



TASK 3-ANALYSIS AND RECOMMENDATIONS

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SUBJECT: SJCOG AFVP – Analysis and Recommendations

Project # 22073

CH. 4 ANALYSIS AND RECOMMENDATIONS

This chapter will identify future needs and gaps in ZEV infrastructure for EV charging and hydrogen stations that need to be filled to encourage adoption of zero emission vehicles (ZEVs) in San Joaquin County. The project team has estimated the pace of ZEV adoption through 2030, performed a gap analysis to identify areas with inadequate ZEV infrastructure and a siting analysis to identify where installations should be focused. Next, the project team identified barriers to promoting alternative fuels in San Joaquin County and provided recommendations to implement as a part of the County’s Alternative Fuels Vision Plan.

NEW VEHICLE ADOPTION

To build zero emissions vehicle forecasts, Frontier Energy used the anticipated Advanced Clean Cars II rule which prohibits the sale of vehicles that run on fossil fuels by 2035, and the Advanced Clean Fleet rule, which will require fleets to be 100% zero emissions by 2045. Details about these regulations can be found in **Appendix B**.

LIGHT DUTY ZEV FORECAST

To build the growth curves for light duty vehicles, Frontier Energy began with the current population of ZEVs and extended the curves with accelerating ZEV percentages of new light duty vehicle purchases towards the target year (2035). For the fast growth curve, estimates show that all new light duty purchases will be ZEVs a year earlier than required (2034). For the medium growth curve, estimates show that all new light duty purchases will be ZEVs by the target year, with exponentially increasing adoption rates in the years approaching 2035. For the slow growth curve, estimates show that all new light duty purchases will be ZEVs by the target year, but with adoption rates that will rapidly increase in the two years preceding the target year (2035). Also, in the medium growth scenario the project team used 26% as the percentage of new ZEV purchases in 2025 to roughly align with a Consumer Reports survey response question data point.

To estimate the number of light duty vehicle registrations in San Joaquin County, Frontier Energy begins with the number of light duty registrations in the previous year, and then multiply that number by the annual growth rate. To estimate the new light duty registrations in San Joaquin County, we begin with the new statewide light duty registrations, and then divide by total statewide registrations per year to get the percentage of new registrations statewide, which is then applied to San Joaquin County registrations to derive estimated new light duty registrations.

Finally, to calculate the forecasted number of new light duty ZEV registrations in San Joaquin County, Frontier Energy used the statewide historical percentages of ZEV purchases from CNCDA and created a smooth growth trajectory that ends with 100% new light duty purchases being ZEVs by 2030 for the medium growth scenario, a smooth growth trajectory that ends with 100% of new purchases being ZEVs by 2029 for the fast growth scenario, and a smooth growth trajectory that ends with 100% of new purchases being ZEVs by 2030 with a sharp uptick in 2029 for the slow growth scenario. Fuel Cell light duty vehicles are not separated out into its own line as their numbers are expected to remain small. **Figure 1** and **Figure 2** below illustrate these growth scenarios.

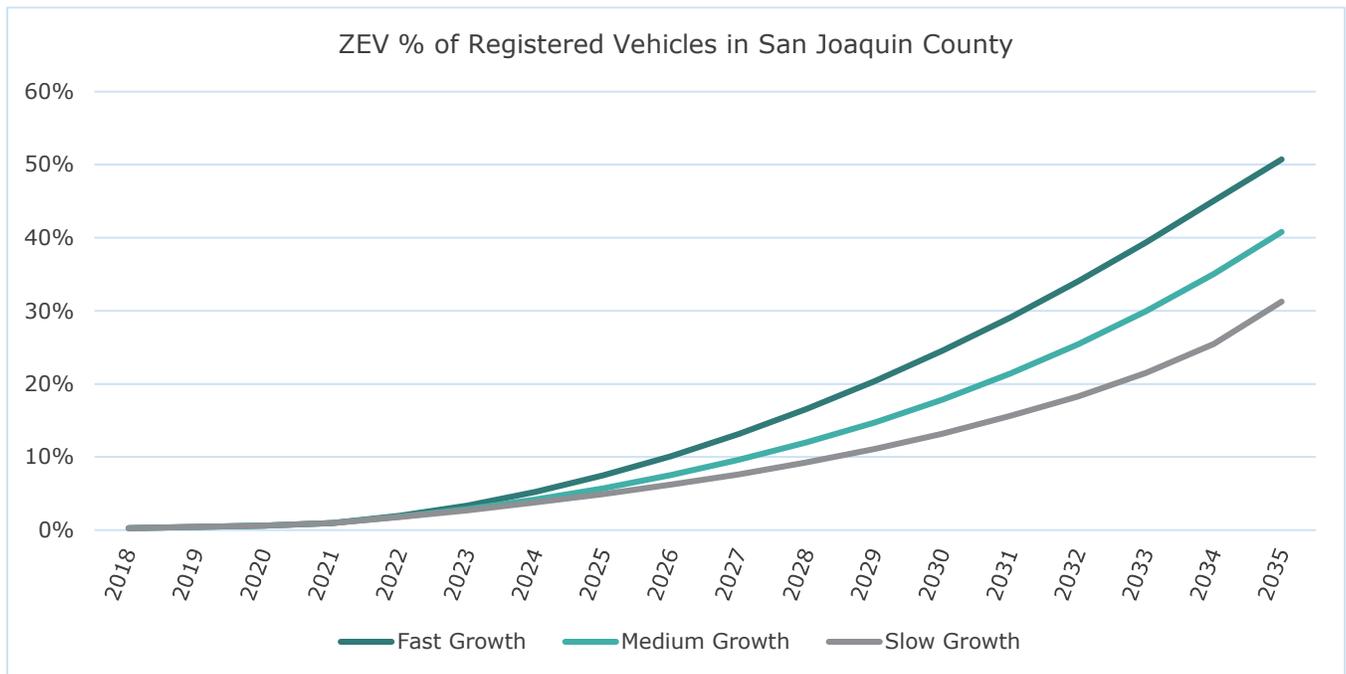


FIGURE 1: ZEV REGISTRATION VEHICLES IN SAN JOAQUIN COUNTY

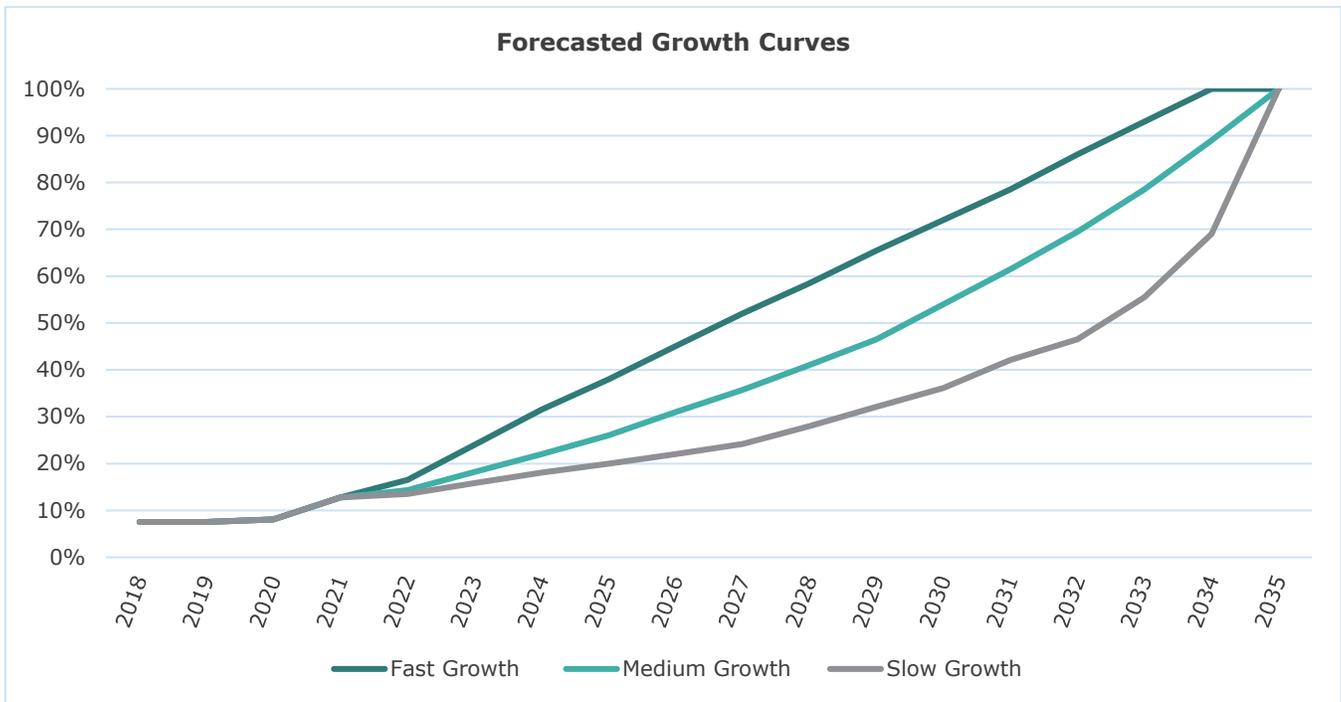


FIGURE 2: PROJECTED ZEV GROWTH

EVALUATION OF POTENTIAL LOCATIONS

EXISTING INFRASTRUCTURE AND GAP ANALYSIS

Chapter 2 of this plan discussed the existing alternative fuel (including EV) infrastructure in San Joaquin County. DKS has built upon this information and compiled a variety of data sources to assist in both the infrastructure Gap Analysis and Siting Analysis. For a full methodology see **Appendix D**.

To identify EV and alternative fuel infrastructure gaps in the project study area, DKS aggregated a number of the data sources listed in **Appendix D** into a single map (Error! Reference source not found.) displaying overlaid data including data collected during the existing conditions analysis (**Chapter 2**) which included data such as existing EV charging stations and other alternative fuel fueling stations (plus “buffers” around the existing infrastructure), existing concentrations of multi-family housing (by census tract, as defined in the methods section), existing areas defined as disadvantaged communities (by the state, by the federal government, and by both), corridors identified by the Federal Highway Administration (FHWA) as EV Corridors (both EV “Ready” and “Pending”), and DC fast chargers identified as NEVI compliant (4 or more 150 kW + chargers within one mile of an identified EV Corridor).

Figure 3 shows that much of the study area is defined as a disadvantaged community (DAC) by either the State, Federal government, or both. Most of the MUD housing is located generally within the incorporated cities and in more urban areas along the major highways. Interstates 5 and 205 and State Route 99, along with portions of State Route 12 are identified by the FHWA as EV

Corridor “Ready” while other routes including State Routes 4, 12, and 120 are identified as EV “Pending”. There are currently two DCFC stations identified as NEVI compliant (meaning that they have at least 4 chargers usable by multiple vehicle manufacturers with at least 150 kW output and are within 1 mile of an FHWA EV Corridor). Both of these NEVI compliant stations are operated by Electrify America. One is located north of Stockton along Interstate 5, and one is located in Tracy along Interstate 205.

The data contained in this map, along with the big data purchased from Streetlight Data, the business data obtained via ESRI Business Analyst, and the Outreach data obtained via public meetings, stakeholder meetings, workshops, focus groups, and the Social Pinpoint site, have all been utilized to facilitate the prioritized siting analysis that follows.

The Gap Analysis results (shown as a color scale based on a point scale) are based on a combination of infrastructure need (based on demographics such as disadvantaged communities and prevalence of multi-unit dwellings) and infrastructure provision (based on existing and planned EV charging and alternative fuel infrastructure). “Positive” points are assigned for “need” categories and “negative” points are based on nearby existing infrastructure. The total points awarded is the sum of all positive and negative point values, with the highest values representing the highest potential for unmet need.

