

Triangle Square Center Digital Signage Impact Lighting Analysis

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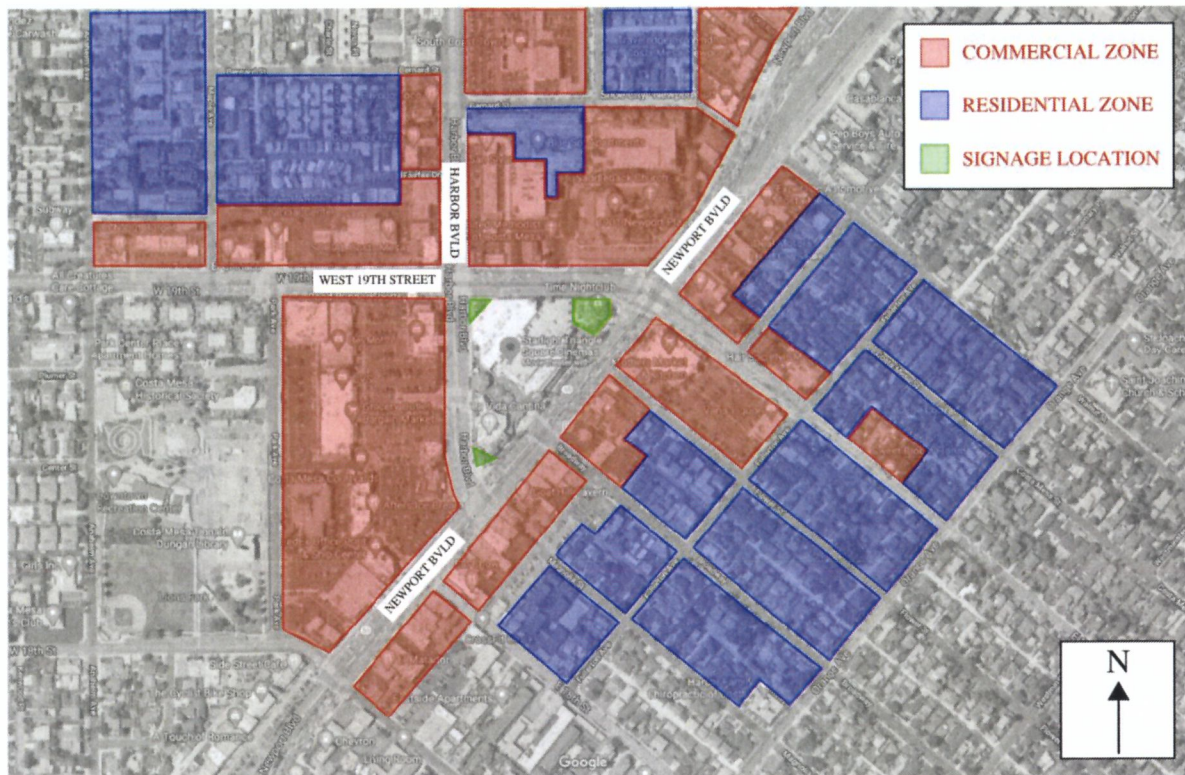
1 - EXECUTIVE SUMMARY

In coordination with Standard Vision (designer of the digital billboard system), Lighting Design Alliance (“LDA”), has conducted a study which evaluates the potential impacts of the proposed digital billboard/electronic display signs to the adjacent residential properties that are in proximity to the Triangle Square Entertainment Center located in Costa Mesa, California. Potential impacts related to lighting include items such as light trespass onto nearby properties, glare contributors, sensitivity zones, etc. The purpose of the lighting study is to examine the potential lighting impacts of the new digital signage within the adjacent residential neighborhoods. After completing the survey and analyzing the findings, it has been determined that the potential impacts of the proposed digital billboard/electronic display signs to the adjacent residential properties that are in proximity to the Triangle Square Entertainment Center located in Costa Mesa, California would be minimal, and well below recommended regulations and would therefore allow for the installation. The contribution of light from the proposed digital billboard/electronic display signs at the identified Sensitive Receptor locations would be at such a low level that it would be difficult to perceive the difference in lighting levels. The following sections describe the findings in greater detail.

2 - PROJECT DESCRIPTION

The Triangle Square Entertainment Center is located at 1870 Harbor Boulevard and 1875 Newport Boulevard. The site is a triangular shaped lot, surrounded by three major streets: 1875 Newport Boulevard, 1870 Harbor Boulevard, and West 19th Street. The site is directly surrounded by commercial properties. Across Newport Boulevard are commercial uses which include Mother’s Market and Kitchen, Dippity Donuts, Lightstyles Lighting, and several other businesses. Across West and East 19th Street are commercial uses including a 76-gas station, the First United Methodist Church of Costa Mesa, and the Newport Plaza Surgical Center. Across Harbor Boulevard is the Costa Mesa Courtyards which includes a BevMo, CVS, 24 Hour Fitness, and several other businesses. Residential areas are adjacent to the site, located behind the commercial block off Newport Boulevard and across the street near the intersection of Harbor Boulevard and Fairfax Drive. Generally, the residential neighborhoods are located off Fullerton Avenue and Broadway, Fullerton Avenue and Flower Street, Harbor Boulevard and Fairfax Drive, and Harbor Boulevard and Bernard Street.

We have provided a site map for reference, showing the commercial and residential zones in color blockings. The red blocks designate commercial properties and the blue shows the residential properties. The green designates the proposed digital signage locations on the site.



The Triangle Square Entertainment Center is developed with a two-story building, with access to the site via the public sidewalk and internal open stairways and walkways throughout the property. Some of the uses existing within the development include restaurants, shops, and a gym.

We have included reference images of the overall site as it exists presently:

-View from Newport Boulevard and Broadway intersection



-View from Harbor Boulevard and West 19th Street



-View off of Newport Boulevard



The primary corner of the site is on Newport Boulevard and West 19th Street. This corner consists of a round cylindrical façade with a dome feature on top. The height of the dome is roughly 54 feet above the finished grade level. The existing façade consists of internally illuminated sign letters, a linear graze light for the Time Nightclub signage, and architectural accent lighting for the dome structure.



The secondary corner of the site is located at the intersection of Harbor Boulevard and Newport Boulevard. Presently there is a vertical façade that consists of internally illuminated sign letters, and linear sign lighters illuminating the La Vida signage.



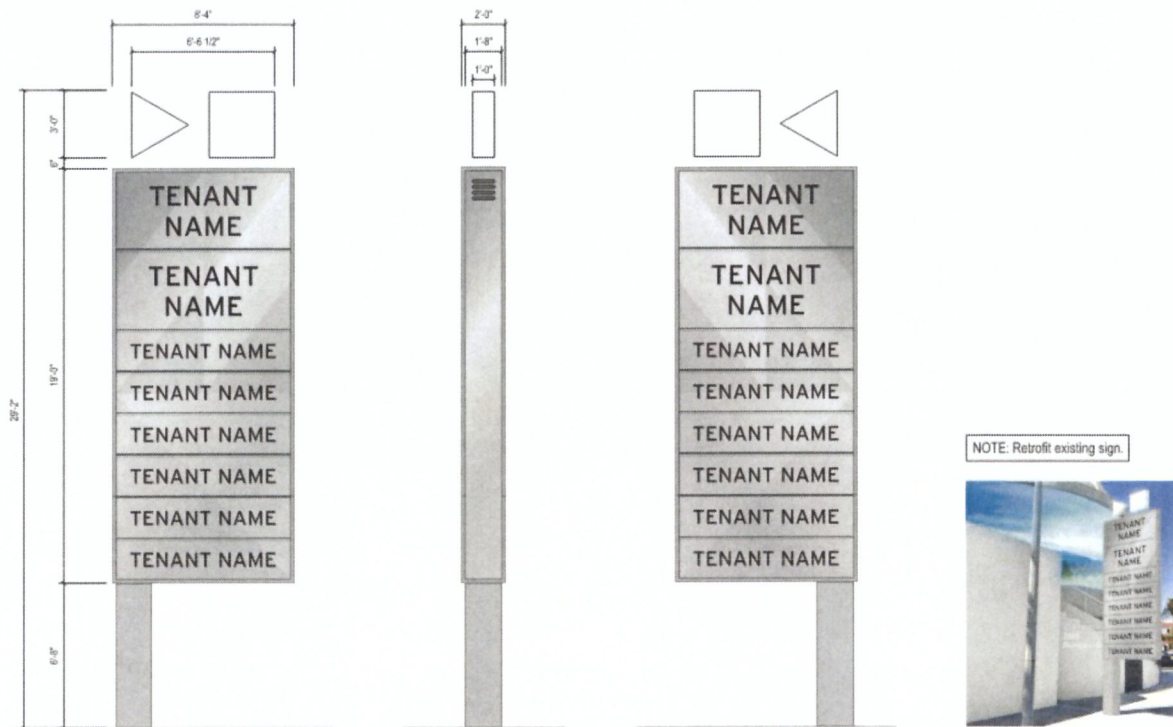
The tertiary corner of the site is on the corner of Harbor Boulevard and West 19th Street. There is currently a non-illuminated vertical façade and illuminated signage for the Triangle Cinemas. The proposed signage would face Harbor Boulevard and the intersection.



The Proposed Project would include a new Light Emitting Diode (LED) digital signage at the primary corner of Newport Boulevard and West 19th Street. The layout of the digital signage on the dome tower façade is currently designed in a series of layers on the façade. The top architectural dome will not have any digital signage incorporated but will have digital addressable LED lighting. Below that there will be a larger main digital signage wrap that is 20'-6" in height and will wrap around the 58'-6" of main façade. The smaller openings below will remain as existing and will not have digital signage installed.



Adjacent to the dome façade, there would be a tenant pylon sign. This pylon sign would be internally illuminated with acrylic lettering, not a digital sign.



At the secondary corner of the project site, Harbor Boulevard and Newport Boulevard, a single LED digital signage is proposed, 30'-0" wide by 20'-0" high. There would also be a secondary tenant pylon sign to replace the existing location that exists currently on site.



At the tertiary corner of the project site, Harbor Boulevard and West 19th Street, there would be a large LED digital sign that would wrap the corner of the building facing Harbor Boulevard and the intersection of Harbor Boulevard and West 19th Street. This signage would be 20'-0" tall and would wrap 44'-6" of the building corner. There would not be signage directly facing West 19th Street.



3 – PROJECT ANALYSIS SCOPE

The purpose of this lighting study is to examine the potential lighting impacts of the new LED digital signage at the identified locations within the adjacent residential neighborhoods. This analysis will describe the pedestrian survey performed to evaluate the existing conditions surrounding the project site, noting the locations, intensity, and directionality of light sources in the area as well as those sources' proximity to residential receptors.

The City of Costa Mesa does not have an ordinance on brightness for signs. The City's sign regulations summary does state that electronic changeable copy signs, except theater marquees and time/temperature signs, are prohibited. The lighting analysis will discuss how the proposed LED digital signage will not negatively impact the sensitive residential receptors. For reference, we have included other portions of codes that are used for digital signage regulations, which includes a portion of a typical city's code on digital signage, the California Environmental Quality Act (CEQA), and Title 24 limitations on signage energy consumption. The analysis will then provide guidance, as needed, on ways to reduce lighting and spillover lighting effects resulting from the Proposed Project.

City of Los Angeles Municipal Code: Super Graphic Wall Signs

Sign Lighting. No super graphic wall sign shall be so illuminated that it interferes with the safety of aircraft flights in the vicinity of the super graphic wall sign location. No super graphic wall sign shall employ direct, indirect, internal, flashing, or other illumination with light sources or reflectivity such that the brightness of the illumination shall constitute a hazard to air traffic or a nuisance, interferes with the safety of motorized vehicles in the vicinity of the super graphic wall sign location, confuses or obstructs the view of any authorized traffic sign or signal, obstructs the sight distance triangle at any street or freeway intersection, extends into the public right-of-way, or interferes with the use and enjoyment of property of any adjacent property owners.

California Environmental Quality Act (CEQA)

CEQA, or the California Environmental Quality Act, is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

The following guidelines are being taken from the City of Los Angeles CEQA Thresholds Guide – 2006. These guidelines are not part of the City of Costa Mesa’s detailed lighting requirements and guidelines, but more used as recommended best practices for implementing lighting that will be less intrusive to the residential areas that are located in proximity to the area site.

A.4. NIGHTTIME ILLUMINATION

This section involves the extent to which a proposed project's artificial lighting affects the visual environment. Nighttime illumination of varying intensities is characteristic of most urban and suburban land uses, including those in the City of Los Angeles. Artificial lighting has become more widely utilized in recent years to address security concerns and aesthetics.

New light sources introduced by a project may increase ambient nighttime illumination levels. Additionally, nighttime spillover of light onto adjacent properties has the potential to interfere with certain functions, including vision, sleep, privacy, and general enjoyment of the natural nighttime condition. The significance of the impact depends on the type of use affected, proximity to the affected use, the intensity of the light source, and the existing ambient light environment. Uses considered sensitive to nighttime light include, but are not limited to, residential uses, some commercial and institutional uses, and natural areas.

A review of surrounding land use was completed to determine the location of light-sensitive land uses. Light-sensitive land uses may include, but are not limited to, residences, including board and care facilities; commercial or institutional uses that require minimal nighttime illumination for proper function, physical comfort, or commerce; and natural areas. The potential for routine spillover of light or an increase in ambient light levels is determined by considering the project’s proximity to light-sensitive uses, the intensity of project light sources, and the existing ambient light environment.

CEQA mitigation measures that involve lighting include the following:

Provides that no person shall construct, establish, create, or maintain any stationary exterior light source that may cause the following locations to either be illuminated by more than 2 footcandles (fc) of lighting intensity or receive direct glare from the light source:

- 1) Any exterior glazed window or sliding glass door on any other property containing a residential unit or units.
- 2) Any elevated habitable porch, deck, or balcony on any other property containing a residential unit or units.
- 3) Any ground surface intended for uses such as recreation, barbecue, or lawn areas on any other property containing a residential unit or units.

Brightness and glare are dependent on the brightness of the surrounding environment. The project is located in a dense urban environment, with a high ambient electric light level.

Title 24 Regulations

Title 24 regulates the wattage that any internally illuminated sign can produce. Section 148 of Title 24 2008 requires that all exterior LED signs have an efficiency of 80% or greater and have a maximum allowed lighting power of less than 12 watts per square foot.

Title 24 limits energy use for exterior signage in California. Title-24 2008 limits exterior, internally illuminated signs, and integral electronic displays to 12 watts/sq. ft.

Title 24 Wattage limits affecting exterior internally illuminated signs and integral electronic displays				
	Watt/sq. ft at full white	Brightness at Full White (candelas/sq. meters)	Hours on per day	Total watt-hours per day per sq. ft. of sign
Daytime Usage (7am to 7pm)	12	3500*	12	144
Nighttime Usage (7pm to 2am)	5	1500*	7	35
Total watt-hours per day per sq. ft. of sign				179

*Title 24 only restricts energy usage and does not restrict brightness

4 – SITE SURVEY

As the Project Site is located within an existing commercial complex within the City of Costa Mesa, this means that there are existing brightness and glare contributors that exist both within the Triangle Square site as well as throughout the commercial district surrounding it. LDA has performed an onsite nighttime survey of the Triangle Square site, adjacent commercial properties, and adjacent residential neighborhoods. The purpose of these surveys was to identify the following:

- Document existing footcandle or light levels to determine the existing threshold of brightness at key commercial and residential points that we had access to. These light levels include all existing light contributors at each location at the time of the survey. This information was gathered to determine the existing lighting levels around the site, and to make assumptions regarding how much light the LED digital signage would contribute to the sensitive receptor areas.
- Document existing brightness contributors around the Triangle Square site, and the adjacent neighborhoods and their relationship to the adjacent neighborhoods if they are visible or not from the properties. These can include existing illuminated signage, existing street or parking lot lighting poles, building mounted floodlights, etc.
- Document each residential location that has a potential view of the proposed LED digital signage located at the primary corner of the site.

From November 3, 2019 through November 5, 2019 LDA conducted a series of site visits to the City of Costa Mesa for the purposes of gathering existing light levels around the commercial and residential sites, and to collect comparative brightness data from other comparable buildings and existing signage. This survey will give a good measurement of the existing light levels on the site and will make it easier to quantify the assumed added lighting to the overall site from the contribution of the digital signage.

This survey provides a measurement of the existing light levels on the site, which can be utilized to quantify the assumed added lighting to the overall site from the contribution of the proposed digital signage.

-Existing Footcandle Light Levels:

The first part of the survey involved getting the footcandle (FC) levels all around the public site to establish existing light levels. A footcandle is the amount of light that actually falls on a given surface. The existing site is currently affected by LED street poles, building mounted floodlights, and illuminated signage. All these factors, and others, are currently contributing to the existing light levels on the site.

In order to measure diversity, brightness, and density, measurements were taken during the day and again during the evening. All footcandle/illuminance readings were taken using an illuminance/light meter from Konica Minolta – Chroma Meter CL-200A. For all footcandle readings taken in the study, all were taken at 38” above the ground level in a horizontal orientation, with the illuminance meter being stabilized on a tripod for consistent readings.



For the footcandle survey, we have included an appendix document that contains a series of detailed maps with accompanying reference images taken onsite where we show the footcandle measurements taken at each significant location on site. Refer to the attached appendix for references for both commercial and residential sites.

-Existing Brightness Contributors

The second part of the survey involved taking note of existing brightness contributors that were located around this project site. This involved taking luminance measurements (cd/m^2) of the brightness contributors. Luminance is a photometric measurement of the luminous intensity of a surface and is determined by measuring the amount of light coming off a surface with a given area. The luminance indicates how much luminous power will be detected by an eye looking at the surface from a particular viewing angle. This is an indicator of how bright the surface will appear, and if it will be a contributor to glare. Generally, if two objects were emitting the same amount of light, the smaller object will appear brighter than the larger object and may therefore contribute to glare.

All luminance/brightness readings were taken using a luminance/spot meter from Minolta – Luminance Meter LS-110, which measures in cd/m^2 .



All measurements were taken from ground level which is the viewpoint of the pedestrian and automobile traffic. Note that the measurements were taken using a specific date and time and used a specific luminance meter. A different luminance meter may have a margin of error of +/- 5% difference and as images on static and digital signage are updated. Those different images produce different readings. While distance does not affect brightness, the viewing angle and the specific target can impact reading, so readings may vary.

