Appendix LU-1

Usage Intensity Calculation Memorandum

MEMORANDUM

To: Allison Little, County of Sacramento

From: Alex Jewell, Kimley-Horn

Date: November 22, 2023

Subject: Sacramento WattEV Innovative Freight Terminal (SWIFT) Project – Usage Intensity Calculation

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This memo provides a calculation of the usage intensity for the Sacramento WattEV Innovative Freight Terminal (SWIFT) project. Usage intensity is a calculation of the maximum number of people per acre that can be present in a given area at any one time. The Sacramento International Airport Land Use Plan (ALUCP) has policies to provide compatibility criteria for land uses within the airports Safety Zones. The proposed project is within Safety Zones 2 and 3 as identified on *Map 3, Compatibility Policy Map: Safety* of the ALUCP. The proposed buildings on the project site are located within Safety Zone 2, which are according to Table 2 of the ALUCP has specific land use compatibility requirements for development within this zone. The proposed solar field was omitted from this calculation as it would have people would only intermittently be present on within the solar field area.

Project Location:

The proposed project would be located in the northwest portion of Sacramento County, approximately 7.5 miles from downtown Sacramento The project site is located south of Interstate 5 immediately south of Sacramento International Airport (SMF) The project site is bounded by Bayou Way and Interstate 5 to the north, fallow farmland and water tanks that are a part of the SMF's water system to the east, the West Drainage Canal (Witter Canal) and farmland to the south, and fallow farmland to the west. The project site generally covers APNs 225-0010-003, 225-0010-035, 225-0010-036, and 225-0010-006.

Project Description:

The proposed project includes deployment of advanced high-powered public charging stations and associated facilities powered by a 12.5 megawatt alternating current (MWac) solar generation field, with nameplate power of 31.2 megawatts of direct current (MWdc), to support zero-emissions electric freight movement in Sacramento. The charging areas and associated support facilities would occupy approximately 24 acres of land on the northern portion of the project site while the remaining 94 acres of the site would be occupied by solar fields and a 200-feet wide buffer area along the western and southern borders of the project site.

The vehicle charging area/rest area would be configured with two truck charging areas separated by a publicly accessible central plaza. The truck charging areas would include six 3,600-kilowatt (kW) charger configurations. Each configuration would consist of three Megawatt Charging Standard (MCS) 1,200 kW chargers and fifteen 240 kW Combined Charging Standard (CCS) chargers, for a total of 18 MCS chargers and 90 CCS chargers designed for heavy and medium duty trucks. The truck charging pads are expected to cover 7.8 acres. In addition to the charging pads, a parking lot for trailers would be provided with an average of 53 parking stalls spread over 2.8 acres of land. The proposed project would also include the installation of 30 CCS chargers dedicated to passenger vehicle use, which would be located at the central plaza.

Three buildings would be included within the public plaza. Three buildings are included within the public plaza. The first building would be used for site operations and maintenance. This will be a single-story building with a footprint of approximately 3,000 square feet. The second two-story building of approximately 7,000 total square feet would accommodate a convenience store, food outlets, restrooms and showers, a resting lounge made for the public, and a refreshment area. These amenities would be placed on the first floor, while the second floor would include a public visitor center. The public visitor center would be designed to showcase California's progress and milestones toward clean air initiatives and emission reduction. A panoramic view overlooking the solar farm and the truck's charging pads would be provided in the public visitor center. No other visitor amenities would be provided. The third building, approximately 3,000 square feet would be WattEV offices for site management and administration. Overall, the footprint of the public plaza would be approximately 5.25 acres.

Sacramento International Airport Land Use Compatibility Plan (ALUCP)

The project site is located on property owned by the Sacramento International Airport and within the Sacramento International Airport Land Use Compatibility Plan (ALUCP). Two designated airport safety zones are located on the project site as shown on *Map 3, Compatibility Policy Map: Safety* of the ALUP. As shown in the attached Figure 1, the western most portion of the project site is within Zone 3. The portion of the project includes one of the truck charging areas and approximately one-third of the solar field. The remainder of the project, including the 5.25-acre central plaza area, the eastern truck charging area, and the remaining approximately two-thirds of the solar field are within Safety Zone 2, which is the most restrictive of the two zones on the project site.