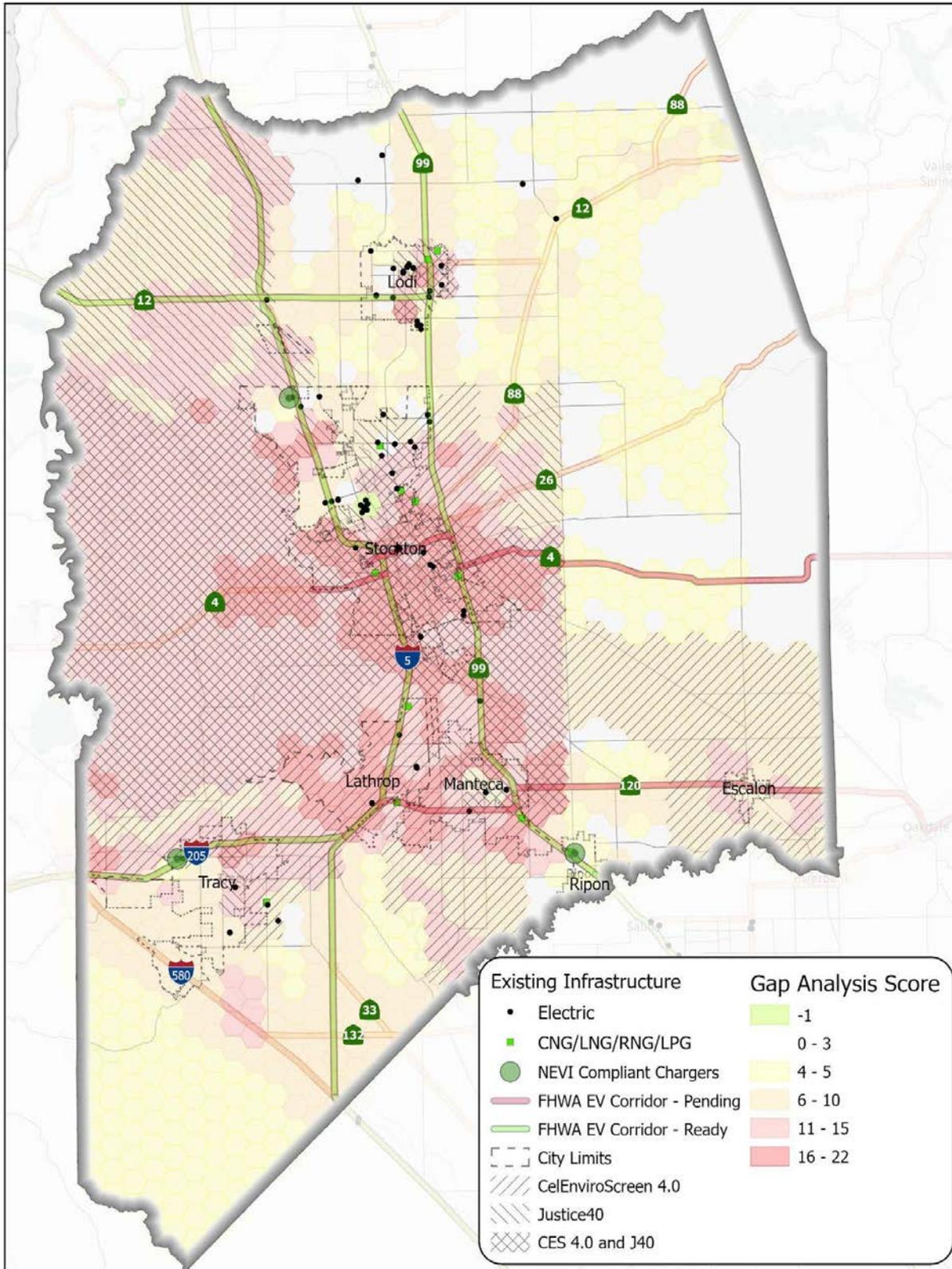


FIGURE 3: GAP ANALYSIS MAP

SITE RECOMMENDATIONS

Using the methodology and geography described in **Appendix D** and the tallying of points based on the gap analysis and siting analysis, each approximately one square mile hexagon area has been ranked both regionwide (the whole of San Joaquin County) and by jurisdiction (each incorporated city and the unincorporated county) to assure that locations throughout the County and its cities are all included in the recommended locations. The top 20 locations based on total points awarded have been identified and mapped. The top twenty locations are summarized in **Table 1** and shown in **Figure 4**. The table shows that of the top twenty, 15 are distributed between the cities of Stockton (7), Lodi (5), Tracy (2), and Ripon (1). The rankings are not meant to indicate that one location should necessarily be chosen over another. Rather, they are meant to identify top locations based on points calculated and can be compared against each other for further study. This analysis does not include detailed site characteristics such as parking availability, safety, or electrical infrastructure provision. As such, because one location is ranked number "1" and another is ranked "2" or "5" this does not mean that the number 1 ranked location should necessarily be chosen first. A more detailed review of specific installation sites to assess the other characteristics described will be needed when determining suitability. This review process is explained later in this chapter.

TABLE 1: NUMBER OF TOP 20 LOCATIONS BY JURISDICTION

JURISDICTION	ENVIRONMENTAL JUSTICE	LIGHT DUTY	MEDIUM/ HEAVY DUTY
CITY OF STOCKTON	7	7	7
CITY OF LODI	5	5	5
CITY OF TRACY	3	3	3
CITY OF MANTECA	2	2	2
CITY OF RIPON	1	1	1
CITY OF LATHROP	-	-	-
CITY OF ESCALON	-	-	-
UNINCORPORATED SAN JOAQUIN COUNTY	2	2	2
TOTAL	20	20	20

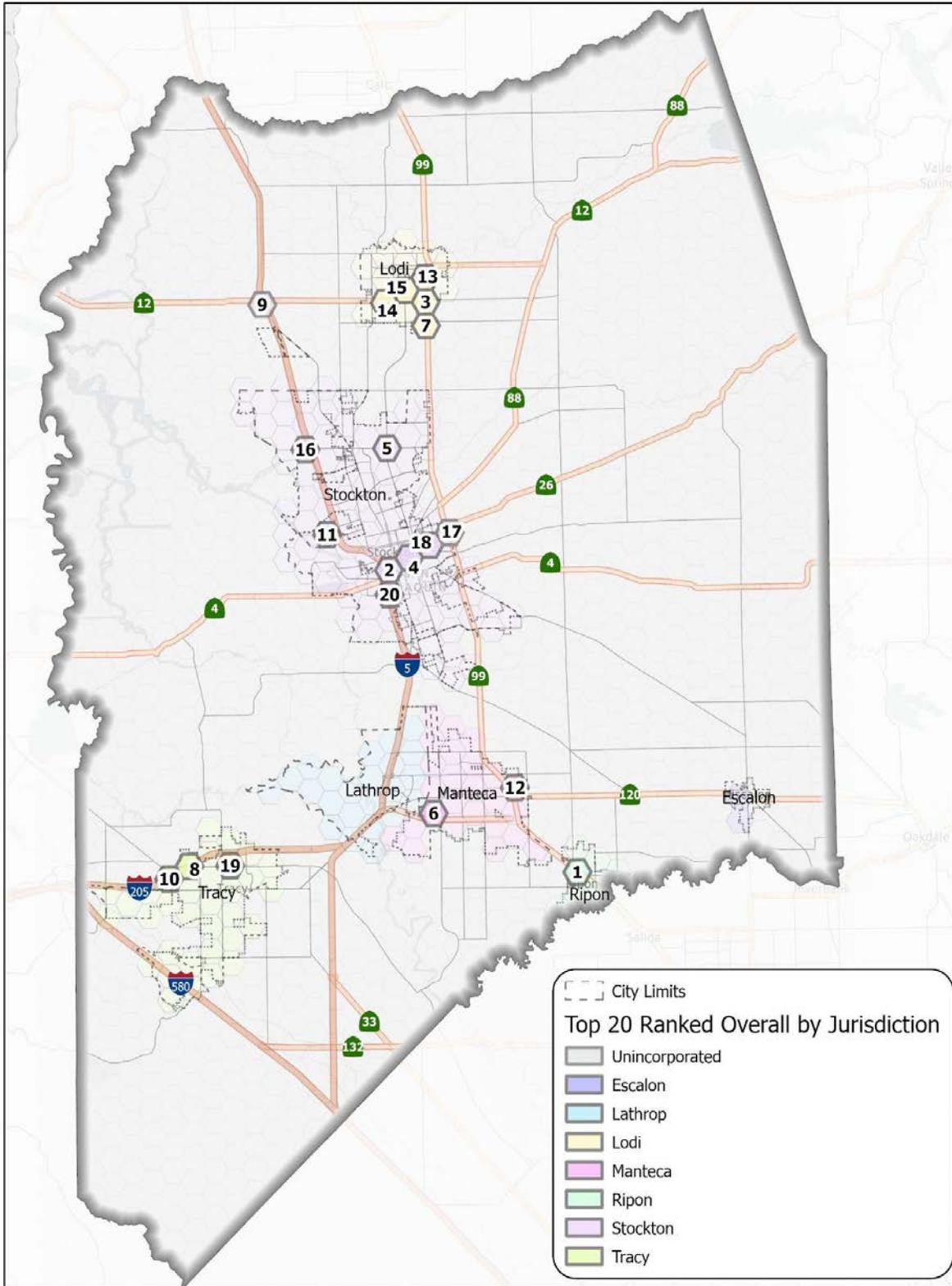


FIGURE 4: SITE PRIORITIZATION – TOP 20 SITES COUNTYWIDE

The top 20 locations ranked based on the point system are described below and listed by the jurisdiction in which they are located.

- City of Stockton
 - Southeast of the interchange of Interstate 5 and State Route 4 (Rank 2)
 - Adjacent to State Route 4 and South Stanislaus Street (Rank 4)
 - Adjacent to East Hammer Lane and West Lane (Rank 5)
 - West of Interstate 5 and West Alpine Avenue/ Country Club Road (Rank 11)
 - West of Interstate 5 and Hammer Lane (Rank 16)
 - Adjacent to State Route 4 and South Filbert Street (Rank 18)
 - Adjacent to Interstate 5 and West 8th Street (Rank 20)
- City of Lodi
 - Adjacent to State Route 99 and East Kettleman Lane (Rank 3)
 - Adjacent to State Route 99 and East Harney Lane (Rank 7)
 - Southwest of State Route 99 and East Victor Road (Rank 13)
 - Adjacent to West Kettleman Lane between South Lower Sacramento Road and South Ham Lane (Rank 14)
 - North of West Kettleman Lane between South Ham Lane and South Stockton Street (Rank 15)
- City of Tracy
 - Adjacent to Interstate 205 and West Grant Line Road (Rank 8)
 - Adjacent to Interstate 205 and Byron Road (Rank 10)
 - East of West Grant Line Road and North Tracy Boulevard (Rank 19)
- City of Manteca
 - Adjacent to State Route 120 and South Airport Way (Rank 6)
 - Adjacent to State Route 99 and East Yosemite Avenue (Rank 12)
- Unincorporated San Joaquin County
 - Flag City Interchange Interstate 5 at State Route 12 (Rank 9)
 - Garden Acres Adjacent to State Route 99 and State Route 4 (Rank 17)
- City of Ripon
 - Adjacent to State Route 99 and Jack Tone Road interchange (Rank 1)
- City of Lathrop
 - No locations identified in the Top 20 scoring locations

Figure 24 through **Figure 27** in **Appendix E** display the local context and supporting data for each of the top twenty locations identified above. The figures each display both the data statistics

that result in the point score for each use case, as well as maps of each location showing local land use and infrastructure including interchanges, gas stations, existing charging infrastructure, existing shopping and dining locations, and existing multi-unit dwellings (MUD) within each of the top hexagon areas.