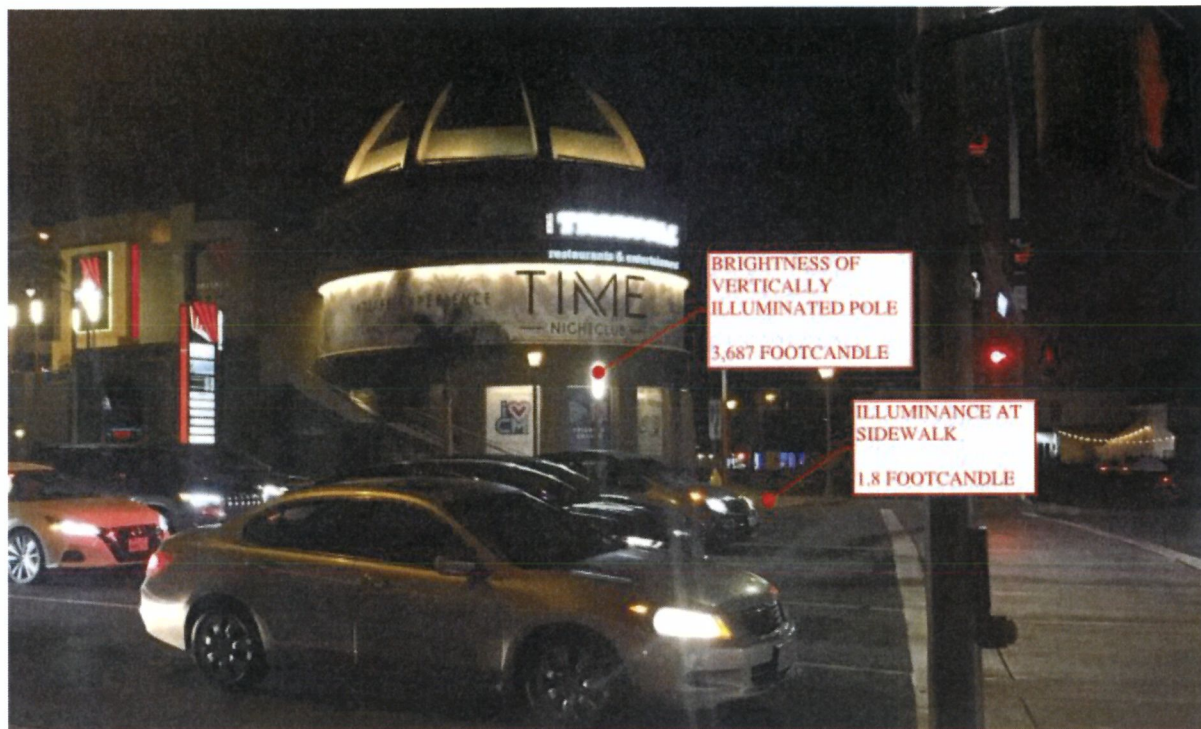
SITE BRIGHTNESS DOCUMENTATION AND RESULTS:

As the Triangle Square site is an existing property, it has existing architectural and signage lighting that is currently visible from the adjacent residential neighborhoods. The residents of these areas have lived with the lighting from the Triangle Square site for years, and the existing lighting has not caused issues such that the lighting need be toned down or modified. In addition to the Triangle Square site, there are also other commercial properties and street lighting that are visible to the adjacent residential neighborhoods.

As the main concern of this project are the LED digital signs on the primary and third corners of the site, we will focus on the existing façade lighting and signage, as well as their current brightness.



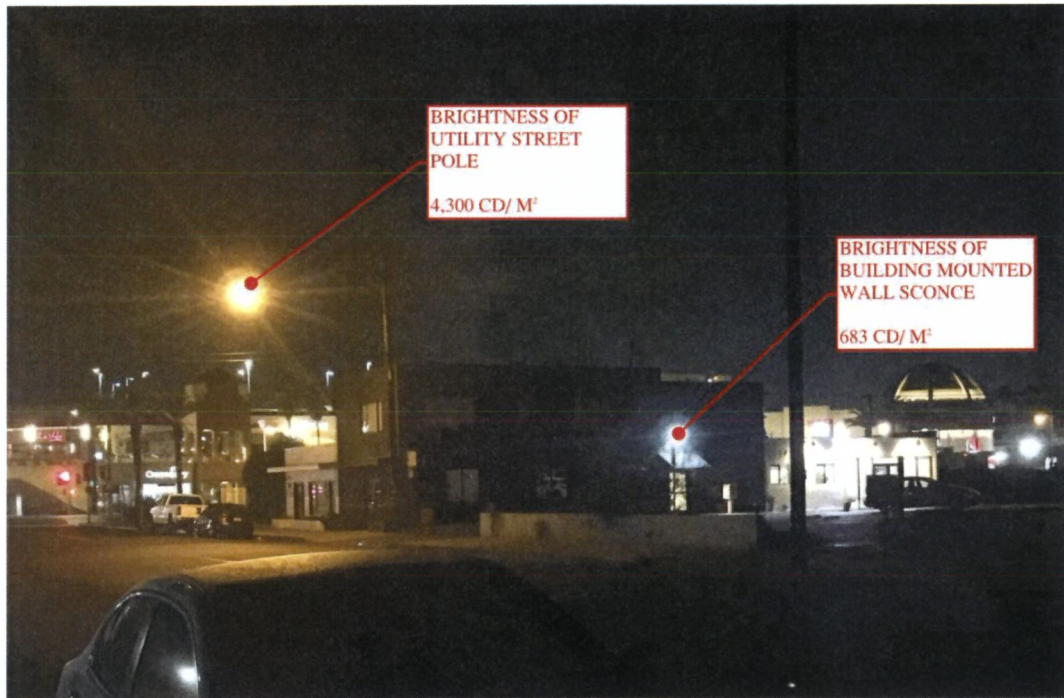
- The existing façade of the dome has a series of different lighting effects:
 - The top of the dome has low level architectural lighting that has a brightness level of 28 cd/m²
 - The main internally illuminated signage of the property “The Triangle” has a brightness level of 407.3 cd/m²
 - The middle signage band has a circular graze fixture at the top of the signage where the brightest point has a brightness level of 376.4 cd/m²
 - The signage lighting at the pedestrian level has a brightness level of 34.7 cd/m²



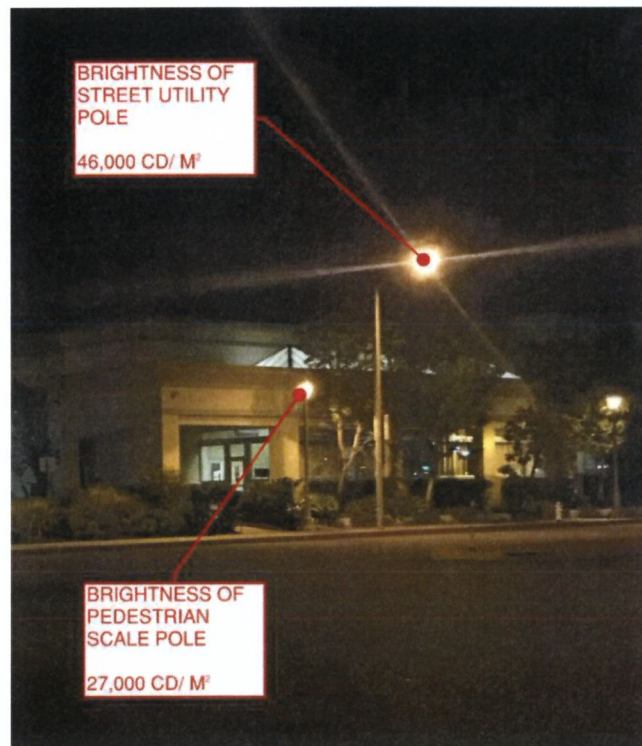
-The series of LED illuminated pedestrian level poles around the sidewalk have a brightness level of $3,687 \text{ cd/m}^2$



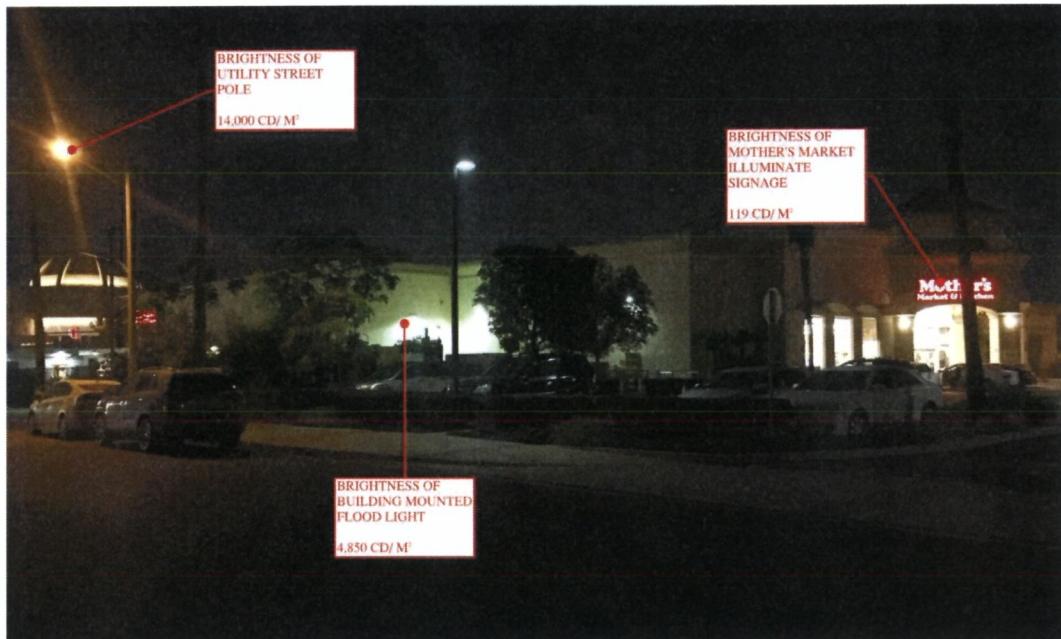
- The existing backlit tenant signage has a brightness level of 323 cd/m²
- Commercial areas outside of the Triangle Square site but still visible from residents include the following:



- Throughout the area are a series of existing street poles with a brightness level of 4,300 cd/m²
- On the backside of the 110 Broadway Unit, are LED building mounted floodlights with a brightness of 683 cd/m²



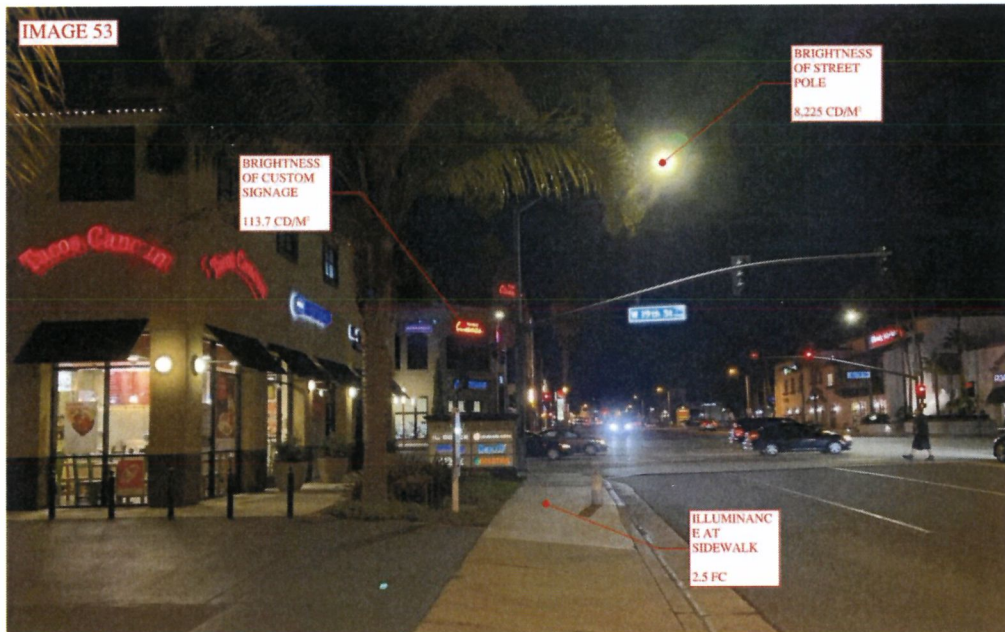
- In the Mother's Market area, the street pole has a brightness of 46,000 cd/m² at the brightest point of the light source
- The pedestrian scale pole has a brightness of 27,000 cd/m² at the brightest point of the light source



- The Mother's Market backlit signage has a brightness level of 119 cd/m²
- The Mother's Market building mounted floodlight has a brightness level of 4,850 cd/m²
- In the Mother's Market area, the street pole has a brightness level of 14,000 cd/m² at the brightest point of the light source



- The existing façade next to Harbor Boulevard and West 19th Street also has a series of different lighting effects:
- The façade is illuminated from nearby sources including pedestrian poles, street poles, car headlights and custom signage
- The main internally illuminated signage of the facade “Triangle Cinemas” has a brightness level of 192.6 cd/m²



- The adjacent commercial area near signage location 3 has glare contributors which include street poles and vehicle headlights
- The brightness of the main glare contributor is the street pole with a brightness of 8,225 cd/m²



- Another adjacent commercial area near signage location 3 has glare contributors which also include street poles and vehicle headlights
- The parking pole is the main glare contributor with a brightness of 6,850 cd/m^2
- In the residential neighborhood there are house mounted light fixtures that are glare contributors:



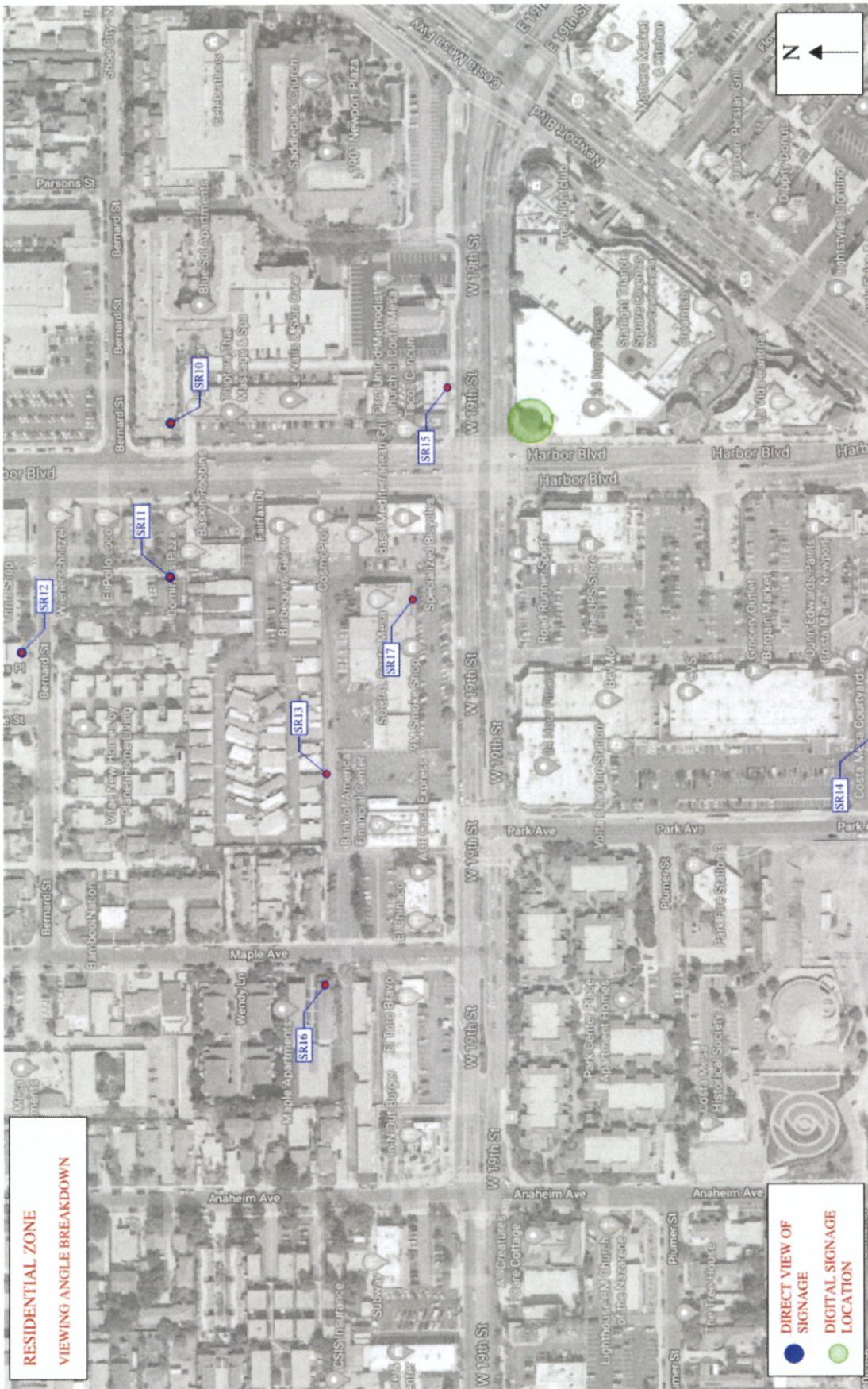
- The house mounted wall sconce has a brightness level of 4,500 cd/m^2



- The view from the nearby trailer park residential space has a view of the very top of the signage 3 location but with a major glare contributor
- The parking pole is the main glare contributor with a brightness of 24,140 cd/m^2

5 – SENSITIVE RECEPTORS (SR)





In the following site map, we have indicated in BLUE, the existing residential properties that surround the project site that we noted have a potential direct view of a portion of the LED digital signage at the primary corner of the Triangle Square site. Residential properties represent sensitive receptors for the purpose of this analysis. We have not included the digital signage at the secondary corner as there are no residential properties that have a view of this signage. There are residential properties that have a view of the third corner of the site.

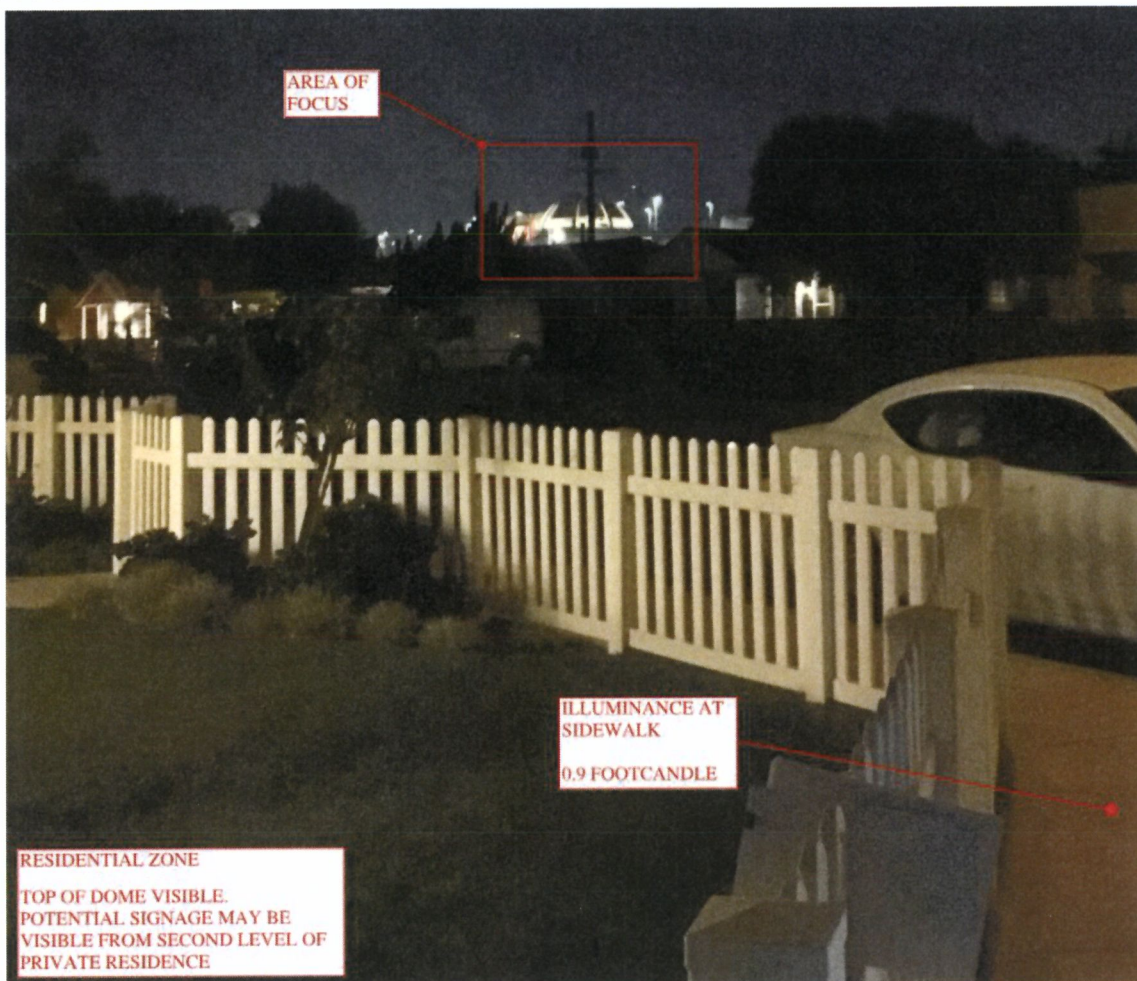
To survey the potential impacts to the residential sites, we have detailed the more significant impacted residential sites that have partial views of the proposed LED digital signage. We have broken them out individually to discuss the potential impacts that the Project site may have and analyzed what the contributed light levels will be per the photometric study.

