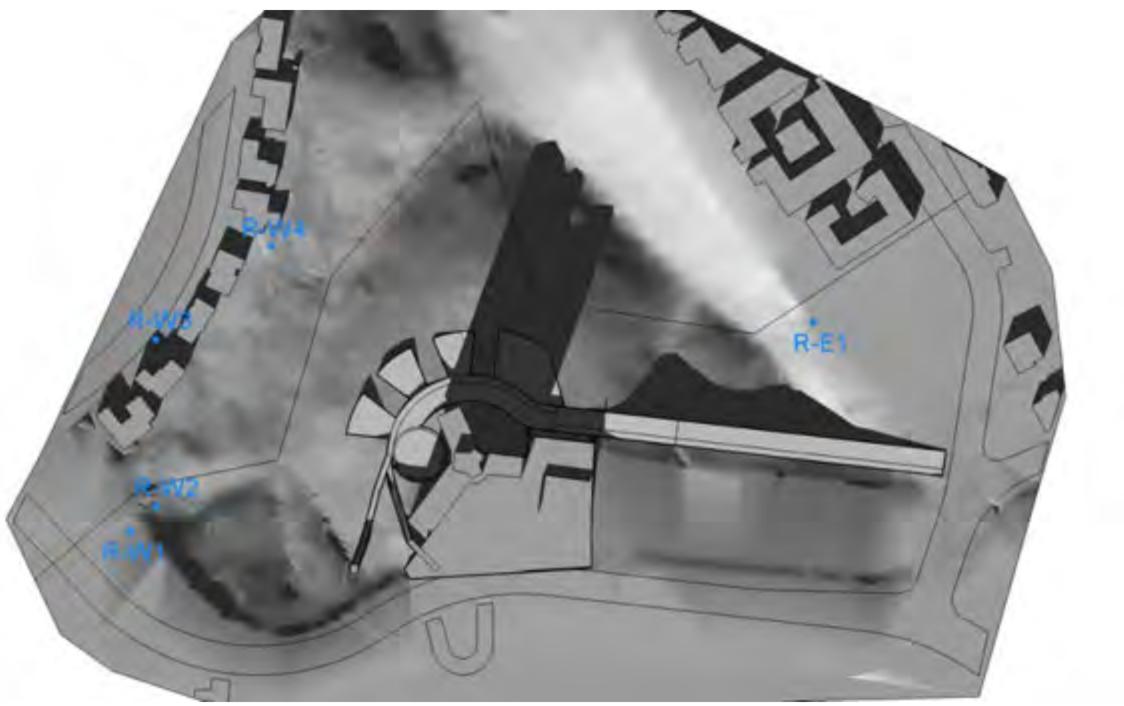

Figure 11: Existing, December 21, 1 PM

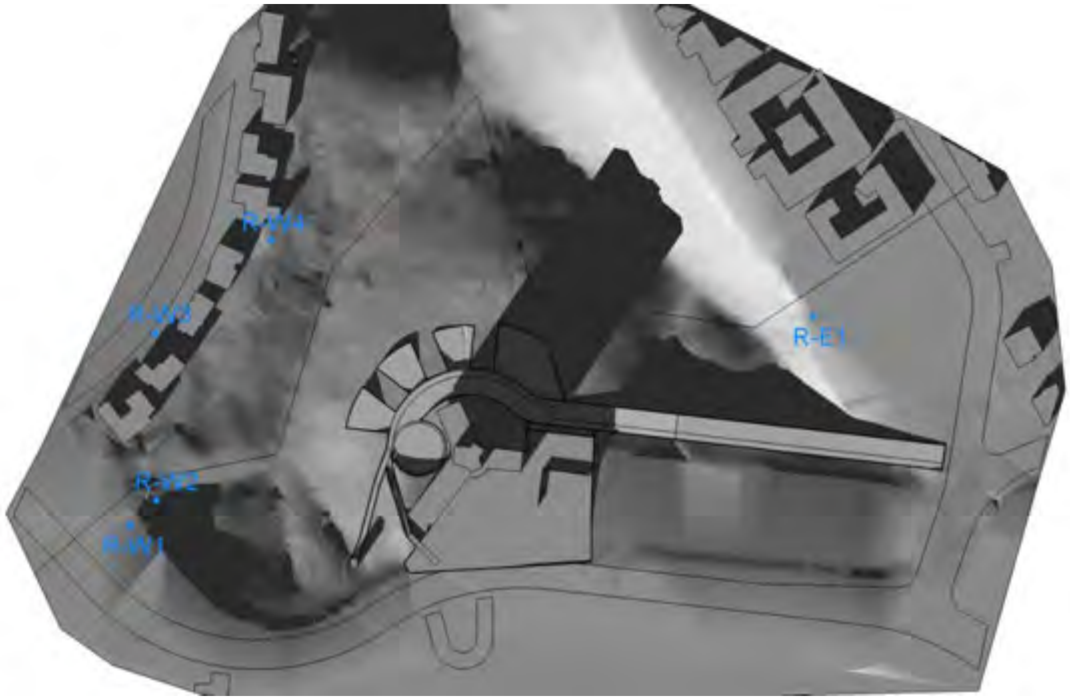

Figure 12: Existing, December 21, 2 PM

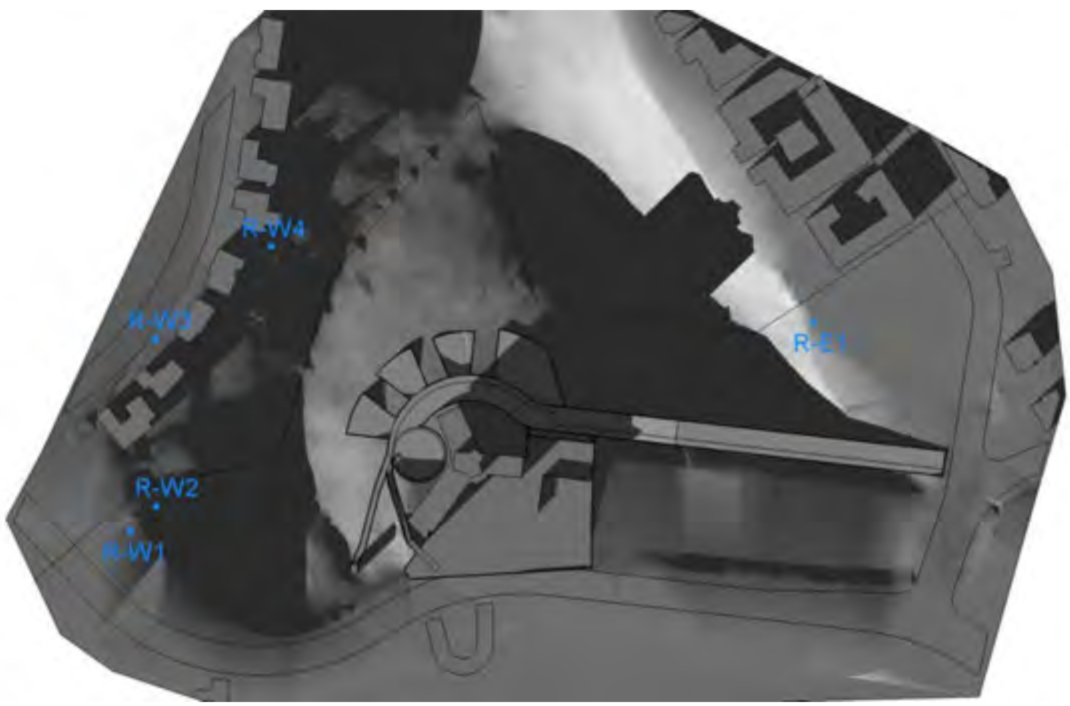

Figure 13: Existing, December 21, 3 PM

Summer Solstice, June 21

The existing Project Site is located south of the sensitive receptor sites, therefore the shading conditions on June 21, the Summer Solstice, represent the least extent of shading conditions for the calendar year.

5.6-2 Table 4 summarizes the results of the calculations for each hour of the day from 9:00 AM until 5:00 PM on June 21, with the shadow patterns illustrated in Figures 14 through 22 below. These illustrations indicate the extent of shadows within the Project site, and on the adjacent properties. The Receptor site are noted on each Figure.

Sunrise on June 21 is at 5:41 AM. The Buildings within the existing Project site, including the Chapultepec Residence Hall at 5400 Remington Road do not cast any shading onto the Receptor Sites to the west and northwest of the Project Site due to the high angle of summer sun.

Sunset on June 21 is at 7:59 PM.

Table 4: Existing Shading, Summer Solstice, June 21

Receptor	Existing Extent of Shadow Summer Solstice - June 21 Pacific Standard Time									Analysis
	9	10	11	12	1	2	3	4	5	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from the Project Site
R-W2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from the Project Site
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from the Project Site
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from the Project Site
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from the Project Site