As stated above, the top 20 locations based on the point system described above include five or more locations in Stockton and Lodi, three in Tracy, two in Manteca and the unincorporated County, one in Ripon, and zero in Lathrop or Escalon. To better represent the entire County and its communities, additional locations that do not rank within the top twenty based on total points have been identified. For equitable distribution and representation, locations have been identified in each of the incorporated cities, as well as additional locations in rural communities in unincorporated San Joaquin County (including Lockeford, Linden, and Farmington). These additional locations are based on the top-ranking locations within each jurisdiction and are identified below.

- City of Stockton
 - Downtown Stockton near Park Street and Center Street (Rank 25)
 - Adjacent to West Benjamin Holt Drive and North Pershing Avenue (Rank 47)
 - Adjacent to State Route 99 and Arch Road interchange (Rank 58)
- City of Lathrop
 - Adjacent to Interstate 5 and West Lathrop Road (Rank 34)
 - Adjacent to Interstate 5 and East Louise Avenue (Rank 46)
 - Adjacent to interchange of Interstate 5 and State Route 120 (Rank 362)
- City of Manteca
 - Adjacent to interchange of State Route 99 and State Route 120 (Rank 33)
 - Southwest of State Route 99 and Lathrop Road (Rank 49)
 - Near West Yosemite Avenue between South Airport Way and South Union Road (Rank 54)
 - Near Lathrop Road between South Airport Way and South Union Road (Rank 60)
- Unincorporated San Joaquin County
 - Adjacent to State Route 120 and Austin Road (Rank 38)
 - East of State Route 99 between Waterloo Road and State Route 26 (Rank 39)
 - Adjacent to State Route 26 in downtown Linden (Rank 111)
 - Adjacent to State Route 88 in downtown Lockeford (Rank 496)
- City of Tracy
 - Adjacent to Interstate 205 between North Tracy Blvd and West Grant Line Rd (Rank 29)
 - Adjacent to Interstate 205 and North MacArthur Drive (Rank 44)
- City of Escalon
 - Adjacent to State Route 120 in downtown Escalon (Rank 76)
- Unincorporated County
 - Northeast of State Route 99 and Waterloo Road (Rank 39)
 - Adjacent to State Route 12 and Lower Sacramento Road (Rank 42)
 - Town of Linden (Rank 111)
 - Town of Lockeford (Rank 496)
 - Town of Farmington (Rank 538)

Figure 5 shows these additional locations and their locations within San Joaquin County.

Error! Reference source not found. through **Figure 11** display the local context for each of the additional locations identified above, as well as the top 20 described previously. **Figure 28** though **Figure 30** in **Appendix E** display the local context and supporting data for each of the additional locations identified above by jurisdiction. The figures each display both the data statistics that result in the point score for each use case, as well as maps of each location showing local land use and infrastructure including interchanges, gas stations, existing charging infrastructure, existing shopping and dining locations, and existing multi-unit dwellings (MUD) within each of the top hexagon areas.

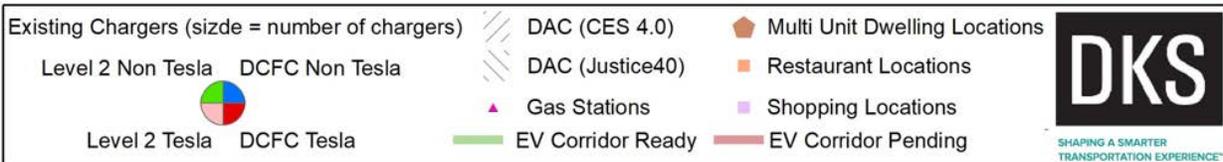
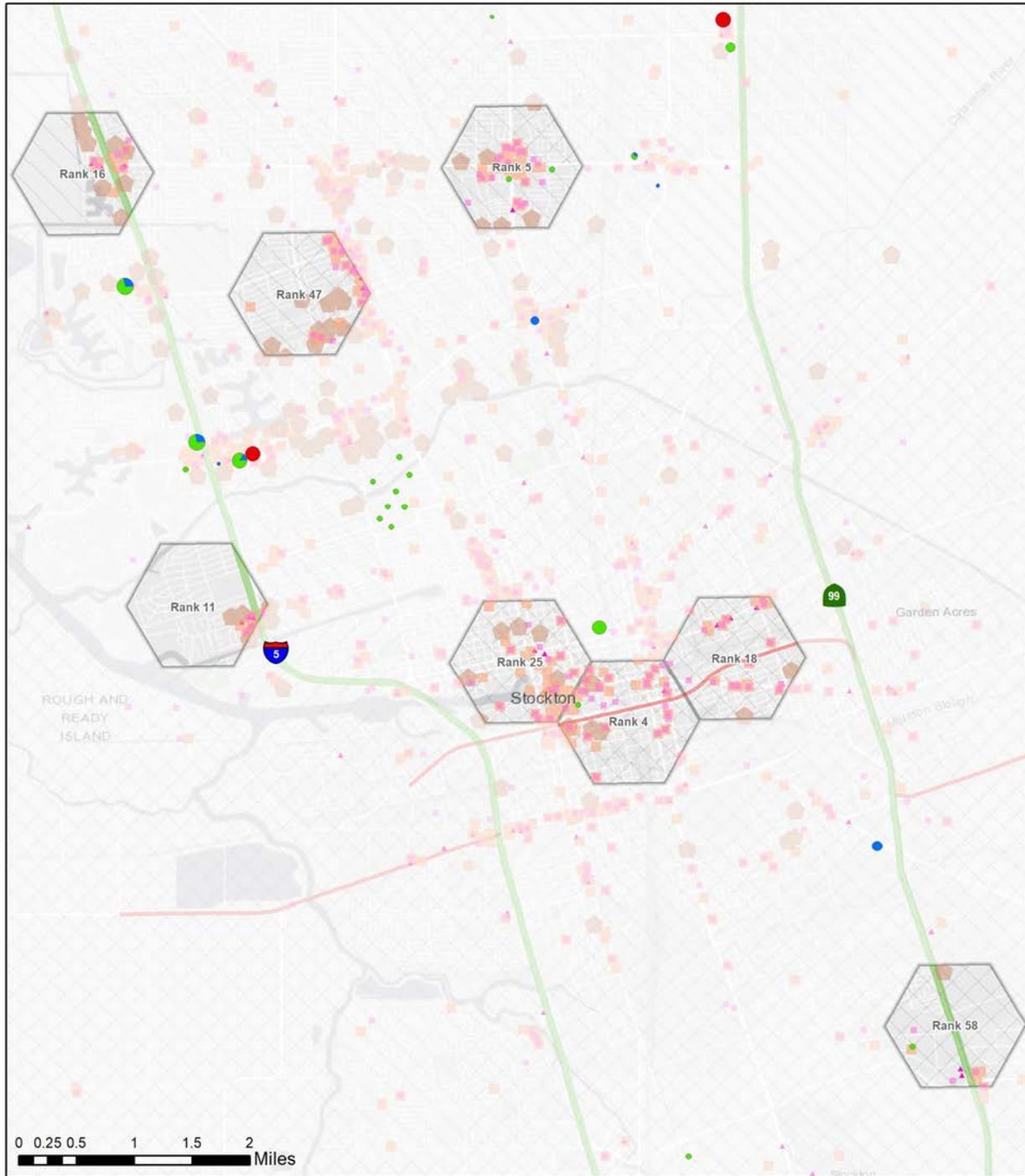


FIGURE 6: RECOMMENDED SITES – CITY OF STOCKTON

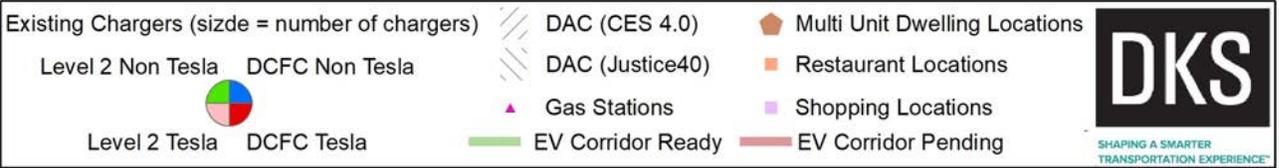
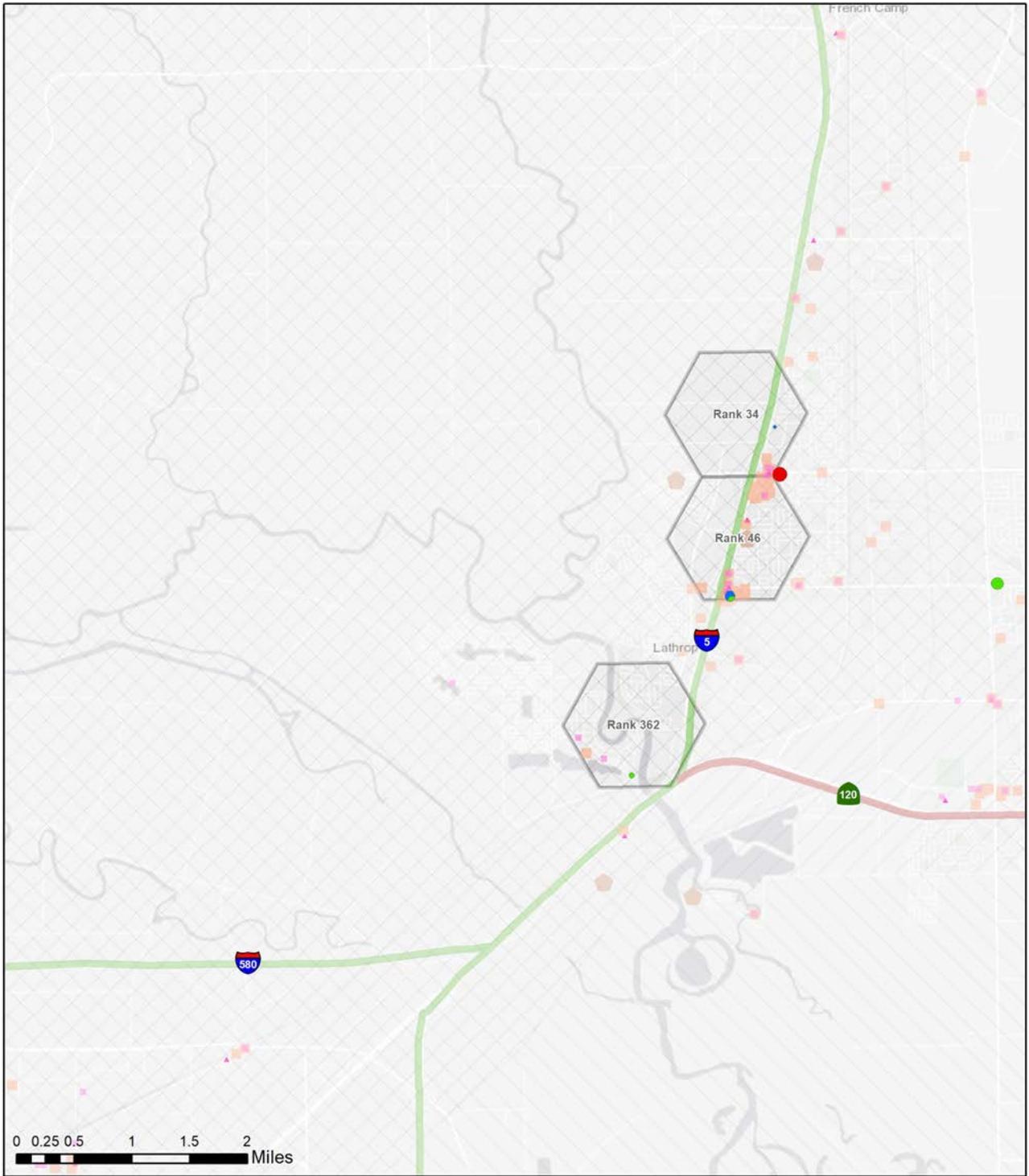