For determining the lighting impacts from the Project onto the Sensitive Receptors, we will be using the City of Los Angeles' CEQA thresholds for contributed light onto a residential site:

Chapter IX, Article 3, Section 93.0117 of the City of Los Angeles Municipal Code (LAMC) provides that no person shall construct, establish, create, or maintain any stationary exterior light source that may cause the following locations to either be illuminated by more than two footcandles of lighting intensity or receive direct glare from the light source:

- 1) Any exterior glazed window or sliding glass door on any other property containing a residential unit or units.
- 2) Any elevated habitable porch, deck, or balcony on any other property containing a residential unit or units.
- 3) Any ground surface intended for uses such as recreation, barbecue, or lawn areas on any other property containing a residential unit or units.

Sensitive Receptor 1:
1944 Church Street



This residence is a two-story property that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage would be visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there is a full city block of single story residential and commercial buildings between the two.

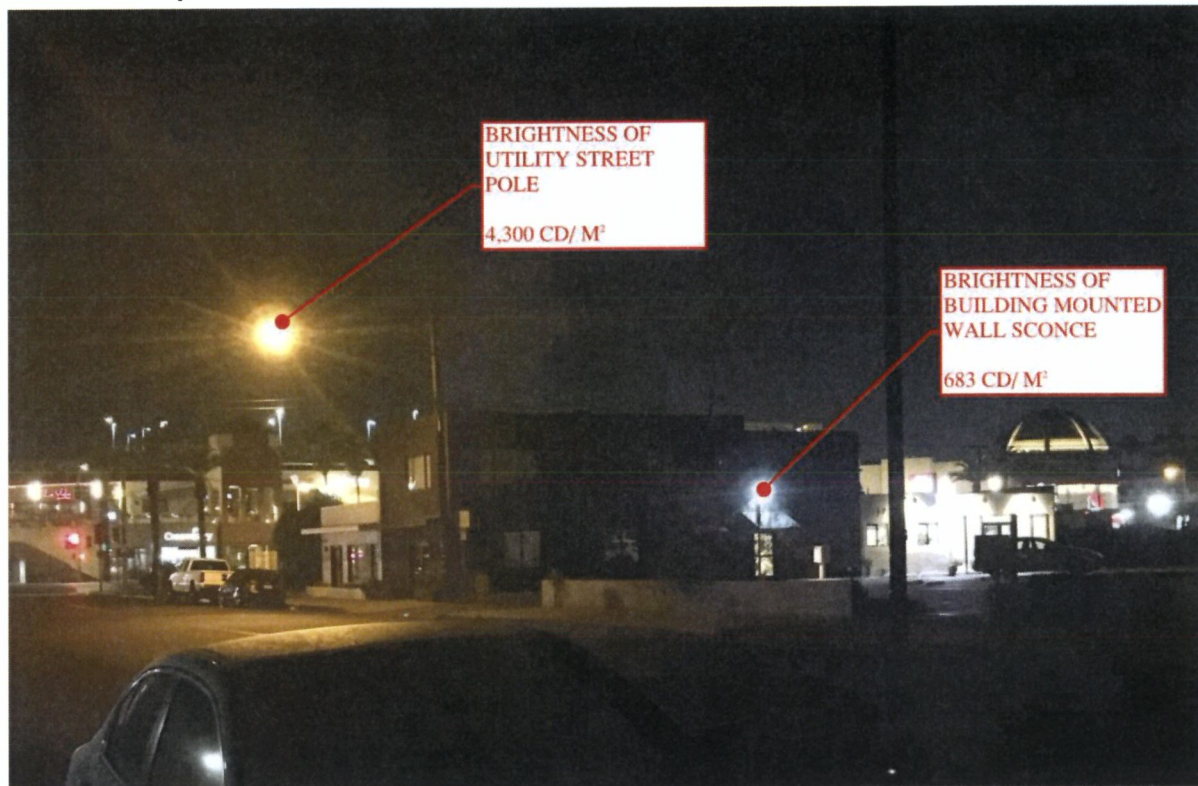
The residence is located roughly 900 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.9 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property.

Per the City of Los Angeles Municipal Code per CEQA, no lighting can provide more than 2.0 footcandles at any part of a residence; therefore the contributed lighting level of 0.2 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 2:

125 Broadway



This residence is a two-story property that has a view of a portion of the proposed LED digital signage. From the ground level, only the very top and portion of the center of the proposed digital signage would be visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there is a full city block of single story residential and commercial buildings between the two.

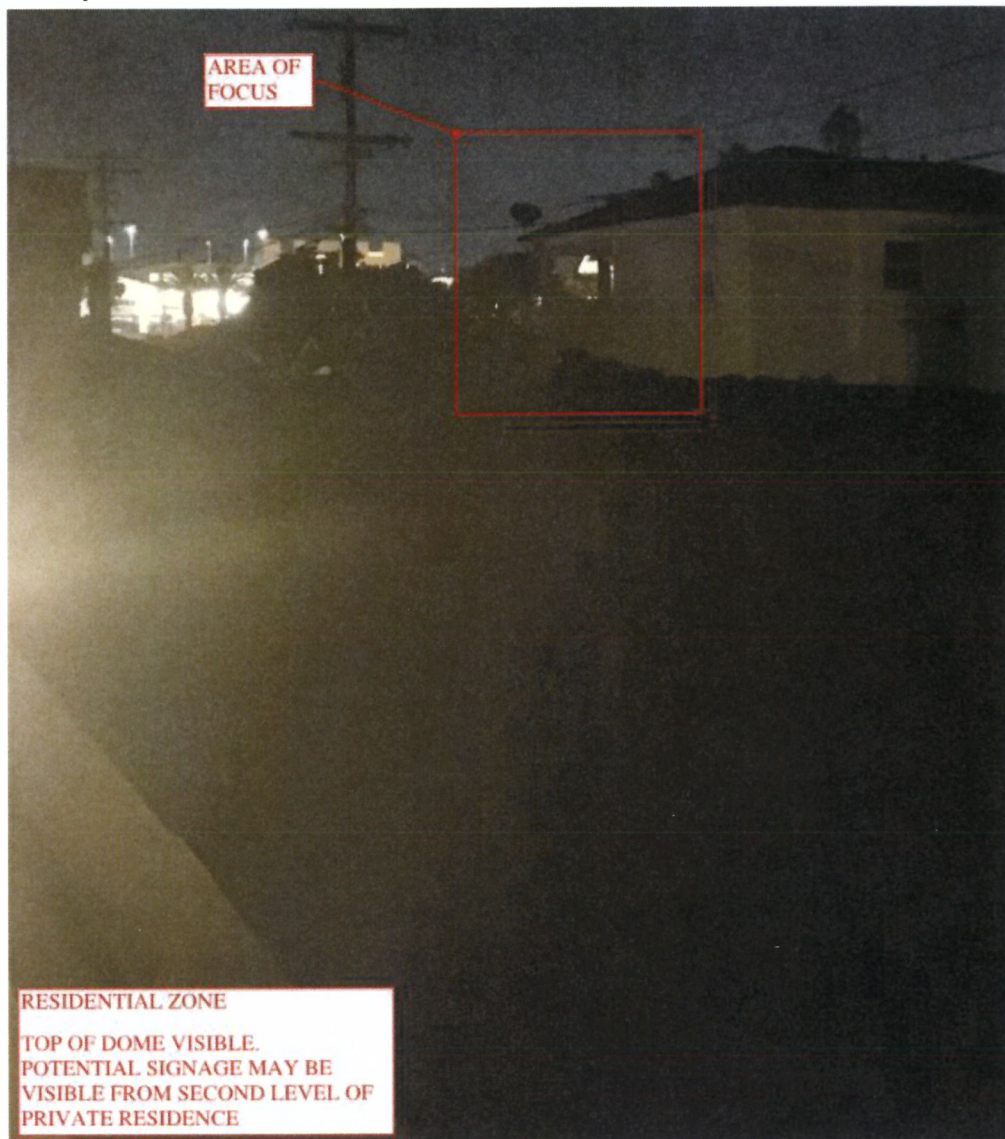
The residence is located roughly 700 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.5 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.3 footcandles to the property.

Therefore, the contributed lighting level of 0.3 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 3:

100 Broadway



This residence is a two-story property that has a view of a portion of the proposed LED digital signage. From the ground level, the proposed signage would not be visible. Looking at the vantage point from the second floor, a portion of the side of the top of the signage that would be visible, but there is another property with an existing second floor that would block the majority of the view.

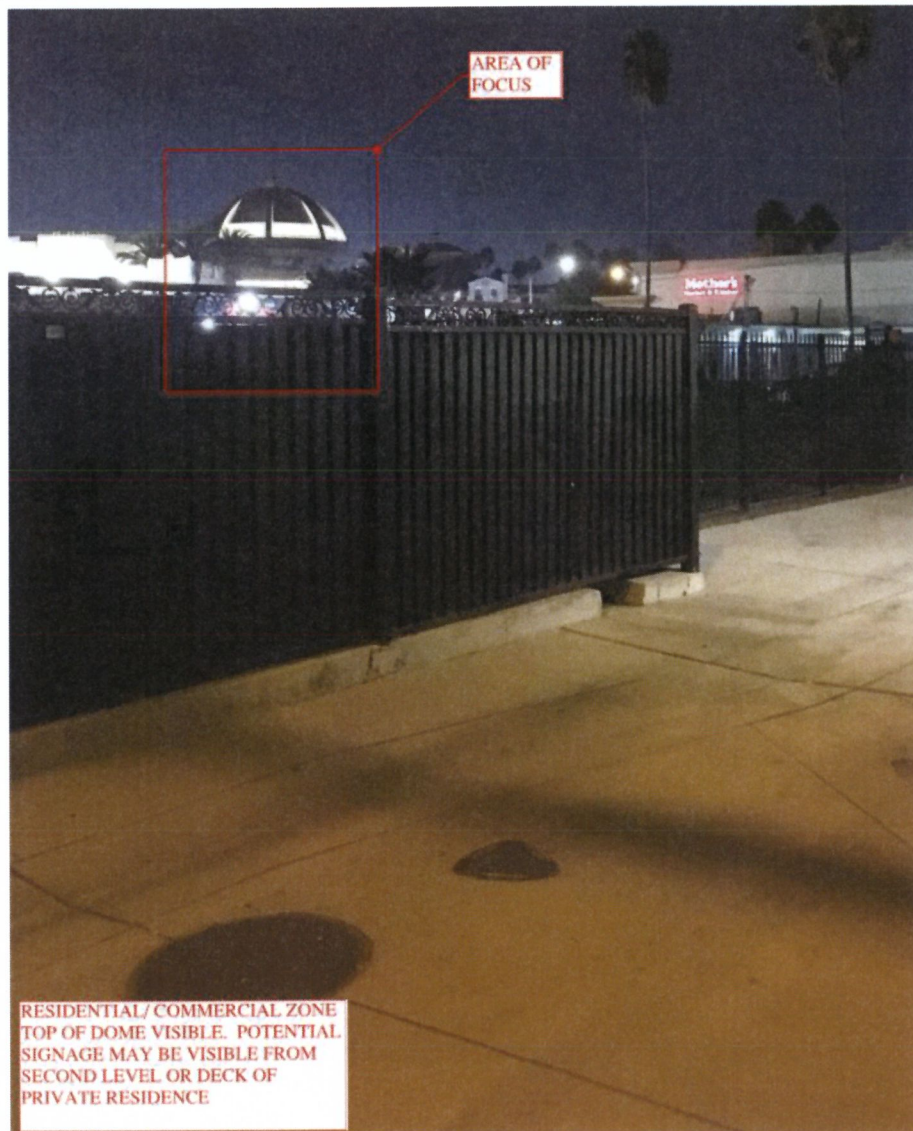
The residence is located roughly 700 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.2 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property.

Therefore, the contributed lighting level of 0.3 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 4:

115 Flower Street



This residence is a single-story property that has a view of a portion of the proposed LED digital signage. From the ground level, the top layer of the proposed digital signage would be partially visible. The residential property has a wooden gate surrounding the property that would help block the view and light trespass from the digital signage.

The residence is located roughly 460 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.1 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.62 footcandles to the property.

Therefore, the contributed lighting level of 0.1 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 5:

117 Flower Street



This residence is a single-story property that has a view of a portion of the proposed LED digital signage. From the ground level, the top layer of the digital signage would be partially visible.

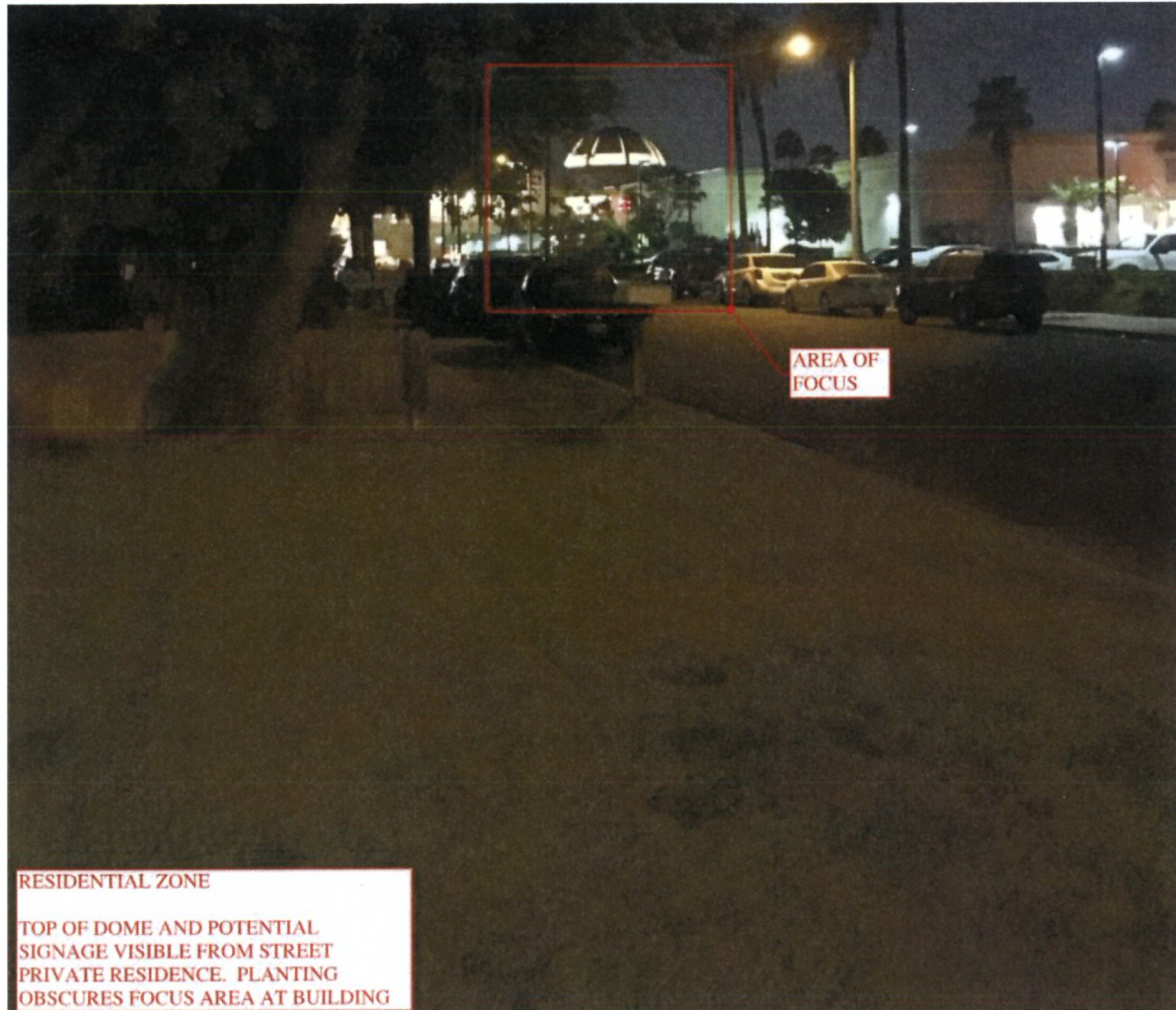
The residence is located roughly 440 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.2 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.17 footcandles to the property.

Therefore, the contributed lighting level of 0.1 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 6:

147 Flower Street



This residence is a two-story apartment complex that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage was visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there is a full city block of single story residential and commercial buildings between the two.

The residence is located roughly 650 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.14 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.3 footcandles to the property.

Therefore, the contributed lighting level of 0.3 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 7:

155 Flower Street



This residence is a two-story apartment complex that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage would be visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there is a full city block of single story residential and commercial buildings between the two.