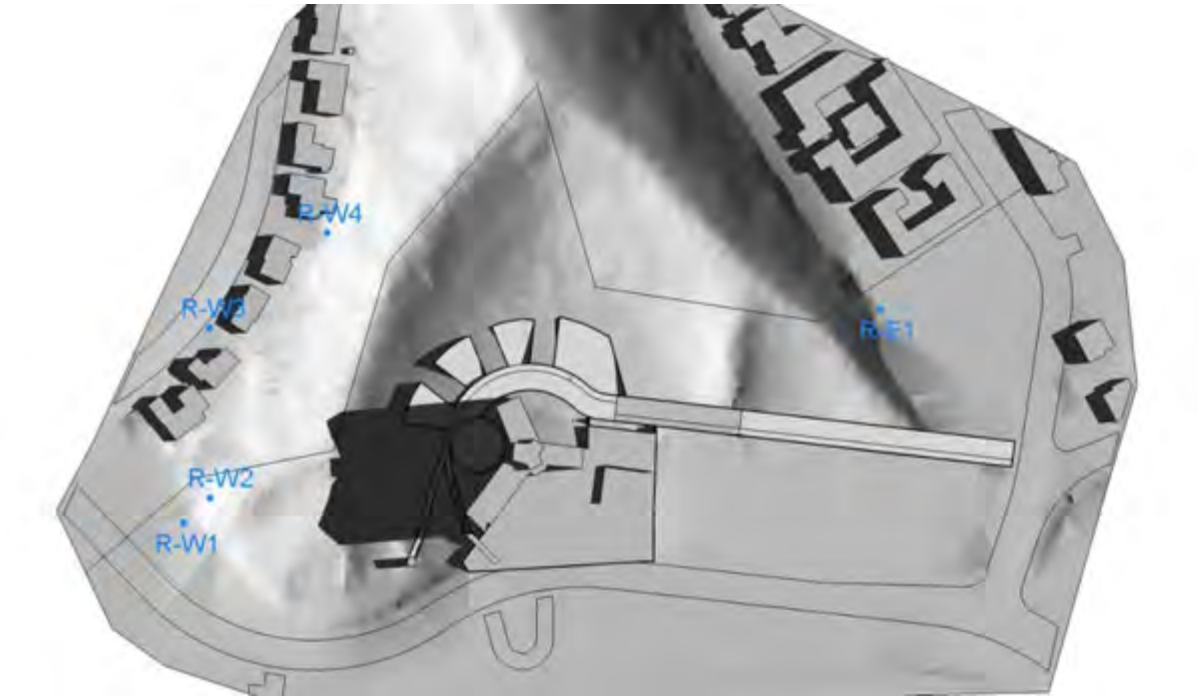

Figure 14: Existing, June 21, 9 AM

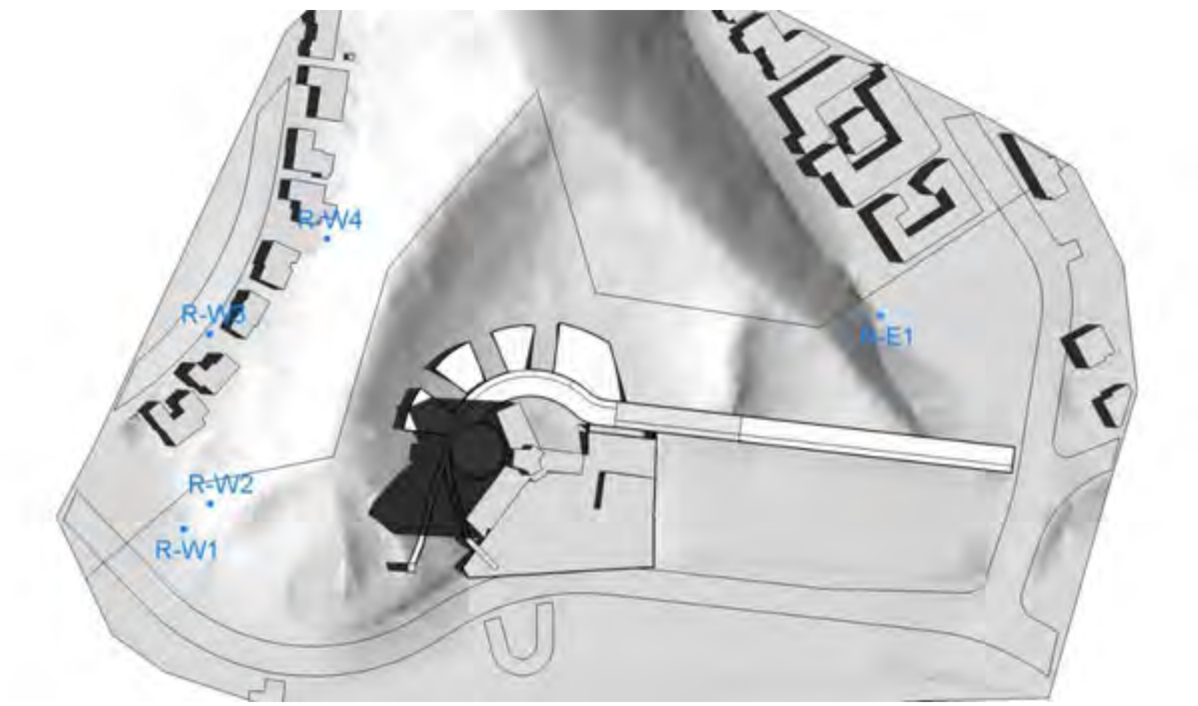

Figure 15: Existing, June 21, 10 AM

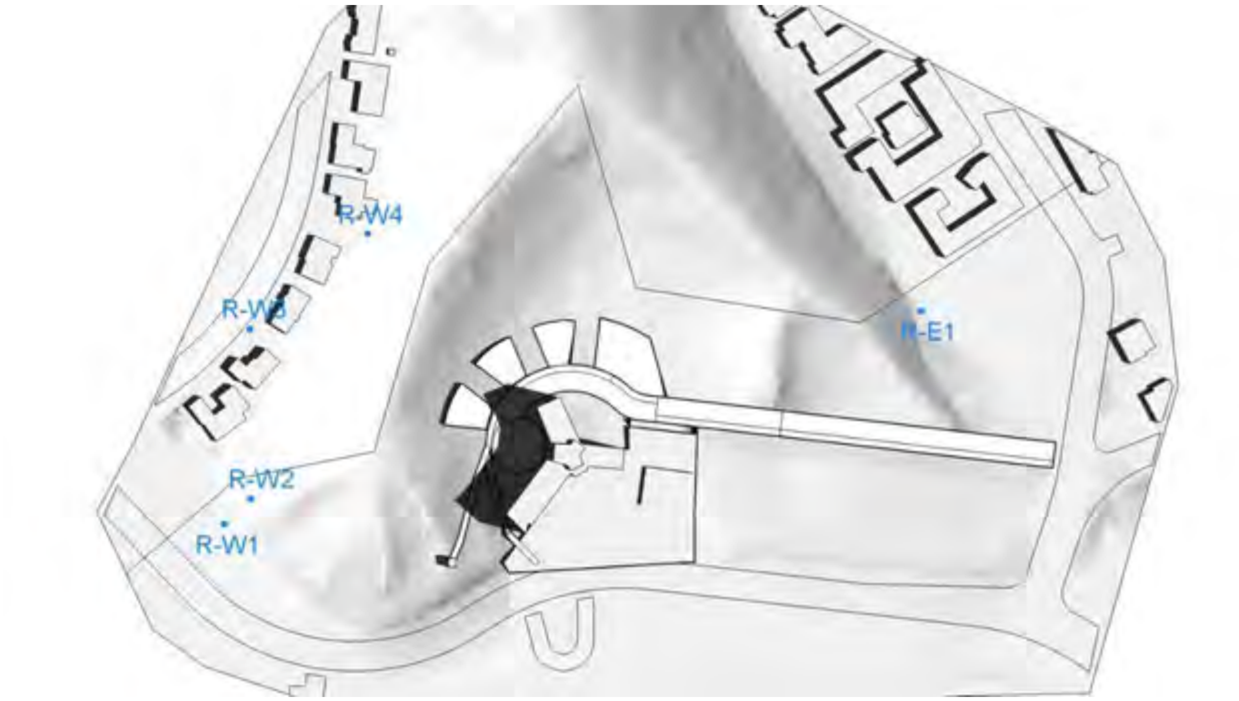

Figure 16: Existing, June 21, 11 AM

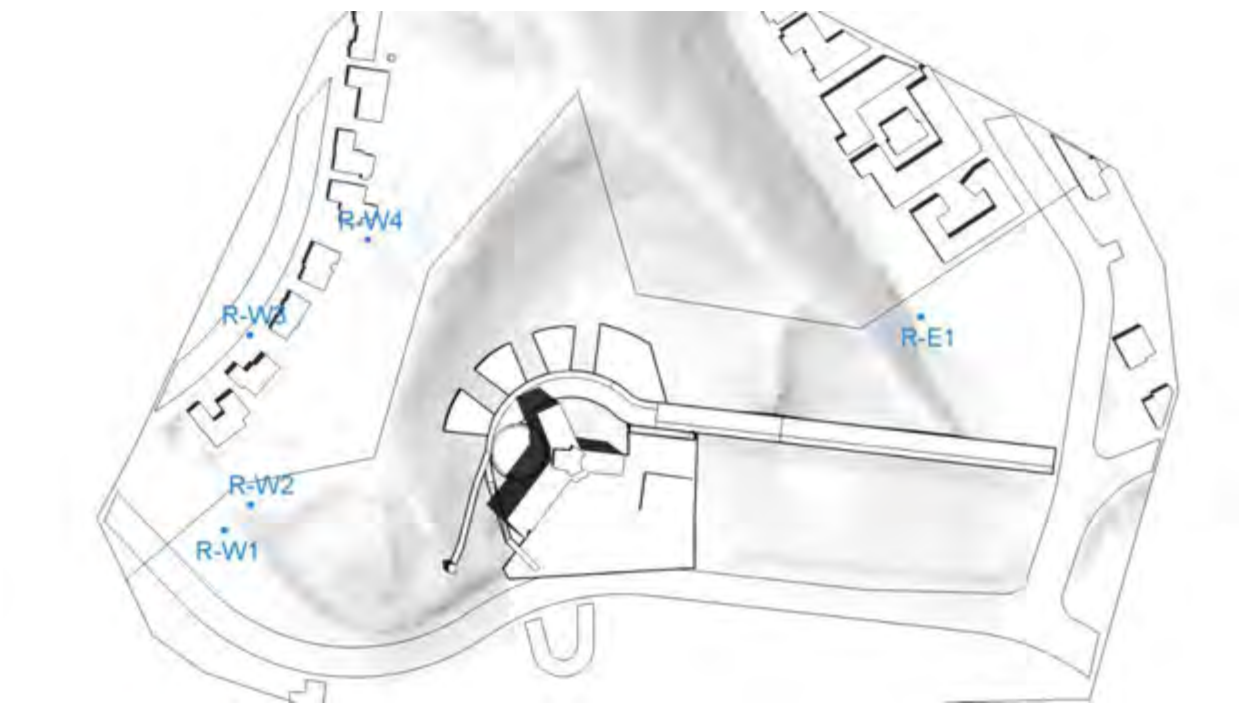

Figure 17: Existing, June 21, 12 PM

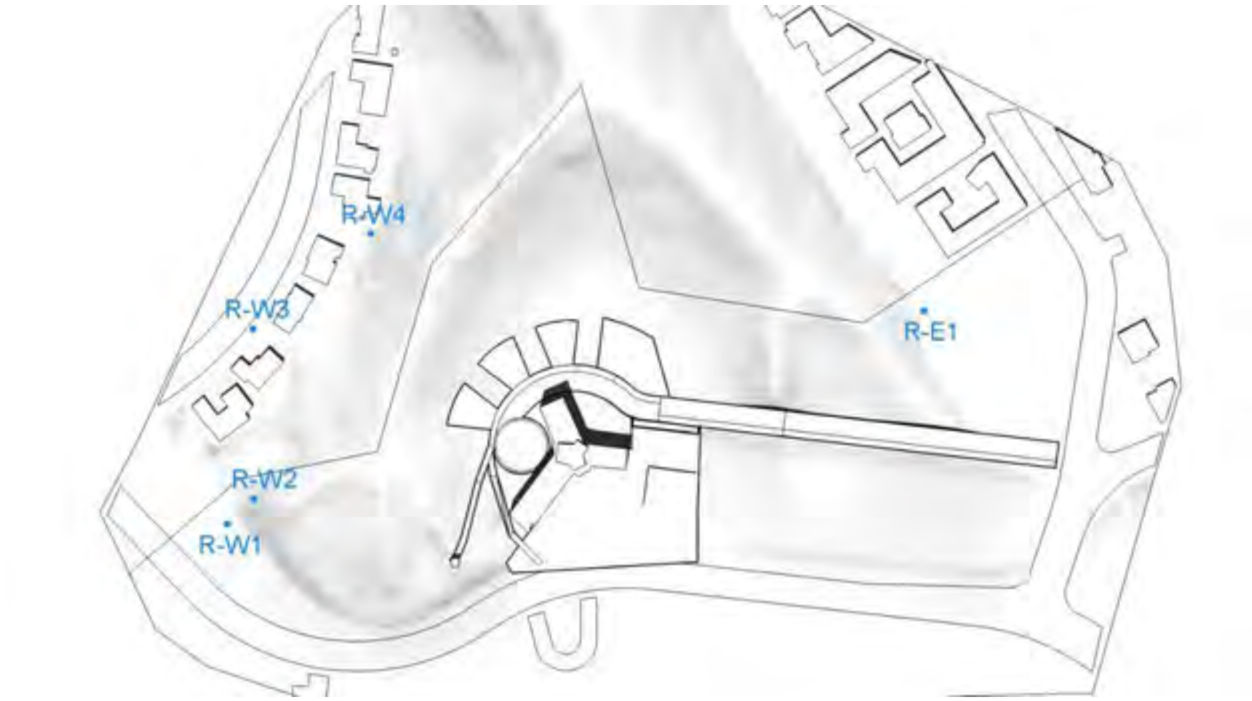

Figure 18: Existing June 21, 1 PM

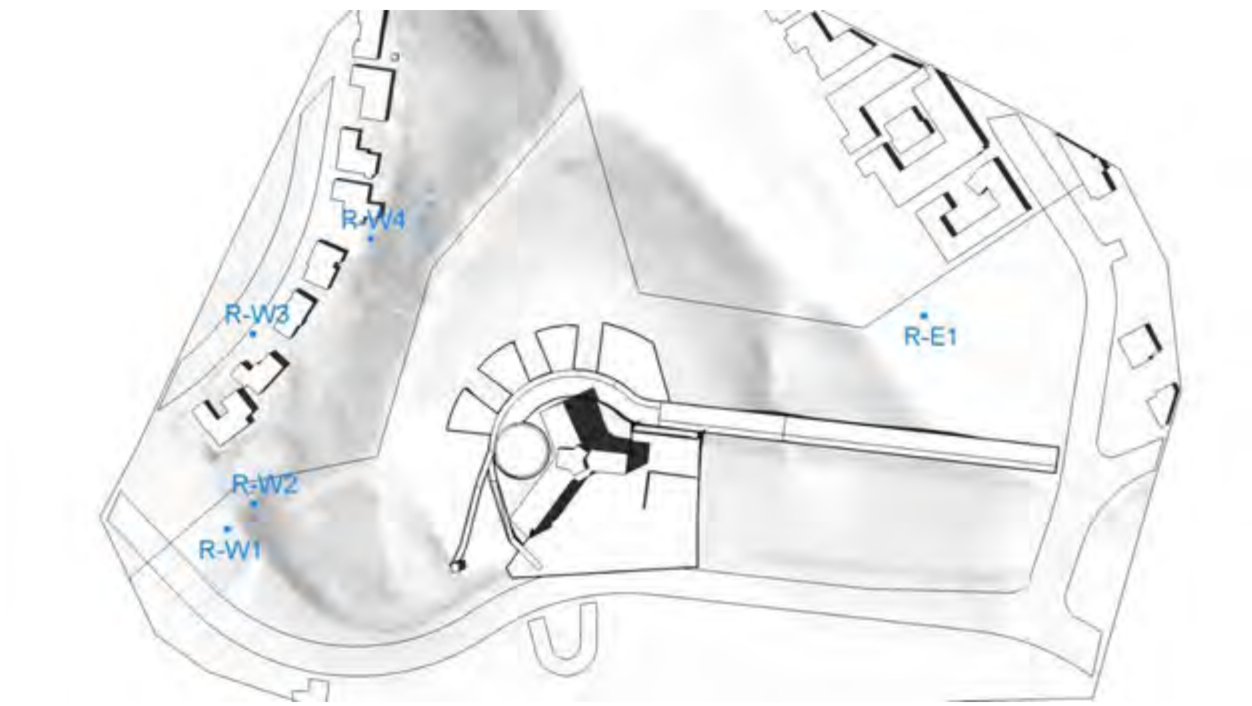

Figure 19: Existing, June 21, 2 PM

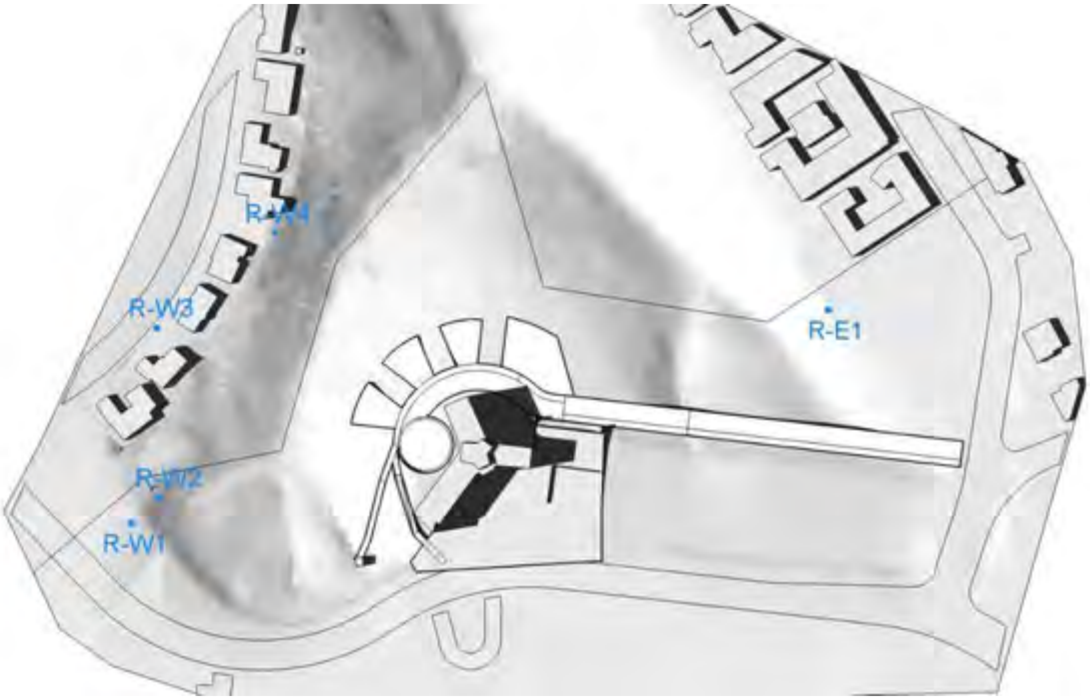

Figure 20: Existing, June 21, 3 PM

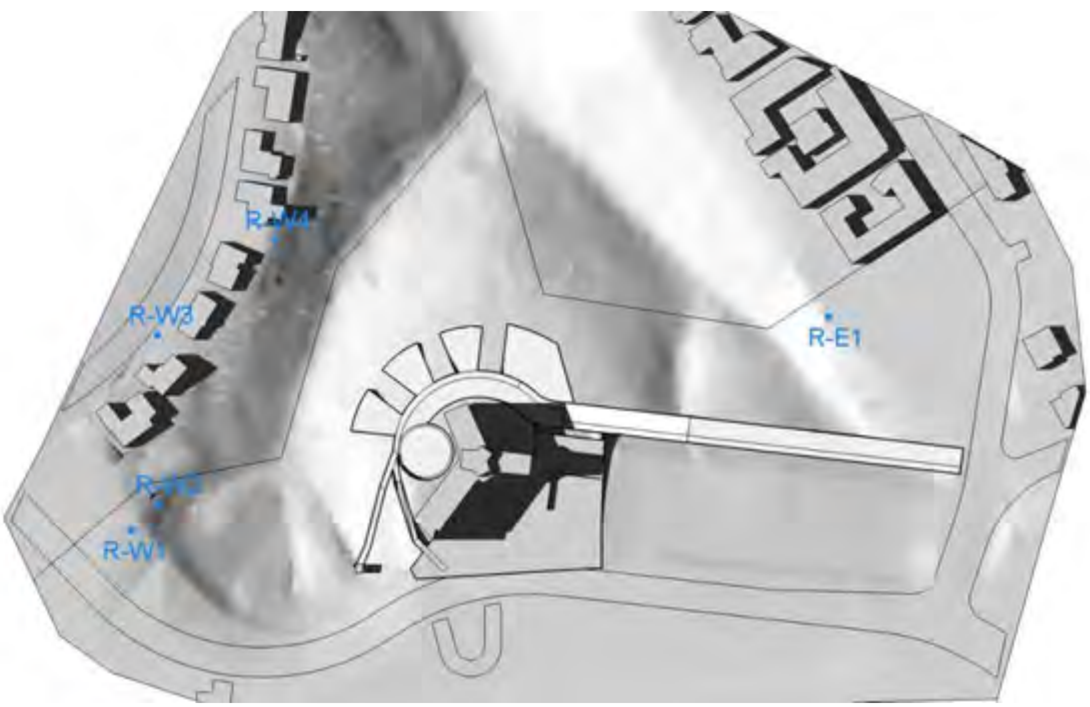

Figure 21: Existing, June 21, 4 PM

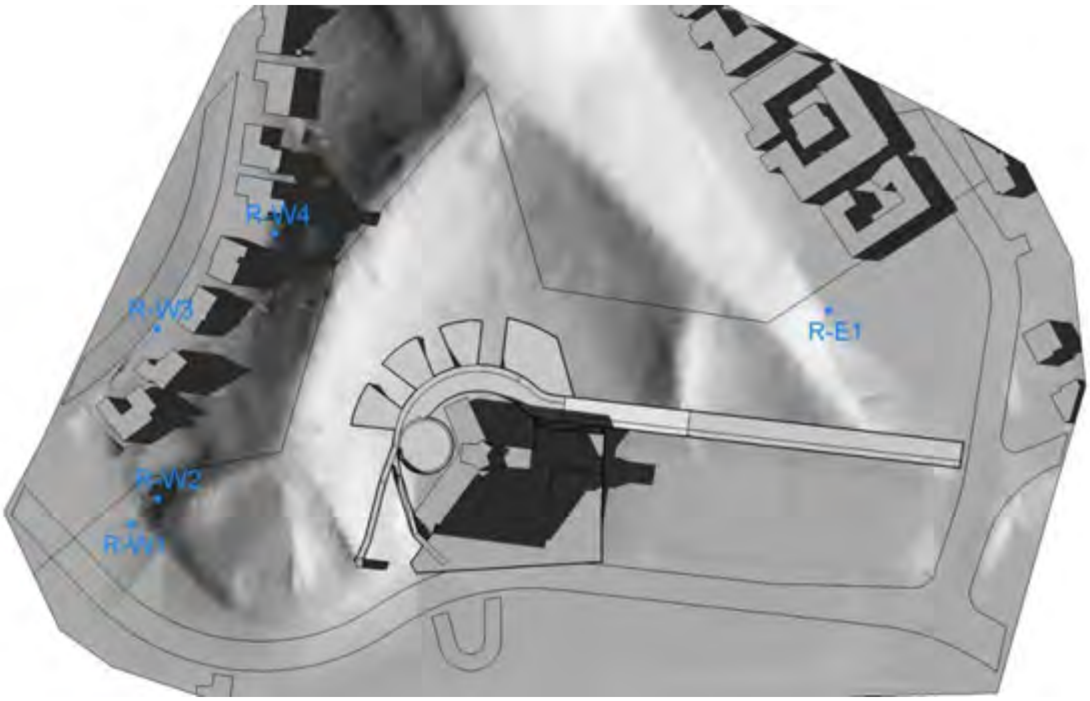

Figure 22: Existing, June 21, 5 PM

5.6-3 Equinox, March 21, September 21

The path of the sun is aligned with the equator two days per year on March 21, the Spring Equinox and September 21, the Fall Equinox. On these two dates the length of the day and the altitude of the sun in the sky is midway between the minimum altitude and duration on December 21, and the maximum altitude and duration on June 21. Shadows created on these two dates represent the mean of the range of both length of the shadows and the time duration of the shadow. Table 5 summarizes the results of the calculations for each hour of the day on March 21 and September 21, with the shadow patterns illustrated in Figures 23 through 31 below. These illustrations indicate the extent of shadows within the Project site, and on the adjacent properties. The Receptor site are noted on each Figure.

Sunrise on March 21 and September 21 is at 6:36 AM. The Buildings within the existing Project site, including the Chapultepec Residence Hall at 5400 Remington Road do not cast any shadows from 9:00 AM to 3:00 PM due to the high sun angle.

Sunset on March 21 and September 21 is at 6:46 PM.

Table 5: Existing Shading, Equinox

Receptor	Existing Extent of Shadow									Analysis
	Equinox - March 21, September 21									
	Pacific Standard Time									
	9	10	11	12	1	2	3	4	5	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.
R-W2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site.
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	Late afternoon shading from Project Site.

Figure 23: Existing, March 21, 9 AM

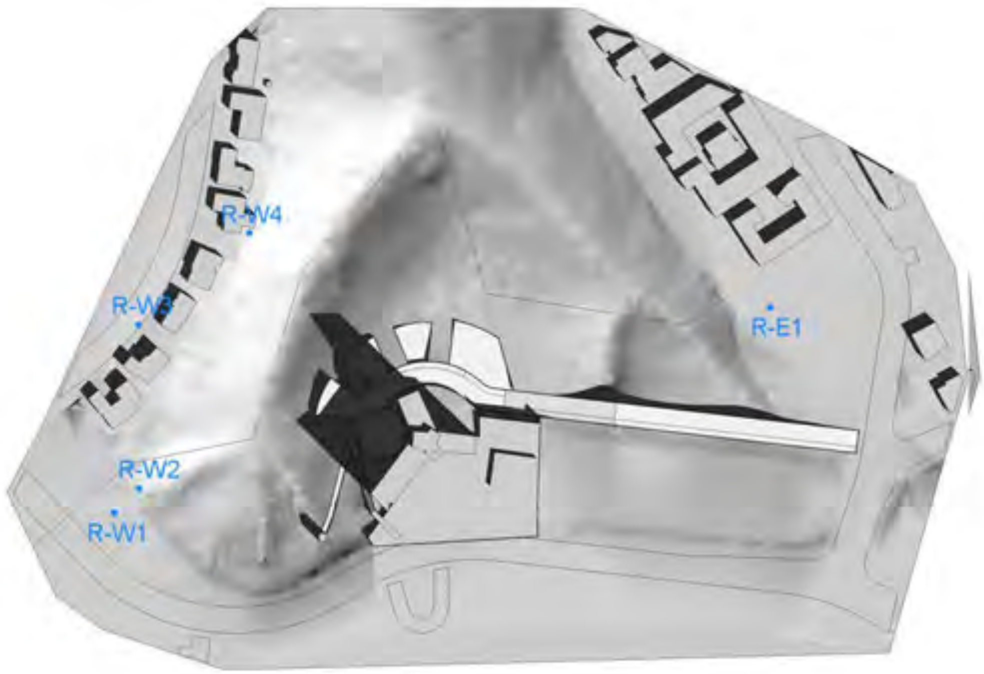

Figure 24: Existing, March 21, 10 AM

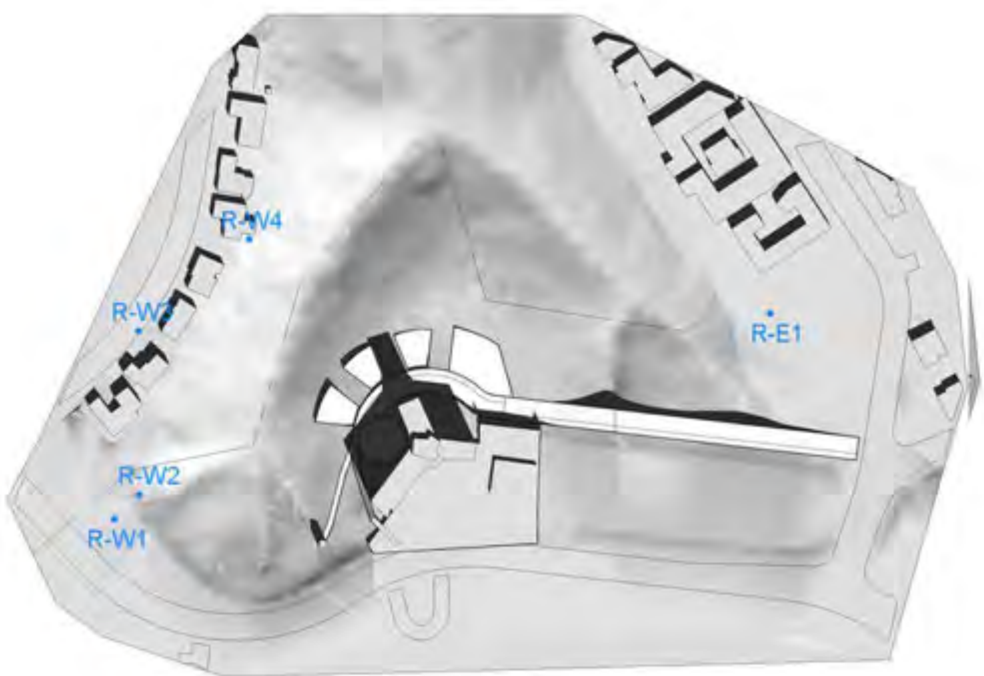

Figure 25: Existing, March 21, 11 AM

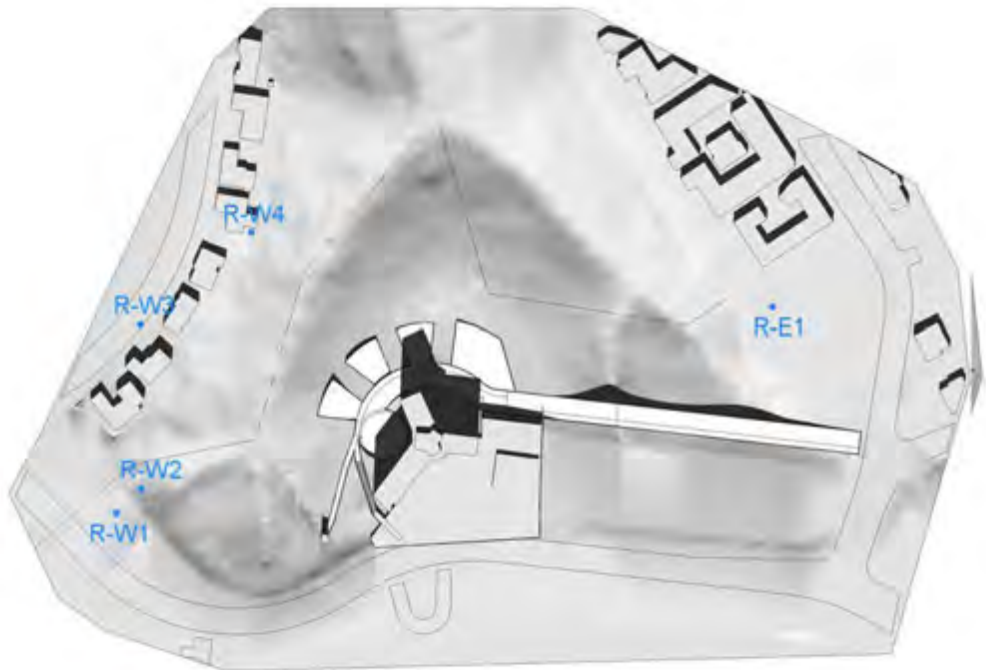

Figure 26: Existing March 21, 12 PM

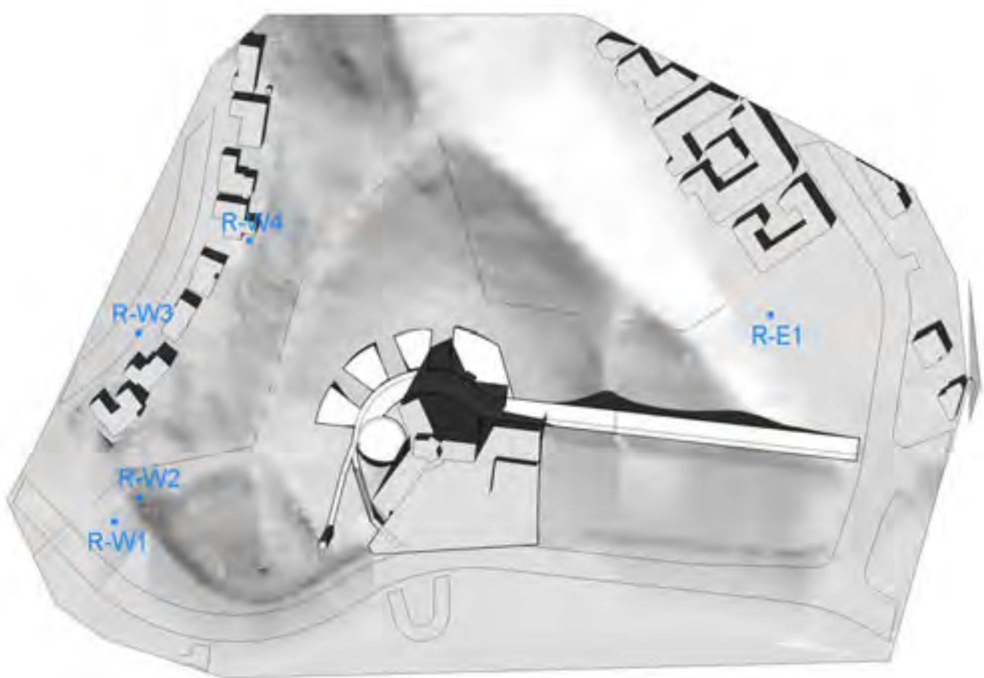

Figure 27: Existing March 21, 1 PM

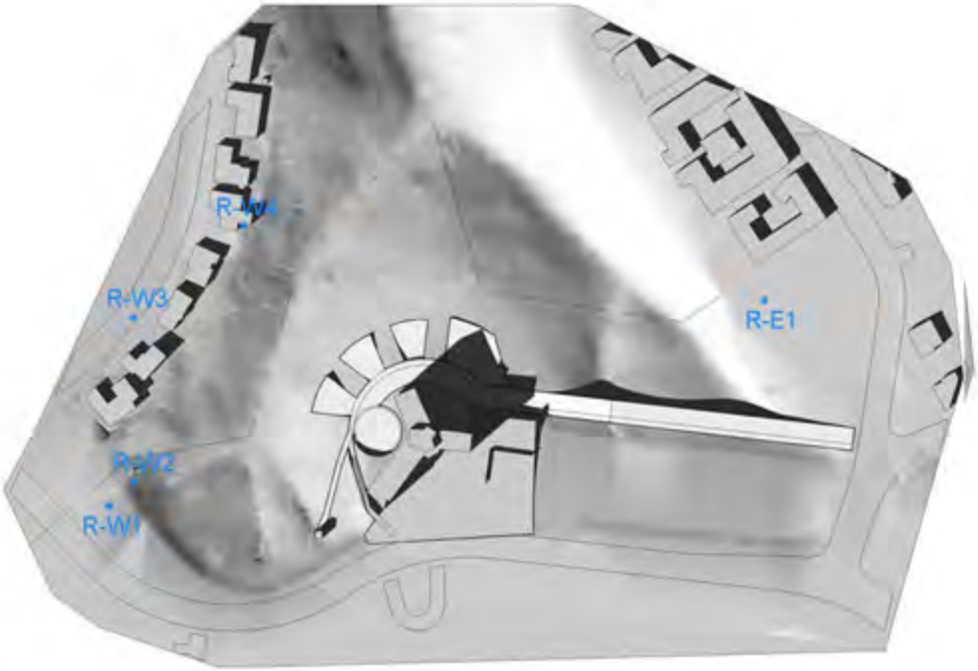

Figure 28: Existing March 21, 2 PM

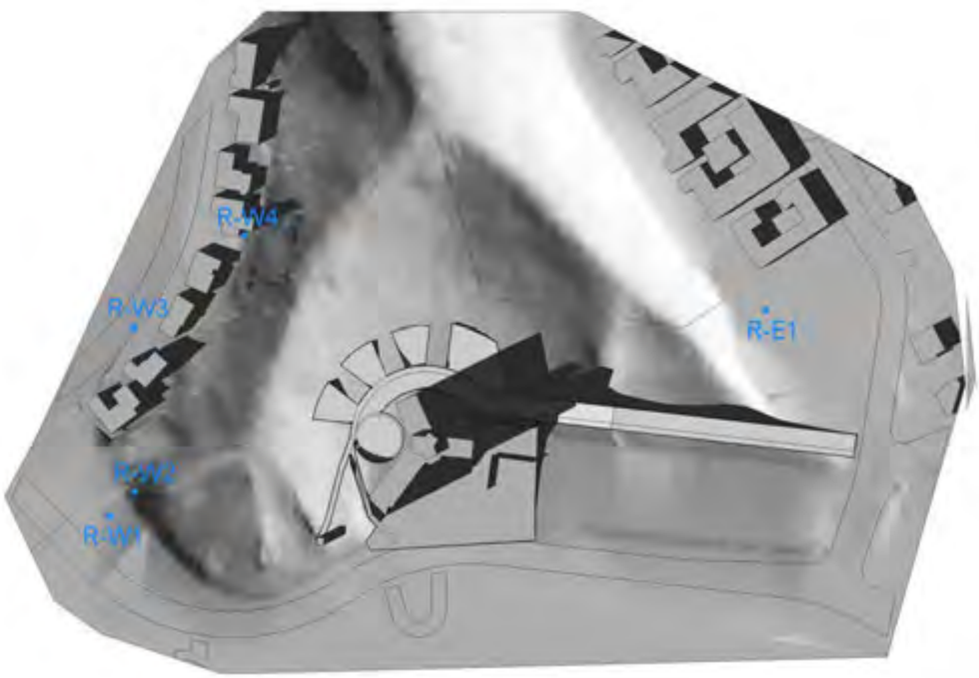

Figure 29: Existing March 21, 3 PM

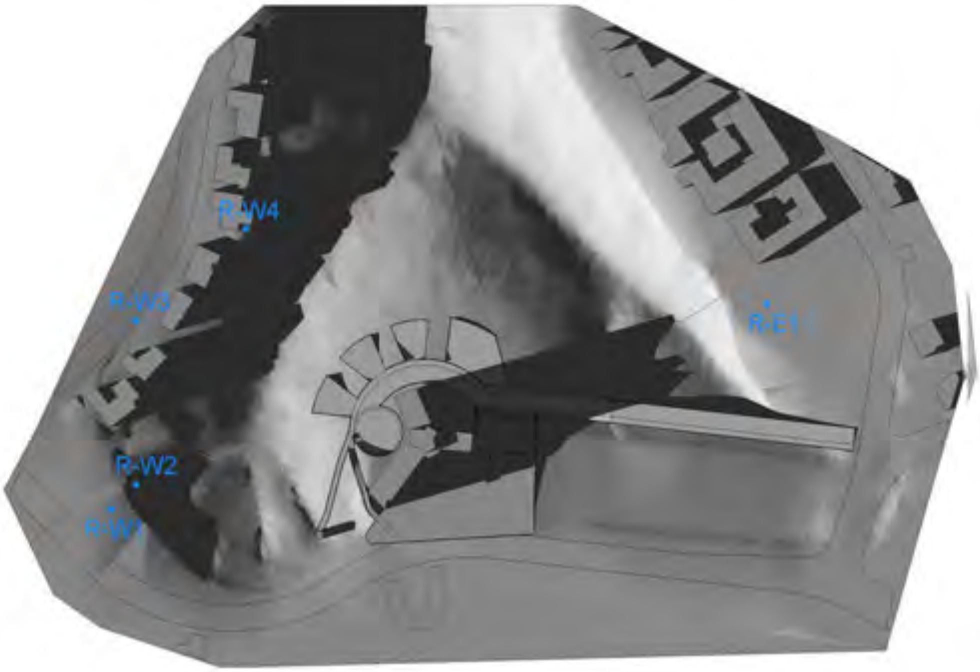

Figure 30: Existing March 21, 4 PM

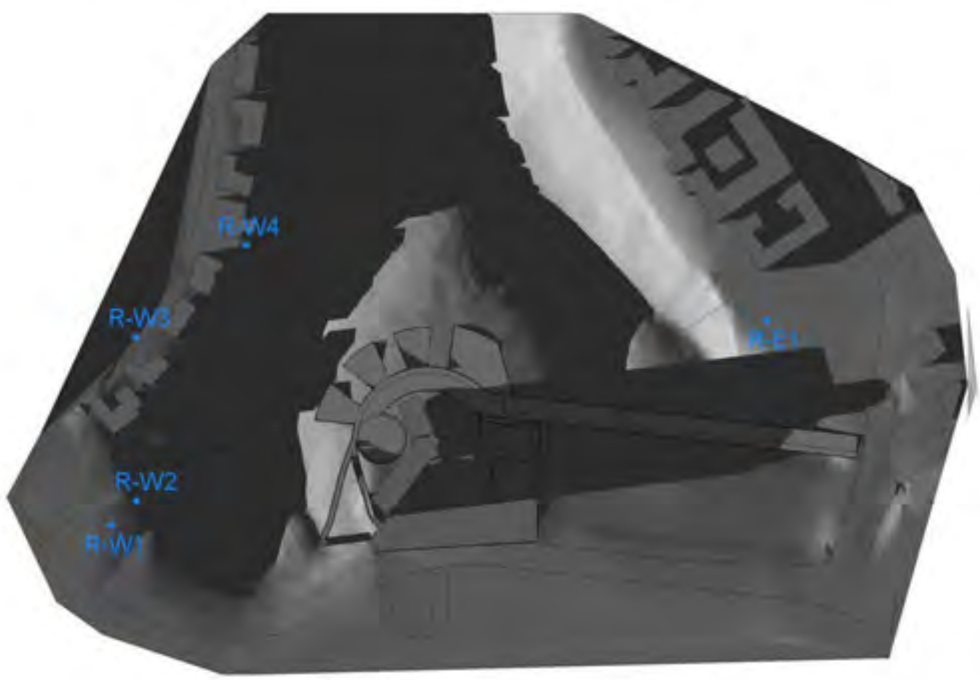

Figure 31: Existing March 21, 5 PM

6. Environmental Impact Assessment

Methodology

This Report examines whether the daylight shading from the Project would significantly impact sensitive areas beyond the Project Site. Locations where sunlight is important to the function, enjoyment, or commercial activity are considered sensitive uses with
6.1 respect to Shading. Shading sensitive uses include residential, recreational, plant nurseries, and existing solar collectors.

The analysis includes a comparison of existing shading conditions surrounding the Project Site, which are described through field surveys and calculations of existing shading patterns and illuminance, to the future shading patterns and illuminance. Existing Shading and Future Shading illuminance are assessed through the use of an illuminance calculation model to predict the amount and direction of light, as discussed in Section 6.2-1 below. The model calculations are presented to predict lighting at the location where lighting is under review to describe the Project performance relative to the significance thresholds identified in Section 5 above.

The potential Shading impacts are dependent on the distance and direction between the Project Site and the nearest Shade sensitive land uses. In accordance with the Significance Thresholds noted above, the duration of Shading greater than 3 hours per day during the months from late October to early April, or 4 hours per day during the months from April to October is considered significant.

6.1-1

Existing Conditions Analysis

Existing conditions lighting observations were conducted following recommended practice procedures defined by the IESNA in RP-33-00 Lighting for Outdoor Environments, and TM-11-00 Light Trespass: Research, Results and Recommendations. Field illuminance
6.1-2 and luminance measurements were conducted to accurately document all existing incident and visible light at each receptor site location.

Analysis of Project

The analysis of the Project Shading includes evaluation of the shading illuminance light trespass from the Project at the Receptor Sites. The Project Architectural massing concept is included in Appendix B, and describes the size and location of buildings which may be included in the Project. The Project Architectural Concept is likely over inclusive and assumes a greater amount and extent of the Project than will actually be implemented, for the purposes of providing a conservative analysis.

The applicant will be required to demonstrate compliance with the requirements of the California Building Code when building plans are submitted for the Project. The actual

Project will likely generate far lower shading than has been modeled, thus, making this a conservative analysis.

Shading Illuminance

The shadows created by the Project are evaluated at the Receptor Sites by calculation of the daylight illuminance without and with the Project. This illuminance calculation identifies the extent and the intensity of the Project shadow. The illuminance is calculated
6.1-3 through the illumination modeling software program. This software utilizes the 3-dimensional architectural computer model, including building dimensions and exterior materials, in conjunction with the solar illuminance data for the site location, to generate an accurate prediction of future illuminance. The evaluation of Project shading is calculated at the adjacent properties and summarized at the Receptor Site locations noted in Section 5 above.

Lighting Analysis

6.2 Project Shading Illuminance

6.2-1 The Project daylight shading is evaluated by way of the methodology defined above with the calculated shadow pattern illustrated at each hour during December 21, June 21, and March (September) 21 at the locations where lighting is under review.