FIGURE 7: RECOMMENDED SITES – CITY OF LATHROP



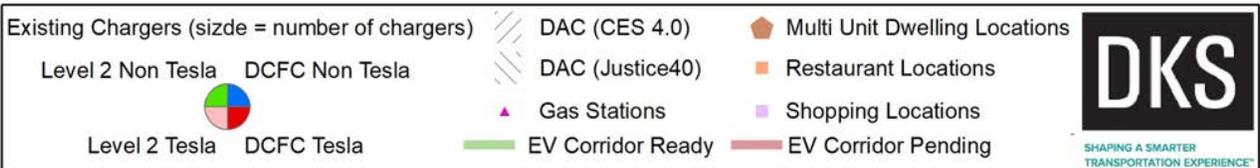
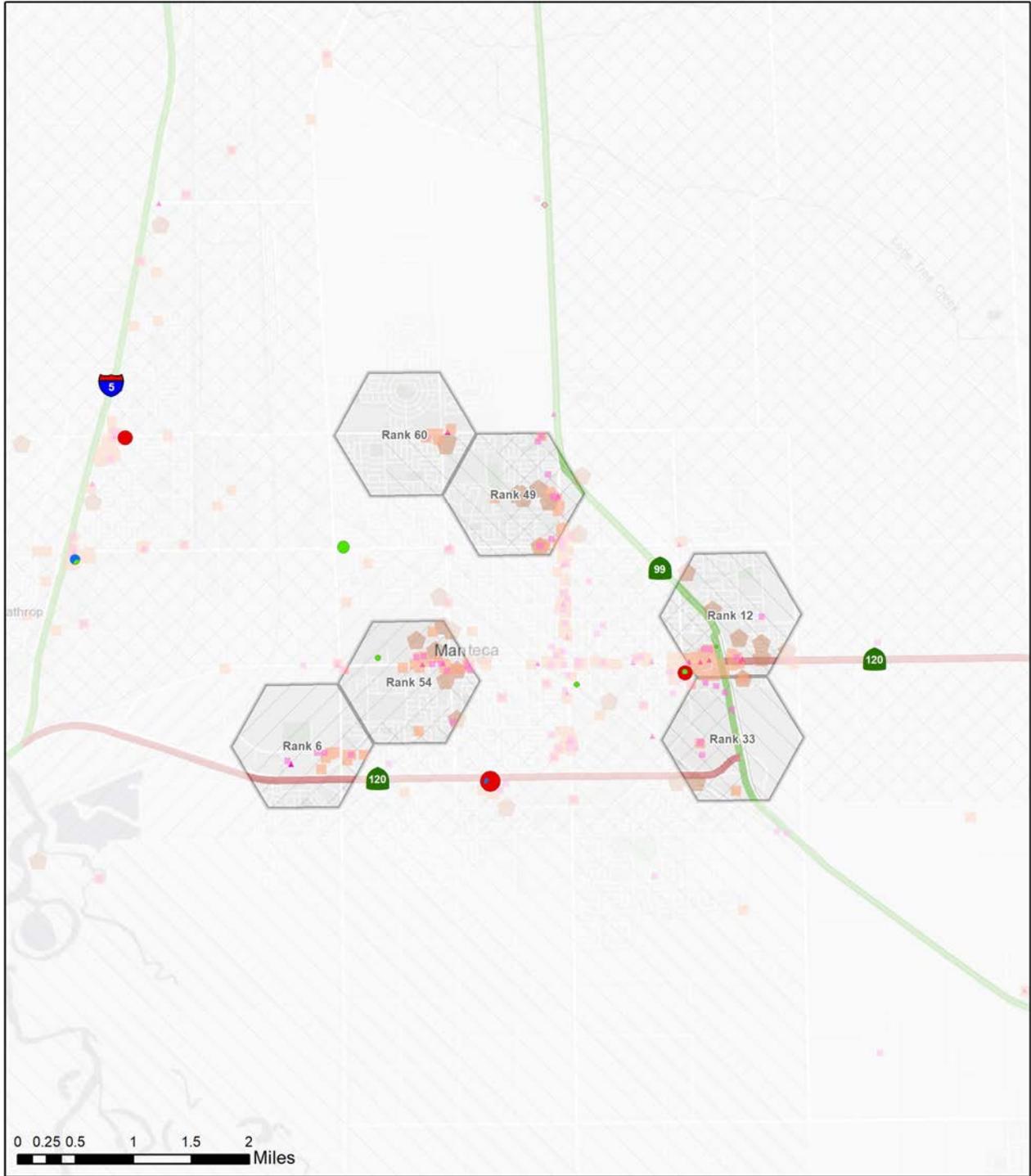


FIGURE 8: RECOMMENDED SITES – CITY OF MANTECA

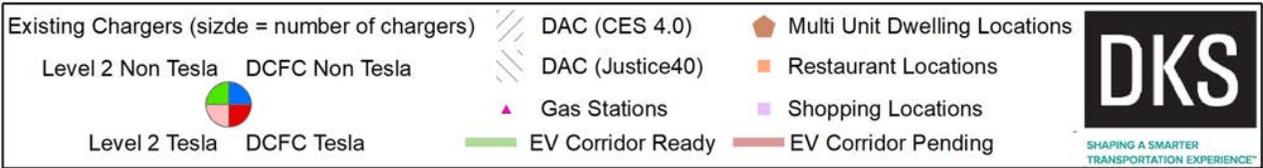
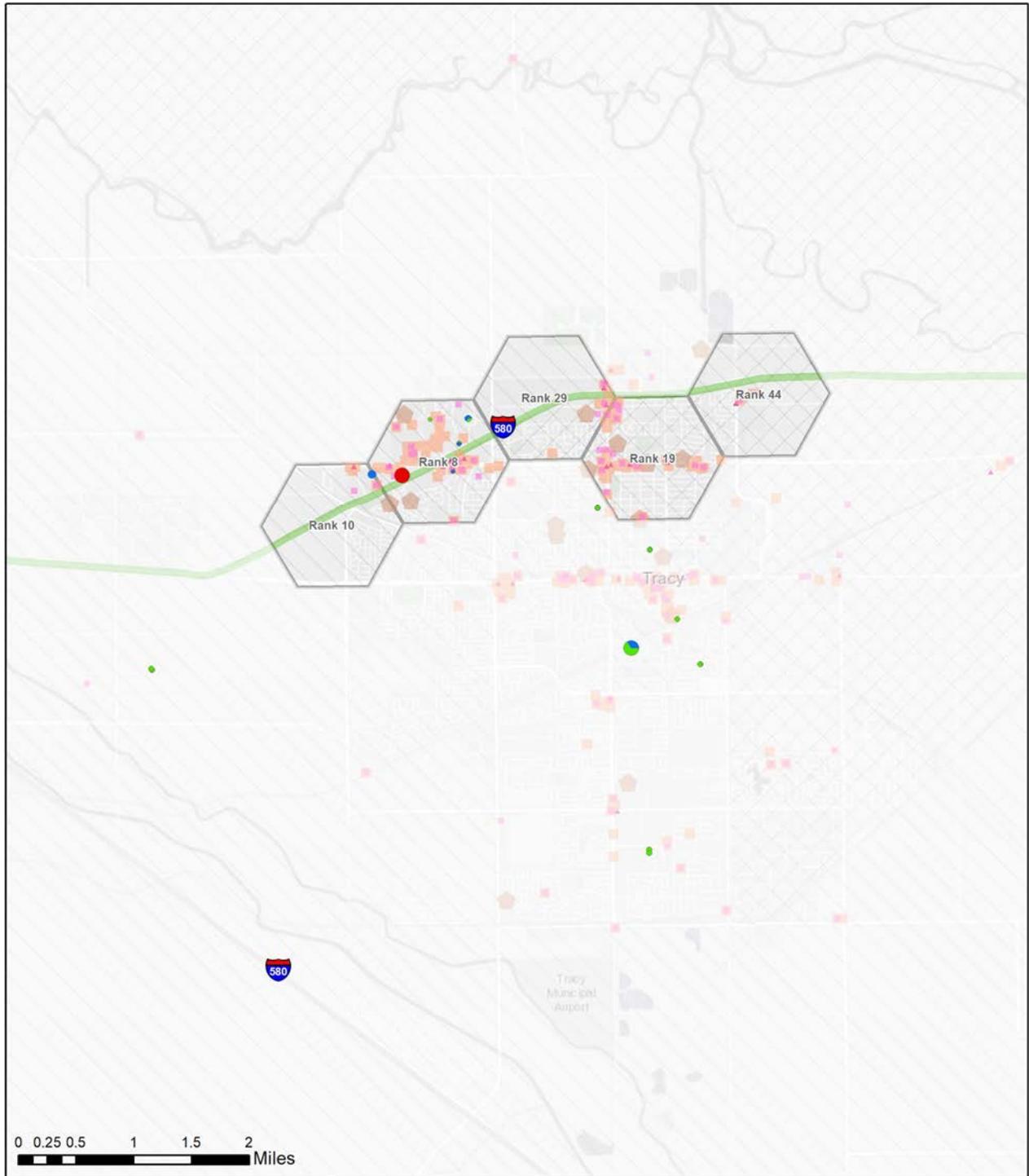


FIGURE 9: RECOMMENDED SITES – CITY OF TRACY

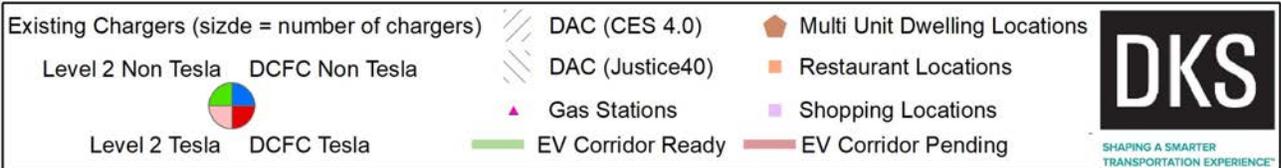
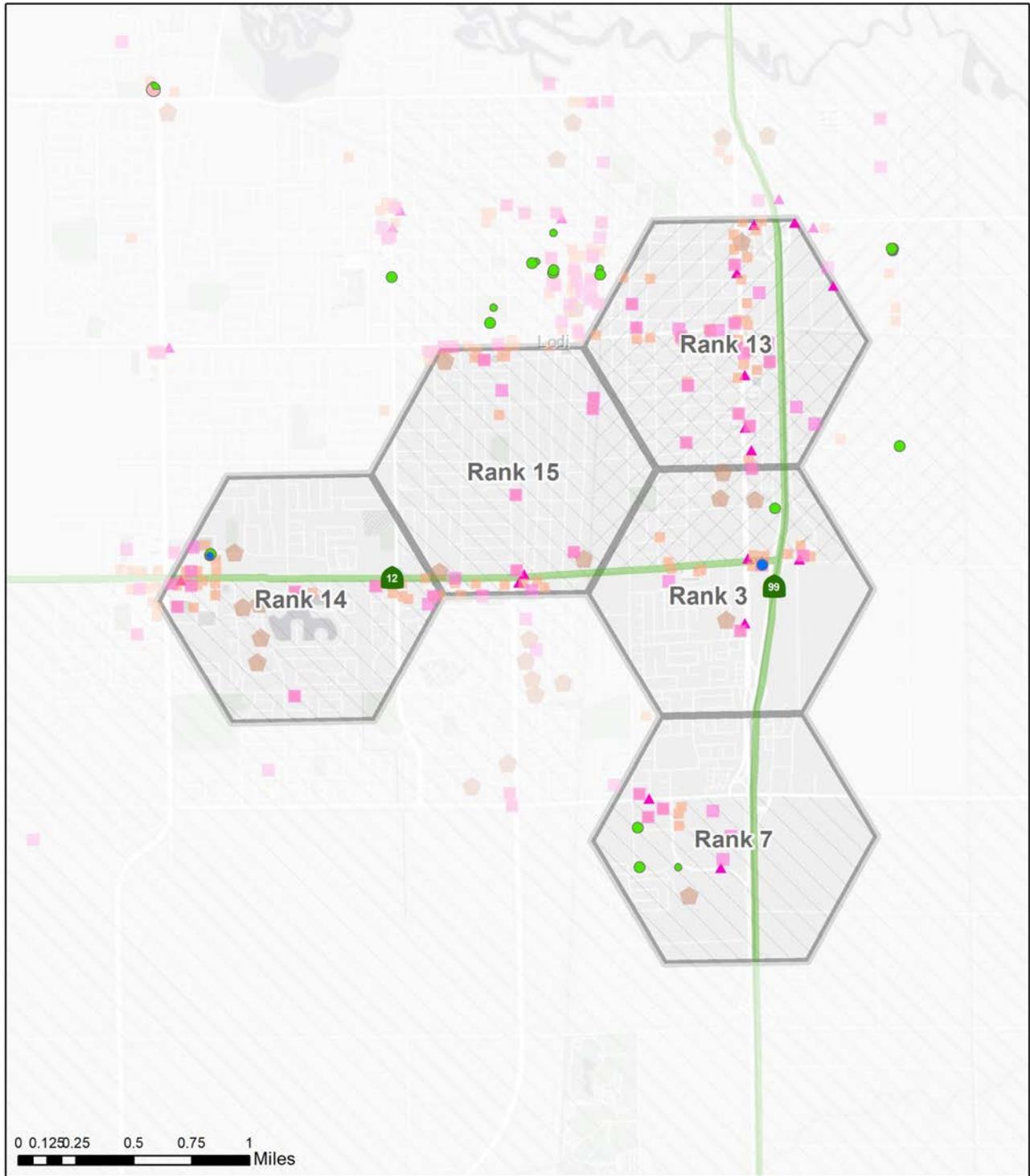