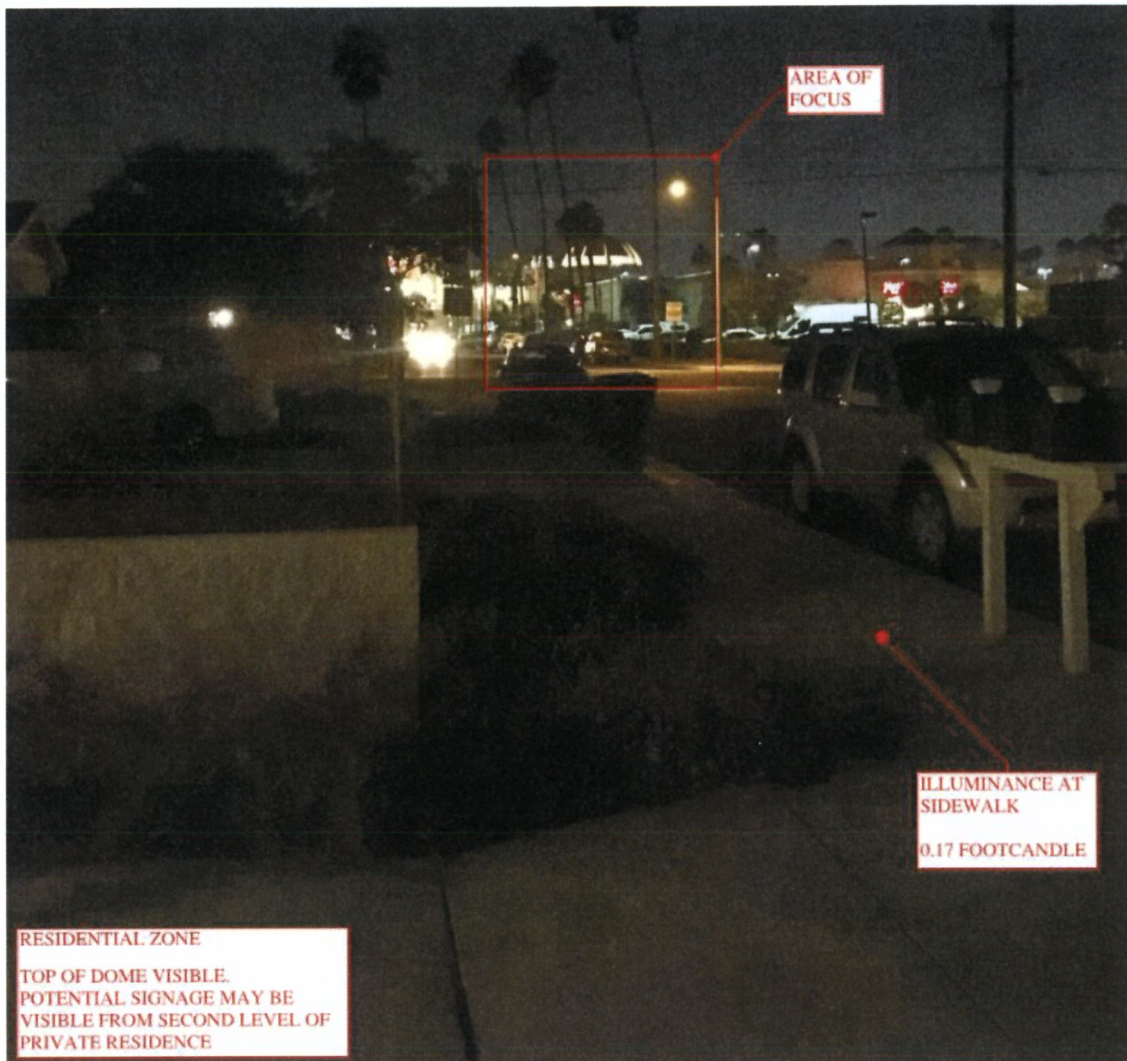
The residence is located roughly 800 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.2 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property.

Therefore, the contributed lighting level of 0.2 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 8:

159 Flower Street



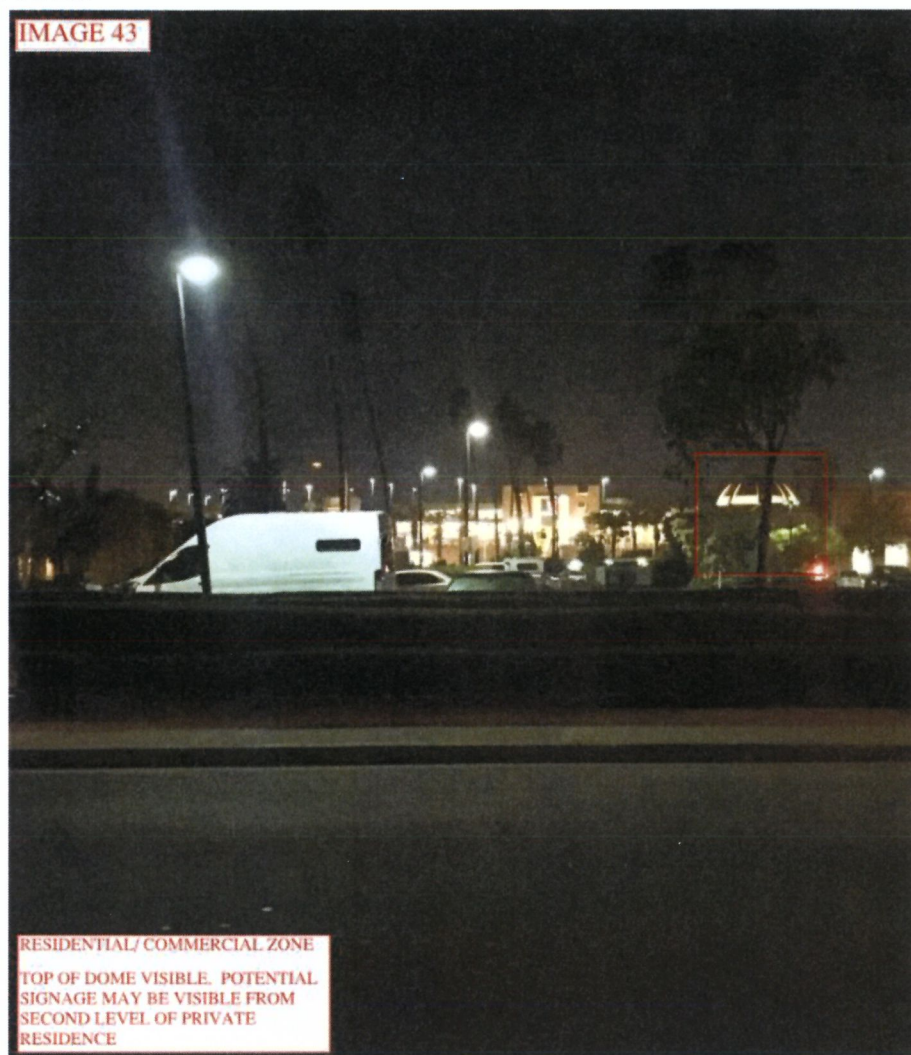
This residence is a two-story apartment complex that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage would be visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there is a full city block of single story residential and commercial buildings between the two.

The residence is located roughly 850 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.17 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property.

Therefore, the contributed lighting level of 0.2 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 9:
162 Flower Street



This residence is a two-story apartment complex that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage would be visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there is a full city block of single story residential and commercial buildings between the two.

The residence is located roughly 790 feet away from the primary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.2 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property.

Therefore, the contributed lighting level of 0.2 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 10:
421 Bernard Street



This residence is a two-story apartment complex that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage would be visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site. The viewing angle at which the residences view the signage is at a sharp angle so the impact from the signage to the residences would be minimal. The position also considers the full city block of single-story commercial buildings between the two.

The residence is located roughly 600 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.6 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.3 footcandles to the property.

Therefore, the contributed lighting level of 0.3 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 11:
1941 Harbor Boulevard



The residences are two-story town homes in a complex that has a potential view of the proposed LED digital signage. From the ground level, there is no view of the signage due to the commercial buildings and trees blocking the view. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the proposed signage visible from that level, but not a significant amount considering the distance the property is away from the project site. The position also considers the full city block of single-story commercial buildings between the two.

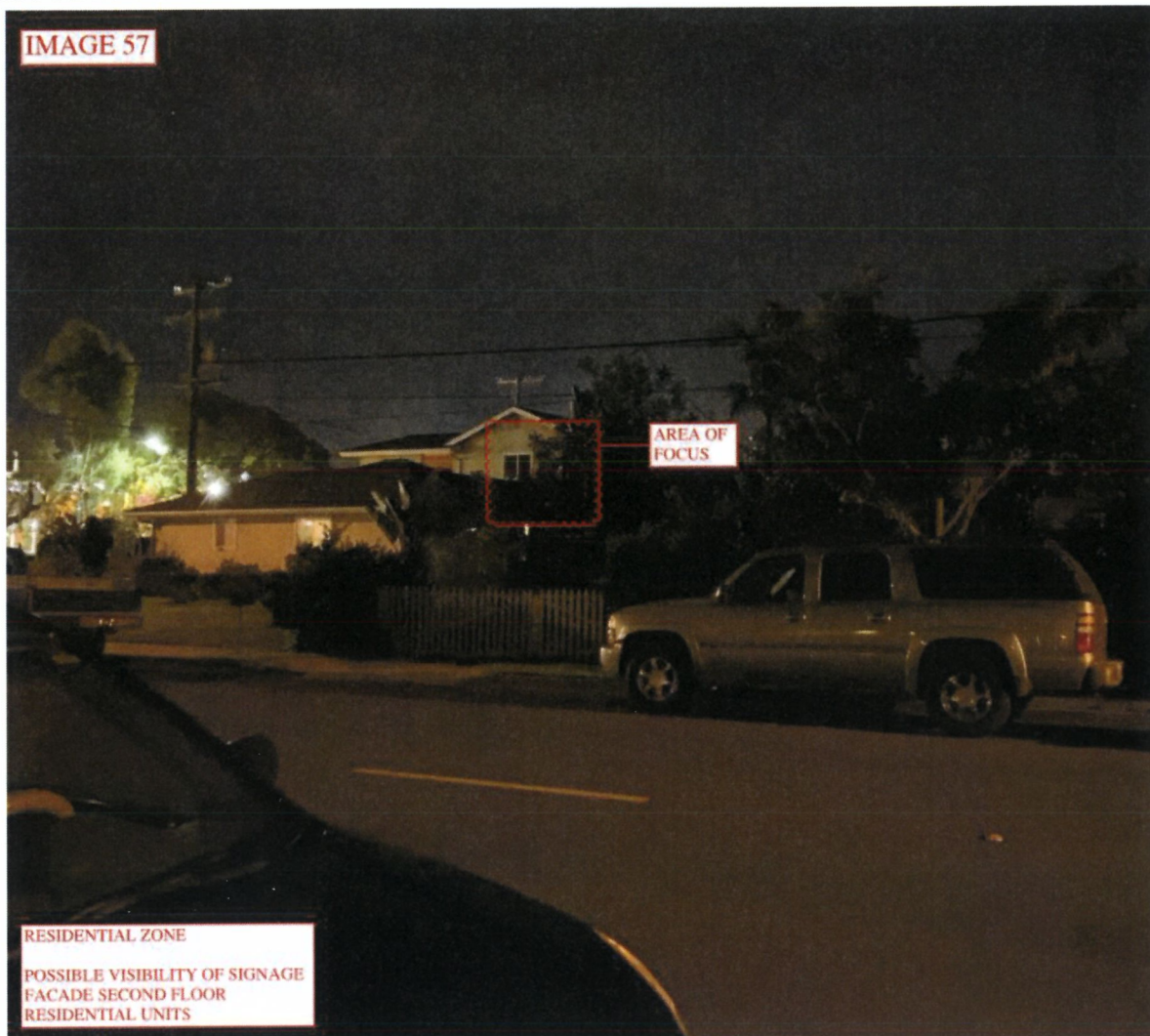
The residence is located roughly 770 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.1 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property on the second level balcony.

Therefore, the contributed lighting level of 0.2 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 12:

520 Bernard Street



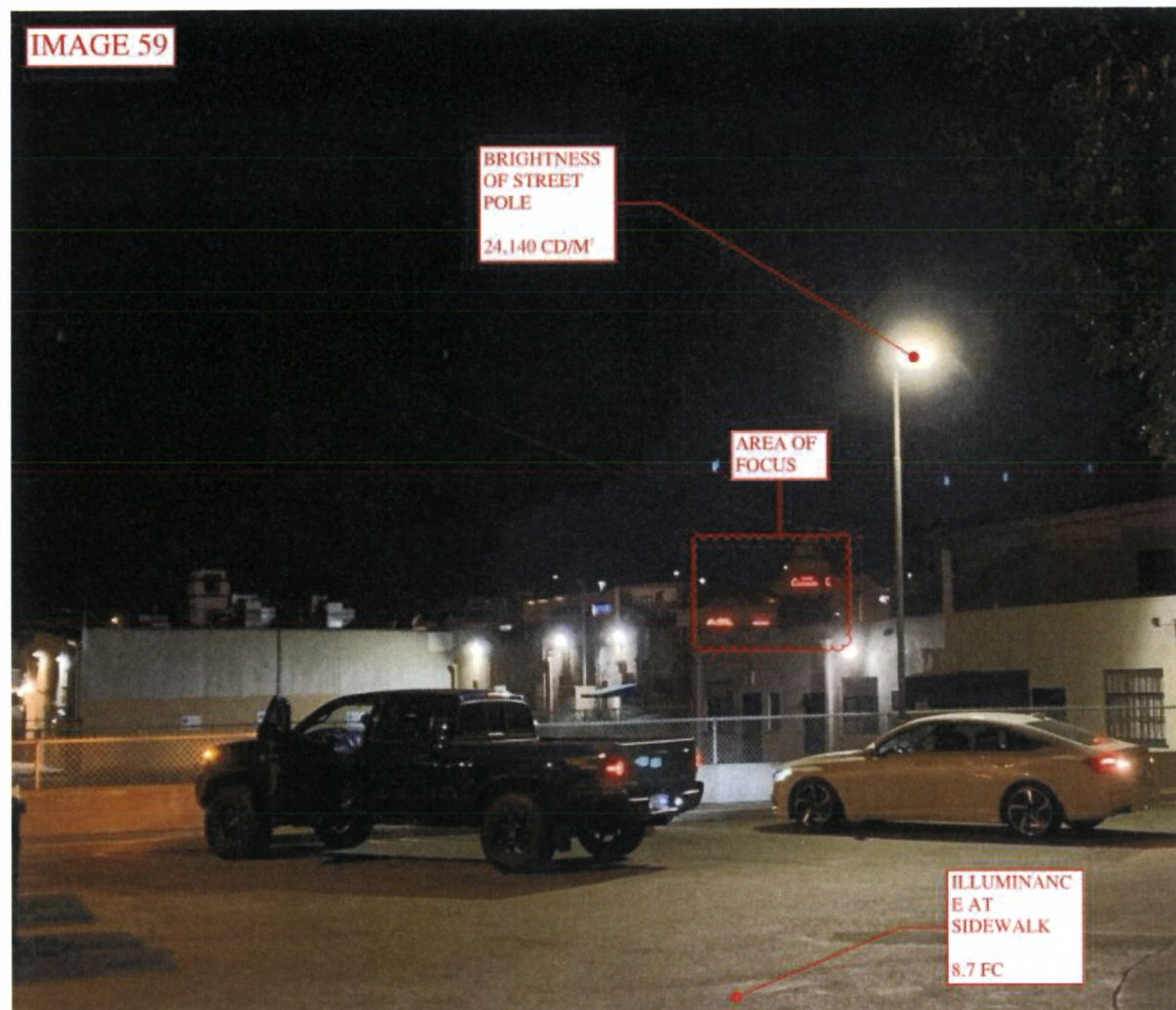
This residence is a two-story apartment complex that has a potential view of the proposed LED digital signage. From the ground level, none of the proposed digital signage location was visible. Since there is a second floor to the property that we did not have access to, we assume that from the upper level, there would be slightly more of the signage visible from that level, but not a significant amount considering the distance the property is away from the project site, and considering there are two full city block of single and double story residential and commercial buildings between the two.

The residence is located roughly 970 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.1 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.1 footcandles to the property.

Therefore, the contributed lighting level of 0.1 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 13:
525 South Fairfax Drive



These residences are in single-story housing complex that has a potential view of the proposed LED digital signage. From the ground level, only the very top of the proposed digital signage location would be visible. It is assumed that the contribution of light was not a significant amount considering the distance the property is away from the project site and considering there is full city block of single and double story commercial buildings between the two.

The residence is located roughly 800 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 8.7 footcandles. A wall is located in front of the complex which restricted access to the actual property. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.2 footcandles to the property.

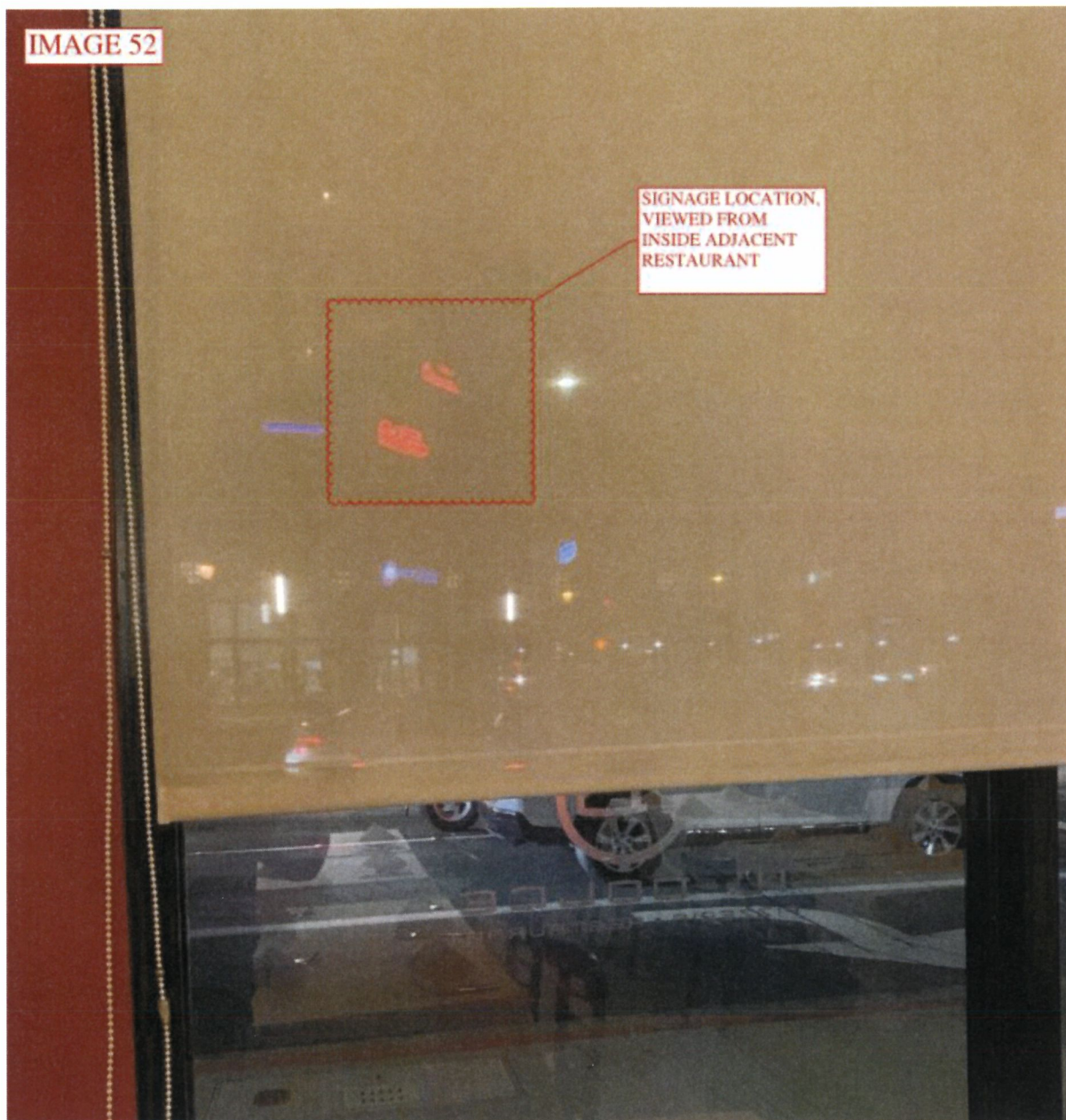
Therefore, the contributed lighting level of 0.2 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 14:
1902 Harbor Boulevard



This location is a commercial restaurant on the ground floor of a single-story complex that has a potential view of the proposed LED digital signage. From the ground level, the very top of the proposed digital signage location would be visible. It is assumed that the contribution of light was not a significant amount considering the viewing angle of the signage and the shades that are always drawn.