Shadows created by the Project will be cast onto properties to the west, north, and east of the Project Site. The Receptor Sites are located to identify the duration of shadows from the Project over the course of the day, from when the sun rises in the east until the sun sets in the west.

As summarized in Tables 6, 7, and 8 below, the results of this analysis demonstrate the Project Shading impacts resulting from the proposed Project at the position where light is under review are below the significance threshold of 3 hours per day for the calendar year.

Figure 32: Receptor Sites where lighting is under review

6.2-2 Winter Solstice, December 21

The calculation of the Project Shading onto the Receptor Sites at the Winter Solstice (December 21) indicates the most conservative analysis of the Project Shading since the solar altitude is at the lowest angle of the year over the course of the day. The results of the analysis of the Project Shading at the position where light is under review are below the significance threshold of 3 hours per day for December 21.

Table 6 summarizes the calculated data, where 0 indicates no Project Shading, and 1 indicates measurable Project Shading at the specific hour. Within Table 6, the tan colored cells indicate increased shading hours as compared to the existing shading conditions on December 21 as noted in Table 3 above. Table 6 and Figures 33 through 39 indicate there is increased Project Shading at Receptor Sites R-W1 and R-W3 from 9:00 to 10:00 AM, and at Receptor Sites R-W2 from 9:00 AM to 11:00 AM and R-W4 from 10:00 until 11:00 AM. Receptor Site R-E1 experiences late afternoon shading from the Project from 3 PM. Receptor Sites R-W1, R-W2, R-W3, and R-W4 experience afternoon shading from topography to the west of the Project Site. The maximum increase in shading time from the Project is 2 hours at Receptor Sites R-W2. All other Receptor Sites experience a one hour increase in shading from the Project. The one hour increase is less than the three hour significance threshold, therefore there is no significant shading impact from the Project on December 21.

Table 6: Project Shading, Winter Solstice, December 21

Receptor	Project Extent of Shadow Winter Solstice - December 21 Pacific Standard Time							Analysis
	9	10	11	12	1	2	3	
R-W1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Early morning shading from Project Site.
R-W2	1.0	1.0	0.0	0.0	0.0	1.0	1.0	Early morning shading from Project Site. Afternoon shading from non Project Site topography to the west
R-W3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	Early morning shading from Project Site.
R-W4	1.0	1.0	0.0	0.0	0.0	0.0	1.0	Early morning shading from Project Site. Afternoon shading from non Project Site topography to the west
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	Late afternoon shading from Project Site and topography to the west

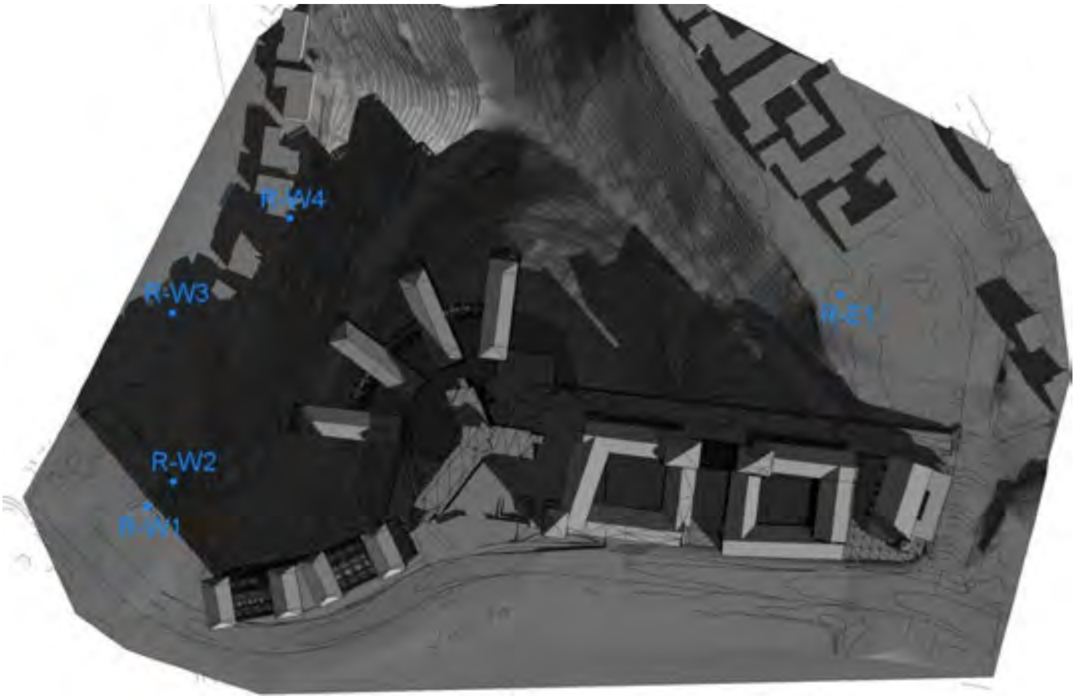

Figure 33: Project, December 21, 9AM

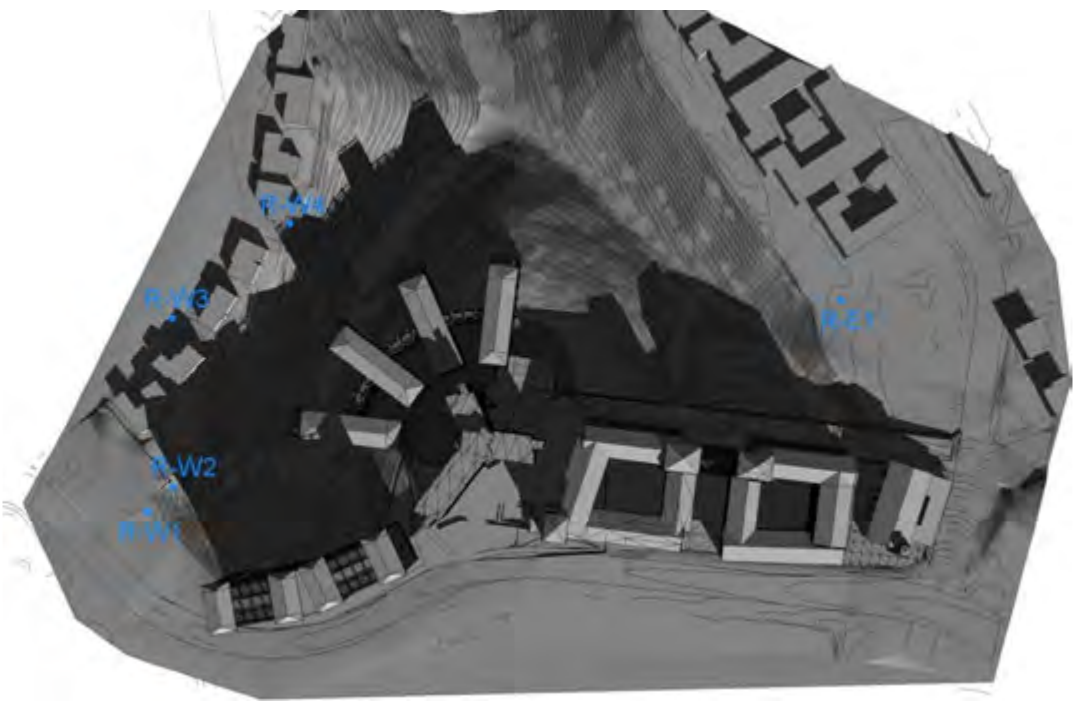

Figure 34: Project, December 21, 10 AM

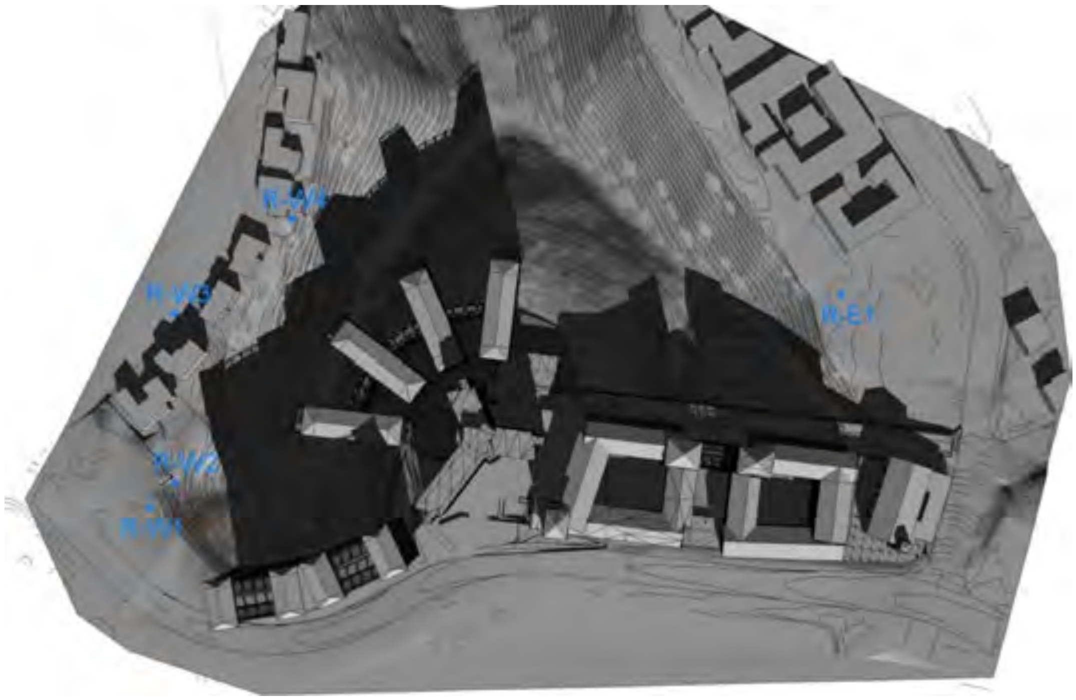

Figure 35: Project, December 21, 11 AM

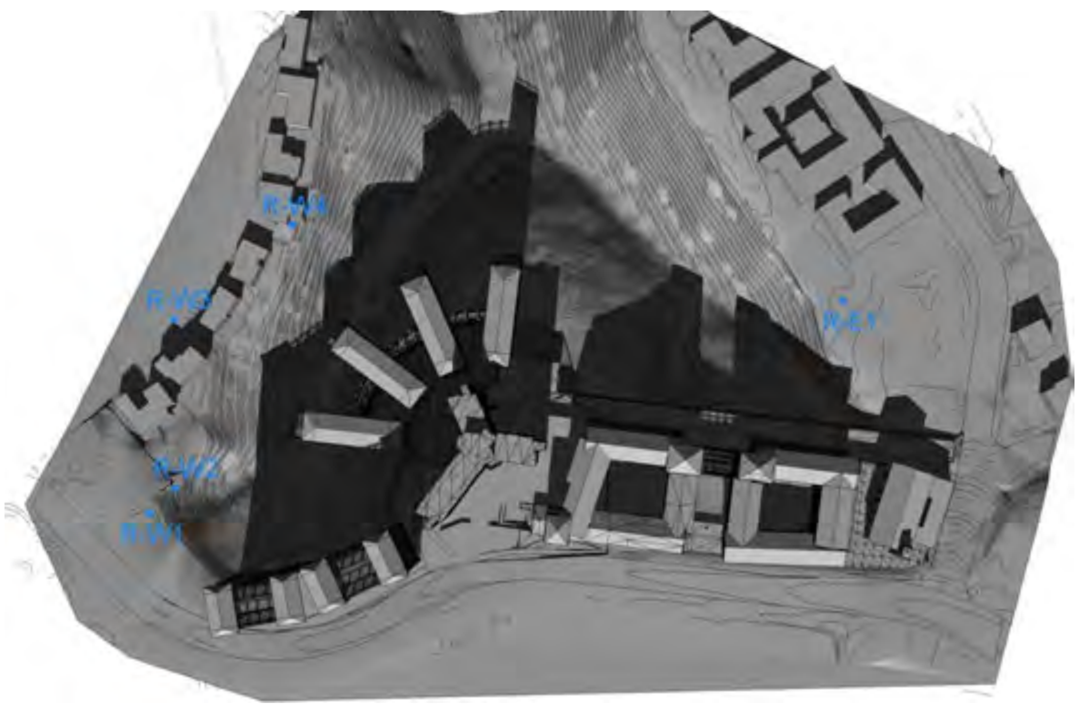

Figure 36: Project, December 21, 12 PM

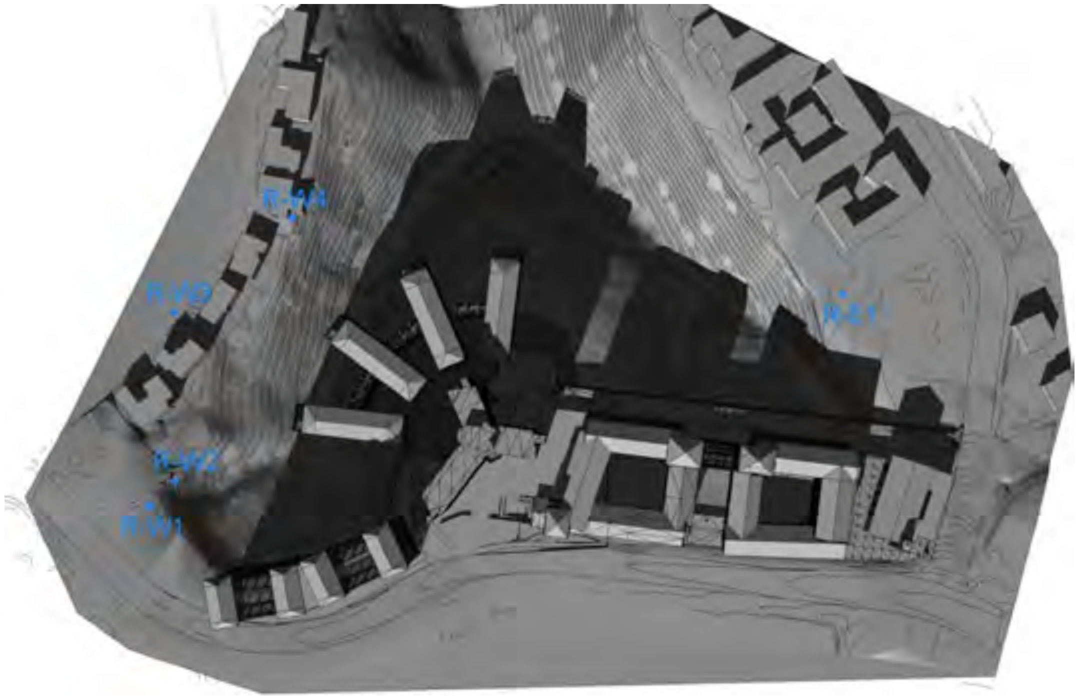

Figure 37: Project, December 21, 1 PM

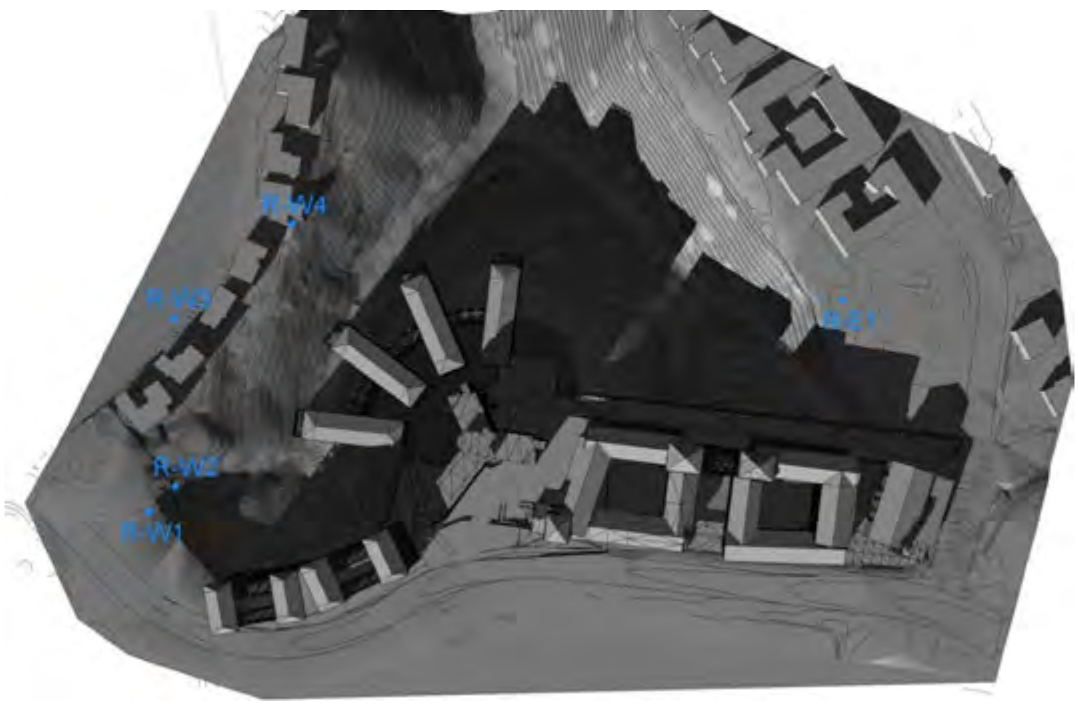

Figure 38: Project, December 21, 2 PM

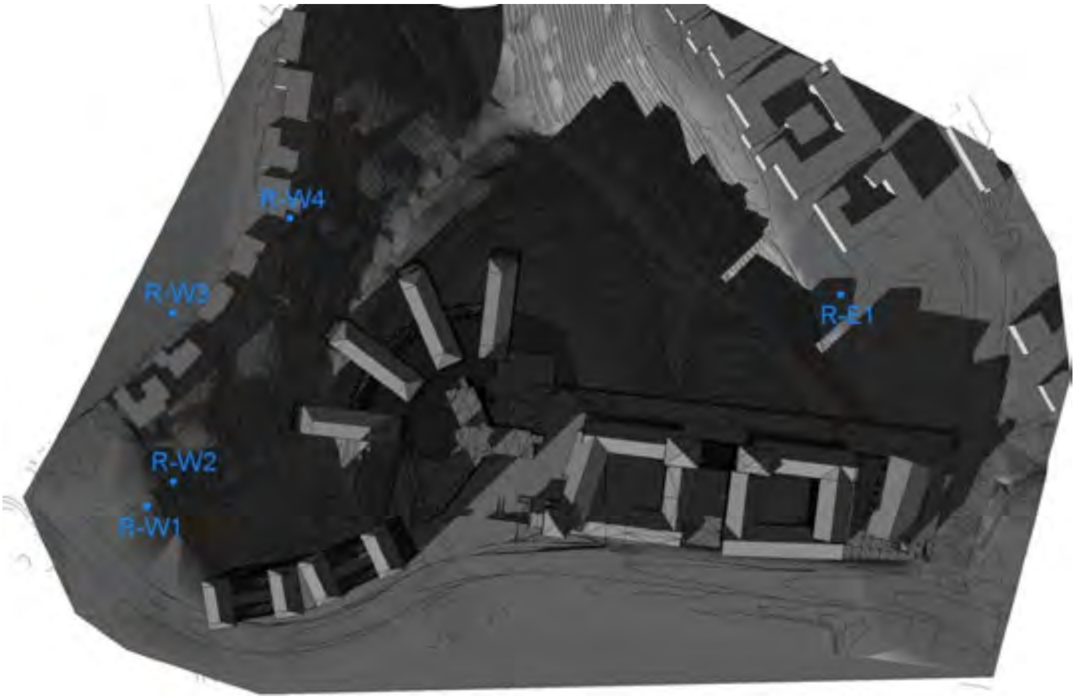

Figure 39: Project December 21, 3 PM

6.2-3 Summer Solstice, June 21

As summarized in Table 7, the results of this calculation demonstrate the Project Shading impacts on June 21 resulting from the proposed Project at the position where light is under review are below the significance threshold of 4 hours per day for the period from April through October. Table 7 summarizes the calculated data, where 0 indicates no shading, and 1 indicates full shading. Within Table 7, the tan colored cells indicate increased shading hours as compared to the existing shading conditions on June 21 as noted in Table 4 above. The data presented in Table 7 and the shadow patterns illustrated in Figures 40 through 48 indicate there is no shading from the Project at the Receptor Sites from 9:00 AM to 5:00 PM. Therefore, there is no significant shading impact from the Project onto the adjacent properties on June 21.

Table 7: Project Shading Summer Solstice, June 21

Receptor	Project Extent of Shadow Summer Solstice - June 21 Pacific Standard Time									Analysis
	9	10	11	12	1	2	3	4	5	
R-W1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from Project
R-W2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from Project
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from Project
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from Project
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No Shading from Project