FIGURE 10: RECOMMENDED SITES – CITY OF LODI

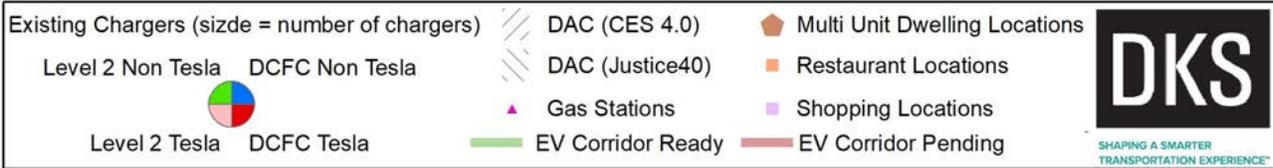
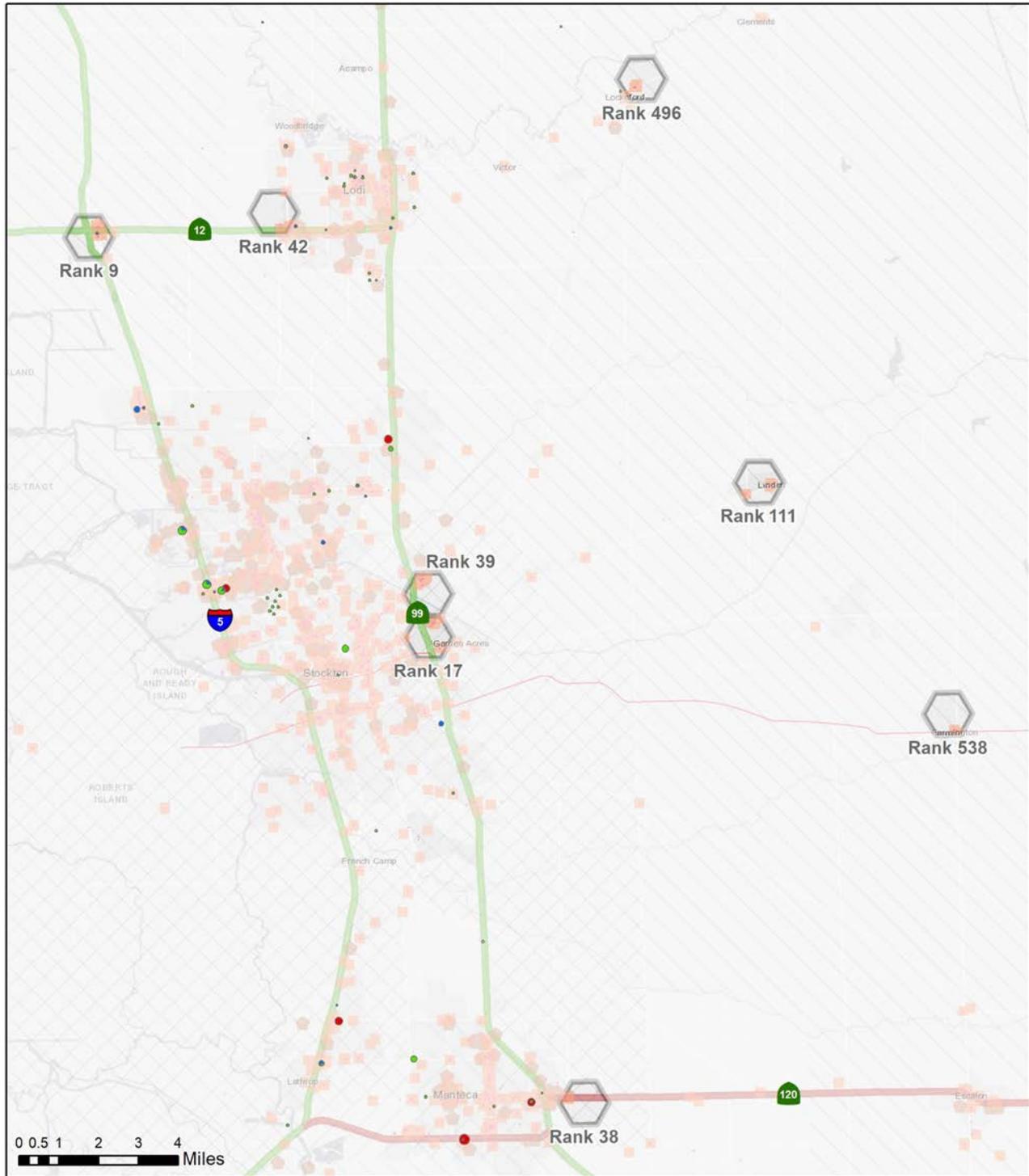


FIGURE 11: RECOMMENDED SITES – UNINCORPORATED COUNTY

BARRIERS

While federal and state legislation and regulation like those discussed in this report (**Appendix B**) support or even mandate the ZEV transition, ZEVs and the infrastructure to support them still face a steep ramp up in adoption. In the technology adoption curve, shown in **Figure 12**, the “chasm” represents the jump from the “early adopter” phase to the “early majority” phase when a technology becomes more mainstream. To cross this chasm certain barriers will need to be overcome.

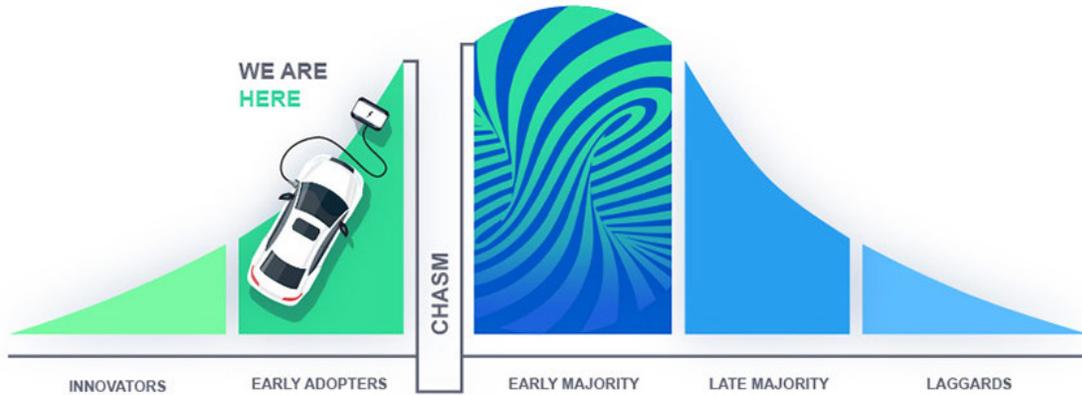


FIGURE 12. EV ADOPTION CURVE

Certain actions can be taken by local governments to support early adopters and implement rules that move others toward ZEV adoption. Through analysis of existing infrastructure gaps and community input the project team has identified the following barriers:

- Lack of charging infrastructure in key areas of the region
- Costs to install infrastructure
- Grid and transformer constraints to serve EV load
- Challenges in the permitting process
- The transition process for fleets
- Lack of awareness about ZEVs and available incentives
- Different payment systems for using EV chargers

LACK OF CHARGING INFRASTRUCTURE

Inadequate infrastructure is a commonly discussed barrier to ZEV adoption, and a key focus of this study. The gap analysis discussed in this chapter provided details about specific areas of San Joaquin County with the greatest need for charging infrastructure. During the community engagement process for this project participants had questions and concerns about the placement of chargers as well as how they would be managed and maintained. Stakeholders also noted that the accessibility of existing charging infrastructure had been an issue as some chargers are for workplace or fleet use only, and not accessible to the public. The community expressed that not only was there not enough infrastructure, but the location and accessibility matters greatly as well.

COSTS

Costs related to the purchase and installation of charging infrastructure can be significant and frequently arise as a concern. The Technical Advisory Committee for this project expressed curiosity about the types of charging technologies that will be discussed in this plan as well as the costs and what could be expected for San Joaquin in the future. These costs include hard costs such as equipment and material and soft costs such as permitting and design. The following list provides further detail about each of these categories of project costs:

Hard costs

- **EV Chargers:** These typically cost \$8,000-\$126,000 to purchase. This includes:
 - Level 1 EV chargers (120V receptacles, no cost, if existing, otherwise, costs depends on existing electrical panel capacity and proximity of charger location)
 - Level 2 EV chargers (\$8,200 for dual head ports, including 20% contingency)
 - Power cords and cable management for Level 1 or 2 chargers (costs included)
 - DC Fast Chargers (\$126,000 includes for dual head 150kW DCFC ports including 20% contingency)
 - Gateway Module/ Load Management Devices (\$2,000 for up to 4 chargers included in charger cost)
 - Note: this excludes costs for warranties because the standard warranty that vendor offers is part of our cost estimates.
- **Materials/Equipment:** \$10-\$15K per charger without electrical or panel upgrade. \$20-30K with electrical or panel upgrades). This includes costs of purchasing and installing materials typically required for fleet EV charging projects (other than the EV chargers themselves) including the following items:
 - Wiring (Note 50 feet of conduit, wiring assumed per Level 1 and 100 feet per Level 2 charger)
 - Conduit Systems (underground and/or surface-mounted)
 - Trenching and/or directional drilling
 - Pull Boxes (installed in the ground and/or surface mounted)
 - Aerial wire spans
 - Footings for installation of EV charger pedestals and electrical service panels
 - Bollards
 - Wheel stops
 - Step-down transformers
 - Electrical service panels including sub-panels
 - Circuit breakers
 - Signage
 - Striping for parking stalls
- **Site restoration:** \$4-20K per charger depending on site conditions. Site restoration covers the costs to install Civil/Landscaping improvements to restore the site following excavation and other construction activities including:

- Minor restoration for civil infrastructure such as roadway and/or sidewalk repaving
- Minor curb and gutter restoration
- Minor surface water (drainage infrastructure) restoration
- Minor landscaping restoration such as replanting

Soft costs

- **Contracting/Design:** Apply an estimated 20% mark-up to the total project costs to include:
 - Engineering design fees
 - Contractor profits
- **Permitting:** Each local authority with jurisdiction mandates electrical permits for installation of EV chargers.
 - Electrical permit fees charged by local jurisdictions, typically \$5,000 per site plus \$1,000 for labor and contingency.
- **Utility fees:** This consists of fees charged by the electrical utility (SDG&E) to bring additional power to the fleet charging depot to power the EV chargers, including:
 - Electrical upgrade design (up to \$5,000 per charger)
 - Transformer replacement (\$35,000-100,000)
- **Contingencies:** A 20% mark-up to be applied to the project costs for each cost category (categories #1, #2, #3, #5, and #6 including contracting/design) consistent with public agency capital project budgeting.