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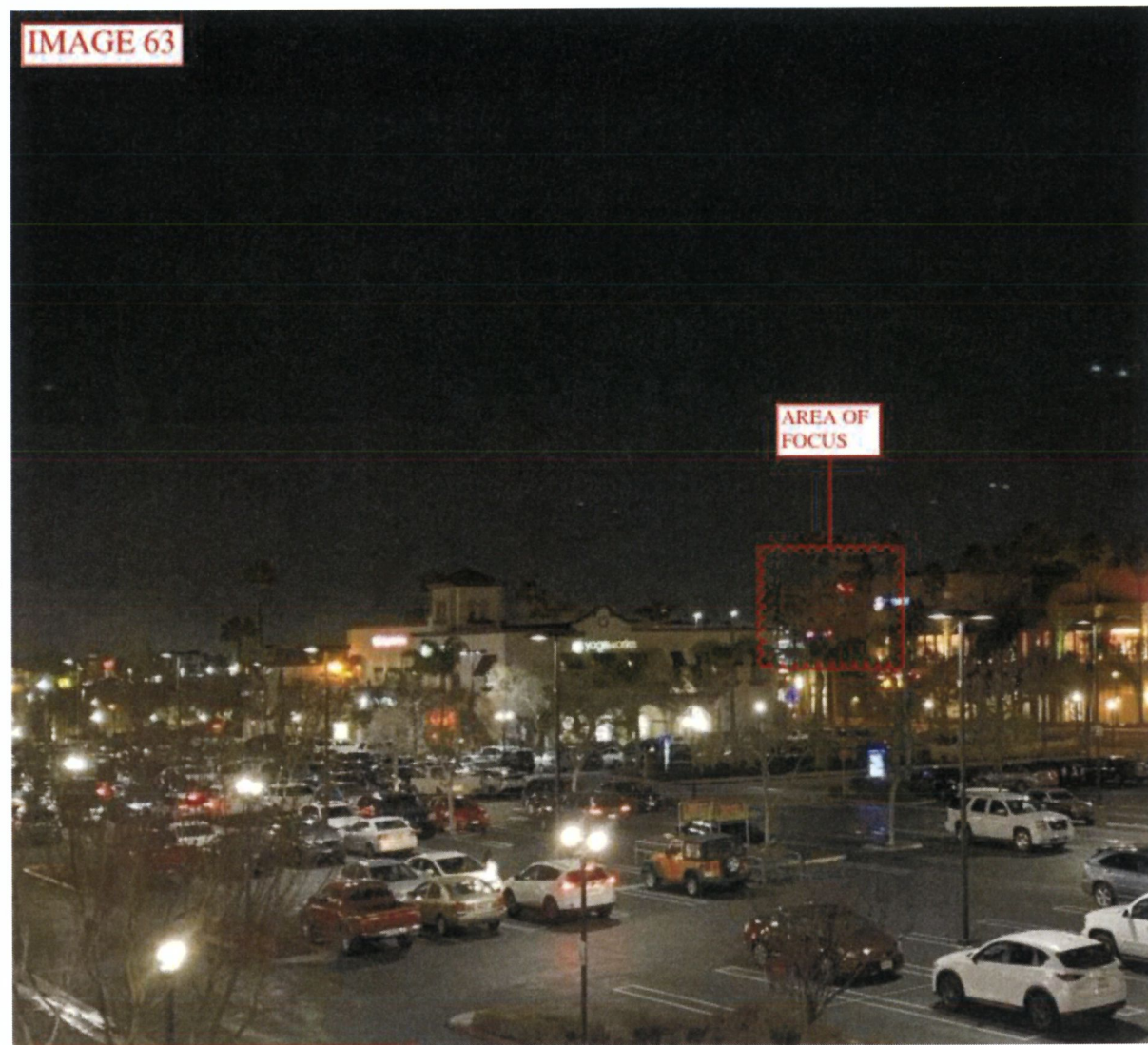
The restaurant is located roughly 150 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 2.6 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.4 footcandles to the property.

Therefore, the contributed lighting level of 0.4 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels. As this is not a residence, this location does not need to directly conform to the City of Los Angeles Municipal Code. Instead, this location was reviewed to ensure that the proposed signage would not have a negative or substantial impact on both the customer experience and business volume.

Sensitive Receptor 15:

1840 Park Avenue



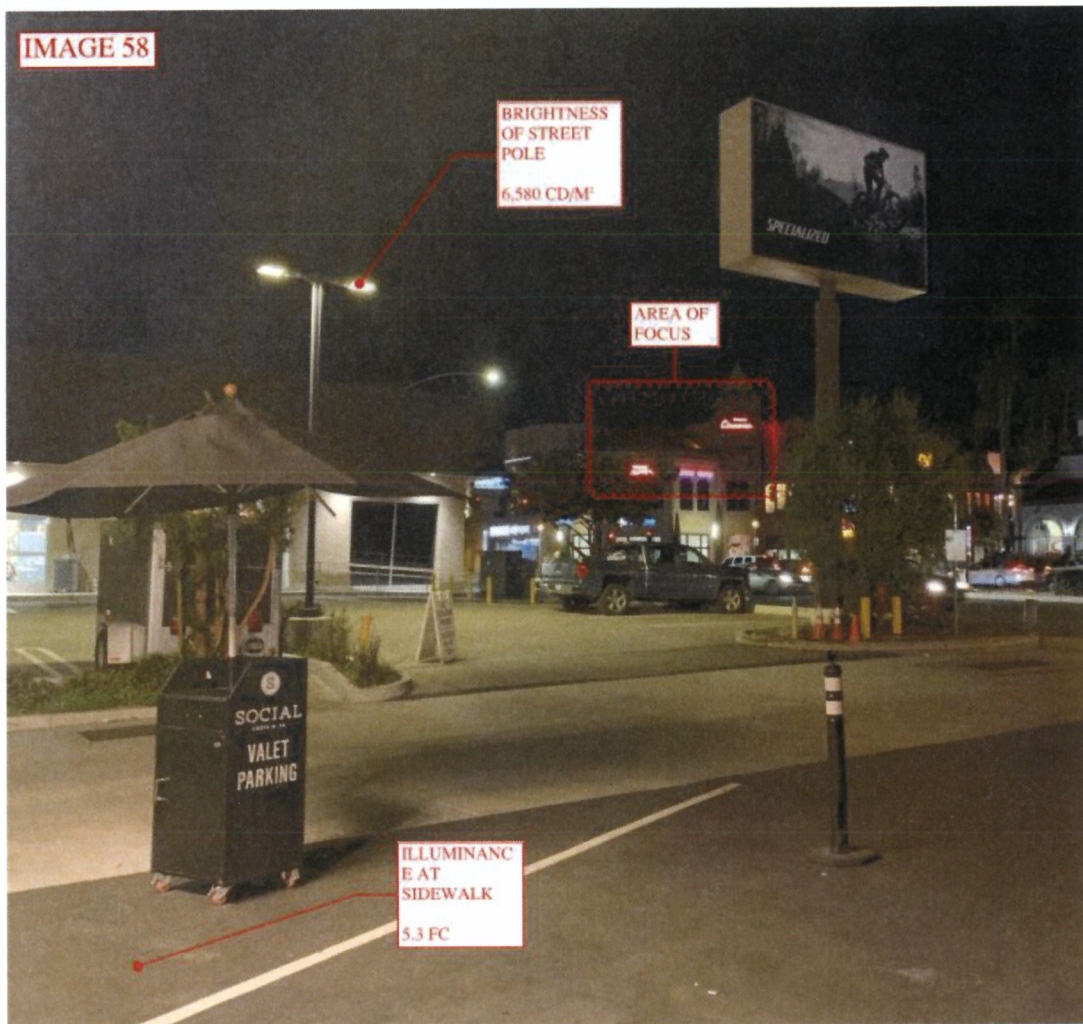
This residence is a two-story apartment complex property that has a view of a portion of the proposed LED digital signage through various trees. From the ground level, the proposed signage would not be visible. Looking at the vantage point adjacent to a second-floor balcony, there was a portion of the side of the top of the signage that would be visible. Single and double story commercial buildings, light poles, and trees blocked the majority of the proposed signage location.

The residence is located roughly 815 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 0.2 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.1 footcandles to the property.

Therefore, the contributed lighting level of 0.1 footcandles at this Sensitive Receptor are going to be at such a low level that it would be difficult to perceive the difference in lighting levels.

Sensitive Receptor 16:
512 West 19th Street



This location is a commercial restaurant on the ground floor of a single-story complex that has a view of the proposed LED digital signage. From the ground level, the proposed digital signage location would be visible. It is assumed that the contribution of light was not a significant amount considering the existing light levels from nearby street poles and custom signage.

The restaurant is located roughly 370 feet away from the secondary corner façade.

The existing footcandle levels taken at the sidewalk in front of the property was 5.3 footcandles. At this distance away from the project site, there would be no more than a potential assumed light contribution of 0.3 footcandles to the property.

Therefore, the contributed lighting level of 0.3 footcandles at this Sensitive Receptor would be at such a low level that it would be difficult to perceive the difference in lighting levels. As this is not a residence, this location does not need to directly conform to the City of Los Angeles Municipal Code. Instead, this location was reviewed to ensure that the proposed signage would not have a negative or substantial impact on both the customer experience and business volume.

6 – PROPOSED SIGNAGE IMPACTS TO SITE

To understand the potential impacts of the proposed signage, we must first look at the operational criteria that the client is proposing for the site. This includes the brightness levels that the digital signage will be set during daylight hours and during nighttime hours, hours of operation, and the dimming transition from day to night and night to day.

The client has provided a detailed operational design guide for the LED digital signage for the site:

-Sign luminance shall change during each day on the following schedule:

-Daytime: From sunrise until 20 minutes prior to sunset, luminance shall not exceed 7,000 cd/m² brightness.

*Note that in the code portion of the report, the recommended maximum brightness of the LED sign during the day was 7,500 cd/m². The client is setting the maximum brightness at a lower level than standard recommendations to accommodate brightness concerns.

*We are countering the 20-minute soft fade rate to be 45-minute soft fade rate so that the dimming is not noticeable by the eye.

-Evening: From sunset until 20 minutes prior to sunrise Luminance shall not exceed 300 cd/m²

--After Hours: From 2:00 am until sunrise, per local code, no animated content or moving patterns shall be permitted.

*Note that in the code portion of the report, the recommended maximum brightness of the LED sign during the night was 1,500 cd/m². The client is setting the maximum brightness at 300 cd/m², a lower level than standard recommendations to accommodate brightness concerns. There is still the concern of the brightness contribution that this signage will have at the residential properties. With this concern, we have documented with the existing lighting that the existing signage lighting and street lighting are currently brighter than 300 cd/m². The current “The Triangle” and “Triangle Cinemas” signage at the primary corner and secondary corner are above 400 cd/m², the signage graze light is above 375 cd/m², and the street column poles are above 4,000 cd/m². The existing pylon signs have a brightness above 300 cd/m². These are all above the 300 cd/m² of the proposed digital signage, so the residential properties have lived with these existing brightness contributors for years. The proposed LED digital signage will occupy a larger area on the façade, but it will not be brighter than any light sources currently installed.

-Illuminance from signs or architectural lights shall not exceed 1.0 footcandles at any adjacent residential zoned property line.

* Note that in the code portion of the report, the CEQA requirement for maximum contributed light is no more than 2.0 footcandles on any adjacent property. The client is setting the maximum at 1.0 footcandles so that there is a tougher standard that the digital signage must comply with above and beyond the recommended practices. For the concerns of light level contribution to the residential properties, there will not be a large increase of lighting from the digital signage because there are already existing contributors of light that are brighter sources than what is being proposed.

For general signage operations: Integral electronic display signs are typically measured in nits, or candelas per square meter. Typically, integral electronic display signs are made up of different colored pixel diodes. A typical pixel consists of a red LED diode, a green LED diode, and a blue LED diode. The higher resolution an integral electronic display sign is, the more pixels it contains.

White images on an integral electronic display are always the brightest, because the red, green and blue diodes are at full intensity. Because signs are rarely full white, the actual brightness of a sign is typically much less than the suggested maximum luminance.

For example, a typical integral electronic display has the 100% luminance settings for different colors:

White: 7,000 candelas/m²

Red: 1,500 candelas/m²

Green: 5,100 candelas/m²

Blue: 700 candelas/m²

The above values come from a report belonging to the Outdoor Advertising Association of America and was written by Dr. Ian Lewin on February 21, 2008.

Intensity depends on resolution (number of pixels per area), and the image on the sign. A lower resolution sign would be less bright than a higher resolution sign. The sign would never be fully white.

The proposed displays shall transition smoothly at a consistent rate of speed from the permitted daytime brightness to the permitted nighttime brightness levels, beginning at 45 minutes prior to sunset and concluding the transition to nighttime brightness 45 minutes after sunset. Where applicable, they shall also transition smoothly at a consistent rate of speed from the permitted nighttime brightness to the permitted daytime brightness levels, beginning 45 minutes prior to sunrise and concluding the transition to daytime brightness 45 minutes after sunrise.

7 - MITIGATION MEASURES

Mitigation measures can be implemented throughout the project but should be prioritized for the portions of the site affecting the Sensitive Receptors where contributed light is higher than the prescribed standards of the Los Angeles Municipal Code. As these are recommendations, it will be up to Standard Vision to implement these suggestions as needed in their design as well as provide overall photometric calculations until it is verified that all Sensitive Receptors around the project site will not be receiving any contributed light over the 1.0 footcandle required level. We recommend that once the digital signage is installed, a third-party contractor visit the site and verify the lighting contribution of the digital signage. This would have to be verified with a calibrated light meter.

For the digital signage, provide individually controlled and dimmable systems which can be set to an appropriate light level in the field and operated through astronomical timeclocks. The maximum brightness of the White LED will be set to 7,000 cd/m². The system will have to be designed so that the signage is dimmable down to 100 cd/m². The nighttime maximum will be set to 300 cd/m², but we recommend having the lower level brightness available if needed for flexibility in the future. We also recommend that final commissioning of the system be completed on site by a third-party contractor to confirm and verify that no adjacent residential properties are receiving light levels that exceed the 1.0 footcandle threshold. We also recommend limiting signs with flashing, strobing, or blinking lights; mechanical/moving parts; or lighted monument signs.

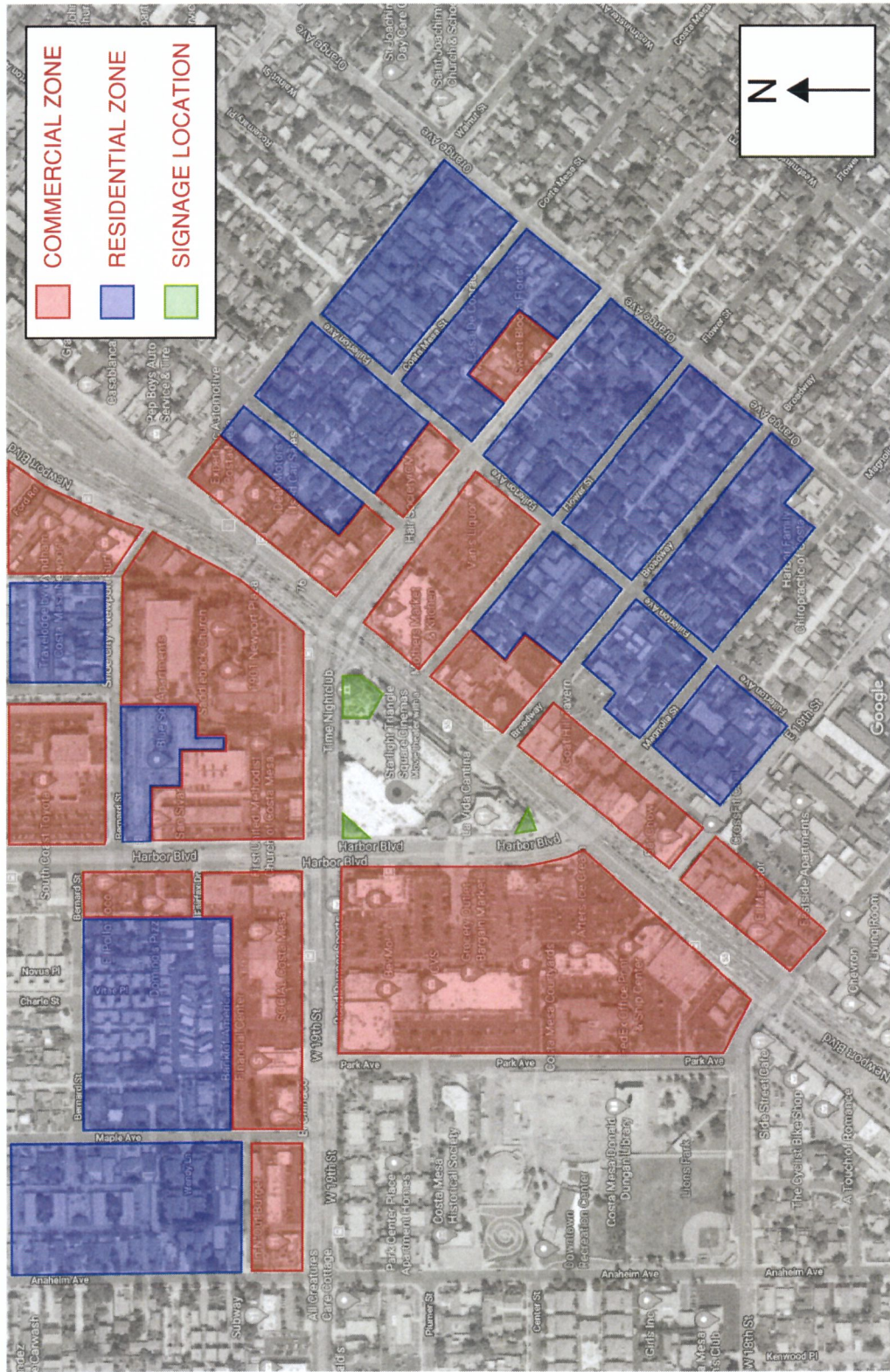
DIGITAL SIGN CONTROL & TRANSITIONS:

- Each LED digital sign billboard shall be individually dimmable as the brightness of the sign is dependent on the media that it is going to be presenting.