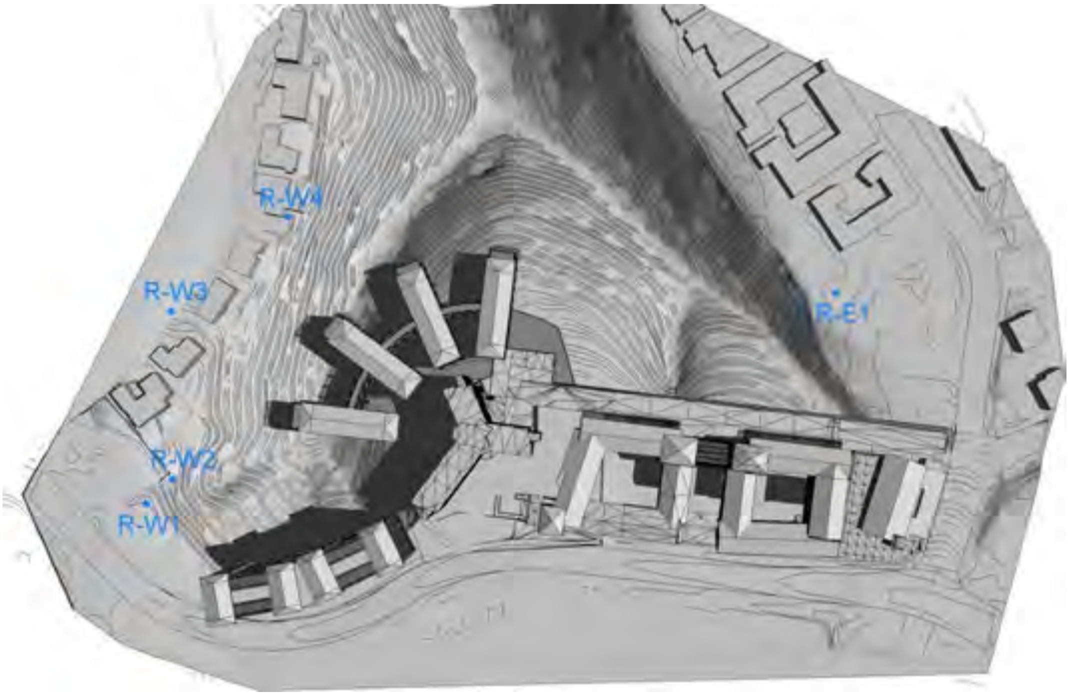

Figure 40: Project, June 21, 9 AM

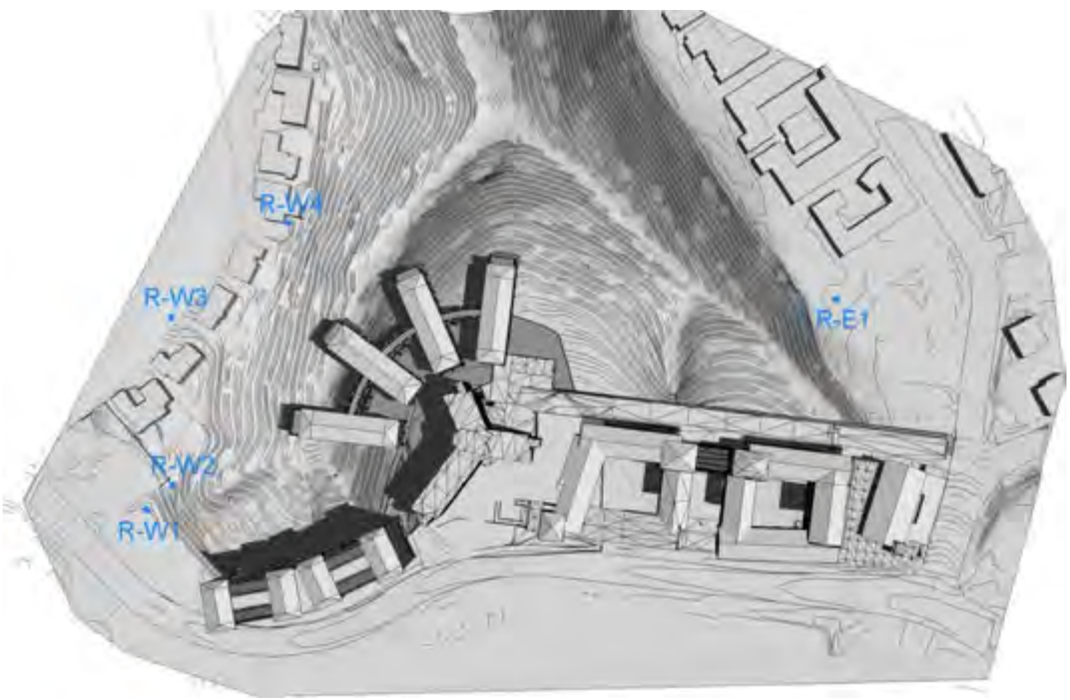

Figure 41: Project, June 21, 10 AM

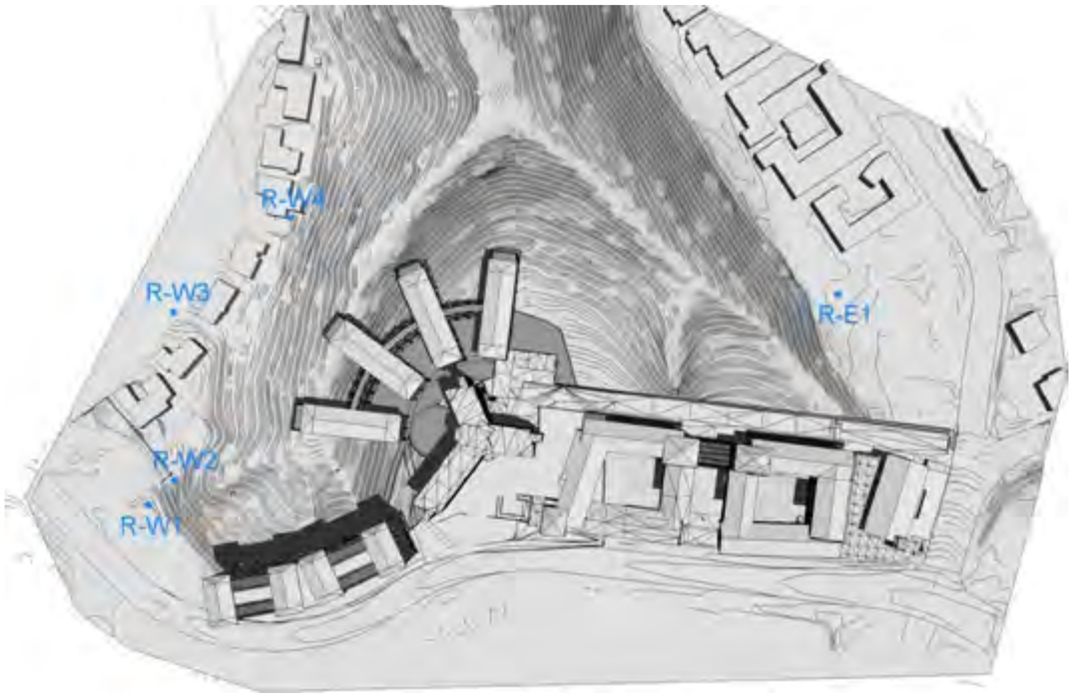

Figure 42: Project, June 21, 11 AM

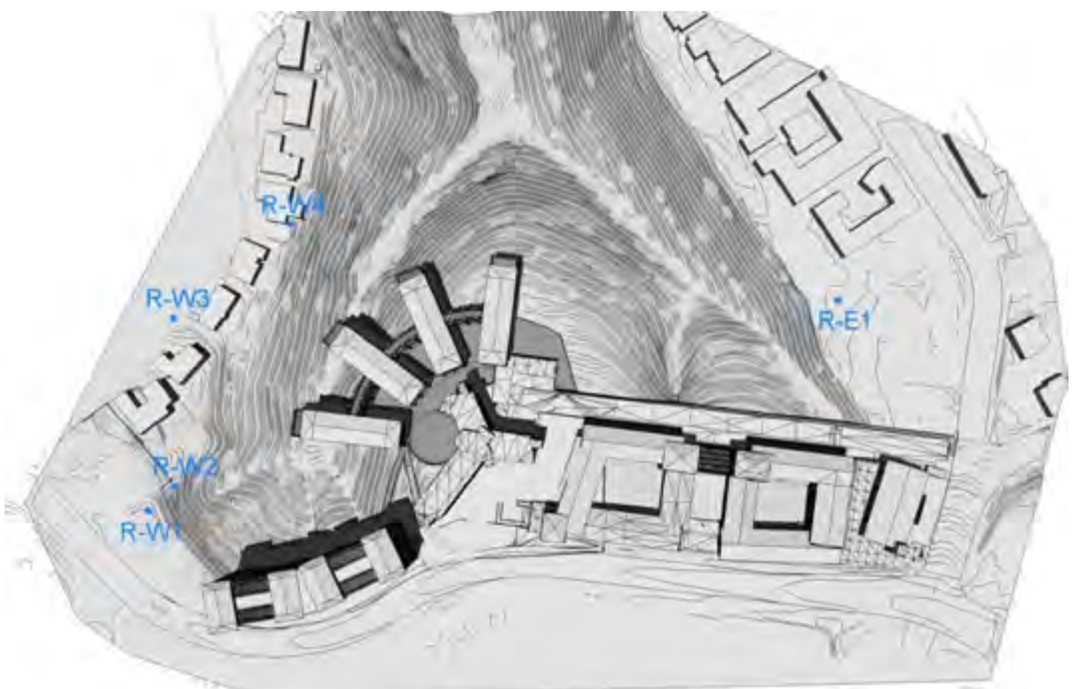

Figure 43: Project June 21, 12 PM

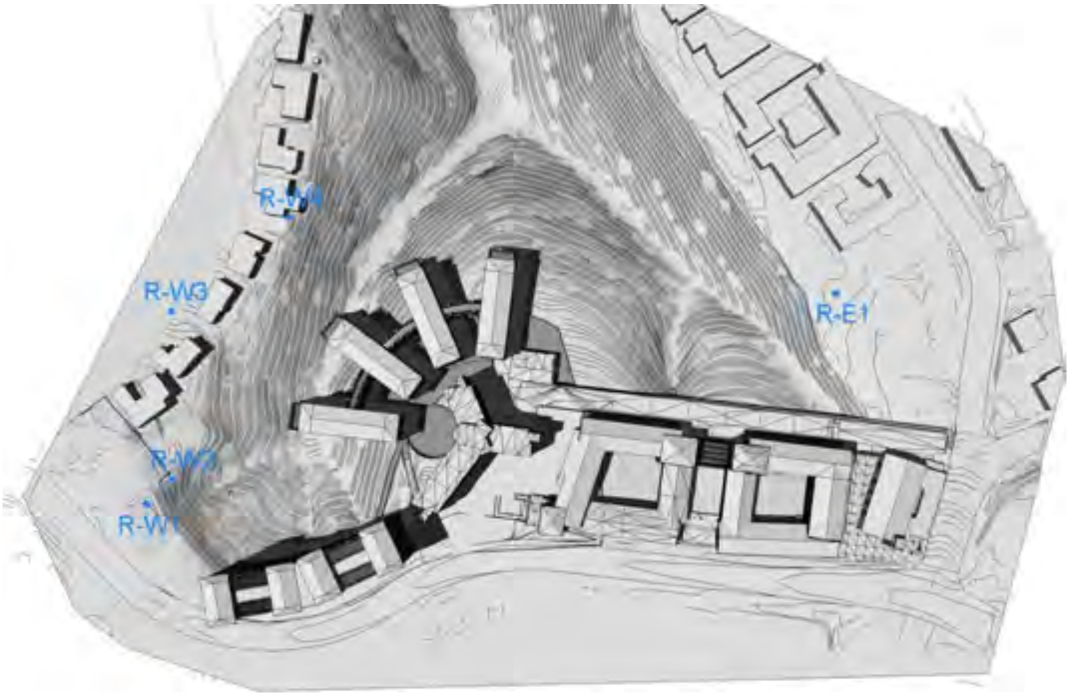

Figure 44: Project, June 21, 1 PM

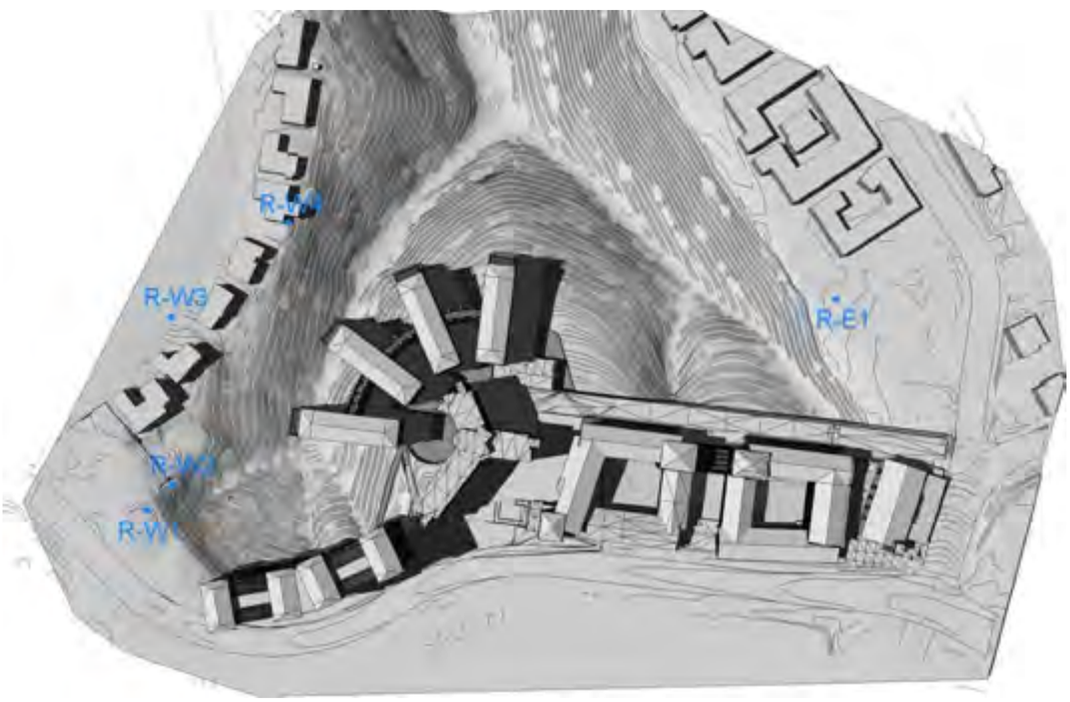

Figure 45: Project, June 21, 2 PM

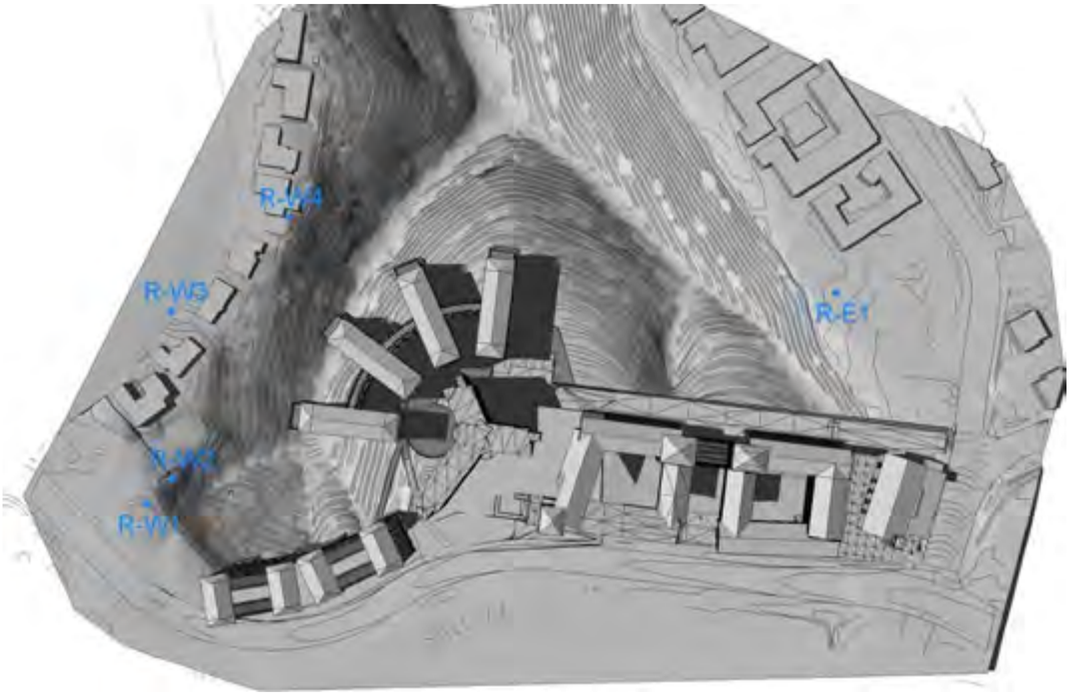

Figure 46: Project June 21, 3 PM

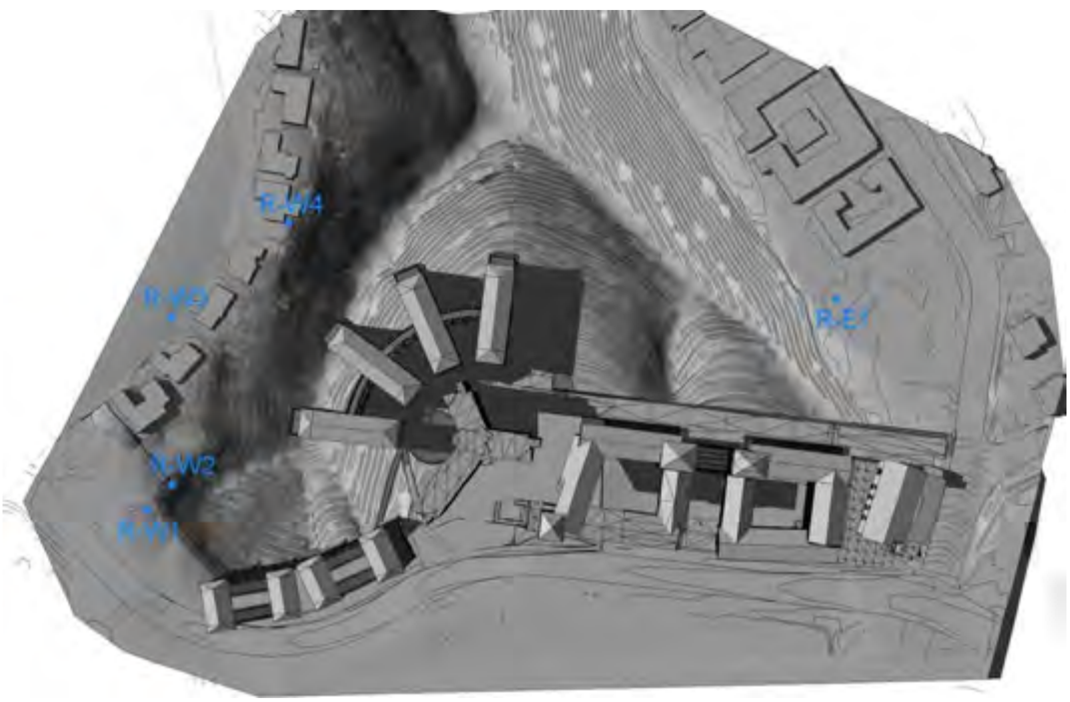

Figure 47: Project June 21, 4 PM

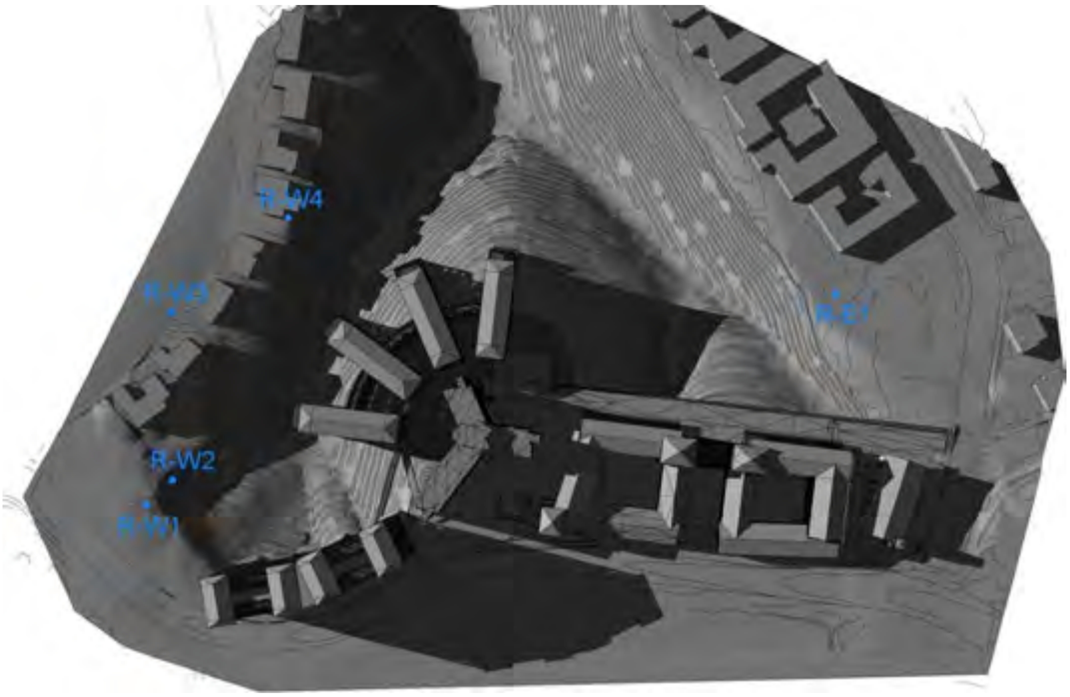

Figure 48: Project, June 21, 5 PM

6.2-4 Equinox, March 21, September 21

The path of the sun is aligned with the equator two days per year on March 21, the Spring Equinox and September 21, the Fall Equinox. On these two dates the length of the day and the altitude of the sun in the sky is midway between the minimum altitude and duration on December 21, and the maximum altitude and duration on June 21. Shadows created on these two dates represent the mean of the range of both length of the shadows and the time duration of the shadow. The results of the shading illuminance calculations presented below for March 21 demonstrate the Project Shading impacts resulting from the proposed Project at the position where light is under review are also below the significance threshold of 3 hours per day. The solar shading data for September 21 are identical, although the threshold for September is 4 hours between the hours of 9:00 AM and 5:00 PM. The data presented below includes the time from 9:00 AM to 5:00 PM and utilizes the lower, 3 hour increase in shading time to provide a conservative analysis. On these two dates the sunrise is 6:36 AM, and sunset is 6:46 PM.

Table 8 summarizes the calculated data for the Equinox, where 0 indicates no shading, and 1 indicates full shading. Within Table 8, the tan colored cells indicate increased shading hours as compared to the existing shading conditions on March 21 as noted in Table 5 above. The data presented in Table 8 and the Project shadow patterns illustrated in Figures 49 through 57 indicates there is an increase to the shaded time from 9:00 AM until 10 AM at Receptor Sites R-W1 and R-W2. There is no increase at all other Receptor sites during the period from 9:00 AM to 5:00 PM. The increase in shading of one hour at the two Receptor Sites is less than the most conservative threshold of three hours, therefore there is no significant shading impact on March 21 or September 21.

Table 8: Project Shading, Equinox, March 21, September 21

Receptor	Project Extent of Shadow Equinox - March 21, September 21 Pacific Standard Time									Analysis
	9	10	11	12	1	2	3	4	5	
R-W1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Early morning shading from Project Site.
R-W2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	Early morning shading from Project Site.
R-W3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	No shading from Project Site
R-W4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	No shading from Project Site
R-E1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	No shading from Project Site