GRID IMPACTS

Electric grid capacity, transformer load and other concerns related to utility infrastructure is a common barrier to the installation of EV charging infrastructure. As illustrated below in **Figure 13**, the capacity of California’s electrical grid varies widely by electrical utility service territory and geography. This is especially true during peak demand periods in the evening hours when power demand spikes and solar power production has waned for the day.

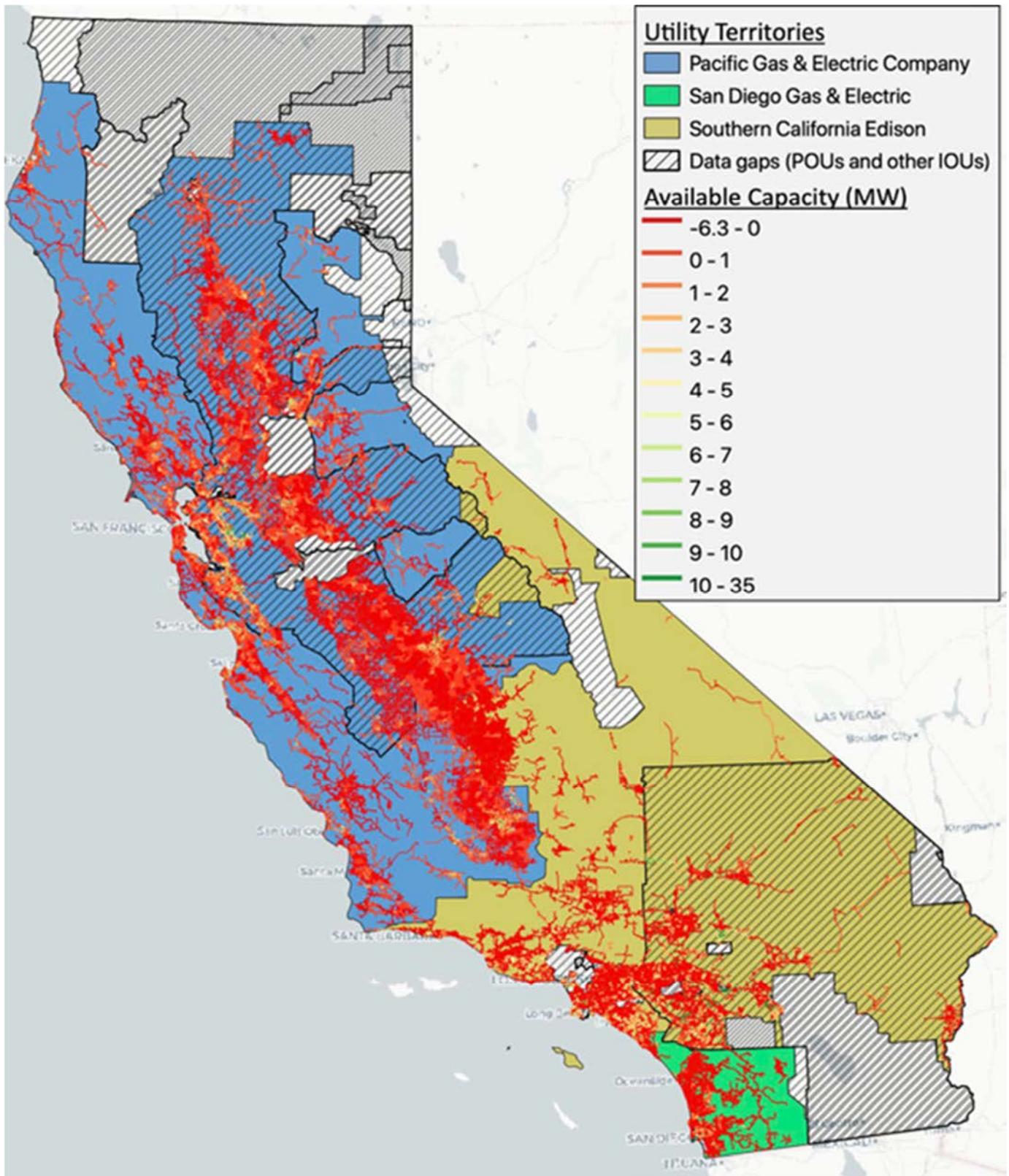


FIGURE 13: CALIFORNIA ELECTRICAL CAPACITY (SOURCE: NREL)

PERMITTING

Even after identifying the need and locations for charging infrastructure and addressing grid constraints, permitting can be yet another barrier to installing the charging equipment and the needed electrical infrastructure. For this reason, streamlining the permitting process to make it as easy as possible can be a simple and cost-effective solution to support the installation of EV charging infrastructure.

In recognition of this, AB 1236 and AB 970 require that local jurisdictions implement streamlined permitting for EV charging stations by implementing at least six of seven criteria:

- 1) Add a city ordinance to codify this regulation.
- 2) Make a checklist available from website for expedited EV charger installations.
- 3) Administrative approval of permits.
- 4) Permits can only be disapproved for Health and Safety reasons.
- 5) Permit applications can be requested electronically, and electronic signatures are accepted.
- 6) Permits cannot be issued conditionally upon approval by an association.
- 7) If any deficiencies are found, all deficiencies will be noted in a single deficiency notice.

With streamlined permitting, residents, businesses, and EV installers can more accurately predict the time and cost of installing a charging station. It also decreases the likelihood that people install charging stations without obtaining a permit. At the time of this writing, San Joaquin County is still in process of meeting permit streamlining requirements. Three jurisdictions within the county, Lathrop, Ripon, and Escalon have not yet met streaming requirements (**Figure 14** and **Table 2**).

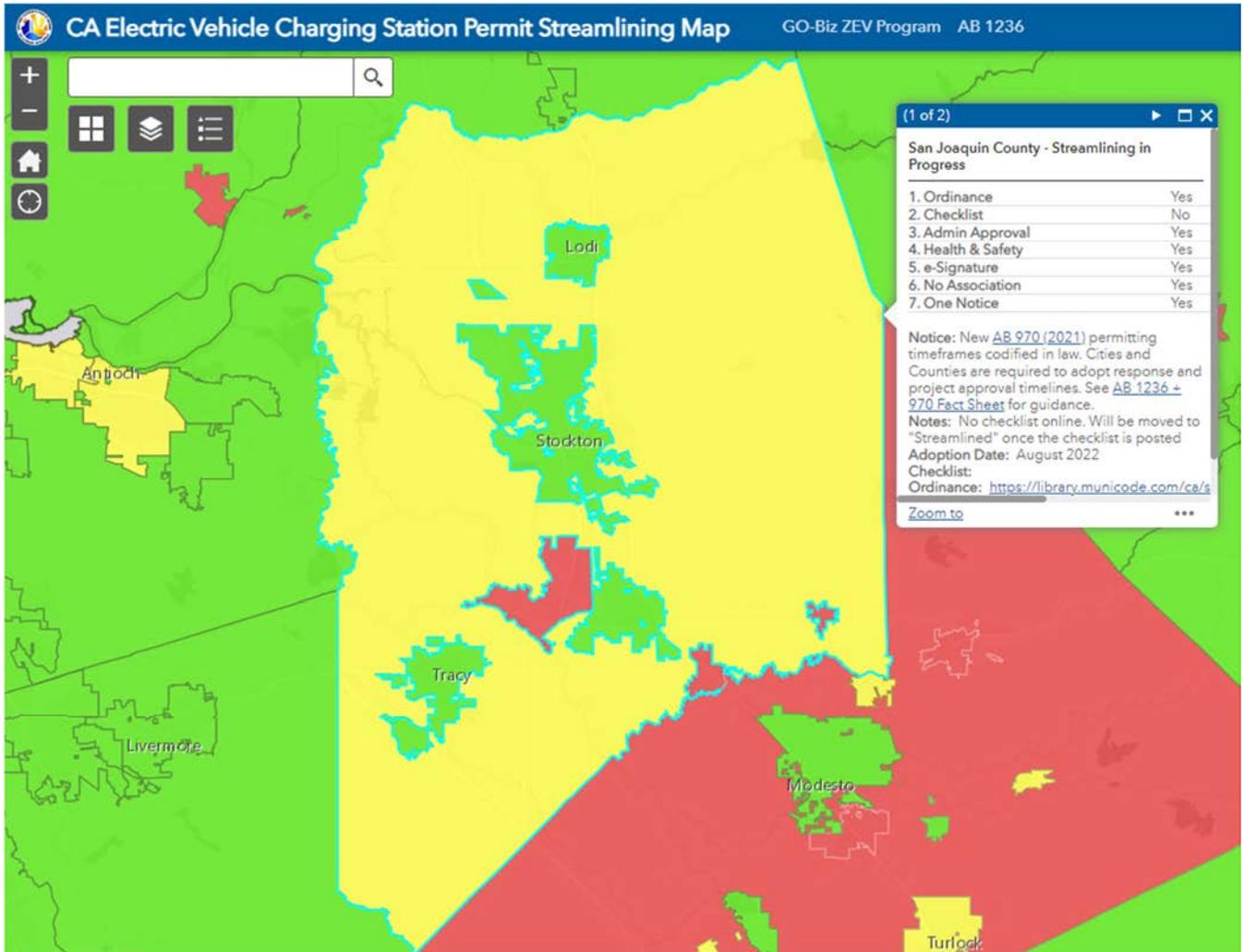


FIGURE 14: PERMIT STREAMLINING MAP-SAN JOAQUIN COUNTY

Source: <https://california.maps.arcgis.com/apps/webappviewer/index.html?id=5b34002aaffa4ac08b84d24016bf04ce>



TABLE 2: PERMIT STREAMLINING STATUS WITHIN SAN JOAQUIN COUNTY

JURISDICTION	STREAMLINING STATUS
LODI	YES
STOCKTON	YES
TRACY	YES
LATHROP	NO
MANTECA	YES
RIPON	NO
ESCALON	NO

THE TRANSITION OF FLEETS

During the community and stakeholder engagement process for this project, questions arose regarding the prioritization for different fuel types: A representative of the City of Lodi’s Public Works noted that for public transportation agencies only electric and hydrogen fuel vehicles will count towards measurements in greenhouse gas emission reduction targets mandated by the state. They expressed concerns about how the shift to alternative fuels will impact goods movement and public transportation. Other concerns discussed included:

- Costs to purchase alternative fuel vehicles.
- Viable ZEV alternatives not being available yet, or if there is a viable option, it is still too costly to justify.
- Some fleet vehicles need to be in operation for long hours and therefore need to be able to run all day without recharging meaning other fuels such as hydrogen would need to be considered.
- Even with grant funds, some ZEV options cost as much as four times as much as an ICE vehicle making them a challenge to justify.