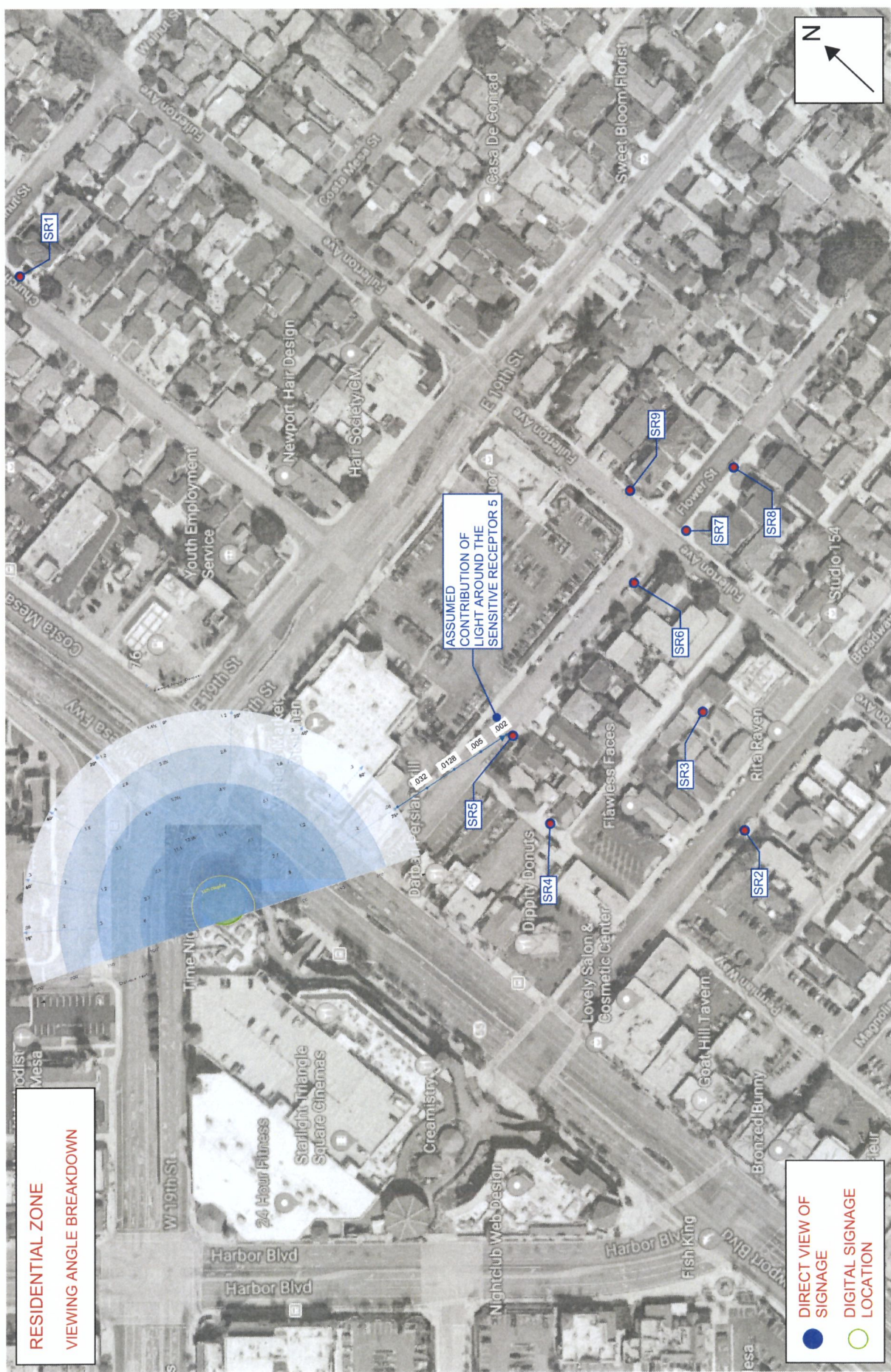
- Digital signage shall be equipped with sensors that modify the brightness of the sign in response to ambient lighting conditions and shall be required to occur gradually, to prevent a sudden change in perceivable brightness levels by pedestrians and motorists.
- Sign luminance shall transition smoothly between the hours of operation limits above over a time period of no less than 20 minutes but recommended to 45 minutes. All transitions shall be completed so that the maximum allowable luminance is achieved by the stated time listed above, with 3840 Hz refresh rate.
- When ambient sunlight illuminance during daytime is less than 100 footcandles for more than one (1) hour, the digital billboard should transition at a smooth rate of change from the daytime luminance level permitted above to the evening luminance level permitted at a suggested rate of no less than 20 minutes but recommended to 45 minutes.
- Each image displayed on a digital billboard shall not be refreshed more often than once every 8 seconds.
- Digital displays shall not include large areas of reflective elements and have a contrast ratio of less than 30:1 to eliminate glare.
- This is not a requirement, but a recommended practice it to have a system in place to have the signage dimmed down in the event of fog. This may be done by having a Ceilograph machine, a mechanism that tracks cloud bases and measures fog, which can then be tied into the dimming system of the signage elements to dim the light levels proportionally per the level of the fog.

8 - CONCLUSION

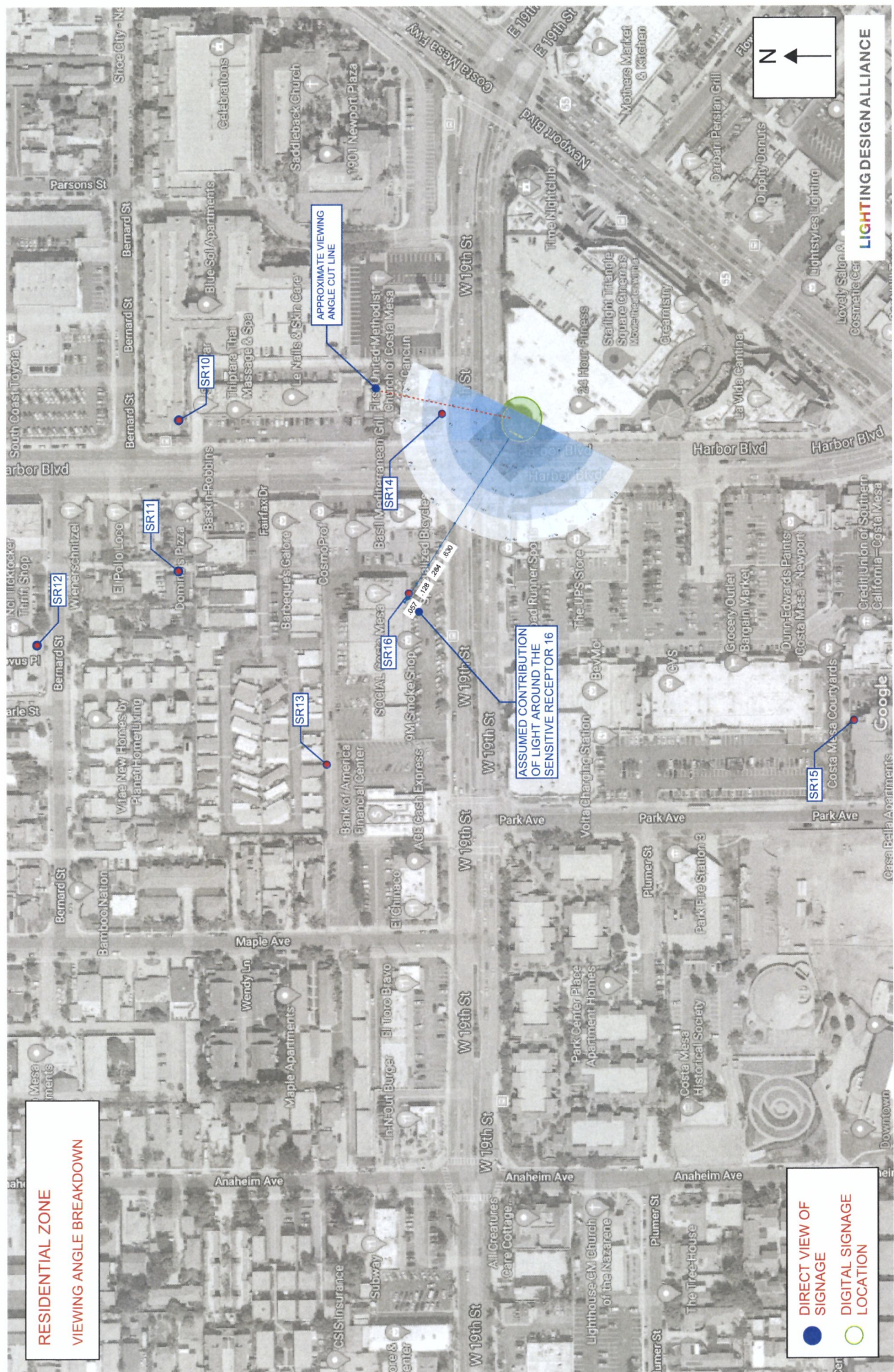
In coordination with Standard Vision (designer of the digital billboard system), Lighting Design Alliance (“LDA”), conducted a study evaluating the potential impacts of the proposed digital billboard/electronic display signs to the adjacent residential properties that are in proximity to the Triangle Square Entertainment Center located in Costa Mesa, California. The purpose of the lighting study was to examine the potential lighting impacts of the new digital signage within the adjacent residential neighborhoods by identifying Sensitive Receptor locations. Potential impacts related to lighting include items such as light trespass onto nearby properties, glare contributors, sensitivity zones, etc. After completing the survey, analyzing the findings, and considering local code and regulations such as Title 24 and the California Environmental Quality Act (CEQA), it has been determined that the potential impacts of the proposed digital billboard/electronic display signs to the adjacent residential properties that are in proximity to the Triangle Square Entertainment Center located in Costa Mesa, California would be minimal and would therefore allow for the installation. The contribution of light from the proposed digital billboard/electronic display signs at the identified Sensitive Receptor locations would be at such a low level that it would be difficult to perceive the difference in lighting levels.













GENERAL NOTE:

1) CALLOUTS SHOWN ARE ASSOCIATED WITH THE LOCATION AND DIRECTION AT WHICH EACH CORRESPONDING REFERENCE IMAGE WAS TAKEN



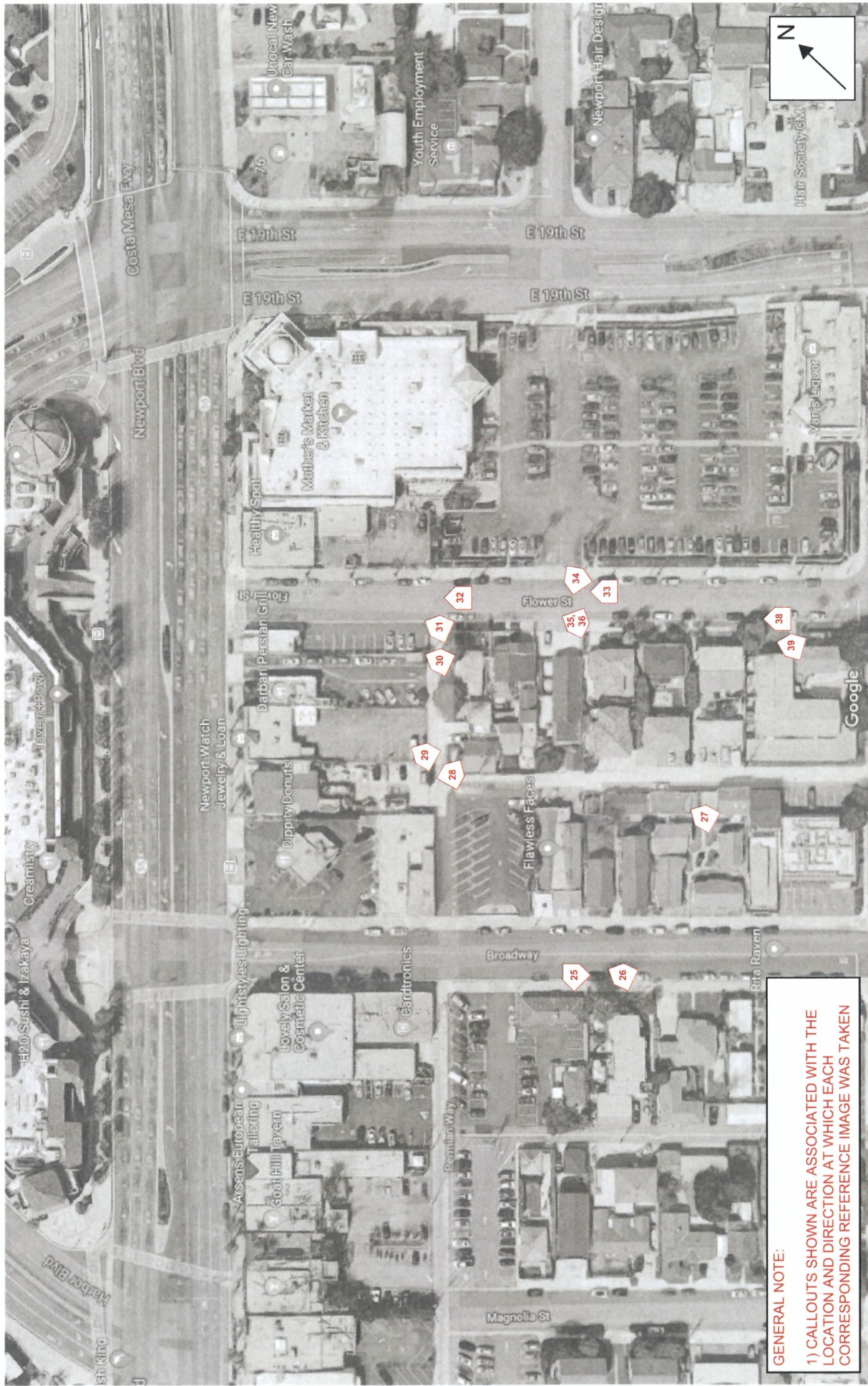
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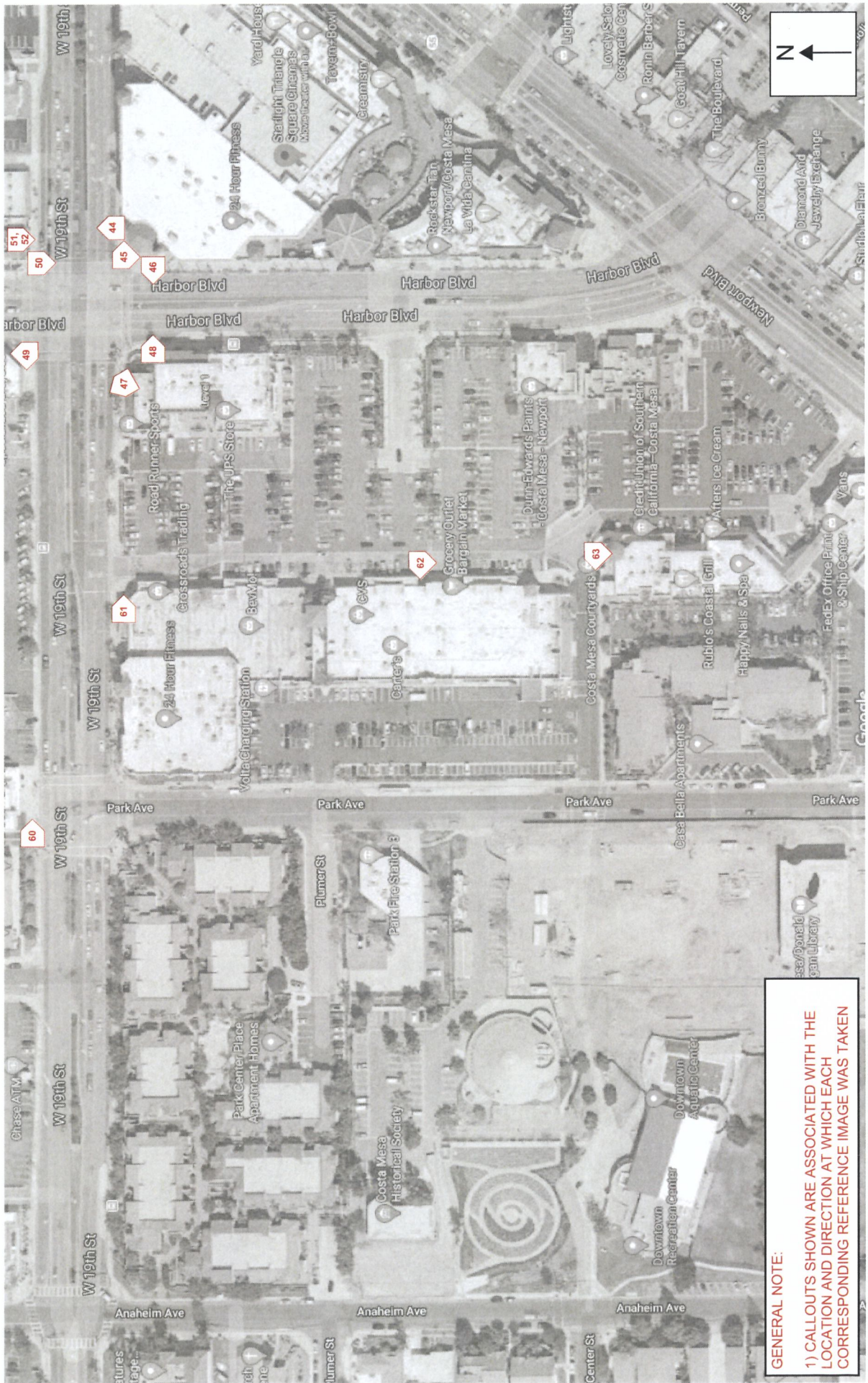
GENERAL NOTE:

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IMAGE 1



IMAGE 2



IMAGE 3



IMAGE 4



IMAGE 5



IMAGE 7



IMAGE 6



IMAGE 8



IMAGE 9



IMAGE 10



IMAGE 11



IMAGE 12



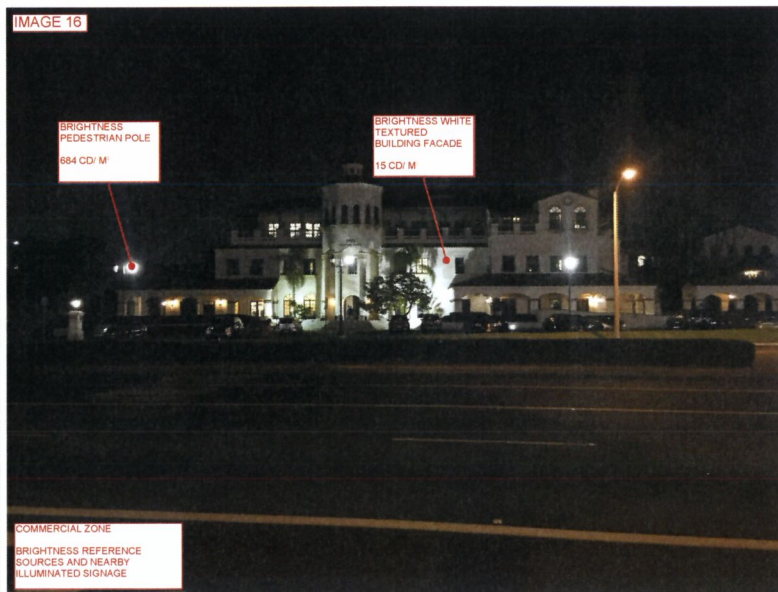
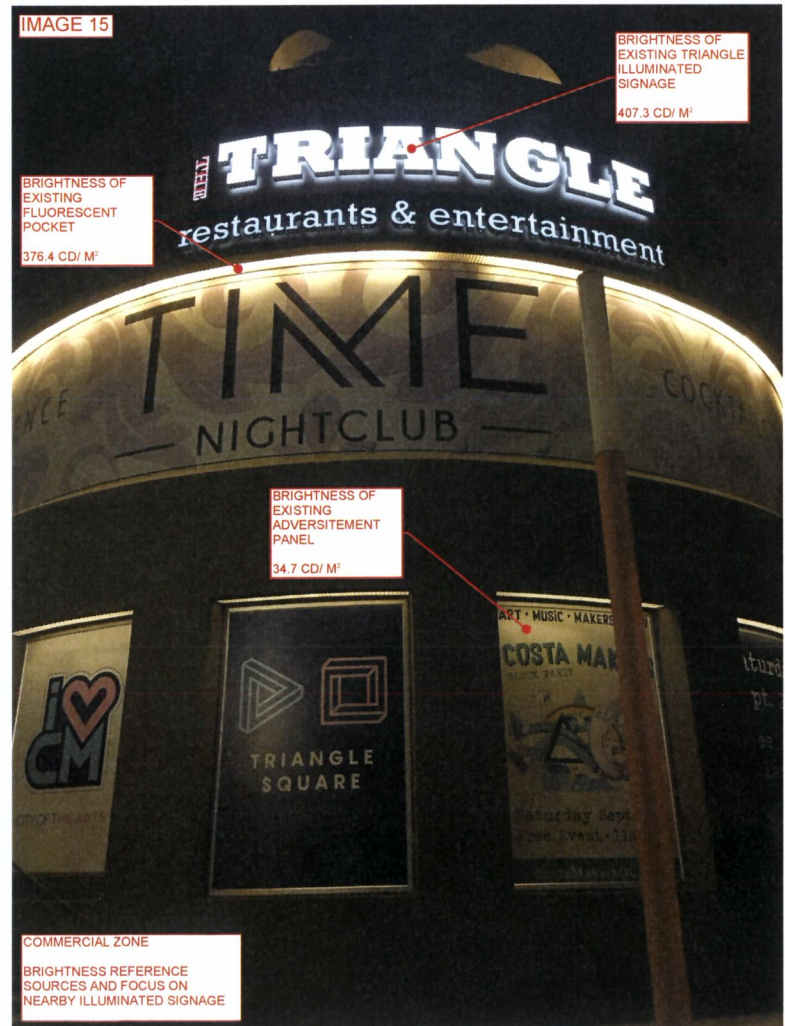
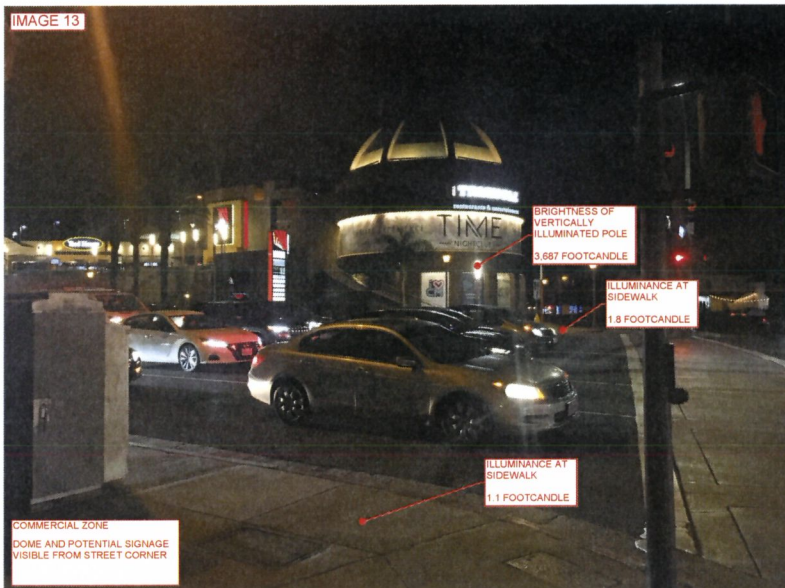