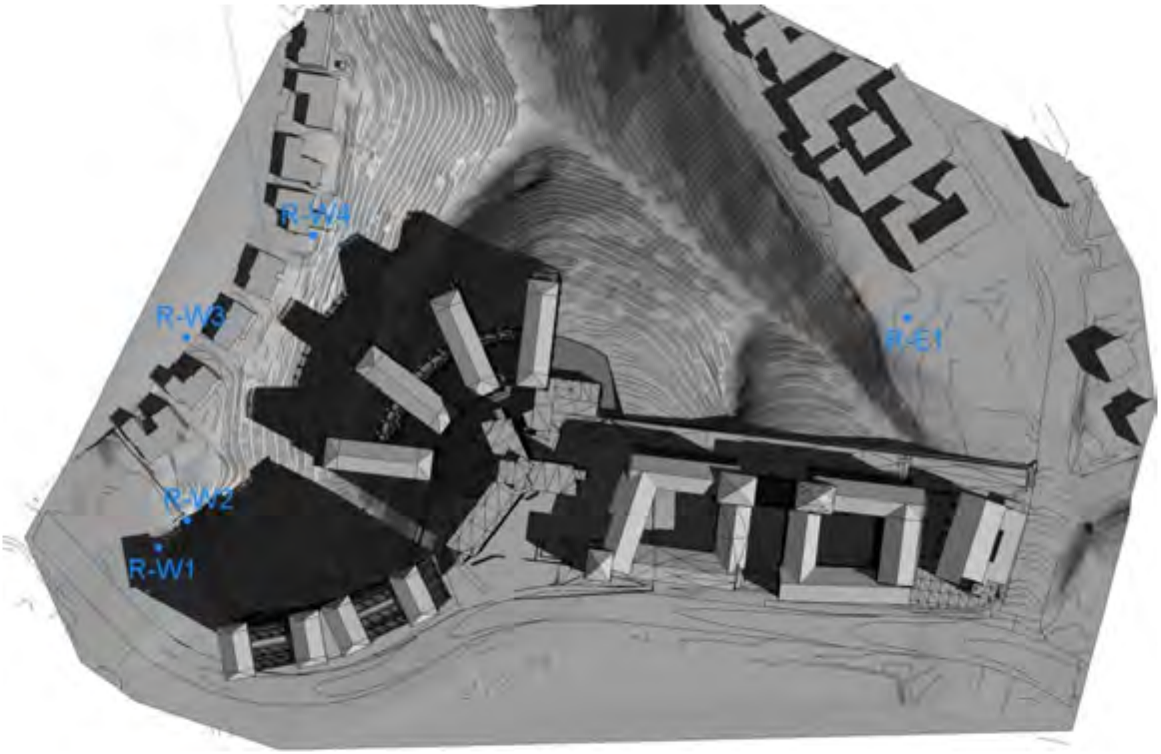

Figure 49: Project, March 21, 9 AM

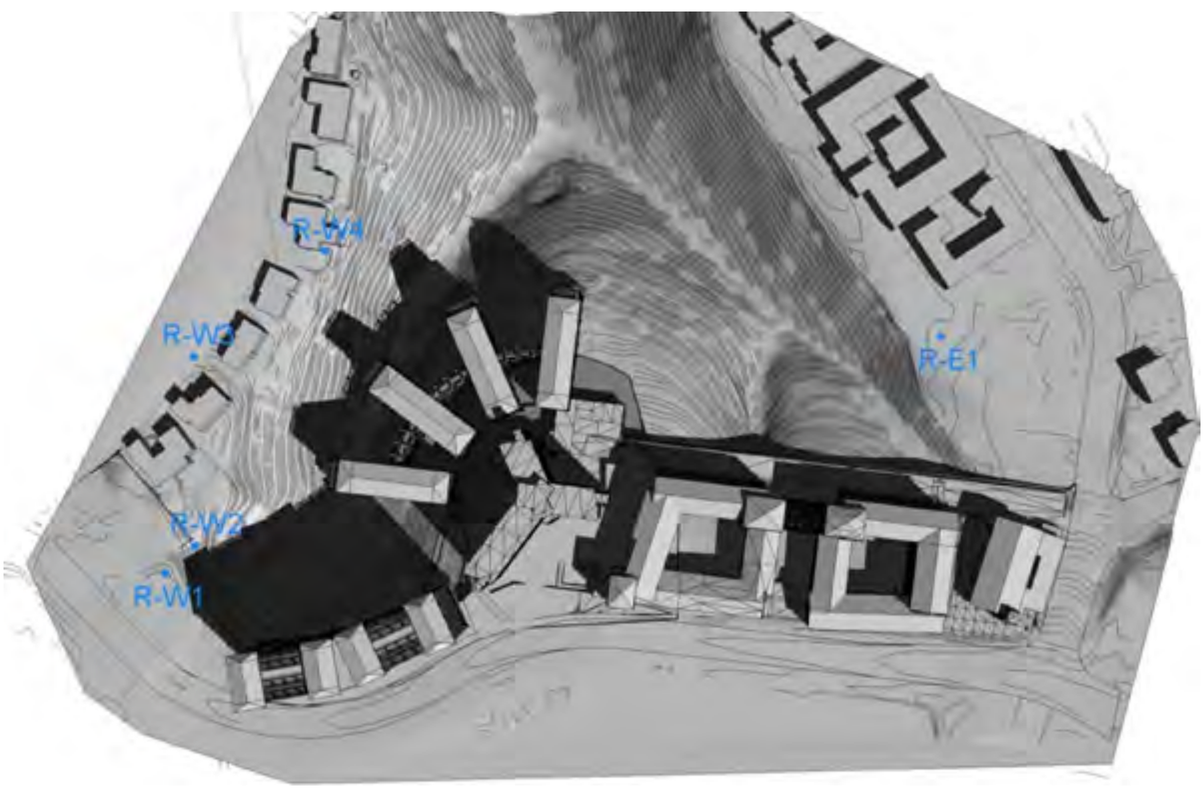

Figure 50: Project, March 21, 10 AM

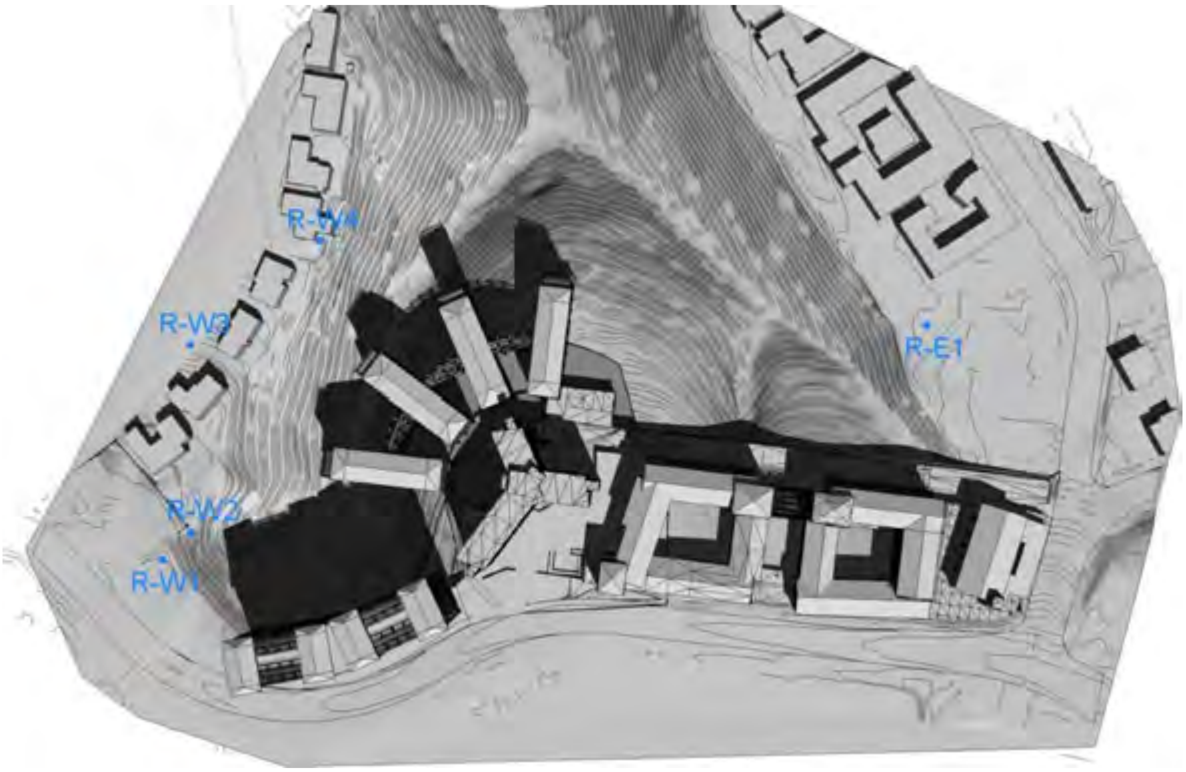

Figure 51: Project March 21, 11 AM

Figure 52: Project March 21, 12 PM

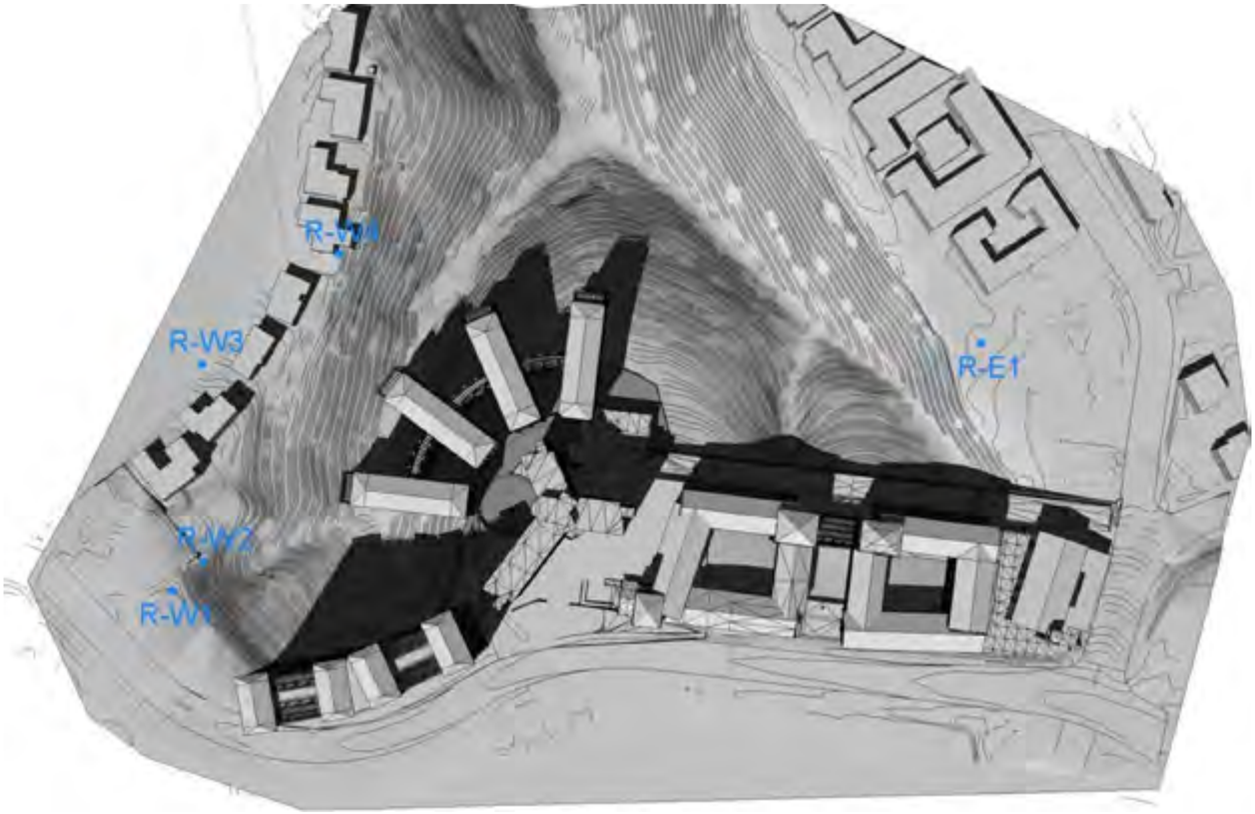

Figure 53: Project March 21, 1 PM

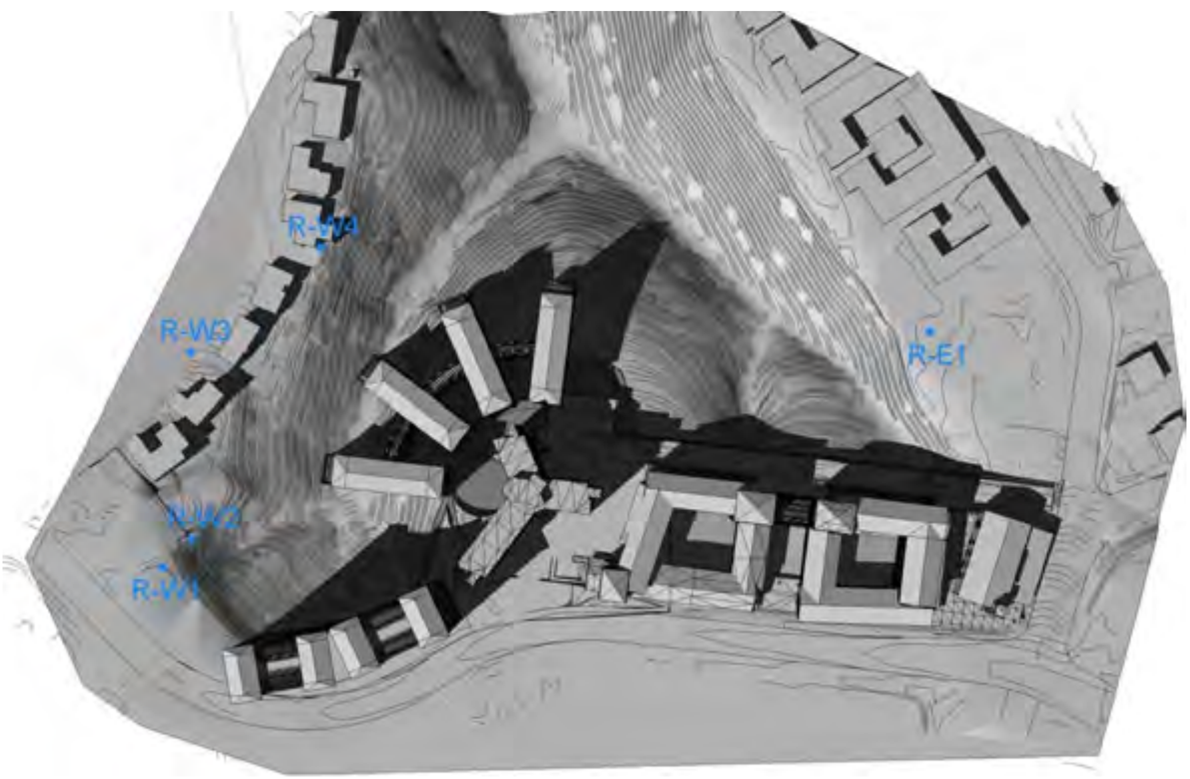

Figure 54: Project March 21, 2 PM

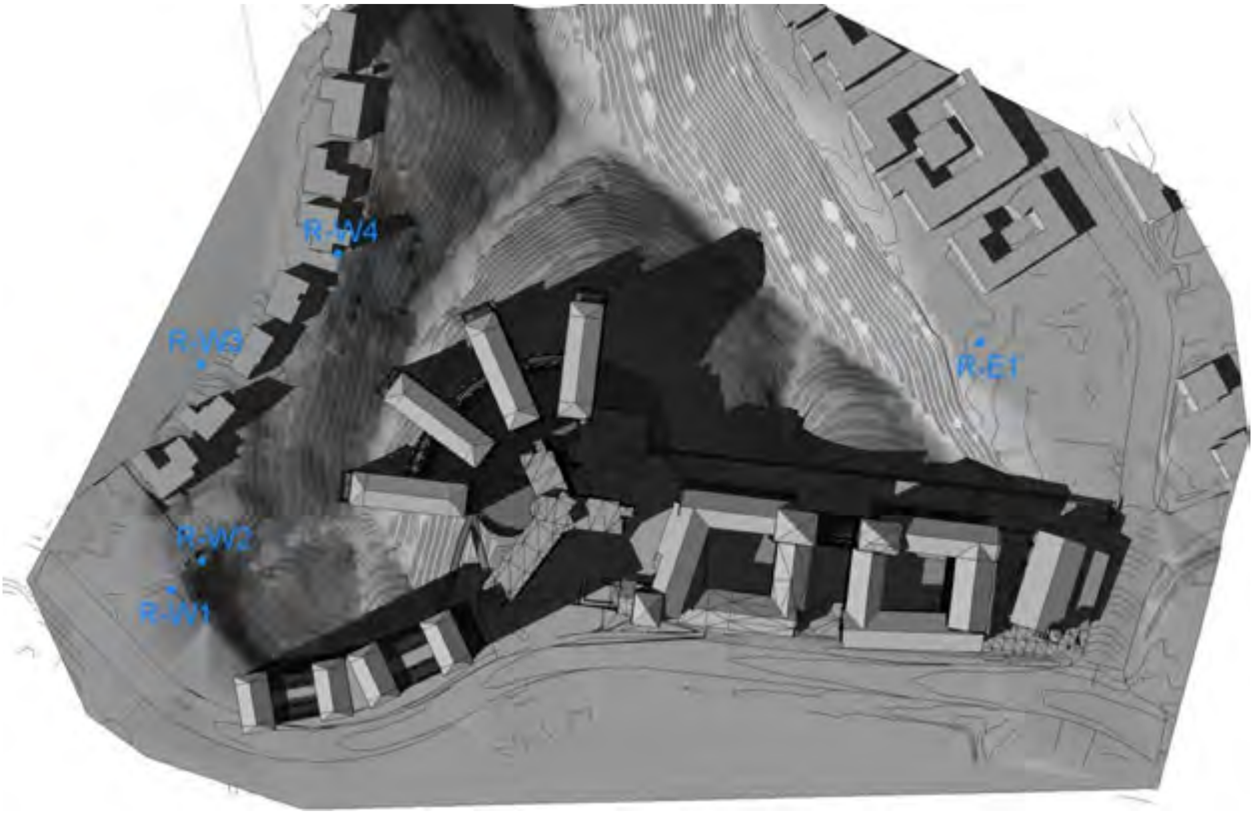

Figure 55: Project March 21, 3 PM

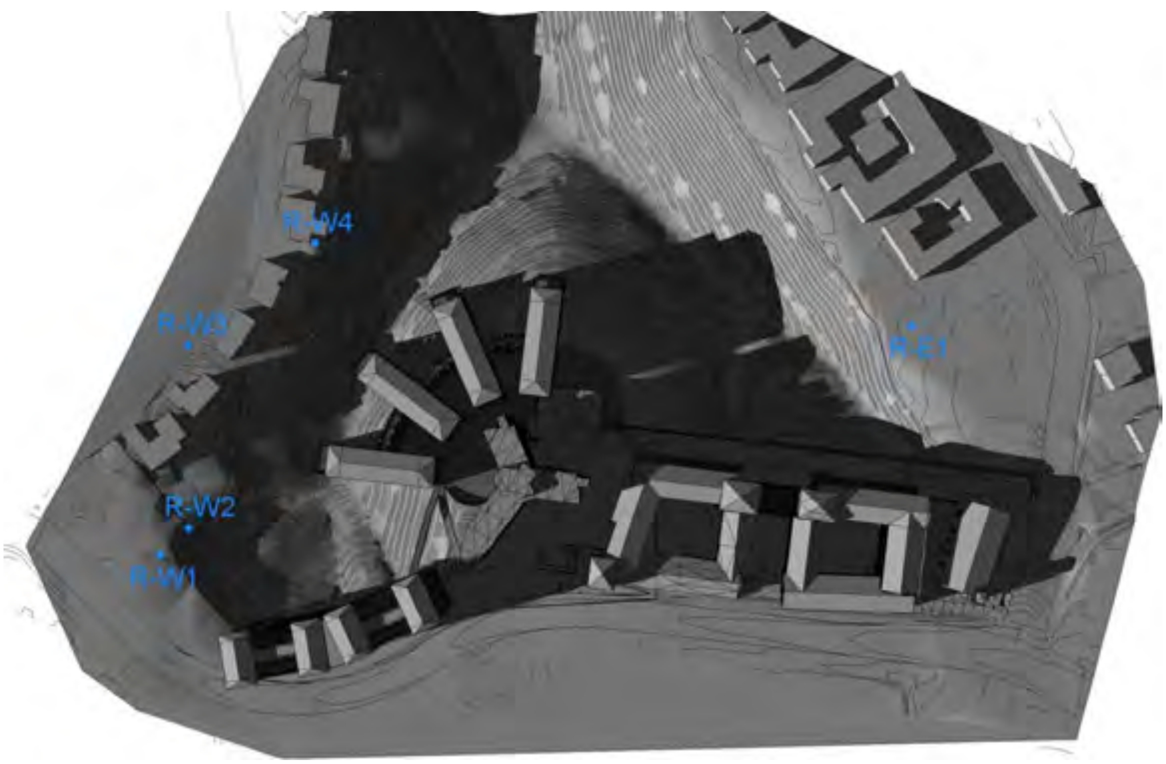

Figure 56: Project March 21, 4 PM

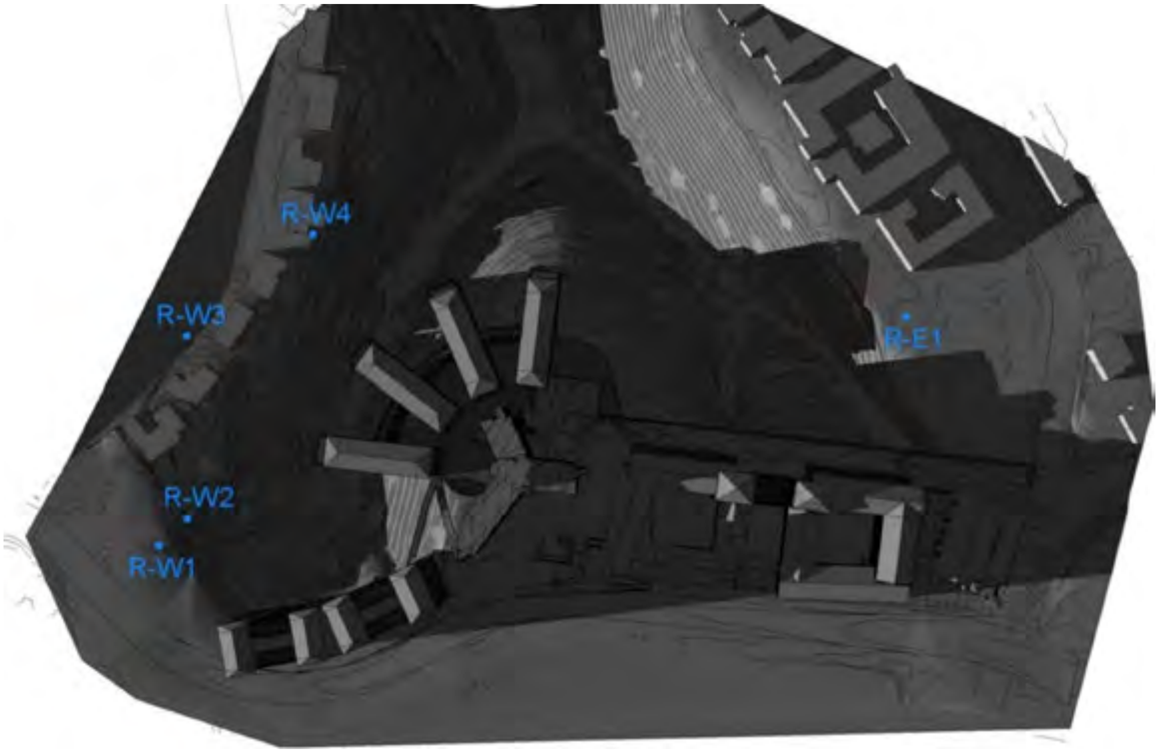

Figure 57: Project March 21, 5 PM

7. Conclusion

The Project may be visible from the residential sites to the southwest, west, and east of the Project site and from surrounding adjacent streets. This Report analyzes the potential daylight shading from the Project at nearby residential properties.

The Project height and mass creates shadows at any given sensitive receptor site for no more than 2 hours between 9:00 AM and 3:00 PM from late October to early April, and from 9:00 AM until 5:00 PM from April to October, and therefore will not have an adverse effect on adjacent properties.

The lighting impacts resulting from the proposed Project evaluated in this Report would be less than significant.

8. Glossary of Lighting Terminology

Discussions of lighting issues include precise definitions, descriptions or terminology of the specific lighting technical parameters. The following glossary summarizes explanations of the technical lighting terms utilized within the Report and the related practice standards to facilitate discussion of these issues. The following technical terms are presented in this Report.

Brightness: The magnitude of sensation that results from viewing surfaces from which light comes to the eye. This sensation is determined partly by the measurable luminance of the source and partly by the conditions of observation (Context), such as the state of adaptation of the eye. For example, very bright lamps at night appear dim during the day, because the eye adapts to the higher brightness of daylight.

Candela: Measure of light energy from a source at a specific standard angle and distance. Candela (cd) is a convenient measure to evaluate output of light from a lamp or light fixture in terms of both the intensity of light and the direction of travel of the light energy away from the source.

Contrast: Evaluation of high, medium and low contrast by the calculated ratio of the luminance from a visible light source or illuminated surface within the Project Site to the ambient luminance within the field of view. Contrast ratios exceeding 30 to 1 are usually deemed uncomfortable; 10 to 1 are clearly visible; and less than 3 to 1 appear to be of equal.

Glare: Glare is visual discomfort experienced from high luminance or high range of luminance. For exterior environments at night, glare occurs when the range of luminance in a visual field is too large. The light energy incident at a point is measured by a scale of footcandles or lux, and is described in the technical term Illuminance. This incident light is not visible to the eye until it is reflected from a surface, such as pavement, wall, dust in the atmosphere or the surface of a light bulb. The visible brightness of a surface is measured in footlamberts (or metric equivalent candelas per square meter) and is described by the term Luminance.

The human eye processes brightness variations across a very broad spectrum of intensities. The ratio of brightness generated by direct noon sun versus a moonlight evening is over 5000 to 1. Human eyes are capable of accommodating to this range of intensities given adequate time to adjust. However, the eye cannot process brightness ratios of more than 30 to 1 within a view without discomfort. See IESNA 10th Edition Handbook, Section 4.10.1, Discomfort Glare and Section 10.9.2 Calculating Glare.

For the purpose of this analysis, brightness of light sources may be described subjectively by the following criteria:

High Contrast Conditions: View of light emitting surface, such as a lens, reflector, or lamp, where brightness contrast ratio exceeds 30 to 1 (source Luminance to surrounding Luminance, ratio in footlamberts).

Medium Contrast Conditions: Brightly lighted surfaces where contrast ratio exceeds 10 to 1, but is less than 30 to 1 (lighted surface Luminance to surrounding Luminance, ratio in footlamberts).

Low Contrast Conditions: Illuminated surfaces where contrast ratio exceeds 3 to 1, but less than 10 to 1 (source Luminance to surrounding Luminance, ratio in footlamberts).

Illuminance: Illuminance is the means of evaluating the density of Luminous Flux. Illuminance indicates the amount of Luminous Flux from a light source falling on a given area. Illuminance is measured in footcandle (fc) which is the lumens per square foot, or Lux (lumens per square meter). Illuminance need not necessarily be related to a real surface since it may be measured at any point within a space. Illuminance is determined from the Luminous intensity of the light source. Illuminance of a point source decreases with the square of the distance from the light source (see Inverse Square Law).

Horizontal Illuminance: Illuminance incident upon a horizontal plane. The orientation of the illuminance meter or calculation point will be 180° from Nadir.

Vertical Illuminance: Illuminance incident upon a vertical plane. The orientation of the illuminance meter or calculation point will be 90° from Nadir.

Inverse Square Law: In physics, an inverse-square law is any physical law stating that a specified physical quantity or intensity is inversely proportional to the square of the distance from the source of that physical quantity. The fundamental cause for this relationship can be understood as geometric dilution corresponding to point-source radiation into three-dimensional space (see Figure 1). The divergence of a vector field which is the resultant of radial inverse-square law fields with respect to one or more sources is everywhere proportional to the strength of the local sources, and hence zero outside sources. Newton's law of universal gravitation follows an inverse-square law, as do the effects of electric, magnetic, light, sound, and radiation phenomena. Thus, Illuminance decreases with the square of the distance from the light source.

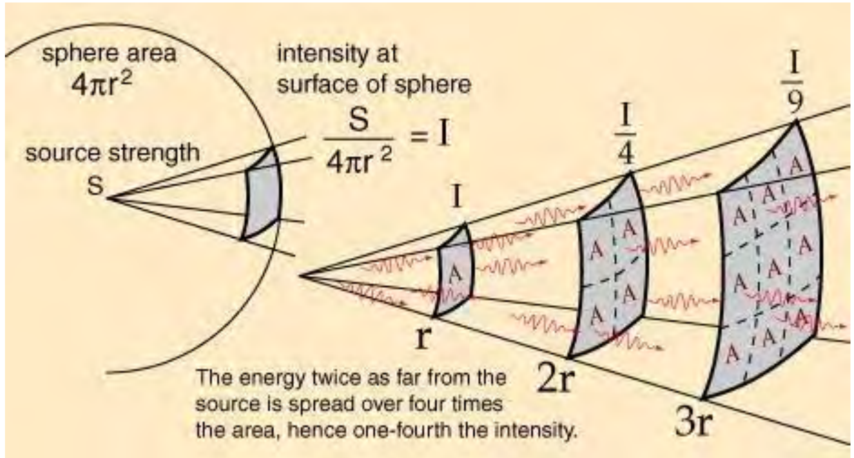

Figure 58: Inverse Square Law Diagram

Luminance:

Luminance is a measure of emissive or reflected light from a specific surface in a specific direction over a standard area. Luminance is measured in footlamberts (fL) (Candela per square foot) or cd/m^2 (Candela per square meter). 1fL = 3.43 cd/m^2.

Whereas Illuminance indicates the amount of Luminous Flux falling on a given surface, Luminance describes the brightness of an illuminated or luminous surface. Luminance is defined as the ratio of luminous intensity of a surface (Candela) to the projected area of this surface (m^2 or ft^2).

APPENDIX A: Project Description and Illustrative Plan

Figure 59: Project Illustrative Plan

APPENDIX B: Solar Data

Solar data for Winter Solstice, Summer Solstice, and the Equinox are included below, including the energy from the sun, the solar azimuth (position relative to due south) and the solar angle (vertical angle above the horizon line).

Table 9: Solar Altitude and Azimuth of the Sun, San Diego, California

Altitude and Azimuth of the Sun

SAN DIEGO, CALIFORNIA

W117 08, N32 45

Pacific Daylight Time

Time	21-Dec		21-Mar		21-Jun	
	Altitude	Azimuth (East of North)	Altitude	Azimuth (East of North)	Altitude	Azimuth (East of North)
5 am					-8.2	55.2
6 am	-9.8	111.6	-11.4	82.0	2.9	63.7
7 am	1.9	119.4	1.5	90.2	14.4	71.1
8 am	12.1	128.4	13.8	98.5	26.5	78.0
9 am	21.2	139.1	26.1	107.6	39.0	84.9
10 am	28.3	152.1	37.7	118.9	51.6	92.6
11 am	32.7	167.2	47.8	134.0	64.0	103.9
12 pm	33.8	183.6	55.2	155.1	75.5	126.8
1 pm	31.2	199.6	57.8	182.1	80.5	193.3
2 pm	25.5	213.9	54.4	208.5	72.1	243.1
3 pm	17.4	225.8	46.5	228.7	60.1	260.2
4 pm	7.7	235.7	36.1	243.1	47.5	269.9
5 pm	-3.3	244.1	24.2	153.9	35.0	277.3
6 pm			12.1	262.9	22.6	284.2
7 pm			0.0	271.2	10.6	291.2
8 pm					-0.9	298.9

Astronomical Applications Dept.

U.S. Naval Observatory

Washington, DC 20392-5420

Table 10: Sunrise and Sunset for San Diego, California

2017		Sunrise/Sunset		Day	Astronomical Twilight		Nautical Twilight		Civil Twilight		Solar Noon	
		Sunrise	Sunset	Length	Start	End	Start	End	Start	End	Time	Mil. mi
Dec	21	6:47 am ↑ (118°)	4:46 pm ↑ (242°)	9:59:50	5:18 AM	6:15 PM	5:48 AM	5:45 PM	6:19 AM	5:14 PM	11:46 am (33.9°)	91.445
Mar/ Sep	21	6:36 am ↑ (89°)	6:46 pm ↑ (271°)	12:09:44	5:14 AM	8:08 PM	5:43 AM	7:39 PM	6:11 AM	7:10 PM	12:41 pm (57.7°)	93.313
Jun	21	5:41 am ↑ (61°)	7:59 pm ↑ (299°)	14:18:24	3:59 AM	9:41 PM	4:37 AM	9:03 PM	5:12 AM	8:28 PM	12:50 pm (80.7°)	94.472

* All times are local time for San Diego.

Table 11: Average Daylight Illuminance

Average Incident Illuminance (klux-hr) for Mostly Clear Conditions

	March					June					September					December				
Orientation	9 am	11 am	1 pm	3 pm	5 pm	9 am	11 am	1 pm	3 pm	5 pm	9 am	11 am	1 pm	3 pm	5 pm	9 am	11 am	1 pm	3 pm	5 pm
Horizontal	50	83	91	69	25	52	90	107	99	67	37	78	96	85	48	27	56	59	36	3
North	11	15	16	14	8	22	16	16	17	18	10	15	16	16	12	8	12	12	9	2
East	79	54	16	14	8	80	70	25	17	14	8	83	10	15	16	56	39	12	9	2
South	42	69	75	57	21	12	24	35	29	14	24	55	69	60	32	54	87	91	65	8
West	11	15	31	74	65	12	16	16	58	83	10	15	16	61	80	8	12	30	58	12
M. Clr (%hrs)	38	43	45	45	45	17	42	55	60	56	39	56	65	69	66	50	51	53	52	53

APPENDIX C: References

The Lighting Handbook, Illuminating Engineering Society of North America (IESNA) 10th Edition, 2011

Nomenclature and Definitions for Illuminating Engineering an IESNA Recommended Practice, IESNA RP-16-10, July 15, 2005

Recommended Practice for Daylighting Buildings an IESNA Recommended Practice, IESNA RP-5-13, June 13, 2013.

Astronomical Applications Department, US Naval Observatory, Washington, D.C. http://aa.usno.navy.mil/data/docs/AltAz.php

Solar Radiation Data Manual for Buildings, National Renewable Energy Laboratory, Golden, Colorado, William Marion and Stephen Wilcox, 1995.

APPENDIX B

Lighting Technical Report

LIGHTING TECHNICAL REPORT

for the

San Diego State University

NEW STUDENT HOUSING PROJECT

San Diego, California

Francis Krahe & Associates, Inc.

Architectural Lighting Design

304 South Broadway, Suite 500

Los Angeles, California 90013

Phone 213.617.0477
Fax 213.617.0482

April 11, 2017

SDSU NEW STUDENT HOUSING PROJECT, LIGHTING TECHNICAL REPORT

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1. Introduction

Executive Summary

1.1 This Lighting Technical Report (Report) by Francis Krahe & Associate Inc. analyzes the architectural building and site lighting (Project Lighting) to be installed within the proposed SDSU New Student Housing (Project), which is located within the San Diego State University Campus at Remington Road in San Diego, California (Project Site). The Project Site is bounded by Hewlett Drive to the west, Interstate 8 to the north, 55th Street to the east, and Remington Road to the south. The Project includes new student residence halls consisting of approximately 2,560 beds, and a separate 2-story building consisting of approximately 15,000 gross square foot food services building (dining hall), as well as associated landscaping, limited parking facilities, and on-site amenities including pedestrian pathways. As proposed, the Project would be built in three phases. The proposed site design accommodates and incorporates the massing and architecture of Chapultepec Hall so that this existing building within the Project site would be consistent with and would complement the new development.

This Report defines the existing lighting conditions within and surrounding the Project Site, reviews the applicable lighting metrics, and models the proposed lighting for the building and site in conjunction with building architecture to evaluate the potential lighting impacts on surrounding properties.

The methods of analysis utilized for this evaluation are based upon the recommended practices established by the Illuminating Engineering Society of North America (IESNA) for the practice of illumination engineering design and application as well as measurement of light sources and illuminated surfaces.

The Project architecture is designed to comply with the requirements of the California Building Code. The Project Lighting is designed to comply with the requirements for light trespass and glare identified by the California Green Building Standards Code (CALGreen), which requires all light fixtures to limit light at the Project property line to 0.74 footcandles (fc), and to utilize light fixtures that limit glare in conformance with the Backlight, Uplight and Glare (BUG) ratings identified by CALGreen. The Project lighting was analyzed and determined to not exceed the 0.74 fc threshold for light trespass, or present a new source of high contrast or glare at adjacent residential properties. Therefore, the Project Lighting would not be a source of light trespass or glare for potentially affected Receptor sites.