The following polices from the ALUCP provide direction on how to calculate usage intensity:

3.3.3. Nonresidential Development Criteria: Proposed Nonresidential Development shall be evaluated in accordance with the following criteria:

a) The usage Intensity (people per acre) limit indicated in Table 2 for each safety zone is the fundamental criterion against which the safety compatibility of most nonresidential land uses shall be measured. The Intensity limits set the total number of occupants

allowed on the Project site during normal busy use. Other criteria may be applicable to uses of special concern (see Policy 3.3.7).

b) All nonresidential uses, including uses listed in Table 1, Safety Compatibility Criteria, as "Normally Compatible," must comply with both the "sitewide average" and "single-\acre" usage Intensity limits indicated below and listed in Table 1 for each safety zone.

Table 1

Safety Zone	**1**	**2**	**3**	**4**	**5**	**6**
	People Per Acre					
Maximum Sitewide Average Intensity	10	60	100	160	130	400
Maximum Single-Ace Intensity	20	120	250	480	390	1,200

1) The "sitewide average" Intensity equals the total number of people expected to be on the entire site divided by the site size in acres (i.e., the gross acreage of the project site).

2) The "single-acre" Intensity equals the number of people expected to occupy the most intensively used 1.0-acre area(s) of the site.

c) The need to calculate the usage Intensity of a particular Project proposal for compliance with the Intensity criteria in the Paragraph (b) table is to be governed by the following:

1) Land use categories indicated in Table 2 as "Normally Compatible" for a particular safety zone are presumed to meet the Intensity criteria indicated in the Paragraph (b) table. Unless the particular Project proposal represents an atypical example of the usage type, calculation of the usage Intensity is not required.

2) Calculation of the usage Intensity must be done for all proposed Projects where the land use category for the particular safety zone is indicated in Table 2 as "Conditional" and the criteria column says "Ensure Intensity criteria are met."

3) Where Table 2 indicates that land use category is "Conditional" for the particular safety zone, but the criteria are other than "Ensure Intensity criteria are met," calculation of the usage Intensity is not necessary for typical examples of the use. However, the Project proposal must comply with the other criteria listed for the applicable land use category and safety zone.

d) No new structures intended to be occupied regularly are allowed in Safety Zone 1.

e) Usage Intensity calculations shall include all people (e.g., employees, customers/visitors) who may be on the Project site at any single point in time, whether indoors or outdoors.

1) For the purposes of these calculations, the total number of occupants during normal busiest periods shall be used.[1]

2) The Project site may be composed of multiple parcels.

f) Each component use within a Nonresidential Development that has multiple types of uses shall comply with the safety criteria in Table 2, Safety Compatibility Criteria, unless the use is ancillary to the primary use.

1) To be considered an Ancillary Use, the use must be associated with the primary use (e.g., a cafeteria in an office building) and occupy no more than 10% of total building floor area.

2) Ancillary Uses must be considered in the sitewide average Intensity limits but may be excluded from the single-acre Intensity calculations.

3) An Ancillary Use may be more intensively occupied (more people in a given area) than the primary use, provided that the Ancillary Use is neither:

- An assembly room having more than 750 square feet of floor area (this criterion is intended to parallel building code standards) and a capacity of 50 people;

  nor

- A K-12 school, day care center, or other risk-sensitive use that is "incompatible" within the safety zone where the primary use is to be located.

g) Other criteria may be applicable to uses of special concern (see Policy 3.3.7 and conditions in Table 2, Safety Compatibility Criteria).

h) Local Agencies may make exceptions for "Conditional" or "Incompatible" land uses associated with rare special events (e.g., an air show at the Airport) for which a facility is not designed and normally not used and for which extra safety precautions can be taken as appropriate.