Municipalities, school districts, and transit agencies will likely be the first large-scale ZEV adopters due to the regulations and funding opportunities discussed throughout this report. Yet, they face significant challenges in making this transition. They will also use more energy—electricity and hydrogen—than passenger cars will use. Some of the key mandates and funding opportunities include:

- The Innovative Clean Transit regulation which requires a transition to zero emission buses by 2040.¹ Small transit agencies must submit a transition plan to CARB by June 2023.
- The U.S. EPA and the State of California funding the replacement of diesel buses with electric buses and providing funding for charging stations. Eligible districts and third-party operators can “stack” federal and state funding to transition to electric buses.
- ARB adopting the Advanced Clean Fleet regulation in 2023. If adopted as written, all public agencies and private fleets with more than 50 vehicles and \$5 million in revenue will be mandated to bring medium- and heavy-duty ZEVs into their fleets starting on January 1, 2024.

Transitioning to ZEVs involves collecting data and information about vehicles and facilities that operators often don’t have. Some organizations don’t have a central fleet manager and instead every department manages its own vehicles and contacts procurement when they want to buy a vehicle. Organizations are often short staffed and don’t have the time to do the research, solicit bids, and apply for grants and incentives. Many ZEVs are also not readily available on dealer lots, and many of the vehicles being announced won’t be available for a year or more.

LACK OF AWARENESS ABOUT ZEVs AND AVAILABLE INCENTIVES

Another frequent challenge with ZEV adoption is limited awareness about zero emission vehicles themselves as well as incentives to purchase them. A general lack of awareness is an on-going challenge faced by those seeking to boost ZEV adoption. This includes knowledge about the vehicles themselves and how they work, the distance they can drive and where they can be fueled. Many are also unaware of available incentives to purchase ZEVs. This includes both for personal use and for fleets that are mandated to transition to ZEVs. To build out the needed infrastructure to support ZEVs, significant workforce development also needs to occur which is another area where awareness will need to be increased.

EV CHARGER PAYMENT SYSTEMS

Different payment systems to use EV chargers can cause confusion and unintended barriers. At a minimum, this process should handle the transaction while not creating a barrier for drivers to use the charging equipment. However, many different payment systems currently exist for EV chargers such as RFID or NFC/chip readers, app-based, cards with the charger network, pay by phone, QR code and pay online or physical card readers. RFID or NFC/Chip readers and magnetic swipe can become non-functional or worse, thieves can install skimmers over magnetic swipe card-readers to steal credit card information. Other systems may can cause inconvenience to the user requiring sign-ups with each charging network. To somewhat combat these issues. The state of California has implemented minimum standards which can be found on the CARB website:

- Minimum payment hardware technology of Euro MasterCard Visa (EMV) chip reader for credit cards and near field communications (NFC) reader for mobile payments
 - Contactless payment is enabled by NFC reader
 - EMV chip enabled payment is available on prepaid debit cards

¹ https://ww2.arb.ca.gov/sites/default/files/2019-10/ictfro-Clean-Final_0.pdf

- Contactless payment is not yet available on prepaid debit cards
- Must display a toll-free number for payment processing
- Must comply with industry data security standards (PCI – DSS Level 1)
- Must be installed on individual EVSE or kiosk²

IMPLEMENTATION STRATEGY

Through research, stakeholder and public engagement and analysis of current and needed infrastructure, the project team has compiled the following recommendations to encourage adoption of alternative fuel infrastructure and vehicles throughout the San Joaquin County region.

GENERAL RECOMMENDATIONS

This section will focus on non-financial/non-infrastructure aspects of implementation that are within the control of SJCOG and its member agencies and project stakeholders.

Coordinate Cooperative Transportation Electrification Planning

Due to the very nature of transportation, planning for the ZEV transition will take coordination across borders and boundaries of counties, cities, utility service territories, transit agencies and more. For this reason, ZEV planning must be collaborative. Beyond the development of the San Joaquin County Alternative Fuels Vision Plan, it is recommended that SJCOG establish a collaborative committee of stakeholders and major cities within the county, and utilities as a first step. This committee should also coordinate with neighboring jurisdictions and regional efforts.

The committee will need to jointly coordinate planning and funding opportunities and efforts for expanding ZEV infrastructure moving forward. These efforts could include but may not be limited to determining goals, measuring progress, and identifying leads for tasks. Some of the goals and activities of the committee could include:

- Providing data that helps the cities, and communities in San Joaquin be more competitive for ZEV-related grants and programs and collaborating on grant and funding opportunities where appropriate. This could include collecting traffic data from identified community-based entities including Caltrans and the U.S. Census Origin-Destination and services like Streetlight. This data can then be used to identify current traffic patterns, seasonal traffic variation, projected highway and freeway annual traffic growth rates, and project potential traffic patterns for ZEVs in 2030.
- Advise on and coordinate ongoing and new funding opportunities. This includes monitoring the sources identified in **Appendix A** of this report.
- Coordinating ongoing education and outreach for residents, employees, and tourists in the leadup to the 2035 ZEV mandates.

² California Air Resources Board: <https://ww2.arb.ca.gov/resources/documents/electric-vehicle-supply-equipment-standards-regulation-background-and-faqs>

- Developing effective outreach and communication programs for disadvantaged communities (DAC) and under-represented populations.
- Developing workforce development programs around ZEV infrastructure, vehicles, and services.
- Measuring progress toward increasing the number of charging stations in desired areas by monitoring information about existing and planned charging stations from PlugShare, Alternative Fuel Data Center, CaFCP’s Hydrogen Station Map, and from planning departments EVgo, Electrify America, Tesla and hydrogen station developers.
- Measuring and recording equity impacts.
- Measuring progress toward ZEV adoption by vehicle class and type.
- Creating and monitoring county or corridor specific goals by reviewing and sharing existing and ongoing transportation planning projects and each jurisdiction’s Planning Division data, general plans, and specific plans for land-use and roadway planning.
- Estimating GHG reduction.
- Updating the San Joaquin County Alternative Vision Plan on a regular basis, perhaps every 2-5 years with annual updates to specific goals.

California has several funding programs for zero emission vehicles and infrastructure, most of which have requirements for data reporting and ensuring that data is regularly updated. Each of these information sources also provides insight into the progress of the ZEV transition. An online dashboard including this information could help paint the picture and blend in region-wide information about transit ridership, active transportation efforts, and other initiatives.

Effective Community Engagement and Workforce Development

Providing effective outreach and workforce development will be key to raising awareness and preparing for the alternative fuels future. The project team has a number of recommendations to address these challenges including using less technical language, providing materials and media in a variety of languages, training and utilizing ambassadors.

Community Engagement

Avoid Technical Language: As a first step, reducing the use of technical verbiage can be a simple change for in-person engagement, collateral, and media. Even when assumed to be simple, technical language may not be easy for people to understand, particularly with audiences where English is a second language or individuals may have limited reading skills. The use of storytelling and associations can help people understand basic concepts. For example, language like “electric vehicle like a Tesla,” helps people draw the link between technology and a consumer product. Avoid acronyms, like ZEV and EVSE in outreach, which are meaningless for most people.

Avoid Heavy Use of Text: Many people in disadvantaged communities struggle with reading. Outreach, incentive, and training materials tend to be heavy with text, either in print or online. Additionally, some training programs require that applicants pass a written test or submit applications and reports in English and sometimes in Spanish. Collateral and course materials should use more images and incorporate video. Short video clips that are quick to watch have a major impact on comprehension. Use members of the community to translate materials into other

languages, like Russian, Farsi, and Hindi, and ensure that the materials are culturally appropriate for the target audiences.

Benefits and challenges of ZEVs: Potential ZEV owners need to see the trade-off between today's investment and a savings that takes months or years. Materials should clearly articulate the cost of a ZEV, the comparison between the cost to fill the tank and charge a battery as well as the risks such as the need for a more robust public charging network and the challenges that may impose if one does not have access to charging at home.

Interactive events: Offering physical and interactive activities such as ride and drives, or ZEV tailgates give people firsthand experiences with ZEVs and an opportunity to talk with ZEV owners to learn about their experiences, both positive and negative. Interactive activities can also help reduce the stigma that ZEVs are inaccessible and complicated.

Workforce Development

Transparency: Workforce development participants need to see the timeline to achieve the higher incomes projected by programs. Materials also need to clearly articulate the duration of a training program, and the risks such as the starting wage and potential wage cap for a job. It can also be more effective to offer physical and interactive activities or experiences so that people can imagine themselves in a ZEV career.

Ambassadors: Ambassadors can be an effective method to recruit people into a new or unfamiliar industry, however people in the ZEV industry often do not look like the people in disadvantaged communities. For this reason, it's important that Ambassadors reflect the target community. Ambassadors, also called "Promoters," may be employed in a ZEV job, or a job related to the industry, an early ZEV adopter, and/or actively participated in a training or employment program. Ambassadors can share their experiences or even play a more direct role as a mentor or guide.

Variety in Career Options: Establish an ecosystem so that activities, education, and outreach provided to the community will first be validated by the network of community partners. Program managers, coaches, social workers, counselors, and educators can participate in a series of workshops designed to educate about the scope of the ZEV industry and the many career options that exist. The workshops should be combined with site visits to further illustrate how the job functions apply. An optimal site visit will be one that has an ambassador working there. This requires strong relationships to be established with business and division executive leaders.

Community Engagement Events: Community engagement events can be a hard sell for recruitment or for participating in a career development program. People may be asked to commit on the spot, which can set them up for failure if unexpected hardships or issues arise and the participant doesn't have a support system to help them through it. For this reason, career fairs, focus groups, info sessions, and workshops should be focused on education rather than to recruitment. Once a participant shows interest, the role of community partners, training providers, and employers should be to fuel that interest until it becomes a passion. It also helps to establish a strong support system within the community, the program, and a potential employer to help the participant weather life's storms.

Air Quality Sensors

Collecting initial roadside data on emissions by installing air quality sensors and repeating data collection and analysis annually or bi-annually can:

- Provide important data that helps the County, cities, or communities be more competitive for ZEV-related grants and programs.
- Measure progress toward reducing transportation related GHGs and air pollution.
- Draw a correlation between available of ZEV charging/fueling stations and zero-emission vehicle miles traveled by visitors and in-bound commuters.

The U.S. EPA has an annual competitive grant for community air monitoring. Several private companies offer roadside air monitoring stations often used during construction projects. San Joaquin County could contract with a company to deploy sensors along the most traveled roads and interchanges for at least 30 days in the summer and 30 days in the winter to create a baseline.

The benefits of monitoring air quality in high-traffic areas include setting a baseline for transportation related emissions as well as a yardstick for improvement. While this does not directly support ZEV adoption or infrastructure expansion, it does provide valuable information for grants and other funding opportunities as well as a metric by which to measure success as ZEV adoption grows.

Create a Dashboard for Local Data

A consolidated data dashboard will:

- Provide important data that helps San Joaquin County, cities, or communities be more competitive for ZEV-related grants and programs.
- Measure progress toward increasing number of charging stations.
- Measure progress toward ZEV adoption by vehicle class and type.

California is fortunate to have many funding programs for zero emission vehicles and renewable energy, all of which have requirements for data reporting and ensuring that data is regularly updated. A single dashboard on the San Joaquin County website could paint the whole picture and blend in county-wide information about transit ridership, active transportation efforts, and other initiatives. Once roadside AQ data becomes available, it could be added to the dashboard.

A single dashboard that shows only the county information that is updated twice a year will create a visual tool that shows progress toward short- and long-term goals. It may also identify zip codes that are slower to move to ZEVs and determine targeted outreach and support needs.