IMAGE 17



IMAGE 18



IMAGE 19



IMAGE 20



IMAGE 21



IMAGE 22



IMAGE 23

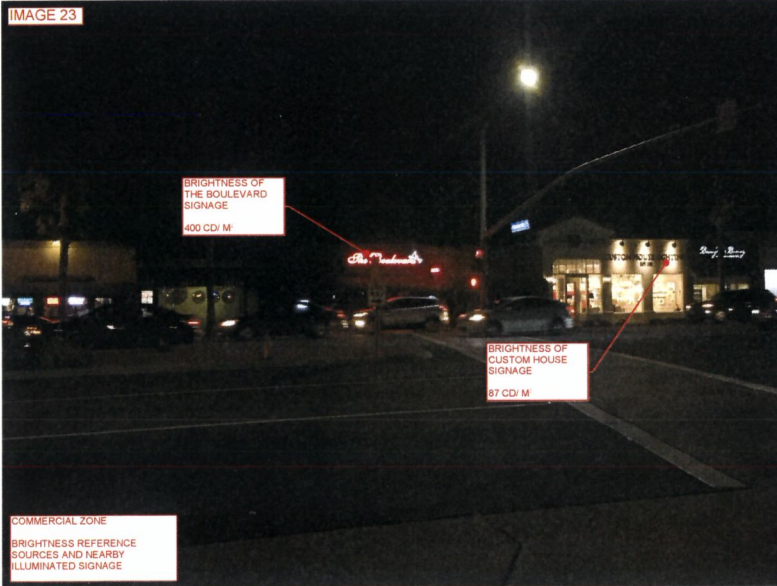


IMAGE 24

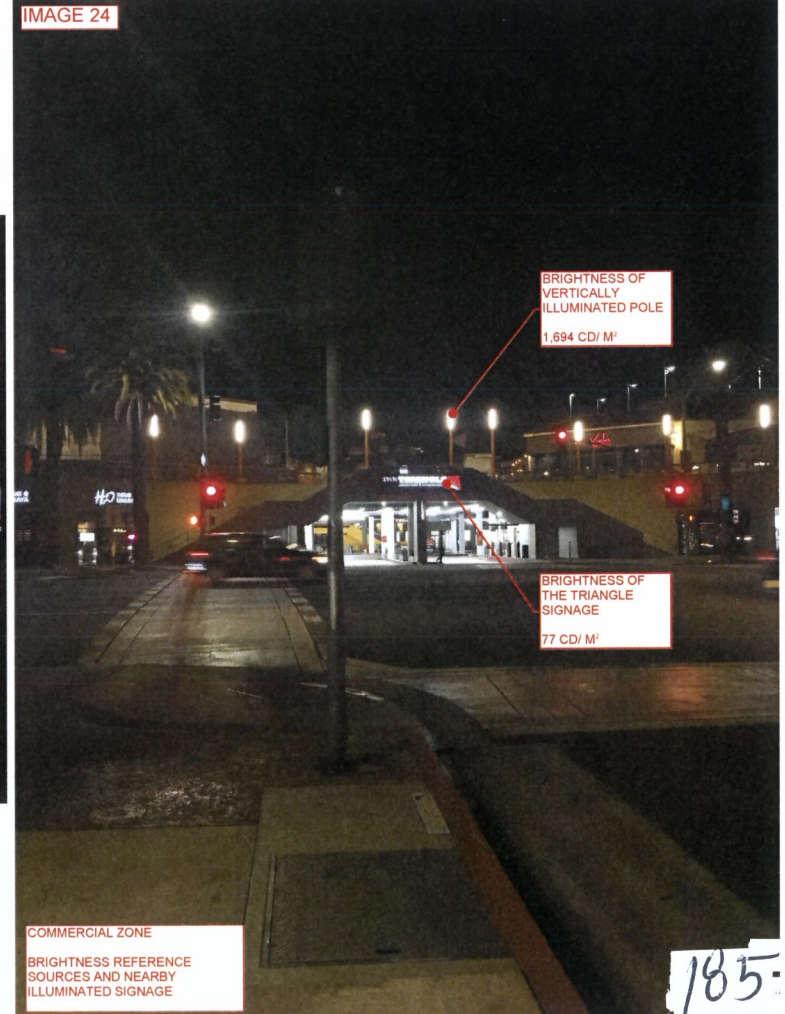
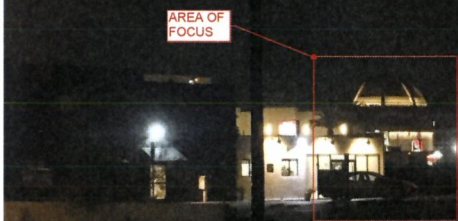


IMAGE 25



RESIDENTIAL ZONE
TOP OF DOME AND POTENTIAL
SIGNAGE VISIBLE FROM
RESIDENCE AND STREET

IMAGE 27



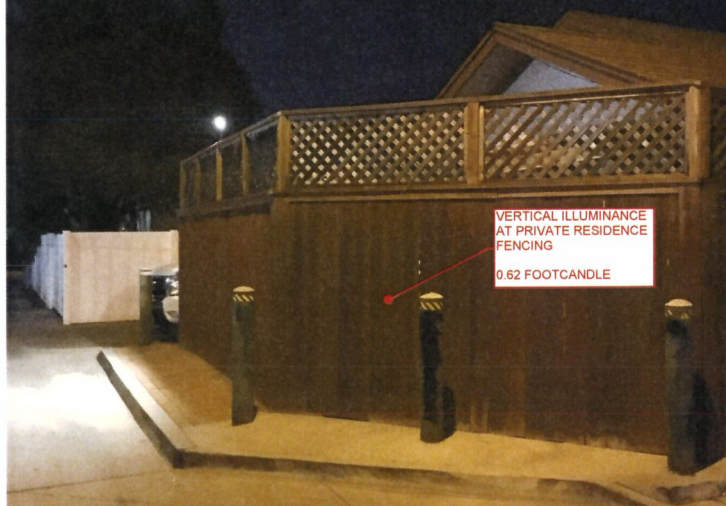
RESIDENTIAL ZONE
TOP OF DOME VISIBLE.
POTENTIAL SIGNAGE MAY BE
VISIBLE FROM SECOND LEVEL OF
PRIVATE RESIDENCE

IMAGE 26



RESIDENTIAL ZONE
BRIGHTNESS REFERENCE
SOURCES

IMAGE 28



RESIDENTIAL/ COMMERCIAL ZONE
TOP OF DOME VISIBLE.
POTENTIAL SIGNAGE MAY BE
VISIBLE FROM SECOND LEVEL OR
DECK OF PRIVATE RESIDENCE

IMAGE 29

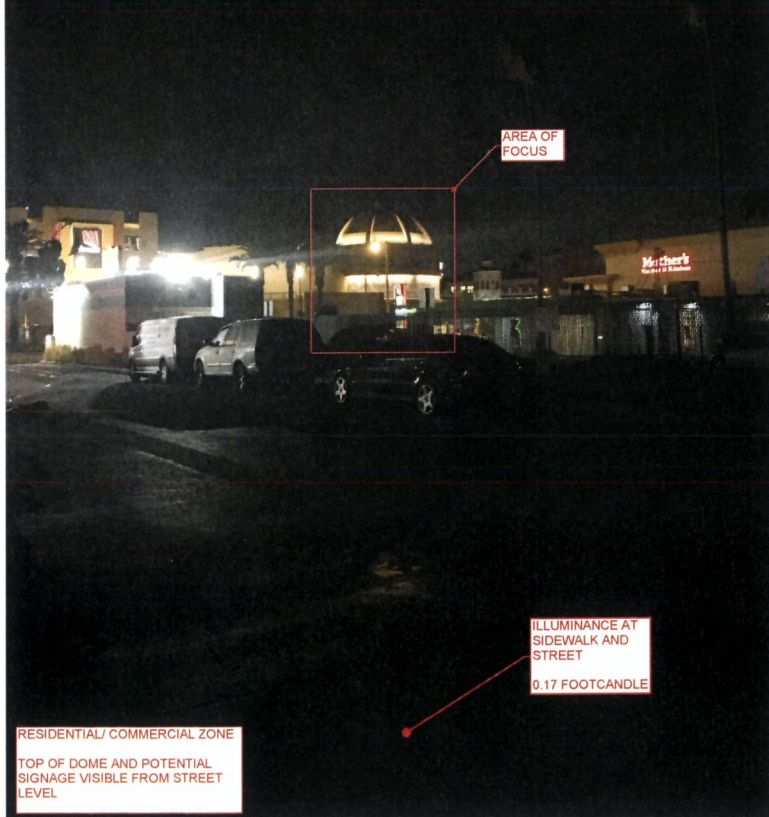


AREA OF
FOCUS

RESIDENTIAL/ COMMERCIAL ZONE

TOP OF DOME VISIBLE.
POTENTIAL SIGNAGE MAY BE
VISIBLE FROM SECOND LEVEL OR
DECK OF PRIVATE RESIDENCE

IMAGE 31



AREA OF
FOCUS

RESIDENTIAL/ COMMERCIAL ZONE

TOP OF DOME AND POTENTIAL
SIGNAGE VISIBLE FROM STREET
LEVEL

ILLUMINANCE AT
SIDEWALK AND
STREET
0.17 FOOTCANDLE

IMAGE 30

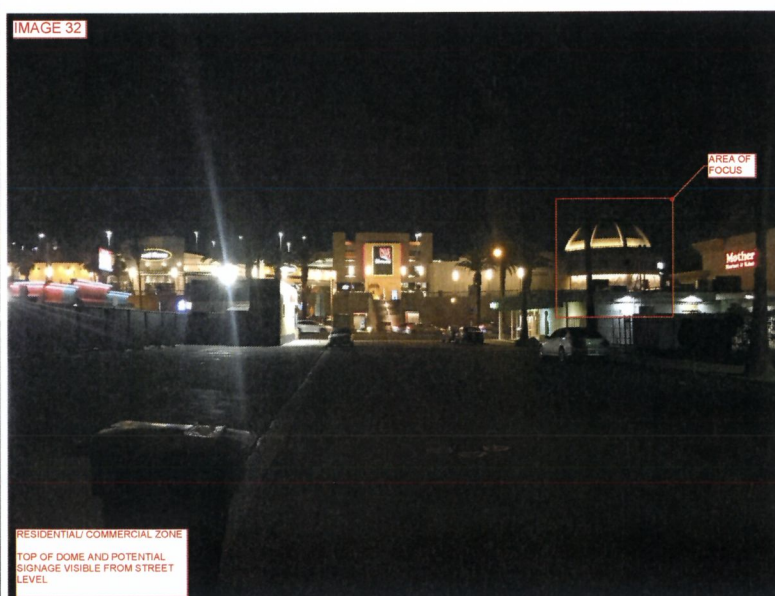


AREA OF
FOCUS

RESIDENTIAL/ COMMERCIAL ZONE

TOP OF DOME AND POTENTIAL
SIGNAGE VISIBLE FROM STREET
LEVEL

IMAGE 32



AREA OF
FOCUS

RESIDENTIAL/ COMMERCIAL ZONE

TOP OF DOME AND POTENTIAL
SIGNAGE VISIBLE FROM STREET
LEVEL

IMAGE 33



IMAGE 34

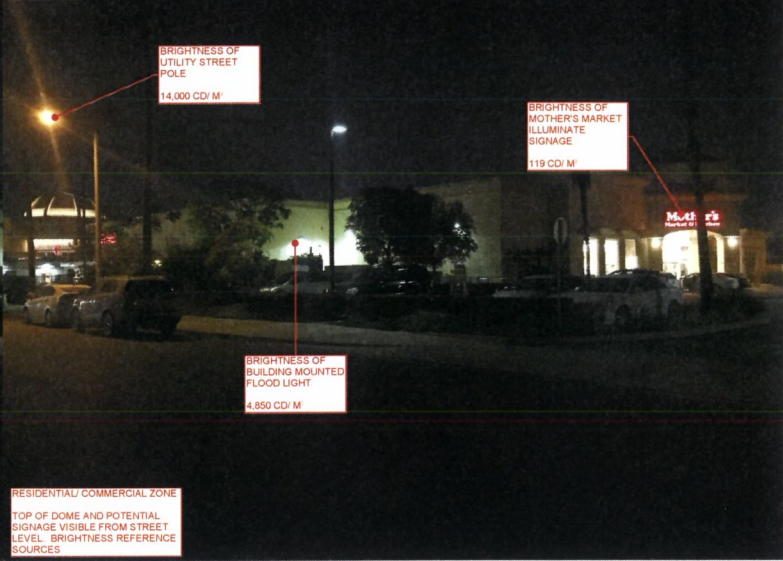
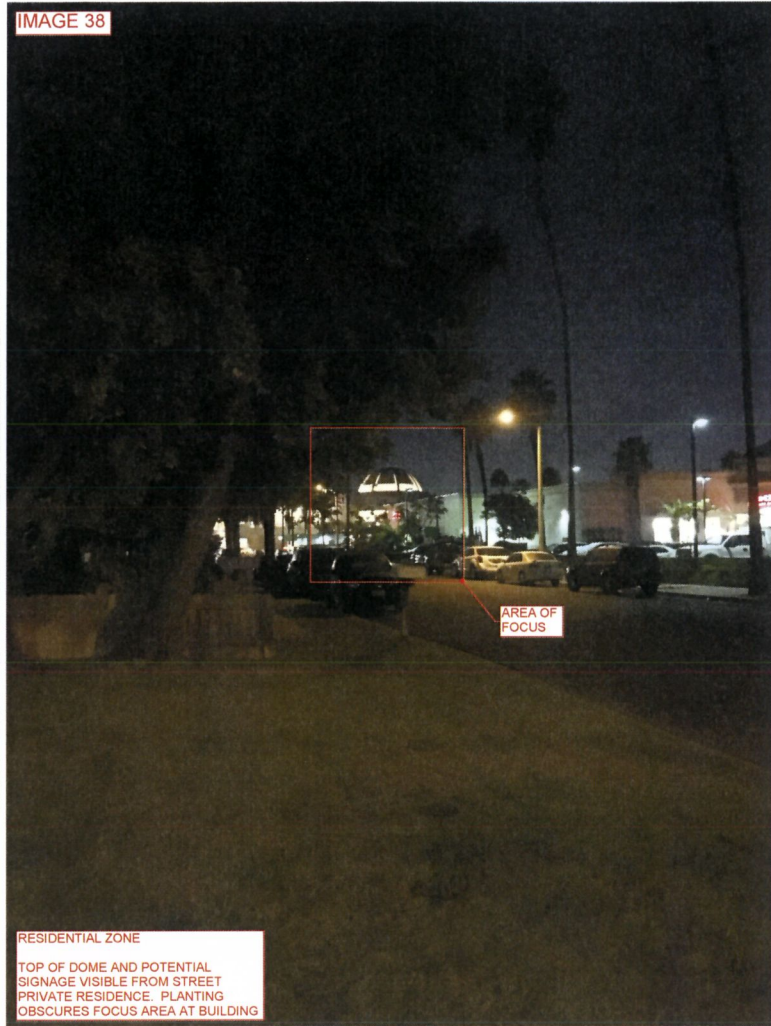