3.3.5. Methodology for Calculation of Single-Acre Intensity: The single-acre Intensity of a proposed development shall be calculated by determining the total number of people expected to be within any 1.0-acre portion of the site, typically the most intensively used

[1] This number will typically be lower than the absolute maximum number of occupants the facility can accommodate (such as would be used in determining compliance with building and fire codes).

building or part of a building. Calculation of the single-acre Intensity depends upon the building footprint and site sizes and the distribution of activities on the site.

a) For sites less than 1.0 acre, the single-acre Intensity equals the total number of people on the site divided by the site size.

b) For sites more than 1.0 acre and a building footprint less than 1.0 acre, the single-acre Intensity equals the total number of building occupants unless the Project includes substantial outdoor occupancy, in which case such usage should be taken into account.

c) For sites having both site size and building footprint of more than 1.0 acre, the single acre Intensity shall normally be calculated as the total number of building occupants divided by the building footprint in acres. This calculation assumes that the occupancy of the building is evenly distributed. However, if the occupancy of the building is concentrated in one area—the office area of a large warehouse, for example—then the occupants of that area shall be included in the single-acre calculation.

d) The 1.0-acre areas to be evaluated shall normally match the building footprints provided that the buildings are generally rectangular (reasonably close to square) and not elongated in shape and, for buildings larger than 1.0 acre, may represent a portion of the building.

e) If a building has multiple floors, then the total number of occupants on all floors falling within the 1.0-acre footprint shall be counted.

Intensity Calculations

The following calculation apply to each of the buildings onsite:

Building 1 – Operations and Maintenance

Safety Zone 2 Intensity Limits

Max Sitewide Average: 60 people per acre

Max Single-Acre: 120 people per acre

Common Occupancy Load Factors[2]

Building 1 – Operations and Maintenance: Light Industrial/300 square feet per person

Building 2 – Convenience Store, Lounge, and Visitor Center: Limited Retail/250 square feet per person

Building 3 – Offices for Site Management and Administration: Office/215 square feet per person

Project Data

Site acreage: 5.25 acres for the Central Plaza area

Light Industrial: 3,000 square feet

Retail: 7,000 square feet

Office: 3,000 square feet

Occupancy:

Light Industrial: $\frac{3{,}000 \text{ square feet}}{300 \text{ square feet per person}} =$ 10 people

Retail[3]: $\frac{7{,}000 \text{ square feet}}{250 \text{ square feet per person}} =$ 28 people

+54 people for 30 EV charging stations

[2] The occupancy load factors are from Table 2, Chapter 2, of the Sacramento International Airport Land Use and Compatibility Plan (2013). Footnote 1 of Table 2 of the ALUCP notes these occupancy load factors (square feet per person) are based on information from various sources and are intended to represent busy=period usage for typical examples of the land use category.

[3] Table 2, Chapter 2, of the ALUCP does not provide occupancy loads for uses such as lounges and visitor center. As such, since retail is estimated to represent the most intensive use of all the activities proposed in the building, the whole building was calculated as retail to provide the most conservative calculation for the building overall. Additionally, because there are 30 passenger car electric vehicle charging stations proposed at the retail building an additional 54 people were added to this building calculation to assume that all charging stations would be used at the same time. A vehicle occupancy factor of 1.8 was added to each car at the passenger car electric vehicle charging stations assuming that some cars may have more than one passenger. An occupancy factor of 1.8 was chosen from the list of vehicle occupancies from Appendix E of the ALUCP (page E-3). A factor of 1.8 represented the highest factor in the range provided for shopping, which appeared to be the most similar use for the proposed project to provide a conservative calculation.

Office: $\frac{3{,}000 \text{ square feet}}{215 \text{ square feet per person}} =$ 14 people

Total: 106 people

Intensity Results

The results of the Intensity calculations indicate that the proposed development satisfies the sitewide and single acre Intensity criteria.

Sitewide Average Intensity

$\frac{\text{Total People}}{\text{Site Acreage}} = \frac{106 \text{ people}}{5.25 \text{ acres}}$ = 20 people per acre

The threshold for maximum site wide intensity for Safety Zone 2 is 60 people per acre. The project is consistent with this maximum intensity.