In summary, the Report's analysis of Project Lighting determined that the Project light sources would not exceed applicable thresholds, and therefore that lighting impacts resulting the proposed Project would be less than significant.

1.2 Project Description

The Project analyzed in this Report consists of the proposed Project architectural building and site lighting (Project Lighting) as set forth in Appendix A. The Project Lighting consists of architectural building and site lighting for all exterior and interior applications within the Project site that may produce a new significant source of light or glare at sensitive receptor sites. The Project Lighting will be designed to conform to the requirements of the California Building Code, including CALGreen and California Title 24 which mandate limits on light trespass and energy use, and require lighting controls to reduce light pollution. The calculations for Project Lighting illuminance conservatively assume the simultaneous use of all lighting equipment required to provide the necessary facility illumination, and expected equipment to appropriately illuminate the Project for safety.

1.3 Summary of Methodology

Light exposure within this Report is evaluated based on the following technical criteria:

Light Trespass: the light that falls on a property but originates on an adjacent property. Light trespass is expressed in terms of illuminance.[1]

Glare/Contrast: According to the IESNA 10th Edition Handbook "glare occurs in two ways: when either the *luminance*[2] is too high, or luminance ratios are too

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[1] *Illuminance measures the amount of illumination (i.e., luminous flux) that falls on a given area from a light source. Luminous flux is defined as the mean value of total candelas produced by a light source, and describes the total amount of light emitted by a light source. The unit for measuring luminous flux is a lumen. Illuminance is measured in foot-candles (lumen per square foot, or the light energy within one square foot surface). Illuminance decreases with the square of the distance from the light source.*

[2] Luminance describes the brightness of an illuminated surface. Luminance is a measure of reflected light from a specific surface in a specific direction over a standard area. It is measured in footlamberts (candelas per square foot). A candela is defined as a measure of light energy from a source at a specific standard angle and distance. Metric equivalent for Luminance is candelas per square meter, or nits.

high"[3]. The evaluation of too high luminance is determined by the maximum luminance of the visible light source. The second factor, "luminance ratios too high", is evaluated by the ratio of the light source luminance as compared to the luminance within the field of view visible at an observer position. This ratio is referred to as Contrast, and is determined by the variation of luminance. For residential occupancies at night, "High," "Medium," and "Low" contrast are terms used to describe effect of the contrast ratios (the ratio of peak measured luminance to the average within a field of view) of greater than 30:1, between 10:1 and 30:1, and below 10:1, respectively. Contrast ratios above 30:1 are generally uncomfortable for the human eye to perceive[4] and may present an unacceptable condition for relaxation and enjoyment of a residence.

2. Glossary of Lighting Terminology

Discussions of lighting issues include precise definitions, descriptions or terminology of the specific lighting technical parameters. The following glossary summarizes explanations of the technical lighting terms utilized within the Report and the related practice standards to facilitate discussion of these issues. The following technical terms are presented in this Report.

Brightness: The magnitude of sensation that results from viewing surfaces from which light comes to the eye. This sensation is determined partly by the measurable luminance of the source and partly by the conditions of observation (Context), such as the state of adaptation of the eye. For example, very bright lamps at night appear dim during the day, because the eye adapts to the higher brightness of daylight.

BUG Rating: A luminaire classification system established in *IES TM-15-11*, BUG Ratings Addendum that provides for uniform assessment of the directional characteristics of illumination for exterior area lighting. BUG is an acronym composed of Backlight, Uplight, and Glare. BUG ratings are based on a zonal lumen calculations for secondary solid angles defined in *IES TM-15-11*.

Candela: Measure of light energy from a source at a specific standard angle and distance. Candela (cd) is a convenient measure to evaluate output of light from a lamp or light fixture in terms of both the intensity of light and the direction of travel of the light energy away from the source.

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[3] *IESNA 10th Edition, Section 4.10 Glare, page 4.25.*

[4] *IESNA 10th Edition, Section 4.10.1 Discomfort Glare, page 4.26*

Contrast: Evaluation of high, medium and low contrast by the calculated ratio of the luminance from a visible light source or illuminated surface within the Project Site to the ambient luminance within the field of view. Contrast ratios exceeding 30 to 1 are usually deemed uncomfortable; 10 to 1 are clearly visible; and less than 3 to 1 appear to be of equal.

Fully Shielded: A lighting fixture constructed in such a manner that all light emitted by the fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the Luminaire, is projected below the horizontal as determined by photometric test or certified by the manufacturer. Any structural part of the light fixture providing this shielding must be permanently affixed. In other words, no light shines above the horizontal from any part of the fixture.

Glare: Glare is visual discomfort experienced from high luminance or high range of luminance. For exterior environments at night, glare occurs when the range of luminance in a visual field is too large. The light energy incident at a point is measured by a scale of footcandles or lux, and is described in the technical term Illuminance. This incident light is not visible to the eye until it is reflected from a surface, such as pavement, wall, dust in the atmosphere or the surface of a light bulb. The visible brightness of a surface is measured in footlamberts (or metric equivalent candelas per square meter) and is described by the term Luminance.

The human eye processes brightness variations across a very broad spectrum of intensities. The ratio of brightness generated by direct noon sun versus a moonlight evening is over 5000 to 1. Human eyes are capable of accommodating to this range of intensities given adequate time to adjust. However, the eye cannot process brightness ratios of more than 30 to 1 within a view without discomfort. See IESNA 10th Edition Handbook, Section 4.10.1, Discomfort Glare and Section 10.9.2 Calculating Glare.

For the purpose of this analysis, brightness of light sources may be described subjectively by the following criteria:

High Contrast Conditions: View of light emitting surface, such as a lens, reflector, or lamp, where brightness contrast ratio exceeds 30 to 1 (source Luminance to surrounding Luminance, ratio in footlamberts).

Medium Contrast Conditions: Brightly lighted surfaces where contrast ratio exceeds 10 to 1, but is less than 30 to 1 (lighted surface Luminance to surrounding Luminance, ratio in footlamberts).

Low Contrast Conditions: Illuminated surfaces where contrast ratio exceeds 3 to 1, but less than 10 to 1 (source Luminance to surrounding Luminance, ratio in footlamberts).

Illuminance: Illuminance is the means of evaluating the density of Luminous Flux. Illuminance indicates the amount of Luminous Flux from a light source falling on a given area. Illuminance is measured in footcandle (fc) which is the lumens per square foot, or Lux (lumens per square meter). Illuminance need not necessarily be related to a real surface since it may be measured at any point within a space. Illuminance is determined from the Luminous intensity of the light source. Illuminance of a point source decreases with the square of the distance from the light source (see Inverse Square Law).

Horizontal Illuminance: Illuminance incident upon a horizontal plane. The orientation of the illuminance meter or calculation point will be 180° from Nadir.

Vertical Illuminance: Illuminance incident upon a vertical plane. The orientation of the illuminance meter or calculation point will be 90° from Nadir.

Inverse Square Law: In physics, an inverse-square law is any physical law stating that a specified physical quantity or intensity is inversely proportional to the square of the distance from the source of that physical quantity. The fundamental cause for this relationship can be understood as geometric dilution corresponding to point-source radiation into three-dimensional space (see Figure 1). The divergence of a vector field which is the resultant of radial inverse-square law fields with respect to one or more sources is everywhere proportional to the strength of the local sources, and hence zero outside sources. Newton's law of universal gravitation follows an inverse-square law, as do the effects of electric, magnetic, light, sound, and radiation phenomena. Thus, Illuminance decreases with the square of the distance from the light source.

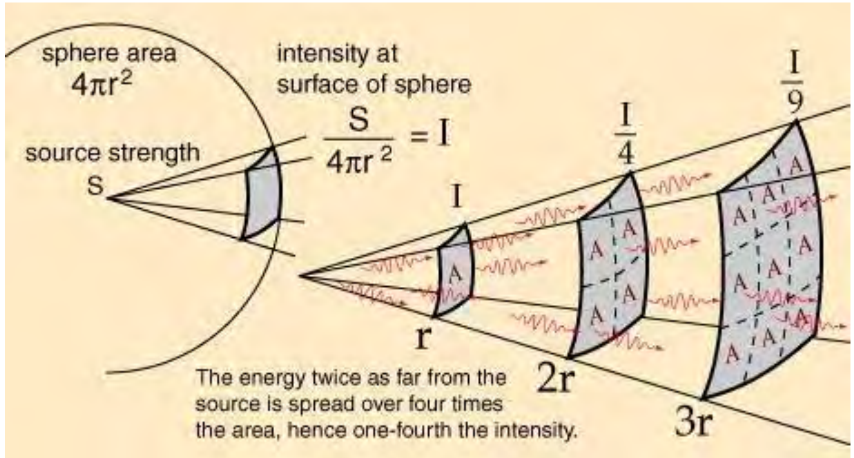

Figure 1: Inverse Square Law Diagram

Output Direction: Luminaires for general lighting are classified in accordance with the percentages of total luminaire output emitted above and below horizontal. The light distribution curves may take many forms within the limits of upward and downward distribution, depending upon the type of light and the design of the luminaire.

Lighting Array: An installation of multiple light sources or lamps where the distance between each lamp or light source within the Lighting Array is less than 5 feet on center in any direction from any other source.

Light Source: Device which emits light energy from an electric power source.

Light Trespass: Electric light from subject property incident onto adjacent properties, measured in footcandles or lux, usually analyzed by measurement at or near the adjacent property line.

Lighting Zone: Defined by IESNA and summarized in Table 26.4 in the 10th Edition and adopted by the CALGreen

Lighting Zone LZ2: Outdoor areas of human activity where the vision of human residents and users is adapted to moderate light levels. Lighting is not uniform or consistent. Lighting is generally desired for safety, security and/or convenience.

Lighting Zone LZ3: Outdoor areas of human activity where the vision of human residents and users is adapted to moderately high light levels. Lighting is generally desired for safety, security and/or convenience.

Lighting Zone LZ4: Outdoor areas of human activity where the vision of human residents and users is adapted to high light levels. Lighting is generally desired for safety, security and/or convenience.

Luminaire: A complete lighting unit consisting of a lamp or lamps and ballast(s) (when applicable) together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply. Also referred to as a Light Fixture.

Luminance: Luminance is a measure of emissive or reflected light from a specific surface in a specific direction over a standard area. Luminance is measured in footlamberts (fL) (Candela per square foot) or cd/m^2 (Candela per square meter). 1fL = 3.43 cd/m^2.

Whereas Illuminance indicates the amount of Luminous Flux falling on a given surface, Luminance describes the brightness of an illuminated or luminous surface. Luminance is defined as the ratio of luminous intensity of a surface (Candela) to the projected area of this surface (m^2 or ft^2).

Luminous Flux: Mean value of total Candelas produced by a light source. Luminous Flux describes the total amount of light emitted by a light source. The unit for measuring Luminous Flux is Lumen (lm).

This radiation could basically be measured or expressed in watts. This does not, however, describe the optical effect of a light source adequately, since the varying spectral sensitivity of the eye is not taken into account. To include the spectral sensitivity of the eye the Luminous Flux is measured in lumen. Radiant Flux or 1 W emitted at the peak of the spectral sensitivity (in the photopic range at 555 nanometers produces a Luminous Flux of 683 lumen). The unit of lumen does not
3.1 define direction.

3. Regulatory Framework

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations (CCR), also known as the California Building Standards Code, consists of regulations to control building standards throughout the State. The following components of Title 24 include standards related to lighting:

California Building Code (Title 24, Part 1) and California Electrical Code (Title 24, Part 3)

- The California Building Code (Title 24, Part 1) and the California Electrical Code (Title 24, Part 3) stipulate minimum light intensities for safety and security at pedestrian pathways, circulation ways, and paths of egress. All lighting for the Project will comply with the requirements of the California Building Code.

California Energy Code (Title 24, Part 6)

- The California Energy Code (CEC) stipulates allowances for lighting power and provides lighting control requirements for various lighting systems, with the aim of reducing energy consumption through efficient and effective use of lighting equipment.

Section 130.2 sets forth requirements for Outdoor Lighting Controls and Luminaire Cutoff requirements. All outdoor luminaires rated above 150 watts shall comply with the backlight, up light, and glare "BUG" in accordance with IES TM-15-11, Addendum A, and shall be provided with a minimum of 40% dimming capability activated to full on by motion sensor or other automatic control. This requirement does not apply to street lights for the public right of way, signs or building façade lighting.

Section 140.7 sets forth outdoor lighting power density allowances in terms of watts per area for lighting sources other than signage. The lighting allowances are provided by Lighting Zone, as defined in Section 10-114 of the CEC. Under Section 10-114, all urban areas within California are designated as Lighting Zone 3.

California Green Building Standards Code (Title 24, Part 11)

The California Green Building Standards Code, which is Part 11 of Title 24, is commonly referred to as the CALGreen Code. Paragraph 5.106.8 Light pollution reduction, defines all non-residential outdoor lighting must comply with the following:

- The minimum requirements in the CEC for Lighting Zones 1–4 as defined in Chapter 10 of the California Administrative Code; and
- Backlight, Uplight and Glare (BUG) ratings as defined in the Illuminating Engineering Society of North America's Technical Memorandum on Luminaire Classification Systems for Outdoor Luminaires (IESNA TM-15-11, Appendix G); and
- Allowable BUG ratings not exceeding those shown in Table A5.106.8 in Section 5.106.8[5] of the CALGreen Code (excerpt included in the Appendix F); or
- Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

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[5] *Table 5.106.8, Footnote 2 defines the location of the Property Line for the purpose of evaluating compliance with the BUG ratings and provides that: "For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section." See Appendix C.*

City of San Diego Municipal Code

The City of San Diego Municipal Code (LAMC) regulates lighting with respect to building lighting, transportation, street lighting and light trespass (i.e., the spillover of light onto adjacent light-sensitive properties). The City also enforces the building code requirements of the San Diego Building Code, the California Building Code, the California Green
3.2 Building Standards Code (CALGreen), and the California Electrical Code.

Applicable regulations include the 2016 version of the San Diego Building Code, the California Building Code, CALGreen, and the California Electrical Code.

The San Diego Municipal Code includes the following sections pertaining to illumination:

Chapter 14, Article 142.0740 Outdoor Lighting Regulations

(a) Purpose and Intent

(1) Outdoor lighting fixtures shall be installed in a manner that minimizes negative impacts from light pollution including light trespass, glare, and urban sky glow in order to preserve enjoyment of the night sky and minimize conflict caused by unnecessary illumination.

(2) Regulation of outdoor lighting is also intended to promote lighting design that provides for public safety and conserves electrical energy.

(3) It is the intent that, in addition to the regulations set forth in Section 142.0740, outdoor lighting fixtures shall be installed and operated in compliance with the following regulations, to the extent applicable:

(A) California Energy Code, California Code of Regulations, Title 24, Part 6;

(B) Green Building Regulations (Chapter 14, Article 10); and

(C) Electrical Regulations (Chapter 14, Article 6).

(c) General regulations that apply to all outdoor lighting:

(1) Outdoor lighting shall comply with the applicable California Energy Code lighting power requirement for the lighting zones identified on Map C-948 filed in the office of the City Clerk.

(2) Shields and flat lenses shall be required to control and direct the light below an imaginary horizontal plane passing through the lowest point of the fixture, except for:

(A) Residential entrance lights installed in accordance with the California Building Code and Electric Code requirements;

(B) Outdoor lighting fixtures less than 4,050 lumens including landscape lighting and decorative lighting;

…..

(E) Lighting for sports and athletic fields;

….

(3) New outdoor lighting fixtures shall minimize light trespass in accordance with the Green Building Regulations where applicable, or otherwise shall direct, shield, and control light to keep it from falling onto surrounding properties. Zero direct-beam illumination shall leave the premises.

(4) Outdoor lighting shall not exceed nominal 4000 Kelvin Color Correlated Temperature (CCT).

(5) All outdoor lighting, including search lights, shall be turned off between 11:00 P.M. and 6:00 A.M. except:

(A) Outdoor lighting may remain lighted for commercial and industrial uses that continue to be fully operational after 11:00 P.M. such as sales, assembly, and repair; and for security purposes or to illuminate walkways, roadways, equipment yards, and parking lots subject to the following:

(i) Adequate lighting for public safety shall be maintained. Outdoor lighting shall otherwise be reduced after 11:00 P.M. where practicable.

.....

(B) Outdoor lighting for the following is permitted to remain lighted after 11:00 P.M. and is exempt from the maximum Kelvin CCT and maximum lumen requirements specified in Section 142.0740(c)(4) and (c)(5)(A):

(i) Outdoor lighting used to illuminate recreational activities that are not in a residential zone may continue after 11:00 P.M. only when equipped with automatic timing devices and shielded to minimize light pollution.

(ii) Illuminated on-premises signs for businesses that are open to the public after 11:00 P.M. may remain lighted during business operating hours only. Illuminated off premises advertising display signs shall not be lighted after 11:00 P.M. Signs located both on-and offpremises shall be equipped with automatic timing devices.

(iii) Outdoor lighting for automated teller machines and associated parking lot facilities and access areas shall be provided during hours of darkness in accordance with California Financial Code Sections 13040-13041.

(C) Outdoor lighting for illumination of the flag of the United States of America.

(6) On properties which are adjacent to or contain sensitive biological resources, any exterior lighting shall be limited to low-level lights and shields to minimize the amount of light entering any identified sensitive biological resource areas.

....

(g) Outdoor lighting on facilities or lands owned, operated, controlled or protected by the United States Government, State of California, County of San Diego, City of San Diego, or other public entity or public agency not subject to City of San Diego ordinances is exempt from the requirements of this division. Voluntary compliance with the intent of Section 142.0740 is encouraged.

4. IESNA Recommended Practices

The Illuminating Engineering Society of North America (IESNA) recommends illumination standards for a wide range of building and development types. These recommendations are widely recognized and accepted as best practices and are therefore a consistent predictor of the type and direction of illumination for any given building type. For all areas not stipulated by the regulatory building code, municipal code or specifically defined requirements, the IESNA standards are typically used as the basis for establishing the amount and direction of light.

The IESNA 10th Edition Lighting Handbook defines Outdoor Lighting Zones relative to a range of human activity versus natural habitat. Table 26.4, Nighttime Outdoor Lighting Zone Definitions, included in the Appendix D hereto, establishes the Zone designation for a range of existing lighting conditions, from low or no existing lighting to high light levels in urban areas. Table 26.4 is referenced by the California Energy Code Title 24 in section 10-114 of the CEC and section 140.7 relative to allowable energy use for outdoor lighting. In addition, the IESNA 10th Edition Lighting Handbook defines Recommended Light Trespass Limits in Table 25.5, included in the Appendix hereto, relative to the Outdoor Lighting Zones. The Recommended Light Trespass Illuminance Limits describe the maximum light trespass illuminance in Lux at the location where trespass is under review. As noted above, the CEC stipulates that all urban areas in California are designated as Lighting Zone 3. IESNA Table 25.5, lists a Pre-curfew 8 Lux (0.76 fc) maximum at the location where trespass is under review for Zone 3. This limit would apply to all building and exterior site lighting.

5. Significance Threshold

Appendix G of the CEQA Guidelines provides a set of sample questions that address impacts with regard to aesthetics, including light and glare. The question that pertains to light and glare is as follows:

Would the project:

- Create a new source of substantial light and glare which would adversely affect day or nighttime views in the area?

In the context of this question from the CEQA Guidelines, the determination of significance shall be made on a case-by case- basis, considering the following factors:

- The change in ambient nighttime levels as a result of project sources; and
- The extent to which project lighting would spill off the project site and affect adjacent light-sensitive areas.

Based on these factors, the regulatory requirements identified above, and IESNA definition of glare, the Project would have a significant light or glare impact on a sensitive receptor (residential uses or commercial or institutional land uses that require minimal night time illumination) if:

- Project Lighting generate light emissions that produces a light intensity exceeding 0.74 foot-candles at the property line of a residence or other sensitive receptor.

- Project Lighting creates new high contrast conditions (contrast ratio over 30:1) visible from a field of view from a residential use or other sensitive receptor.

6. Existing Conditions

Introduction

The existing Site includes the 11 story Chapultepec Residence Hall at 5400 Remington Road and SDSU Parking lots 9 and 10A along Remington Road, as well as open space
6.1 with tall trees to the north.

The existing conditions adjacent to the Project Site are suburban in nature, and include existing single family, low rise residences along Remington Road. and Hewitt Drive to the west, northwest and southwest, multi-family low rise residences to the northeast, and the SDSU Campus to the south and south east. There is significant open space immediately adjacent to the Project Site on the west, northwest, and northeast Project property lines.

The topography of the Project Site and the adjacent Remington Road. is a relatively flat bluff top, at higher elevation than the residential properties to the east, northeast, west, and northwest of the Project Site. The existing Chapultepec Residence Hall is highly visible from surrounding properties to the west, north, and east.

Existing lighting conditions are documented at receptor site locations surrounding the Project Site to comprehensively define the range of existing lighting conditions and views from the surrounding properties and streets to the Project Site. Illuminance (fc) and luminance (cd/m^2) were measured at each Receptor Site in accordance with the procedures outlined in Section 7.1 Methodology, subsections 7.1-1 and 7.1-2 below. Views of the Project site from the adjacent streets are evaluated to determine the visibility of the Project and the surrounding lighting conditions.

The existing conditions data is analyzed in comparison to the Project Lighting, and Project Daylight, as part of the evaluation of the Project's potential light and glare impacts. The
6.2 following section provides a detailed description of each receptor site location and elaborates on the conditions within each receptor site.

Receptor Site Locations

Receptor sites are utilized to evaluate the maximum potential impacts that may result from light, glare, or shadow onto residential properties and roadways surrounding the Project site to the north, east, south, and west. The Residential Receptor site locations are within close proximity of the Project, have views of the Project Site, and are considered existing residential use properties or may be located adjacent to existing residential properties.

The following criteria are used to select potential Receptor Site locations:

- Future Light Visibility – Potential receptor sites are analyzed that provide direct view of the areas of greatest light intensity.

- Proximity – Potential receptor sites at a minimum distance to the Project are analyzed. These locations are selected because light intensity decreases[6] exponentially with distance, locations at a greater distance will experience less light intensity than nearby locations.

Figure 2 illustrates the Project location shaded in red and the surrounding adjacent residential property locations near the Project Site are shaded yellow. Receptor sites are identified with an R prefix followed by an abbreviation for the direction from the Project site (E = East for example), and numbered consecutively.

Receptor Site R-W1: At the west property line of the Project Site near the eastern edge of the residential property line of 5312 Remington Road. Receptor Site R-W1 is located to evaluate the Project at the property line to the west. Site R-W1 is within Project Site within Parking Lot 10A, at the north edge of the parking lot. Distance to the Project west exterior façade is approximately 155 ft.

Receptor Site R-W2: At the west property line of the Project Site, at the eastern edge of the residential property at 5312 Remington Road. Receptor Site R-W2 is located to evaluate the Project at the nearest residential property line to the west. Site R-W2 is within the canyon adjacent to the Project Site property line. Distance to the Project west exterior façade is approximately 158 ft.

Receptor Site R-W3: West of the Project Site at the northwest property line of 5417 Hewlett Drive, at the eastern edge of the Hewlett Drive right of way. Receptor Site R-W3 is located to evaluate the Project at the residential property to the west. Distance to the Project Site is approximately 222 ft. Distance to the Project west exterior façade is approximately 228 ft.

Receptor Site R-W4: West of the Project Site at 5441 Hewlett Drive, at the rear patio of the residence. Receptor Site R-W4 is located to evaluate the Project at the residential property line to the west. Receptor Site R-W4 is located at the southeast corner of 5441 Hewlett Drive. Distance to the Project Site is approximately 119 ft. Distance to the Project west exterior façade is approximately 166 ft.

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[6] *The Inverse Square Law shows that the intensity of light diminishes at the square of the distance traveled. See the definition in Section 2, Glossary of Lighting Terminology for additional discussion.*

Receptor Site R-E1: East of the Project Site, at the west edge of the parking area of 5420 55th Street. Receptor Site R-E1 is located to evaluate the Project within the adjacent properties to the east of the Project Site. Distance to the Project Site is approximately 178 ft. Distance to the Project east exterior façade is approximately 212 ft.

Figure 2: The Project and surrounding locations where lighting is under review

6.3

Criteria

As established in Section 3, the following factors were used to assess the existing conditions at each receptor site

Table 1. Existing Conditions Lighting Criteria

Criteria	Metric	Procedure
Illuminance /Trespass	Measured illuminance (lux/footcandles) documented at each receptor site	Horizontal and vertical illuminance measurements at each receptor site with Minolta illuminance meter.[7]
Glare / Contrast	Observed existing conditions	Observed and recorded conditions with respect to the view to the Project Site from the receptor site in terms of project coverage and context, light sources, lighted surfaces, and illuminated signs.

Analysis of Receptor Site Survey Data

6.4 The existing Project Site conditions and observations are summarized below in relation to the evaluation factors established in Section 5, Significance Threshold:

Illuminance: The Illuminance listed in Table 2 below summarize the measured Illuminance at the receptor sites. The measured illuminance data are consistent with an urban lighting condition, with relatively high illuminance at the street and sidewalk within the public right of way, and high illuminance within the private properties for safety and security. Many of the adjacent commercial properties include illuminated signs which contribute to a relatively bright night environment.

The highest existing horizontal illuminance level was recorded at receptor site R-E1 with 0.351 fc, while the lowest horizontal illuminance was recorded at receptor site R-W2 at 0.115 fc. The highest existing vertical illuminance level was recorded at receptor site R-

7 *Horizontal Illuminance measurements are recorded with the light meter held horizontally and the sensor at 180 degrees to the nadir at 3 feet above grade. Vertical illuminance measurements are recorded with the light meter in the vertical position and the sensor located 90 degrees from nadir at 3 feet above grade. For the Project, the vertical illuminance data is presented to identify the sum of all existing illuminance at the receptor sites from the direction of the Project Site. The existing lights at the Project Site and at the surrounding streets vary in height from grade mounted flood lights to medium height light poles at approximately 25 feet above grade. This range of variation in height produces an angle of incidence to the light meter of less than 10 degrees for receptor sites at 125 feet from the Project Site and less than 5 degrees at distances above 300 feet. Because of these conditions, the vertical illuminance measurements are used in this Report to summarize incident illuminance at the receptor sites and is a more conservative measurement than perpendicular illuminance data.*

E1 with 0.420 fc, while the lowest vertical illuminance was recorded at receptor site R-W2 at 0.039 fc.

Table 2. Summary of Existing Illuminance Measurements at Receptor Sites

Receptor	Illuminance (fc)		Analysis
	Horizontal	Vertical	
R-W1	0.341	0.103	Low illuminance from adjacent parking lot lighting, measured at the north edge of Parking Lot 10A, within the western region of the Project site.
R-W2	0.015	0.180	Low illuminance, measured in the canyon near residential property line at 5312 Remington Road, west Project site property line.
R-W3	0.243	0.062	Low Illuminance, measured at 5417 Hewlett Drive west of the Project site west property line, within the Hewlett Drive right of way.
R-W4	0.017	0.039	Low Illuminance, measured at 5441 Hewlett Drive rear patio west of the Project site west property line
R-E1	0.351	0.420	Moderate illuminance, measured at parking area of 5429 55th Street, east of the Project Site.