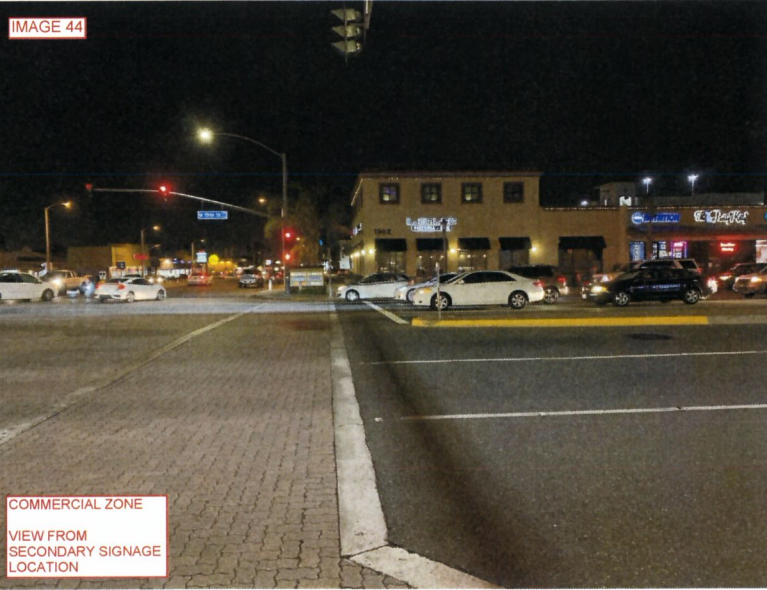
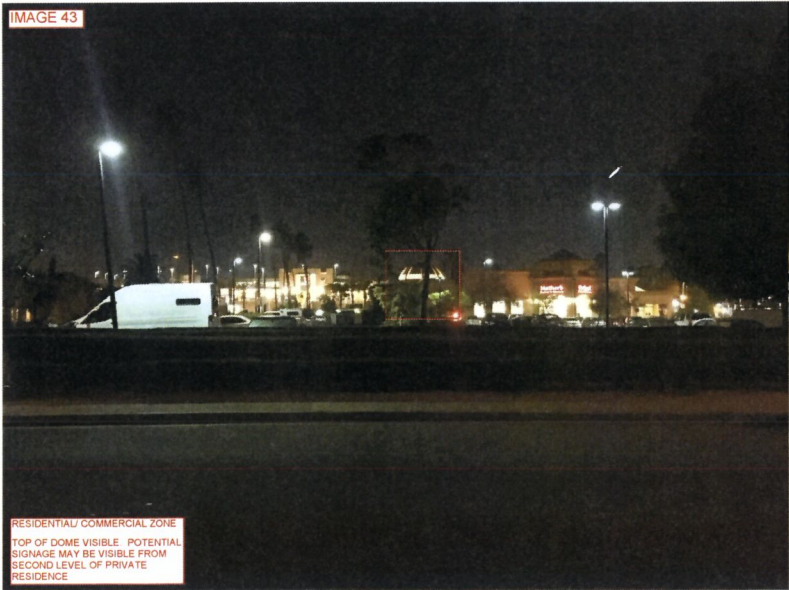
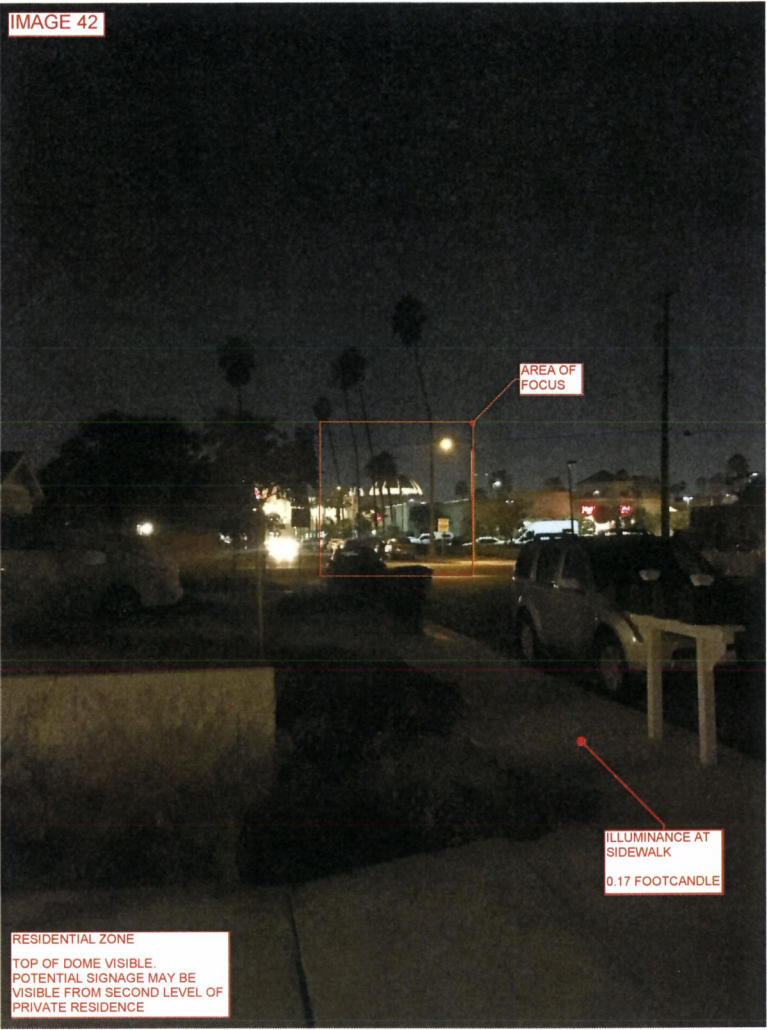
IMAGE 35

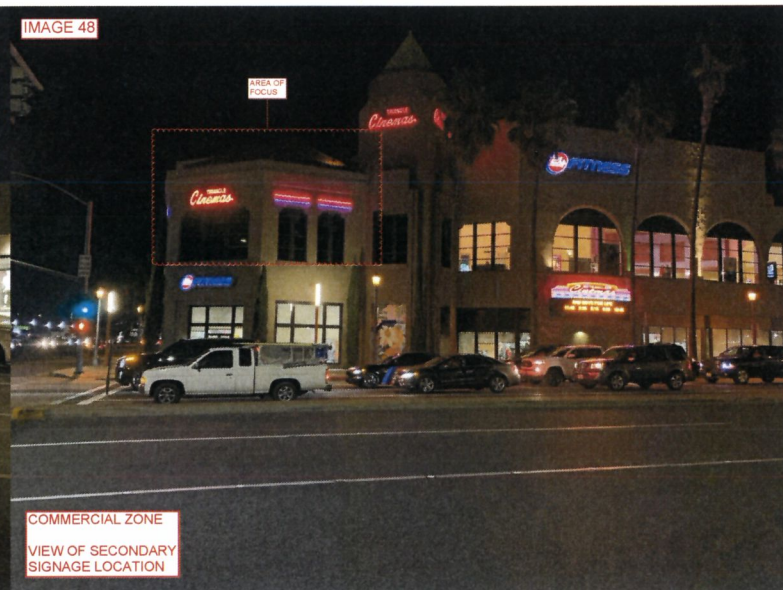
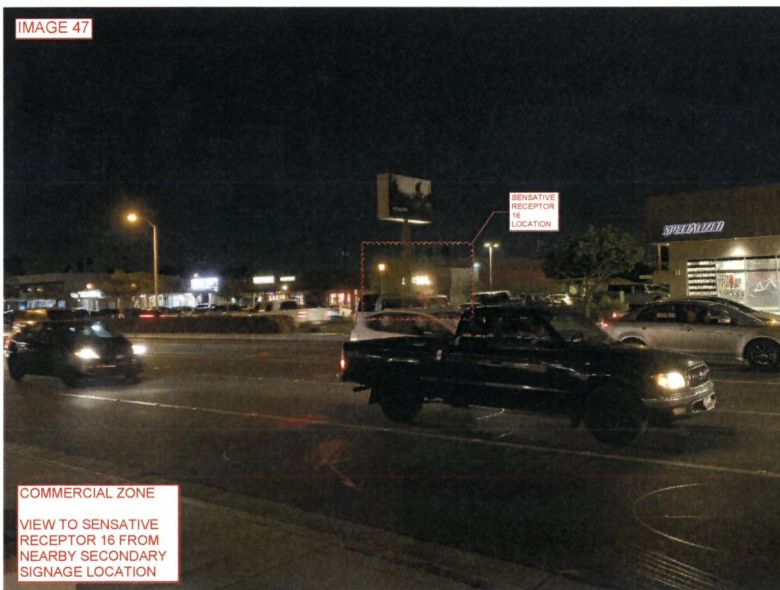
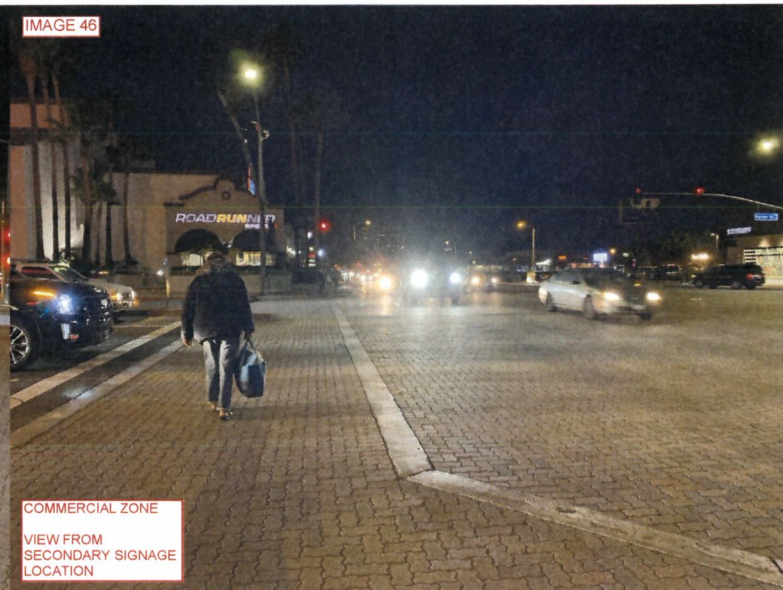


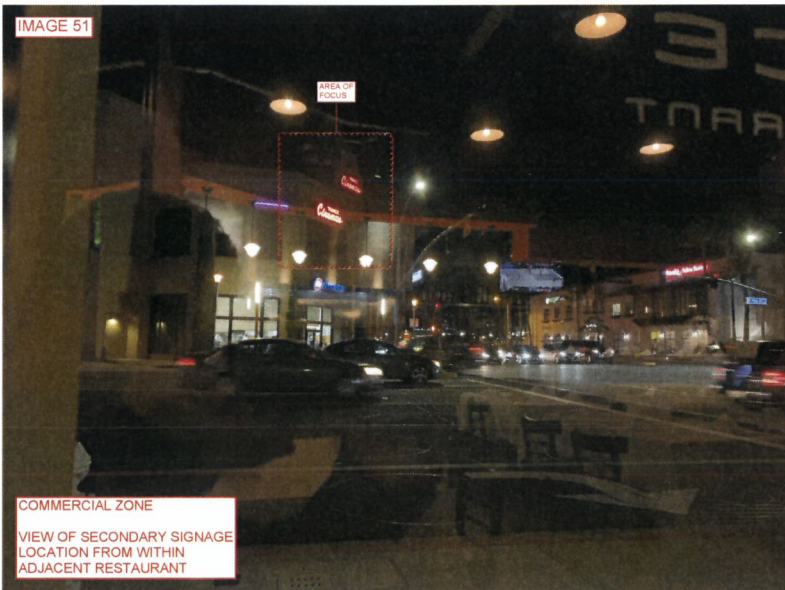
IMAGE 36

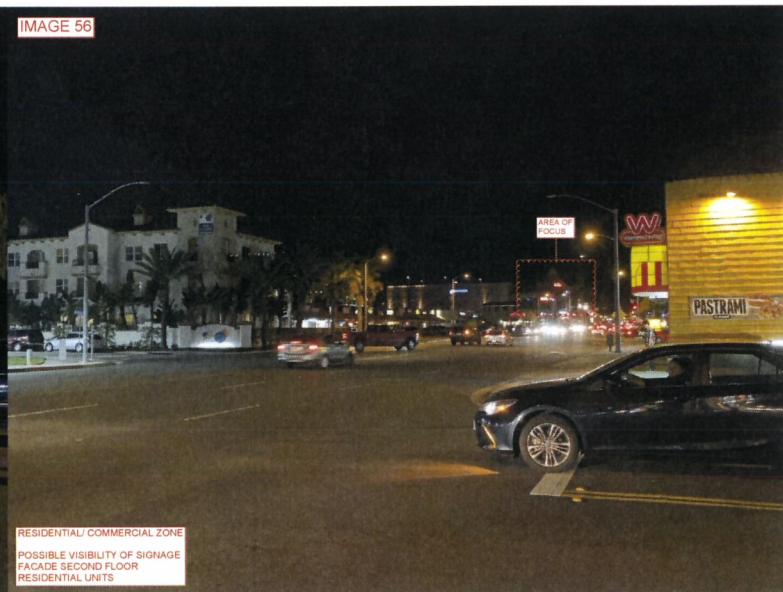
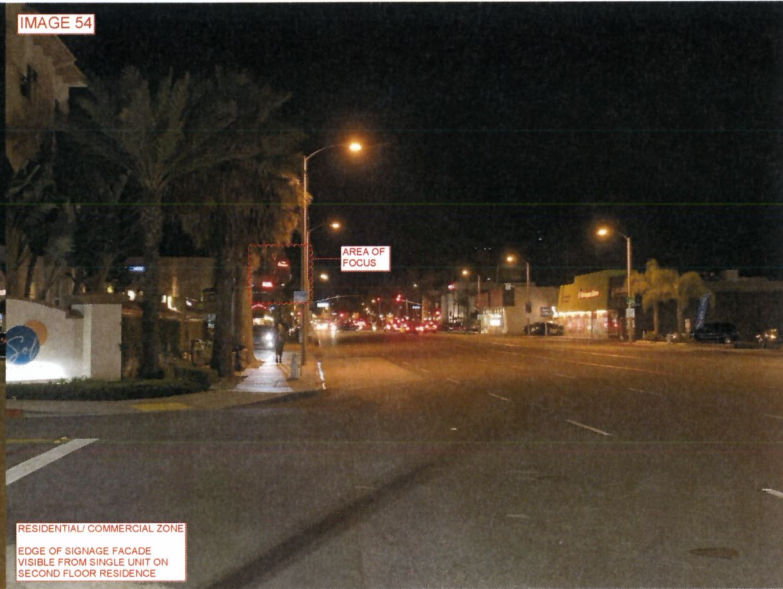












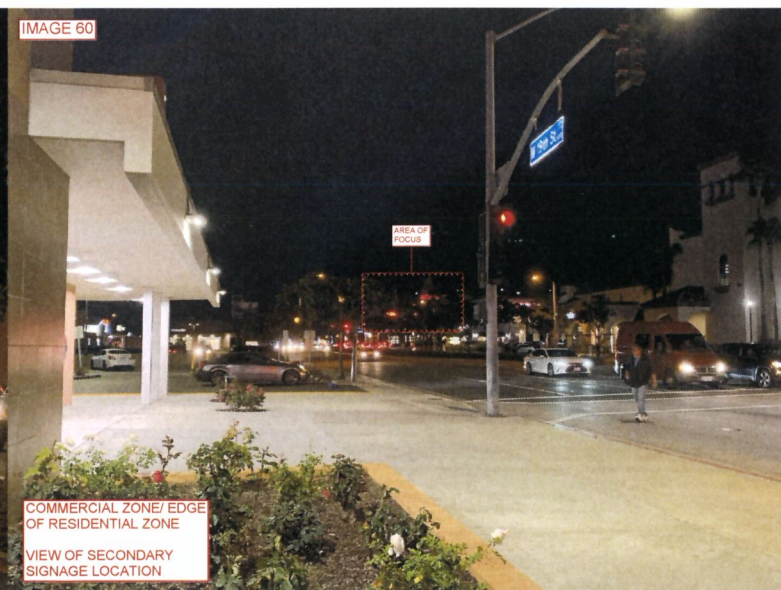
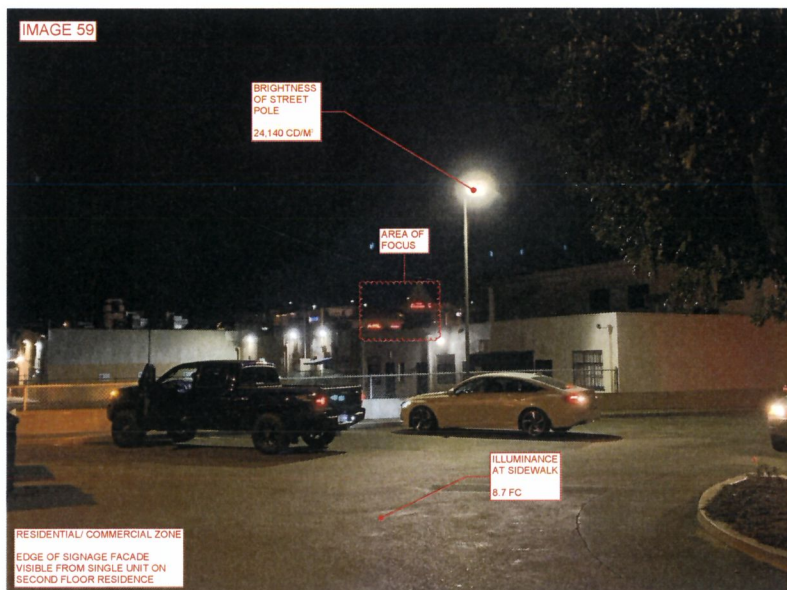
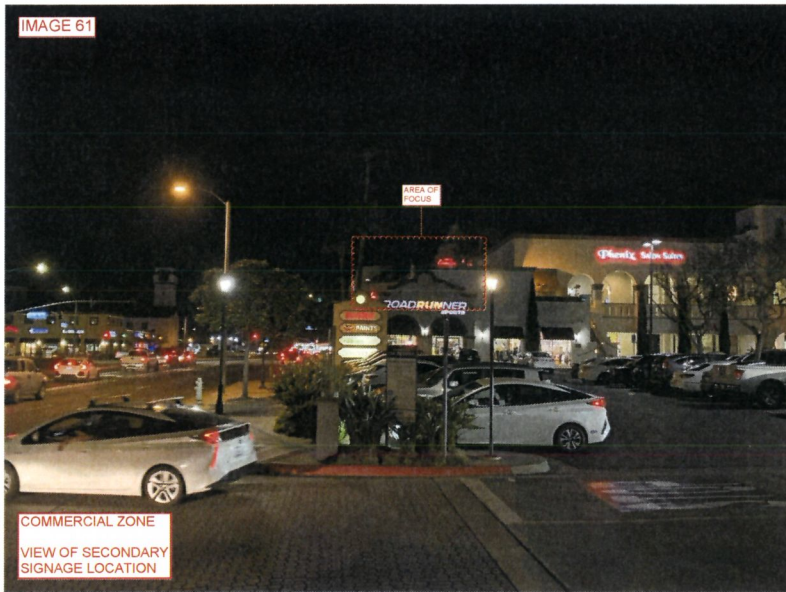


IMAGE 61



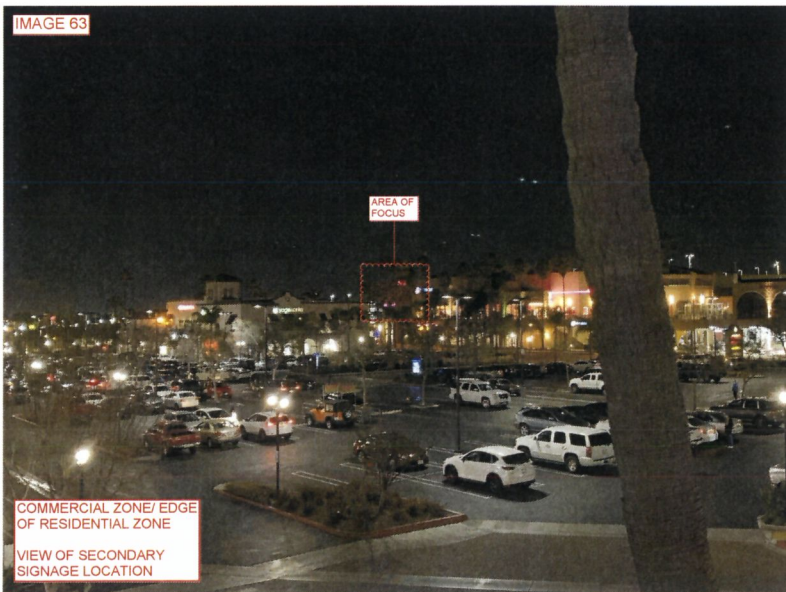
COMMERCIAL ZONE
VIEW OF SECONDARY
SIGNAGE LOCATION

IMAGE 62



COMMERCIAL ZONE
VIEW OF SECONDARY
SIGNAGE LOCATION

IMAGE 63



COMMERCIAL ZONE/ EDGE
OF RESIDENTIAL ZONE
VIEW OF SECONDARY
SIGNAGE LOCATION