Single Acre Intensity

Building 1 – Operations and Maintenance:

$\frac{\text{Total People}}{\text{Single Acre}} = \frac{10 \text{ people}}{1 \text{ acre}}$ = 10 people per acre

The threshold for maximum single-acre intensity for Safety Zone 2 is 120 people per acre. Building 1 is consistent with this maximum intensity.

Building 2 – Convenience Store, Lounge, and Visitor Center:

$\frac{\text{Total People}}{\text{Single Acre}} = \frac{82 \text{ people}}{1 \text{ acre}}$ = 82 people per acre

The threshold for maximum single-acre intensity for Safety Zone 2 is 120 people per acre. Building 2 is consistent with this maximum intensity.

Building 3 – Offices for Site Management and Administration:

$\frac{\text{Total People}}{\text{Single Acre}} = \frac{14 \text{ people}}{1 \text{ acre}}$ = 14 people per acre

The threshold for maximum single-acre intensity for Safety Zone 2 is 120 people per acre. Building 3 is consistent with this maximum intensity.

Vehicle Charging Areas

Table 2, Chapter 2, of the ALUCP does not provide occupancy loads for uses such as the vehicle charging stations. As such, for the purposes of this analysis, the intensity calculations for the vehicle charging stations were based on the peak hour trip counts provided for the traffic analysis. Under the cumulative conditions, the PM peak hour represents the greatest number of trips to the charging stations at 334 trips. The total trips represent a car or truck arriving to the project site and leaving the project site. This would result in 167 cars or truck coming to the vehicle charging area. This represents the total number of vehicles for the vehicle charging areas on east and west sides of the project site. Each truck charging area is approximately 4.38 acres.

A vehicle load factor of 1.2 was added to the number of vehicles to account for vehicles that may have more than one person.[4]

Sitewide Average Intensity

$$\frac{\text{Total People}}{\text{Site Acreage}} = \frac{200 \text{ people}}{4.38 \text{ acres}} = 46 \text{ people per acre}$$

The vehicle charging area on the east side of the property is located within Safety Zone 2. The threshold for maximum site wide intensity for Safety Zone 2 is 60 people per acre. The project is consistent with this maximum intensity. It should be noted that this calculation assumes that all project trips are located within the one vehicle charging area in the east side of the project site and none on the west side charging area.

Single Acre Intensity

Conservatively assuming that 1 acre of the 4.38 acre charging area would contain half of the people onsite, the total number of people would be 100 people.

$$\frac{\text{Total People}}{\text{Single Acre}} = \frac{100 \text{ people}}{1 \text{ acre}} = 100 \text{ people per acre}$$

The threshold for maximum single-acre intensity for Safety Zone 2 is 120 people per acre. The vehicle charging area is consistent with this maximum intensity.

[4] A vehicle occupancy factor of 1.2 was added to each vehicle at the electric charging stations for cars and trucks assuming that some cars may have more than one passenger. An occupancy factor of 1.2 was chosen from the list of vehicle occupancies from Appendix E of the ALUCP (page E-3). A factor of 1.2 represented the highest factor in the range provided for work, which appeared to be the most similar use for the proposed project to provide a conservative calculation.

The vehicle charging area on the west side of the project site located within Safety Zone 3. Safety Zone 3 has the following Intensity limits:

Safety Zone 3 Intensity Limits

Max Sitewide Average: 100 people per acre

Max Single-Acre: 250 people per acre

Applying the same conservative approach used in the calculation above the project would be consistent with this maximum intensity for Zone 3.

Conclusion

The proposed SWIFT project is consistent with the maximum intensity limits of the ALUCP. The approximately 14 acres of the project site (not including the solar field) where the highest concentrations of people will be located are within the allowable intensities as established by the ALUCP.