Contrast/Glare: The visual evaluation of High, Medium and Low Contrast describes the perception of how bright a visible object appears to the surrounding objects within any given field of view and context. High Contrast indicates a potential glare condition for residential use receptor sites. Table 3 below summarizes the measured luminance at each Receptor site along with qualitative descriptions of the existing conditions. The qualitative summary includes notations regarding the brightness of visible light sources and surrounding illuminated surfaces within the field of view to the Project Site from the Receptor sites, and the visibility of the Project site within the field of view toward the Project.

Table 3: Summary of Existing Luminance and Glare

Receptor	Luminance (cd/m²)		Contrast Ratio (Max / Average)	Analysis
	Average	Maximum		
R-W1	3.82	2043.06	534.4	High Contrast/Glare from existing lights within the Project site and sports field and parking lights in the background. Direct view of Project Site to the east with no obstructions.
R-W2	3.81	823.80	216.1	High Contrast/Glare from existing lights within the Project site and existing parking lot and sports field lights in the background. Direct view of Project Site to the east with obstructions from trees.
R-W3	0.89	389.80	439.1	High Contrast/Glare from existing site and building lighting within the Project Site. Direct view of Project Site to the east with obstructions from trees.
R-W4	8.39	827.30	98.6	High Contrast/Glare from existing lighting within the Project Site and parking and security lights in the distance at 55th Street. Direct view of Project Site to the east with some obstructions from trees.
R-E1	3.22	1724.00	534.7	High Contrast/Glare from existing site and building lighting within the Project Site and sports field and parking lighting in the background. Direct view of Project Site to the west.

Observations from Residential Receptor Sites

Receptor Site R-W1:

Site R-W1 is located adjacent to the west property line of the Project Site near the eastern
6.5 edge of the residential property line of 5312 Remington Road. Receptor Site R-W1 is
located to evaluate the Project at the property line to the west. Site R-W1 is within the
6.5-1 north boundary of SDSU Parking Lot 10A, within the Project Site. Distance to the Project
west exterior façade is approximately 155 ft.

Figure 3: R-W1 Day View:

Date of Measurements: February 23, 2017 2:00 PM; Weather Conditions: Clear

Figure 4: R-W1 Night View

Date of Measurements: February 23, 2017, 6:35 PM; Weather Conditions: Clear, Waxing Gibbous

As shown in Figure 3 and Figure 4, Receptor Site R-W1 has a clear view of a large portion of the Project site and includes a prominent view of the existing Chapultepec Residence Hall at 5400 Remington Road, west façade, and partial south facade. Trees and dense landscape obscure the view to the north of the Receptor Site.

The brightest existing light sources are the stair lights within the building, illuminated
6.5-2 windows, and service lights at grade within the Project site, and adjacent sports field lights
to the south within the University Campus.

Receptor Site R-W2:

Receptor Site R-W2 is located at the west property line of the Project Site, at the eastern edge of the residential property at 5312 Remington Road. Receptor Site R-W2 is located to evaluate the Project at the nearest residential property line to the west. Site R-W2 is within the canyon adjacent to the Project Site property line. Distance to the Project west exterior façade is approximately 158 feet.

As shown in Figure 5 and Figure 6, Receptor Site R-W2 has an obstructed view of the Project site and the existing Chapultepec Residence Hall at 5400 Remington Road, west façade, with trees in the foreground. Trees and dense landscape obscure the view to the north and south of the Receptor Site.

The brightest existing light sources are the parking and street light poles within the Project Site and the sports field lights to the south, and the parking and security lights to the east of the Project Site.

Figure 5: R-W2 day view:

Date of Measurements: February 23, 2017, 2:15 PM; Weather Conditions: Clear

Figure 6: R-W2 night view:

Date of Measurements: February 23, 2017, 7:18 PM; Weather Conditions: Clear, Waxing Gibbous

6.5-3

Receptor Site R-W3:

Receptor Site R-W3 is located west of the Project Site at the northwest property line of 5417 Hewlett Drive, at the eastern edge of the Hewlett Drive right of way. Receptor Site R-W3 is located to evaluate the Project at the residential property to the west. Distance to the Project Site is approximately 222 feet. Distance to the Project west exterior façade is approximately 228 feet.

As shown in Figure 7 and Figure 8, Receptor Site R-W3 has a clear view of the existing Project Site including the Chapultepec Residence Hall at 5400 Remington Road, north and west façades. The view is partially obscured by tall trees to the north and south.

The brightest existing light sources are the existing building stair lights, lights within the building rooms, and parking and street light poles within the Project site.

Figure 7: R-W3 day view:

Date of Measurements: February 23, 2016, 3:17 PM; Weather Conditions: Clear

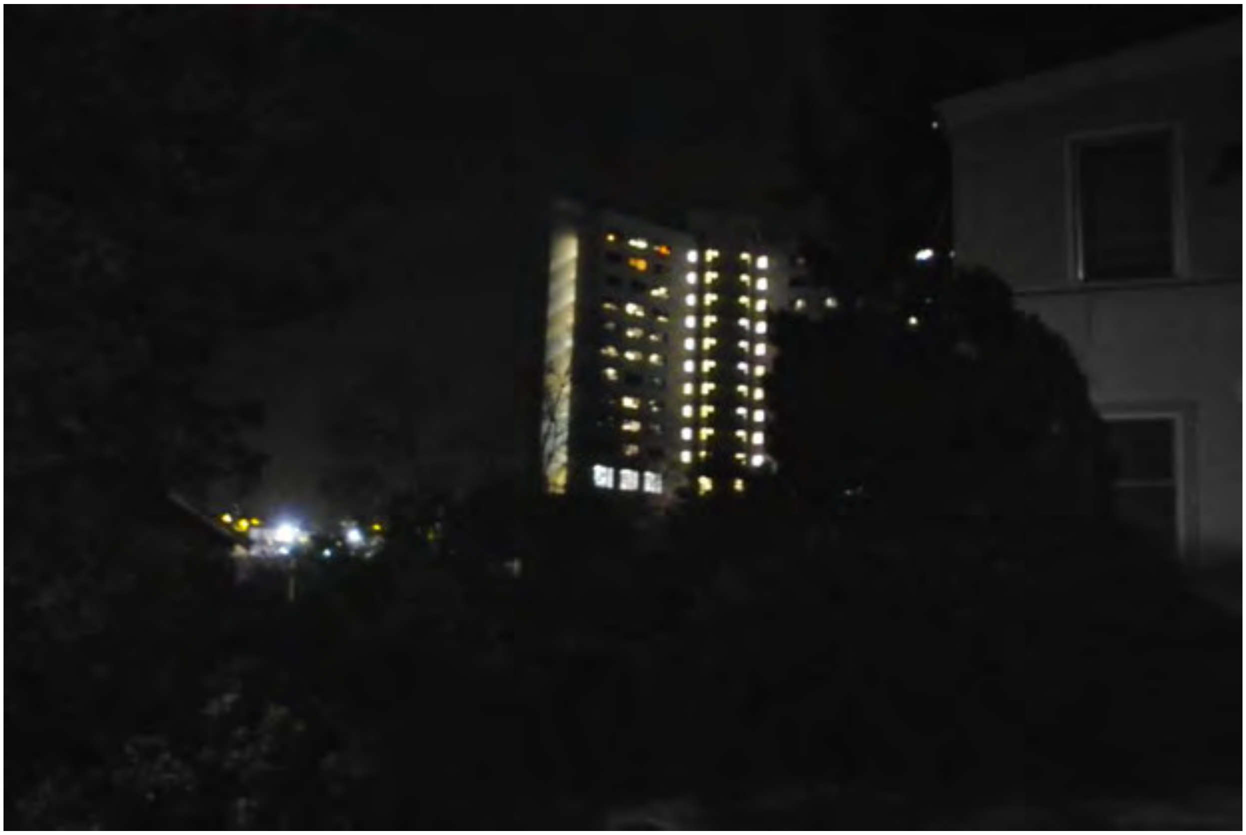


Figure 8: R-W3 night view:

Date of Measurements: February 23, 2017, 7:00 PM; Weather Conditions: Clear, Waxing Gibbous

6.5-4

Receptor Site R-W4:

Receptor Site R-W4 is located west of the Project Site at 5441 Hewlett Drive, at the rear patio of the residence. Receptor Site R-W4 is located to evaluate the Project at the residential property line to the west. Receptor Site R-W4 is located at the southeast corner of 5441 Hewlett Drive. Distance to the Project Site is approximately 119 feet. Distance to the Project west exterior façade is approximately 166 feet.

As shown in Figures 9 and 10, Receptor Site R-W4 has a clear view of the existing Project Site including the Chapultepec Residence Hall at 5400 Remington Road, north, west facades, and a partial view of the east façade. The view is obscured to the south by tall trees.

The brightest existing light sources are the parking and street light poles within the Project site. Lights within the Residence Hall are visible.

Figure 9: R-W4 day view:

Date of Measurements: February 23, 2016, 2:45 PM; Weather Conditions: Clear

Figure 10: R-W4 night view:

Date of Measurements: February 23, 2017, 7:25 PM; Weather Conditions: Clear, Waxing Gibbous

6.5-5

Receptor Site R-E1:

Receptor Site R-E1 is located east of the Project Site, at the western edge of the parking area of the residential property at 5420 55th Street. Receptor Site R-E1 is located to evaluate the Project within the adjacent properties to the east of the Project Site. Distance to the Project Site is approximately 178 feet. Distance to the Project east exterior façade is approximately 212 feet.

As shown in Figures 11 and 12, Receptor Site R-E1 has a clear view of the Project Site including the existing Chapultepec Residence Hall at 5400 Remington Road, east façade, and the surrounding on grade parking lots and open space within the Project Site.

Existing lighting includes exterior parking and security lighting and interior stair and room lighting within the Chapultepec Residence Hall, and SDSU sports field and parking lighting to the south in the background.

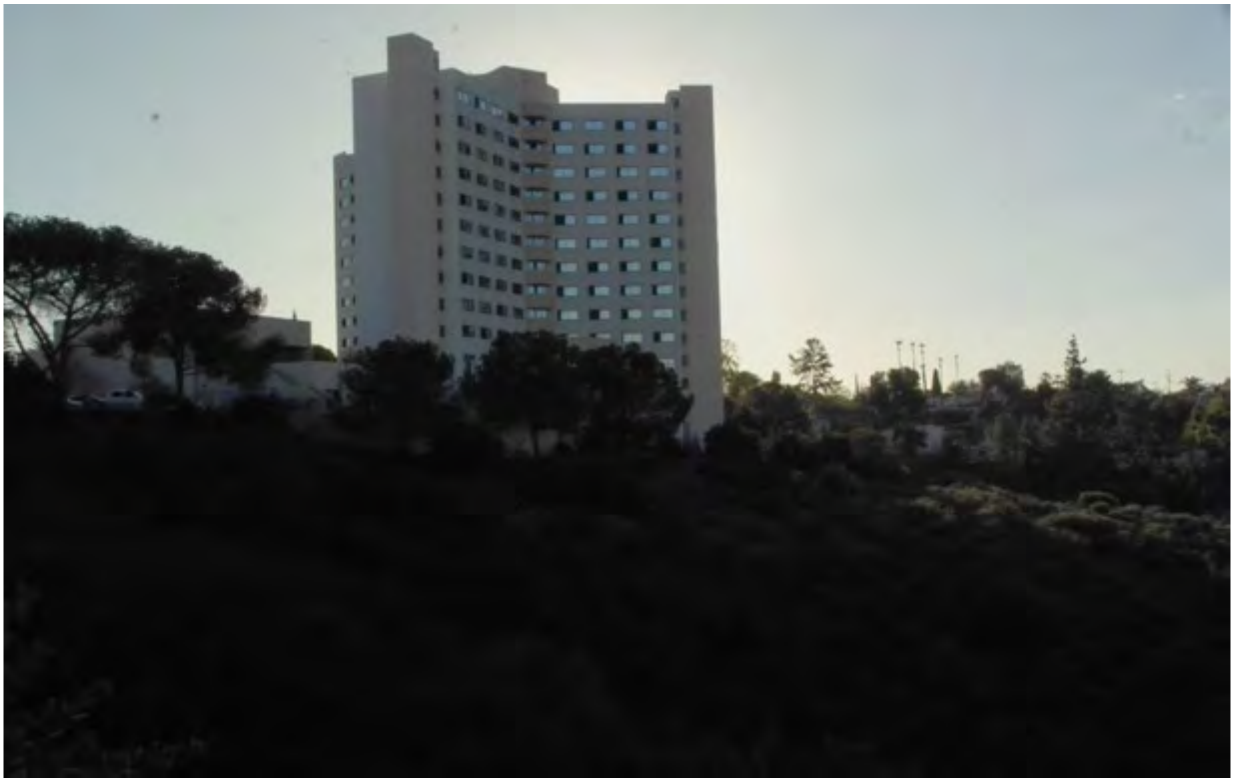


Figure 11: R-E1 day view:

Date of Measurements: February 23, 2017, 4:00 PM; Weather Conditions: Clear

Figure 12: R-E1 night view:

Date of Measurements: February 23, 2017, 8:00 PM; Weather Conditions: Clear, Waning Gibbous

7.1 **7. Environmental Impact Assessment**

Methodology

This Report examines whether the Project Lighting would significantly impact areas beyond the Project Site. The analysis includes a comparison of existing conditions surrounding the Project Site, which are described through field surveys, to the future lighting conditions. Future conditions are assessed through the use of an illuminance calculation model to predict the amount and direction of light, as discussed in Section 7.1712-1 below. The illuminance calculations are presented to predict lighting at the location where lighting is under review to describe the Project performance relative to the significance thresholds identified in Section 5 above.

Existing Conditions Analysis

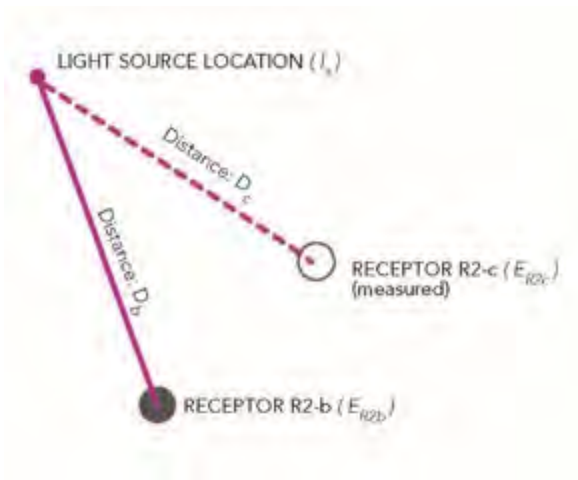
Existing conditions lighting observations were conducted following recommended practice procedures defined by the IESNA in RP-33-00 Lighting for Outdoor Environments, TM-10-00 Addressing Obtrusive Light (Urban Sky Glow and Light Trespass) in Conjunction with Roadway Lighting, and TM-11-00 Light Trespass: Research, Results and Recommendations. Field illuminance and luminance measurements were conducted to accurately document all existing incident and visible light at each receptor site location.

Incident light can be understood as a vector of luminous flux moving through space. As the vector (light) is incident upon a surface, the intensity of the resulting illuminance will vary depending upon the relative orientation of the vector to the surface. The greatest illuminance will result when the surface and vector are perpendicular. The least illuminance will result when the surface and vector are parallel. In the field conditions, where there are multiple sources of light originating from varied positions, illuminance measurements are recorded horizontally with the photosensor facing up at 3 feet above grade, and vertically with the photosensor facing the Project. These measurements document the total horizontal illuminance received at the receptor site as well as the direction and intensity of light converging on the receptor site from direction of the Project Site. Since the receptor sites are located on the opposite side of the public right of way from the Project Site, the vertical illuminance represents a plane perpendicular to the light sources. Under these conditions, there is little difference between the vertical and perpendicular plane and the vertical plane analysis that is conducted in this Report would be equal to or greater than the illuminance from a precisely perpendicular plane analysis would provide. Therefore, this Report utilizes a vertical and horizontal illuminance analysis. The existing Illuminance is measured with a Minolta Illuminance meter.

The existing luminance is measured from the Receptor site to light sources and surfaces within the field of view toward the Project site from the Receptor site. This existing conditions luminance data is measured with a Minolta LS-100 Luminance meter with procedures consistent with best practices for field measurement of luminance as per IESNA standards. The LS-100 meter utilized by Francis Krahe & Associates, Inc. reports luminance data in either candelas per square meter or footlamberts (fL). All existing luminance data measured and reported in this report are recorded as cd/m^2.

Figure 13: Minolta LS-100 meter

At inaccessible locations the calculated illuminance based on the inverse square of the distance as per the equation below:



$$E_{R2c} = I_S / D_c^2 \qquad E_{R2b} = I_S / D_b^2$$

$$E_{R2c} \times D_c^2 = E_{R2b} \times D_b^2 = I_S$$

$$E_{R2b} = E_{R2c} \times (D_c / D_b)^2$$

Figure 14: Calculated illuminance at distance

The above methodology is used to determine illuminance or luminance when distances *Da* and *Db* are known, and illuminance or luminance is measured at an inaccessible location R2-c.

7.1-2 Analysis of Project

The analysis of the Project Lighting includes evaluation of the illuminance light trespass and glare from the Project at the Receptor Sites. The Project Lighting included within the analysis is summarized in Appendix B. The Project Lighting includes the building and architectural lighting which may be included in the Project. The Project Architectural Concept is included in Appendix A and describes the Project building dimensions and massing. The Project Architectural Concept and Lighting Concept are likely over inclusive and assume a greater amount of Project Lighting than will actually be implemented, for the purposes of providing a conservative analysis.

The applicant will be required to demonstrate compliance with the requirements of the California Building Code when building plans are submitted for the Project and Project Lighting. The actual Project and Project Lighting will likely generate far lower illuminance and / or luminance than the lighting that has been modeled, thus, making this a conservative analysis.

7.1-3 Illuminance Light Trespass

Illuminance light trespass at the Receptor Sites is calculated through the illumination modeling software program AGI32 by Lighting Analysts Inc.. This software utilizes the 3-dimensional architectural computer model, including building dimensions and exterior materials, in conjunction with the photometric data of the Project Lighting, and the plan locations and product specifications, to generate an accurate prediction of future illuminance and luminance. The Project is evaluated with respect to horizontal and vertical illuminance at the locations where lighting is under review.

For the analysis of light trespass at the residential properties, the illuminance is calculated at the review locations within a vertical plane from grade up to the maximum height of the proposed Project buildings, with data points calculated at 10 feet on center, vertically and horizontally. The data points are offset by 5 feet vertically and horizontally from the edge of each vertical plane. The calculation plane simulates the illumination (fc) captured by light meters. Figure 15 illustrates the locations where the lighting is under review and where the illuminance is calculated to evaluate light trespass at residential properties.

The evaluation of Project Lighting illuminance light trespass is calculated at six vertical planes located adjacent to the Project property line segments to the west, north, and east to demonstrate compliance with CALGreen requirements for Zone 3 (0.74 fc maximum). The vertical planes for evaluation of the Project Lighting are located as follows: to the west of the Project Site in four segments (vertical planes W1, W2, W3 and W4); and to the east of the Project site in two segments (vertical planes E1, E2).

Figure 15: Illuminance calculation planes where lighting is under review

Glare

The lighting analysis of the Project includes a review of any potential glare impact to residential properties.

The glare from the Project Lighting is evaluated in terms of the visibility of the light sources and the resulting contrast ratio of the proposed Project Lighting to the measured existing
7.1-4 luminance within the field of view, evaluated from the Receptor Sites identified in the field survey of existing conditions in Section 6 above.

The glare from the Project is evaluated in terms of the maximum luminance and the calculated contrast ratio to the measured existing luminance within the field of view from the Receptor Sites identified in the field survey of existing condition.

Lighting Analysis

The analysis of the Project includes calculations for illuminance light trespass, and
7.2 comparisons of luminance to evaluate glare at residential properties. Conservatively, the analysis assumed the simultaneous use of all Project Lighting.

Project Lighting Light Trespass Analysis

7.2-1 The light trespass from the Project Lighting is evaluated by way of the calculated illuminance (fc) according to the methodology defined above at the Receptor Site locations where lighting is under review. The resulting illuminance from the Project Lighting is presented in Table 4. The results of the analysis demonstrate the Project Lighting light trespass impacts resulting from the proposed Project at the position where light is under review are below the significance threshold of 0.74 foot-candles.

Project Lighting must conform to the requirements of CALGreen, which stipulates the light from the Project building and site lighting must not exceed 0.74 fc at the Project boundary, which is identified as the adjacent property line to the west, south, east, and north of the Project site. Vertical planes W1, W2, W3, W4, E1, and E2 are located at the adjacent property line to present the calculated illuminance from the Project Lighting where the CALGreen standard applies. These vertical planes are substantially closer to the Project site than the sensitive residential receptor locations, therefore these vertical calculation planes present a very conservative analysis.

The calculations for Project Lighting illuminance include the lighting equipment required to provide the appropriate illumination for this facility, which will be designed to provide site and interior lighting as required by code and by best practice. The Project Lighting Concept is included in Appendix B.

Building Lighting must comply with the light trespass limits stipulated by CALGreen, and will therefore require a method to restrict reflected light from the Project to illuminance less than 0.74 fc at the Vertical Planes. Methods to limit the illuminance at vertical planes may include lights directed away from the adjacent property lines, architectural shading structures, vertical louvers, shading systems deployed while the lights are active, or addition of an architectural screen to further shield the light from Project. One method for meeting CALGreen requirements is shown in Appendix B. The summary of the illuminance calculations data is presented below in Table 4, which shows that all lighting levels would be below the CEQA significance thresholds.

Table 4: Project Lighting Illuminance (fc)

Vertical Plane	Threshold E_V (fc)	Project Illuminance E_V (fc)			Analysis
		Maximum	Minimum	Average	
W1	0.74	0.10	0.00	0.01	Below Threshold
W2	0.74	0.20	0.00	0.08	Below Threshold
W3	0.74	0.60	0.10	0.21	Below Threshold
W4	0.74	0.50	0.00	0.12	Below Threshold
E1	0.74	0.70	0.00	0.16	Below Threshold
E2	0.74	0.40	0.00	0.18	Below Threshold

Incident light (fc) from a source degrades in proportion to the inverse square of the distance from the source to the location where lighting is under review. The illuminance E_V (fc) incident at any given distance D (feet) from an illuminated surface S (feet^2) with uniform surface luminance of L (cd/m^2) is calculated by the following formula:

$$E_V = \frac{L \times S}{10.76 \times D^2}$$

This formula illustrates the reduction in illuminance at any location as the distance increases from a source surface. The largest area light sources produce the greatest distance from the Project where the illuminance will be equal to or greater than 0.74 fcs.

More distant residential properties will receive less light from the Project due to the increased distance. Therefore, the Project will not produce a significant light trespass impact to any residential properties.

As the maximum light trespass illuminance for the Project is below the threshold of 0.74 fc at the adjacent property line as analyzed in Table 4, light trespass levels would be even lower at the adjacent residences. Illuminance from the Project will decrease in proportion to the inverse square of the distance. Therefore, the illuminance from the Project at the

Receptor Sites will be substantially lower than the calculated values at the vertical planes adjacent to the Project.

Project Lighting Glare Analysis

The Project Lighting may be visible from the residential Receptor Sites to the west, north west, and southeast of the Project Site. The requirements defined in California Green Building Standards Code (Title 24, Part 11), Table 5.106.8, for Lighting Zone 2, stipulates
7.2-2 backlight, uplight, and glare requirements for all exterior lighting to reduce the brightness visible from adjacent properties. For Zone 2, the maximum allowable glare ratings is G2, which allows up to 375 zonal lumens for either BVH or FVH zones. The 375 lumen maximum light output is comparable to an approximately 30 cd/m^2 surface luminance for a light source area approaching 1 m^2. To provide a conservative analysis a maximum permitted Project Lighting luminance of 60 cd/m^2 is used in the Contrast Ratio Glare analysis. The Contrast Ratio of the Project Lighting to the average measured existing luminance is presented in Table 5 below, which indicates extremely low contrast ratios, and no new sources of glare.

The Project Lighting which may be visible from the Residential Receptor sites is evaluated in comparison to the existing average measured luminance observed during the field surveys as noted in Section 6 above and as summarized in Table 5 below. The existing lighting surrounding the Project site includes sports lights for the adjacent stadium to the south of the Project Site and parking lot lights and street lights on Remington Rd.

Table 5: Project Lighting Luminance (cd/m^2) – Analysis of existing measured to Project Lighting

Receptor	Description	Existing Measured Luminance (cd/m^2)		Project Lighting Luminance (cd/m^2)	Contrast Ratio (Project Max / Existing Average)	Analysis
		Average	Maximum	Maximum		
R-W1	roadway; commercial adjacent	306	1900	60	0.2	Low Contrast, No Glare
R-W2	residential adjacent	615	2937	60	0.1	Low Contrast, No Glare
R-W3	roadway; residential adjacent	57	330	60	1.0	Low Contrast, No Glare
R-W4	residential adjacent	176	1541	60	0.3	Low Contrast, No Glare

R-E1	roadway; residential adjacent	87	498	60	0.7	Low Contrast, No Glare

The Contrast Ratio is the ratio of Project Lighting Maximum Luminance to the Existing Measured Luminance Average. Contrast Ratios less than 30:1 are considered medium contrast, and will not introduce a new source of glare. Contrast Ratios less than 10:1 are considered low contrast, and will not introduce a new source of glare.

The California Green Building Standards Code BUG rating limits the Project Lighting luminance to an acceptable contrast range relative to the existing brightness visible from the Receptor Sites. For all Receptor Sites the Project Lighting Luminance presents a Low Contrast condition, less than a 10 to 1 contrast ratio. The Project lighting will be shielded and directed down and away from the adjacent property lines in order to satisfy the requirements of CALGREEN. The lighting within the Project building interior must also be designed to meet the CALGREEN light trespass and glare requirements, and will therefore be much less bright than the existing conditions. Therefore, the Project Lighting will not introduce a new source of high contrast or glare.

8. Conclusion

The Project and Project Lighting may be visible from the residential sites to the southwest, west, and east of the Project site and from surrounding adjacent streets. This Report analyzes the potential light trespass or glare at nearby residential properties.

The Project Lighting is designed to comply with the requirements for light trespass and glare identified by CALGreen, which requires all light fixtures to limit light beyond the Project property line to 0.74 fc, and to utilize light fixtures that limit glare according to the Backlight, Uplight and Glare (BUG) ratings identified by CALGreen. The Project will comply with these requirements. The Project Lighting is also below the CEQA threshold of 0.74 fc for light trespass at the adjacent residential properties, and will not present a new source of high contrast or glare for potentially affected Receptor sites.

Furthermore, the comparison of the measured existing illuminance and calculated Project illuminance indicates the Project will not introduce a new source of glare.

The lighting impacts resulting from the proposed Project evaluated in this Report would be less than significant.