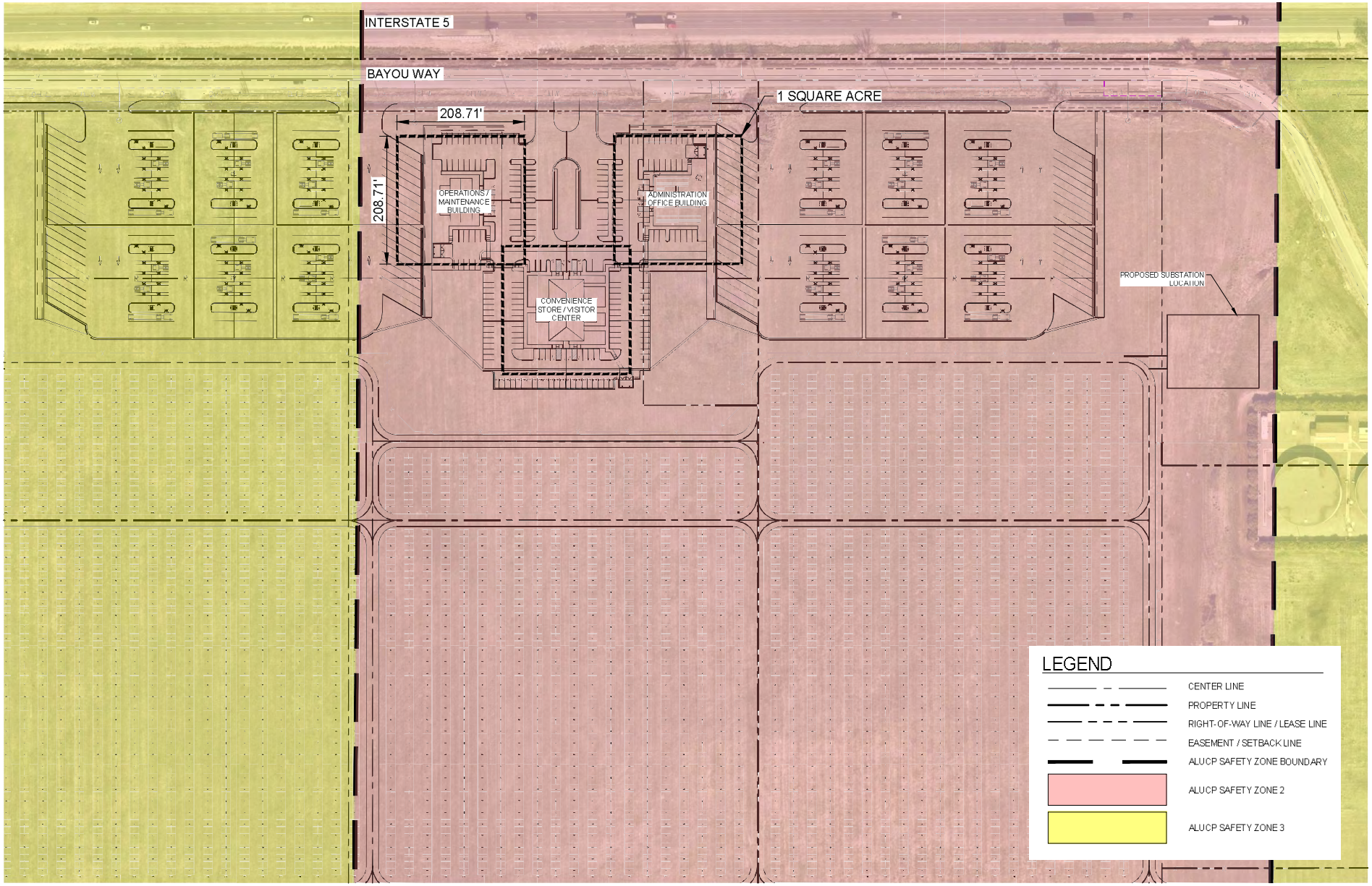

Figure 1: Airport Land Use Compatibility Plan (ALUCP) - Airport Safety Zones

Not to scale

Sacramento WattEV Innovative Freight Terminal (SWIFT) Project

Kimley»Horn
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