APPENDIX A: Project Description and Illustrative Plan

Figure 16: Project Illustrative Plan

APPENDIX B: Project Lighting

The following diagram illustrates the Project Lighting included within the illuminance calculations as the basis of the analysis for light trespass and glare in Sections 7.2-1 and 7.2-3, 8 above.

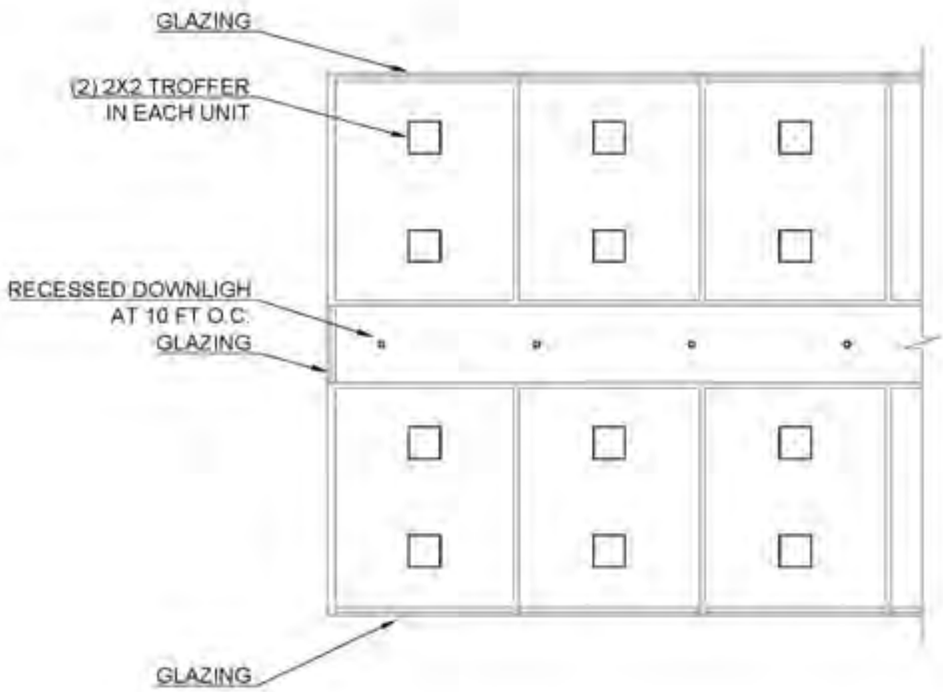


Figure 17: Project Typical Floor Interior Unit Lighting Layout

APPENDIX C: 2016 California Green Building Standards Code Section 5.106.8

NONRESIDENTIAL MANDATORY MEASURES

vides helpful information for local governments, residents and businesses. www.opr.ca.gov/docs/ZEV_Guidebook.pdf.

5.106.8 Light pollution reduction. [N] Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the *California Energy Code* for Lighting Zones 1-4 as defined in Chapter 10 of the California Administrative Code; and
2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and
3. Allowable BUG ratings not exceeding those shown in Table 5.106.8, or

Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

Exceptions: [N]

1. Luminaires that qualify as exceptions in Section 140.7 of the *California Energy Code*.
2. Emergency lighting.

Note: [N] See also *California Building Code*, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.

5.106.10 Grading and paving. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales.
2. Water collection and disposal systems.
3. French drains.
4. Water retention gardens.
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

TABLE 5.106.8 [N]
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS[1,2]

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating[3]				
Luminaire greater than 2 mounting heights (MH) from property line	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	B0	B0	B1	B2
Maximum Allowable Uplight Rating				
For area lighting[4]	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	U1	U2	U3	U4
Maximum Allowable Glare Rating[5]				
Luminaire greater than 2 MH from property line	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code*.
2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
3. If the nearest property line is less than or equal to two mounting heights from the back hemisphere of the luminaire distribution, the applicable reduced Backlight rating shall be met.
4. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaires located in these areas shall meet *U*-value limits for "all other outdoor lighting."
5. If the nearest property line is less than or equal to two mounting heights from the front hemisphere of the luminaire distribution, the applicable reduced Glare rating shall be met.

34 JULY 1, 2015 SUPPLEMENT BLUE 2013 CALIFORNIA GREEN BUILDING STANDARDS CODE

Figure 18: 2016 California Green Building Standards Code, July 1, 2015 Supplement Blue, page 34

APPENDIX D: IESNA Light Trespass

The IESNA 10th Edition Lighting Handbook, Table 26.4, Nighttime Outdoor Lighting Zone Definitions

Table 26.4 | Nighttime Outdoor Lighting Zone Definitions

Zone	Outdoor Lighting Situation	Definition
LZ4	High Ambient Lighting	Areas of human activity where the vision of human residents and users is adapted to high light levels. Lighting is generally considered necessary for safety, security and/or convenience and it is mostly uniform and/or continuous. After curfew, lighting may be extinguished or reduced in some areas as activity levels decline.
LZ3	Moderately High Ambient Lighting	Areas of human activity where the vision of human residents and users is adapted to moderately high light levels. Lighting is generally desired for safety, security and/or convenience and it is often uniform and/or continuous. After curfew, lighting may be extinguished or reduced in most areas as activity levels decline.
LZ2	Moderate Ambient Lighting	Areas of human activity where the vision of human residents and users is adapted to moderate light levels. Lighting may typically be used for safety and convenience but it is not necessarily uniform or continuous. After curfew, lighting may be extinguished or reduced as activity levels decline.
LZ1	Low Ambient Lighting	Areas where lighting might adversely affect flora and fauna or disturb the character of the area. The vision of human residents and users is adapted to low light levels. Lighting may be used for safety and convenience but it is not necessarily uniform or continuous. After curfew, most lighting should be extinguished or reduced as activity levels decline.
LZ0	No Ambient Lighting	Areas where the natural environment will be seriously and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and/or detracting from human enjoyment and appreciation of the natural environment. Human activity is subordinate in importance to nature. The vision of human residents and users is adapted to the darkness, and they expect to see little or no lighting. When not needed, lighting should be extinguished.

Figure 19: IESNA Table 26.4

The IESNA 10th Edition Lighting Handbook, Table 26.5, Recommended Light Trespass Illuminance Limits

Table 26.5 | Recommended Light Trespass Illuminance Limits

	Limit in lux[a]	
Lighting Zone	Pre-curfew	Post-curfew
LZ4	15	6
LZ3	8	3
LZ2	3	1
LZ1	1	0
LZ0	0.1	0

a. Maximum initial illuminance on a plane perpendicular to the line of sight to the luminaire(s). Plane located at observer position where light trespass is under review. [7]

Figure 20: IESNA Table 26.5

APPENDIX E: Project Lighting Illuminance Calculation Data

Data presented below is derived from the lighting illuminance calculations prepared as per the methods described in Section 7above. Illuminance data is presented in the following tables with location coordinates defined relative to the elevation and horizontal distance from lower left viewing from the Project site to the vertical plane where light trespass is under review. Grid data is displayed at ten feet on center, vertical and horizontal.

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W1

VERTICAL (ft) \ HORIZONTAL (ft)	0	10	20	30	40	50	60	70
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W1

VERTICAL (ft) \ HORIZONTAL (ft)	80	90
170	0.00	0.00
160	0.00	0.00
150	0.00	0.00
140	0.00	0.00
130	0.00	0.00
120	0.00	0.10
110	0.00	0.10
100	0.00	0.10
90	0.10	0.10
80	0.10	0.10
70	0.10	0.10
60	0.10	0.10
50	0.10	0.10
40	0.10	0.10
30	0.10	0.10
20	0.10	0.10
10	0.10	0.10
0	0.10	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W2

VERTICAL (ft) \ HORIZONTAL (ft)	0	10	20	30	40	50	60	70
220	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
210	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
200	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
190	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
180	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
170	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
160	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
150	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10
140	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
130	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
120	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
110	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
100	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
90	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
80	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
70	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
60	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
50	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
40	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
30	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
20	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
10	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10
0	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W2

VERTICAL (ft) \ HORIZONTAL (ft)	80	90	100	110	120	130
220	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10
170	0.10	0.10	0.10	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10
130	0.10	0.10	0.10	0.10	0.10	0.20
120	0.10	0.10	0.10	0.10	0.20	0.20
110	0.10	0.10	0.10	0.20	0.20	0.20
100	0.10	0.10	0.20	0.20	0.20	0.20
90	0.10	0.10	0.10	0.20	0.20	0.20
80	0.10	0.10	0.10	0.20	0.20	0.20
70	0.10	0.10	0.10	0.10	0.20	0.20
60	0.10	0.10	0.10	0.10	0.10	0.20
50	0.10	0.10	0.10	0.10	0.10	0.10
40	0.10	0.10	0.10	0.10	0.10	0.20
30	0.10	0.10	0.10	0.10	0.10	0.10
20	0.10	0.10	0.10	0.10	0.10	0.10
10	0.10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.10	0.10	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W3

VERTICAL (ft) / HORIZONTAL (ft)	0	10	20	30	40	50	60	70
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
140	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10
130	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.20
120	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.20
110	0.20	0.20	0.20	0.20	0.20	0.10	0.20	0.20
100	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
90	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
80	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
70	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
60	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
50	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20
10	0.20	0.20	0.10	0.10	0.10	0.20	0.20	0.20
0	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.20

APPENDIX E

ILLUMINANCE (fc):

Vertical Plane W3

VERTICAL (ft) \ HORIZONTAL (ft)	80	90	100	110	120	130	140	150
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20
160	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20
150	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.20
140	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
120	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30
110	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30
100	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
90	0.20	0.20	0.20	0.20	0.30	0.40	0.40	0.40
80	0.20	0.20	0.20	0.30	0.30	0.40	0.40	0.40
70	0.20	0.20	0.20	0.30	0.30	0.40	0.50	0.50
60	0.30	0.30	0.30	0.30	0.40	0.40	0.50	0.50
50	0.30	0.30	0.30	0.30	0.40	0.40	0.50	0.60
40	0.30	0.30	0.30	0.30	0.40	0.40	0.50	0.50
30	0.30	0.30	0.30	0.30	0.40	0.40	0.50	0.50
20	0.30	0.30	0.30	0.30	0.40	0.40	0.50	0.50
10	0.30	0.30	0.30	0.30	0.30	0.40	0.50	0.50
0	0.30	0.30	0.30	0.30	0.30	0.40	0.40	0.50

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W3

VERTICAL (ft) \ HORIZONTAL (ft)	160	170	180	190	200	210	220	230
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.20	0.10	0.10	0.10	0.10	0.10	0.20	0.20
160	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20
150	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
140	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
120	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20
110	0.30	0.30	0.30	0.20	0.20	0.20	0.20	0.20
100	0.30	0.30	0.30	0.30	0.20	0.20	0.20	0.20
90	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.20
80	0.40	0.40	0.40	0.30	0.20	0.20	0.30	0.30
70	0.50	0.50	0.40	0.30	0.20	0.20	0.30	0.30
60	0.60	0.50	0.40	0.30	0.30	0.30	0.30	0.30
50	0.60	0.50	0.40	0.40	0.30	0.30	0.30	0.30
40	0.60	0.50	0.40	0.40	0.30	0.30	0.30	0.30
30	0.50	0.50	0.50	0.40	0.30	0.30	0.40	0.40
20	0.50	0.50	0.40	0.40	0.30	0.40	0.40	0.40
10	0.50	0.50	0.40	0.40	0.40	0.40	0.40	0.40
0	0.40	0.50	0.40	0.40	0.40	0.40	0.40	0.40

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W4

VERTICAL (ft) \ HORIZONTAL (ft)	0	10	20	30	40	50	60	70
280	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
270	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
260	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
250	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
190	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
180	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
170	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
160	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
150	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
140	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
120	0.30	0.20	0.20	0.20	0.30	0.30	0.30	0.30
110	0.30	0.20	0.20	0.20	0.30	0.30	0.30	0.30
100	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
90	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
80	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
70	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30
60	0.40	0.40	0.30	0.30	0.30	0.30	0.30	0.30
50	0.40	0.40	0.40	0.30	0.30	0.30	0.30	0.30
40	0.50	0.40	0.40	0.30	0.30	0.30	0.30	0.30
30	0.50	0.40	0.40	0.30	0.30	0.20	0.30	0.30
20	0.00	0.40	0.40	0.30	0.20	0.20	0.20	0.20
10	0.50	0.40	0.40	0.30	0.20	0.20	0.20	0.20
0	0.50	0.40	0.40	0.30	0.20	0.20	0.20	0.20

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W4

VERTICAL (ft) \ HORIZONTAL (ft)	80	90	100	110	120	130	140	150
280	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
270	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
260	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
250	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
160	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
150	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
140	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10
130	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10
120	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10
110	0.30	0.20	0.20	0.20	0.20	0.20	0.10	0.10
100	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20
90	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20
80	0.30	0.30	0.20	0.20	0.20	0.20	0.20	0.20
70	0.30	0.30	0.20	0.20	0.20	0.20	0.20	0.20
60	0.30	0.30	0.20	0.20	0.20	0.20	0.20	0.20
50	0.30	0.30	0.30	0.20	0.20	0.20	0.20	0.20
40	0.30	0.30	0.30	0.20	0.20	0.20	0.20	0.20
30	0.20	0.30	0.30	0.30	0.30	0.20	0.20	0.20
20	0.20	0.30	0.30	0.30	0.30	0.30	0.20	0.20
10	0.20	0.20	0.30	0.30	0.30	0.30	0.30	0.30
0	0.20	0.30	0.00	0.30	0.30	0.30	0.30	0.30

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APPENDIX E

ILLUMINANCE (fc):

Vertical Plane W4

VERTICAL (ft) \ HORIZONTAL (ft)	160	170	180	190	200	210	220	230
280	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
270	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
260	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
250	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
120	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
110	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
100	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
90	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
80	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
70	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
60	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10
50	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10
40	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10
30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
0	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20

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APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W4

VERTICAL (ft)

HORIZONTAL (ft)	240	250	260	270	280	290	300	310
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
260	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
230	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
220	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
210	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
200	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
190	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
180	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
170	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
160	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
150	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
140	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00
130	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
120	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
110	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
100	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
90	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
80	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
70	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
60	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
50	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
40	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00
30	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00
20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane W4

VERTICAL (ft) \ HORIZONTAL (ft)	320	330	340	350	360
280	0.00	0.00	0.00	0.00	0.00
270	0.00	0.00	0.00	0.00	0.00
260	0.00	0.00	0.00	0.00	0.00
250	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00
230	0.00	0.00	0.00	0.00	0.00
220	0.00	0.00	0.00	0.00	0.00
210	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00
190	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00
40	0.10	0.00	0.00	0.00	0.00
30	0.10	0.00	0.10	0.00	0.00
20	0.10	0.10	0.10	0.10	0.00
10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.10	0.10

APPENDIX E

ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	0	10	20	30	40	50	60	70
280	0.50	0.40	0.40	0.30	0.20	0.20	0.20	0.20
270	0.50	0.40	0.40	0.30	0.20	0.20	0.20	0.20
260	0.00	0.40	0.40	0.30	0.20	0.20	0.20	0.20
250	0.50	0.40	0.40	0.30	0.30	0.20	0.30	0.30
240	0.50	0.40	0.40	0.30	0.30	0.30	0.30	0.30
230	0.40	0.40	0.40	0.30	0.30	0.30	0.30	0.30
220	0.40	0.40	0.30	0.30	0.30	0.30	0.30	0.30
210	0.40	0.30	0.30	0.30	0.30	0.30	0.30	0.30
200	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
190	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
180	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
170	0.30	0.20	0.20	0.20	0.30	0.30	0.30	0.30
160	0.30	0.20	0.20	0.20	0.30	0.30	0.30	0.30
150	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
140	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
120	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
110	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
100	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
90	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
80	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
70	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
60	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
50	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
40	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
30	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

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APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	80	90	100	110	120	130	140	150
280	0.20	0.30	0.00	0.30	0.00	0.00	0.00	0.00
270	0.20	0.20	0.30	0.30	0.00	0.00	0.00	0.00
260	0.20	0.30	0.30	0.30	0.00	0.00	0.00	0.00
250	0.20	0.30	0.30	0.30	0.00	0.00	0.00	0.00
240	0.30	0.30	0.30	0.20	0.00	0.00	0.00	0.00
230	0.30	0.30	0.30	0.20	0.00	0.00	0.00	0.00
220	0.30	0.30	0.20	0.20	0.00	0.00	0.00	0.00
210	0.30	0.30	0.20	0.20	0.00	0.00	0.00	0.00
200	0.30	0.30	0.20	0.20	0.00	0.00	0.00	0.00
190	0.30	0.20	0.20	0.20	0.00	0.00	0.00	0.00
180	0.30	0.20	0.20	0.20	0.00	0.00	0.00	0.00
170	0.30	0.20	0.20	0.20	0.00	0.00	0.00	0.00
160	0.20	0.20	0.20	0.20	0.00	0.00	0.00	0.00
150	0.20	0.20	0.20	0.10	0.00	0.00	0.00	0.00
140	0.20	0.20	0.20	0.10	0.00	0.00	0.00	0.00
130	0.20	0.20	0.10	0.10	0.00	0.00	0.00	0.00
120	0.20	0.20	0.10	0.10	0.00	0.00	0.00	0.00
110	0.20	0.20	0.10	0.10	0.00	0.00	0.00	0.00
100	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
90	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
80	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
70	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
60	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
50	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
40	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
30	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
20	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
10	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
0	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.10

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APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	160	170	180	190	200	210	220	230
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
270	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
260	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
250	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
90	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
80	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
70	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
60	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10
50	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
40	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
30	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

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APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	240	250	260	270	280	290	300	310
280	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
270	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.10
260	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10
250	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10
240	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
230	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
220	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
210	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10
200	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
120	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
110	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
100	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
90	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
80	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
70	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
60	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20
50	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20
40	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.20
30	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20
20	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20
10	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.20
0	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.20

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	320	330	340	350	360	370	380	390
280	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
270	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
260	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
250	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20
180	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20
170	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.20
160	0.10	0.10	0.10	0.10	0.20	0.30	0.30	0.30
150	0.10	0.10	0.10	0.20	0.20	0.30	0.40	0.40
140	0.10	0.10	0.10	0.20	0.30	0.40	0.50	0.50
130	0.10	0.10	0.10	0.20	0.30	0.50	0.60	0.50
120	0.10	0.10	0.10	0.20	0.30	0.50	0.70	0.60
110	0.10	0.10	0.10	0.20	0.30	0.50	0.60	0.70
100	0.10	0.10	0.10	0.20	0.30	0.40	0.60	0.70
90	0.10	0.10	0.10	0.20	0.30	0.40	0.60	0.60
80	0.10	0.10	0.10	0.20	0.30	0.40	0.50	0.60
70	0.10	0.10	0.10	0.20	0.30	0.40	0.50	0.60
60	0.10	0.10	0.10	0.20	0.30	0.40	0.50	0.60
50	0.20	0.20	0.10	0.10	0.30	0.40	0.50	0.50
40	0.20	0.20	0.10	0.10	0.20	0.30	0.40	0.40
30	0.20	0.20	0.10	0.10	0.20	0.30	0.30	0.40
20	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.30
10	0.20	0.30	0.20	0.20	0.10	0.10	0.10	0.20
0	0.20	0.30	0.20	0.20	0.20	0.20	0.20	0.20

APPENDIX E

ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	400	410	420	430	440	450	460	470
280	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
270	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
260	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
250	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.10
180	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
170	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
160	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.20
150	0.40	0.40	0.40	0.30	0.30	0.30	0.30	0.20
140	0.50	0.40	0.40	0.40	0.30	0.30	0.30	0.30
130	0.50	0.50	0.50	0.40	0.40	0.40	0.30	0.30
120	0.60	0.60	0.50	0.50	0.40	0.40	0.40	0.30
110	0.70	0.70	0.60	0.50	0.50	0.40	0.40	0.30
100	0.70	0.70	0.70	0.60	0.60	0.50	0.40	0.40
90	0.70	0.70	0.70	0.70	0.60	0.50	0.50	0.40
80	0.60	0.70	0.60	0.70	0.60	0.50	0.50	0.40
70	0.60	0.60	0.60	0.70	0.60	0.60	0.50	0.50
60	0.60	0.60	0.60	0.70	0.60	0.60	0.50	0.50
50	0.60	0.60	0.60	0.60	0.60	0.50	0.50	0.50
40	0.50	0.50	0.60	0.50	0.50	0.50	0.50	0.40
30	0.40	0.50	0.50	0.50	0.50	0.40	0.40	0.40
20	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.30
10	0.30	0.40	0.40	0.40	0.40	0.40	0.40	0.30
0	0.20	0.30	0.30	0.30	0.40	0.40	0.30	0.30

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E1

VERTICAL (ft) \ HORIZONTAL (ft)	480	490	500	510	520	530	540	550
280	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
270	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00
260	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
250	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
240	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
230	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
220	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
210	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
200	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
190	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
150	0.20	0.20	0.20	0.10	0.10	0.10	0.10	0.10
140	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10
130	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10
120	0.30	0.20	0.20	0.20	0.20	0.10	0.10	0.10
110	0.30	0.20	0.20	0.20	0.20	0.10	0.10	0.10
100	0.30	0.30	0.20	0.20	0.20	0.10	0.10	0.10
90	0.40	0.30	0.20	0.20	0.20	0.20	0.10	0.10
80	0.40	0.30	0.30	0.20	0.20	0.20	0.10	0.10
70	0.40	0.30	0.30	0.20	0.20	0.20	0.20	0.10
60	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.10
50	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.20
40	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.20
30	0.40	0.30	0.30	0.30	0.20	0.20	0.20	0.20
20	0.30	0.30	0.30	0.30	0.20	0.20	0.20	0.20
10	0.30	0.30	0.30	0.20	0.20	0.20	0.20	0.20
0	0.30	0.30	0.20	0.20	0.20	0.20	0.20	0.20

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E1

HORIZONTAL (ft)		560	570
VERTICAL (ft)	280	0.00	0.00
	270	0.00	0.00
	260	0.00	0.00
	250	0.10	0.10
	240	0.10	0.10
	230	0.10	0.10
	220	0.10	0.10
	210	0.10	0.10
	200	0.10	0.10
	190	0.10	0.10
	180	0.10	0.10
	170	0.10	0.10
	160	0.10	0.10
	150	0.10	0.10
	140	0.10	0.10
	130	0.10	0.10
	120	0.10	0.10
	110	0.10	0.10
	100	0.10	0.10
	90	0.10	0.10
	80	0.10	0.10
	70	0.10	0.10
	60	0.10	0.10
	50	0.10	0.10
	40	0.10	0.10
	30	0.10	0.10
	20	0.10	0.10
	10	0.10	0.10
	0	0.10	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	0	10	20	30	40	50	60	70
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10
170	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20
120	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.20
110	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.30
100	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
90	0.20	0.20	0.30	0.30	0.30	0.30	0.30	0.40
80	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.40
70	0.20	0.20	0.20	0.30	0.30	0.30	0.40	0.40
60	0.20	0.20	0.30	0.30	0.30	0.30	0.40	0.40
50	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.40
40	0.10	0.20	0.20	0.20	0.20	0.30	0.30	0.30
30	0.10	0.20	0.20	0.20	0.20	0.20	0.30	0.30
20	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.30
10	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20
0	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10

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APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	80	90	100	110	120	130	140	150
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
170	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
120	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
110	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
100	0.30	0.40	0.40	0.40	0.40	0.40	0.40	0.40
90	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
80	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
70	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
60	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.30
50	0.40	0.40	0.40	0.40	0.40	0.40	0.30	0.30
40	0.30	0.30	0.30	0.30	0.40	0.30	0.30	0.30
30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.20
20	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.20
10	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	160	170	180	190	200	210	220	230
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.10	0.10	0.10	0.10	0.00	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.20	0.20	0.10	0.10	0.10	0.10	0.10	0.10
120	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10
110	0.30	0.30	0.20	0.20	0.20	0.20	0.10	0.10
100	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.20
90	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.20
80	0.30	0.40	0.30	0.30	0.20	0.20	0.10	0.10
70	0.30	0.40	0.30	0.30	0.20	0.20	0.10	0.10
60	0.30	0.30	0.30	0.30	0.20	0.20	0.10	0.10
50	0.30	0.30	0.30	0.20	0.20	0.20	0.10	0.10
40	0.30	0.30	0.30	0.20	0.20	0.10	0.10	0.10
30	0.20	0.30	0.20	0.20	0.10	0.10	0.10	0.10
20	0.20	0.20	0.20	0.20	0.10	0.10	0.10	0.10
10	0.10	0.20	0.10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	240	250	260	270	280	290	300	310
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10
170	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20
120	0.10	0.10	0.20	0.20	0.20	0.20	0.30	0.30
110	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
100	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.30
90	0.20	0.20	0.20	0.30	0.30	0.30	0.30	0.30
80	0.20	0.20	0.20	0.30	0.30	0.30	0.40	0.40
70	0.10	0.20	0.20	0.30	0.30	0.30	0.40	0.40
60	0.10	0.20	0.20	0.30	0.30	0.30	0.30	0.30
50	0.10	0.20	0.20	0.20	0.30	0.30	0.30	0.30
40	0.10	0.10	0.20	0.20	0.20	0.30	0.30	0.30
30	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.20
20	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20
10	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.10
0	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10

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APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	320	330	340	350	360	370	380	390
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
160	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
120	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
110	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
100	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
90	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.30
80	0.40	0.40	0.40	0.40	0.30	0.40	0.40	0.40
70	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
60	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
50	0.30	0.30	0.30	0.40	0.40	0.40	0.40	0.30
40	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
30	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30
20	0.20	0.30	0.30	0.30	0.30	0.30	0.30	0.30
10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.10

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	400	410	420	430	440	450	460	470
190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00
160	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00
150	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
140	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
130	0.20	0.20	0.20	0.20	0.20	0.10	0.10	0.10
120	0.30	0.30	0.20	0.20	0.20	0.20	0.10	0.10
110	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.10
100	0.30	0.30	0.30	0.30	0.30	0.30	0.20	0.10
90	0.40	0.40	0.30	0.30	0.30	0.30	0.20	0.10
80	0.40	0.40	0.30	0.30	0.30	0.20	0.20	0.10
70	0.40	0.40	0.30	0.20	0.20	0.20	0.10	0.10
60	0.40	0.40	0.30	0.30	0.20	0.20	0.20	0.10
50	0.30	0.30	0.30	0.30	0.20	0.20	0.20	0.10
40	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.10
30	0.20	0.20	0.20	0.20	0.10	0.20	0.10	0.10
20	0.30	0.20	0.20	0.20	0.20	0.20	0.10	0.10
10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00
0	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00

APPENDIX E
ILLUMINANCE (fc):

Vertical Plane E2

VERTICAL (ft) \ HORIZONTAL (ft)	480	490
190	0.00	0.00
180	0.00	0.00
170	0.00	0.00
160	0.00	0.00
150	0.10	0.00
140	0.10	0.10
130	0.10	0.10
120	0.10	0.10
110	0.10	0.10
100	0.10	0.10
90	0.10	0.10
80	0.10	0.10
70	0.10	0.10
60	0.10	0.10
50	0.10	0.10
40	0.10	0.10
30	0.10	0.00
20	0.10	0.00
10	0.00	0.00
0	0.00	0.00

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