Potential sources of information include:

- CALSTART and the Center for Sustainable Energy (CSE), the two organizations that administer most rebate programs, have dashboards that show rebates and incentives by county, zip code, and vehicle type.^{3, 4, 5}
- The California Energy Commission’s (CEC) ZEV dashboard shows ZEV vehicle registrations, charging stations, hydrogen stations, and medium-and-heavy duty deployment by county and sometimes by zip code.⁶
- The Air Resources Board requires annual reporting about transit bus deployments with a spreadsheet of each agency bus by fuel type.⁷
- California Distributed Generation Statistics shows the distribution of solar incentives from multiple funding programs.⁸
- The Governor’s Office of Business Development’s Permit Streamlining Map.⁹
- The American Community Survey (ACS) from the U.S. Census Bureau gives an annual snapshot of the population statistics, including employment, housing, and modes of transportation.¹⁰

CSE and CEC both use Tableau, an online platform that connects to external databases and creates visualizations. All the sources identified have spreadsheets that can be downloaded and used in other applications. Some of the sources also offer data integration so that information is automatically updated.

Meet State of California Requirements for Streamlined Permitting

The *San Joaquin Valley Plug-In Electric Vehicle Readiness Plan* identified that Streamlining Permitting and Inspection Processes is a core area of EV readiness.¹¹ DKS recommends San Joaquin County prioritize compliance with permit streamlining and that SJCOG support Lathrop, Ripon, and Escalon as appropriate in meeting these requirements.

Complying with the two regulations that require streamlined permitting for charging stations will:

- Enable more residential, public, workplace, and multifamily charging stations because the process for getting an EVSE permit will be standardized and faster, which can result in lower costs.

³ <https://californiahvip.org/impact/#deployed-vehicle-mapping-tool>,

⁴ <https://calevip.org/rebate-statistics>

⁵ <https://cleanvehiclerebate.org/en/rebate-map>

⁶ <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-zev-sales>

⁷ <https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit/reporting-tool-data>

⁸ <https://www.californiadgstats.ca.gov/charts/li/>

⁹ <https://business.ca.gov/industries/zero-emission-vehicles/plug-in-readiness/>

¹⁰ <https://www.census.gov/programs-surveys/acs>

¹¹ http://www.valleyair.org/grants/documents/pev/san_joaquin_valley_pev_readiness_planning_guide.pdf

- Prepare the region for NEVI funding as streamlined permitting is a requirement for this funding.
- Make entities more competitive for grants.
- Enable charging stations throughout the county.

The California State Building Officials (Calbo) published a set of resources for small jurisdictions that include sample forms and model ordinances for reference.¹²

Encourage Home and Workplace Charging

Creating a one-stop shop for businesses, property owners, and residents with information and resources will:

- Enable more residential, public, workplace, and multifamily charging stations because unbiased and objective information is available from a trusted resource.
- More charging stations at home and at workplaces will encourage increased EV adoption and ZEV miles traveled.
- A network of charging stations that accept payment can add to tax revenue.
- A focus on workplace charging can encourage fleets to transition to ZEVs.

Many charging stations will need to be installed on privately owned land and the property owners must express interest and take action to install these charging stations.

The AIDA (Awareness, Interest, Desire and Action) model traces the customer journey through Awareness, Interest, Desire and Action, and is perhaps the best-known marketing model.

- Attention (or Awareness) creates buyer recognition of the technology, product, or brand.
- Interest communicates the benefits of the technology, product, or brand to the potential buyer to encourage them to learn more.
- Desire creates an emotional connection so that the buyer moves from liking the technology, product, or brand to wanting it.
- Action moves the buyer to take the next step—or to walk away.

Many of the existing EV websites and sources of information focus on Attention and Interest, and others are solely about the Action step. SJCOG can fill a void for local business owners and residents by offering objective, helpful information to move the person from thinking about installing a charging station to reaching out to a vendor or the utility to take the next step.

Create a page on the San Joaquin County website with resources for residents and businesses that includes:

- A summary of rebates and incentives grouped by single-family home, multifamily property, workplace and public charging.
- For homeowners, a link to tools like Veloz’s [Home Charging Advisor](#)

¹² <https://www.calbo.org/sites/main/files/file-attachments/ab1236toolkitsmalljurisdiction.pdf?1524861090>

- For multifamily property owners, a link to programs like SJVAPCD’s [Charge Up! Incentive Program](#)
- For employers, a link to resources like Plug In America’s [Workplace Charging guide](#)

Consider offering customer service and advice via Plug In America¹³ or Clean Vehicle Empowerment Collaborative.¹⁴ Both nonprofits offer multilingual and email support to end users and businesses interested in EVs and charging stations on a per-call or monthly basis.

Supporting Fleet Transitions

One of the first areas the collaborative committee can address includes municipal fleets, school bus operators, and transit operators and large companies that have 50 or more medium- and heavy-duty vehicles. Coordinating with these mandated adopters could identify baseload users for one or more of the proposed ZEV fuel plazas, which would reduce each operator’s costs to build individual stations. It could also identify opportunities for group buying pools to place one order under one PO. Buying larger numbers of the same vehicle (or same charging station) can mean a price reduction, faster delivery, or additional perks like training and maintenance.

Other opportunities the collaborative could explore include:

- Offering free site assessments to identify the facilities that appear to have sufficient capacity for a charging station and assist with utility coordination.
- Provide data collection tools so that fleet managers can start collecting the information about their vehicles to start the planning.
- Identify GHG reduction from charging and hydrogen stations to estimate Low Carbon Fuel Standard (LCFS) credits.

DEPLOYMENT RECOMMENDATIONS

The focus of this section will be on infrastructure deployment recommendations including, charger siting and location, electrical service, operations, working with utilities and resiliency.

Charging Infrastructure Placement and Installation Guidelines

A core activity of a collaborative committee for advancing alternative fuel infrastructure in San Joaquin County should include planning for cost-effective investment in ZEV infrastructure. Earlier in this chapter area recommendations were identified based on a number of factors discussed in the methodology in **Appendix D**. The committee will also need to determine factors for prioritization such as serving disadvantaged communities, residents living in multi-unit dwellings or serving high-traffic areas, factors which have also been identified and mapped earlier in this chapter.

¹³ <https://pluginamerica.org/why-go-plug-in/ev-support-program/>

¹⁴ <https://evequity.com/>

To optimize operational efficiency and reduce installation costs, when planning to place or install EV chargers, consider the factors below:

Siting Chargers:

- Ease of access along key corridors, especially near intersections that have amenities for EV drivers to visit while charging. Examples of popular amenities include restrooms, popular retail venues, restaurants, libraries, community centers, tourist attractions, beaches, and parks, etc.
- Proximity to areas of concentrated high-density housing as multi-unit housing typically lacks EV charging.
- Availability of parking, preferably near a power source to minimize costs to bring power to the site such as trenching.
- Visibility of the chargers themselves which includes location in a parking lot, lighting and proximity to nearby streets or storefronts; it is not recommended they be installed in difficult to find or see areas.
- Safety of the location and of the installation including being well lit at night and ensuring charging cables will not need to run across sidewalks to be used or overlap on to sidewalks when not in use.
- Other considerations may also need to be considered such as tree roots or branches that may be disturbed and put the installation at odds with urban tree-canopy goals.

Electrical service:

- Evaluate capacity of electrical infrastructure (utility service and electrical panel) to support immediate and long-term vehicle charging needs. Identify costs for necessary electrical service upgrades in collaboration with local utilities and/or a qualified electrician.
- To help minimize costs, choose charging locations that are as close as possible to existing or proposed electrical service infrastructure and other EV charging stalls.
- Plan electrical raceway or conduit runs for electrical wiring and data cables from the electrical panel serving the chargers and consider a layout that minimizes linear conduit distances to all proposed EV charger-equipped parking spaces.
- If possible, install chargers during construction, remodels, or other facility upgrades planned to reduce costs and minimize construction impacts.
- Charger hosts should consider different strategies to separate meters for building and electric vehicle charging uses to manage peak load impact on the grid and minimize demand charges for electric vehicles.¹⁵

¹⁵ See Snohomish County PUD Public Electric Vehicle Chargers Electric Rates effective January 1, 2021. This electric rate schedule allows charger hosts to install electric vehicle charging equipment that has a lower rate for demand, energy, and minimum charges when first installed. The charges increase incrementally each year anticipating higher future charging needs.

Charger location and layout:

- If possible, surface-mount conduit along wall surfaces to avoid more costly trenching under paved surfaces. If wall mounting is not feasible, trench beneath planting strips to reduce cutting and re-paving costs and to minimize disruptions during construction.
- Identify suitable locations with smooth, plumb surfaces for wall mounted charging stations if possible or suitable floor surfaces for pedestal mount stations. If possible, use wall-mounted chargers to avoid the need for pedestals which are more costly and complex to install.
- To maximize charging capacity, consider installing dual-port pedestal mount stations with long charge cords (up to 25'). Many chargers include optional cord management systems such as retracting reels to minimize trip hazards. Depending on parking configuration, a single charger or dual head charger pair can serve up to eight parking stalls.
- To comply with the Americans with Disabilities Act (ADA), charging station configuration must meet current CA Title 24 Building Code requirements, charging stations must not block ramps or pathways, and cables should not extend across ramps, pathways or sidewalks when connected to a vehicle, sometimes called "path of travel".
- Where feasible, avoid locating chargers under trees where sap, pollen, or leaves would fall on the charging station.
- To better accommodate the varied charge port locations on different EVs, use perpendicular (90 degree) parking stalls that allow a vehicle to enter either front-first or rear-first instead of parallel or diagonal stall parking.
- Plan locations for easy and cost-effective future charger installation, typically adjacent to other EV charging stalls.

Operational considerations:

- Provide adequate lighting activated by motion sensors for safe night-time access and consider weather protection.
- Consider sighting chargers in areas with good visibility and securely affixed to the ground or wall.
- Closed-circuit television (CCTV) surveillance is an additional option, especially in low visibility public areas, to prevent theft and vandalism.
- Ensure chargers are easily identified and install signage or wayfinding as needed.
- Provide protective bollards and wheel blocks where appropriate, especially on sloped sites.

Data connectivity:

- Measure cellular signal levels to ensure adequate coverage where smart chargers will be installed. Underground or enclosed parking structures may require cellular repeaters to ensure adequate signal strength to chargers.

Once specific sites have been selected and optimal charger locations within the site have been identified the installation of chargers require a multi-step process summarized in **Table 3** below.

TABLE 3: MILESTONES TO INSTALLATION

MILESTONE TITLE	DESCRIPTION OF ACTIVITY
PLANNING & BUDGETING	<ul style="list-style-type: none"> Identify charger quantities, locations, types and priorities and identify project costs.
ELECTRICAL SERVICE UPGRADE REQUEST	<ul style="list-style-type: none"> Electrical infrastructure upgrades by utility (If needed)
PROJECT FUNDING	<ul style="list-style-type: none"> Seek capital funding through City/County budgets or 3rd party funding sources.
CHARGER INSTALLATION DESIGN	<ul style="list-style-type: none"> Prepare designs for permit approval and bid package.
PROJECT PERMITTING	<ul style="list-style-type: none"> Permits submitted for review and approval.
BIDDING	<ul style="list-style-type: none"> Project bids and awarded to contractor.
EV ACQUISITION	<ul style="list-style-type: none"> Purchase and installation of EV chargers by selected contractor(s).
CHARGER COMMISSIONING	<ul style="list-style-type: none"> Test and commission EV chargers to ensure operation.

ADDRESSING GRID CONSTRAINTS

Grid constraints are not an issue unique to San Joaquin County or even to California. Utilities across the country are engaged in planning to manage both transportation and building electrification. The balance for electric utilities will be to determine the areas most in need of infrastructure upgrades and when they will need to be upgraded to ensure the most cost-effective transition minimizing the pressure to raise rates. Counties and municipalities can assist in this transition as well as gain information they need for their planning by working with utilities early in the process and through the site evaluation. Ideally, the process should look as follows:

1. Even before sites have been identified, developing a relationship with a utility representative can be a vital step. **Figure 15** shows each utility across San Joaquin County.
2. Informing the local utility of the general plans for how much charging infrastructure and when it may be added will allow them to include this additional load into their long-term planning.

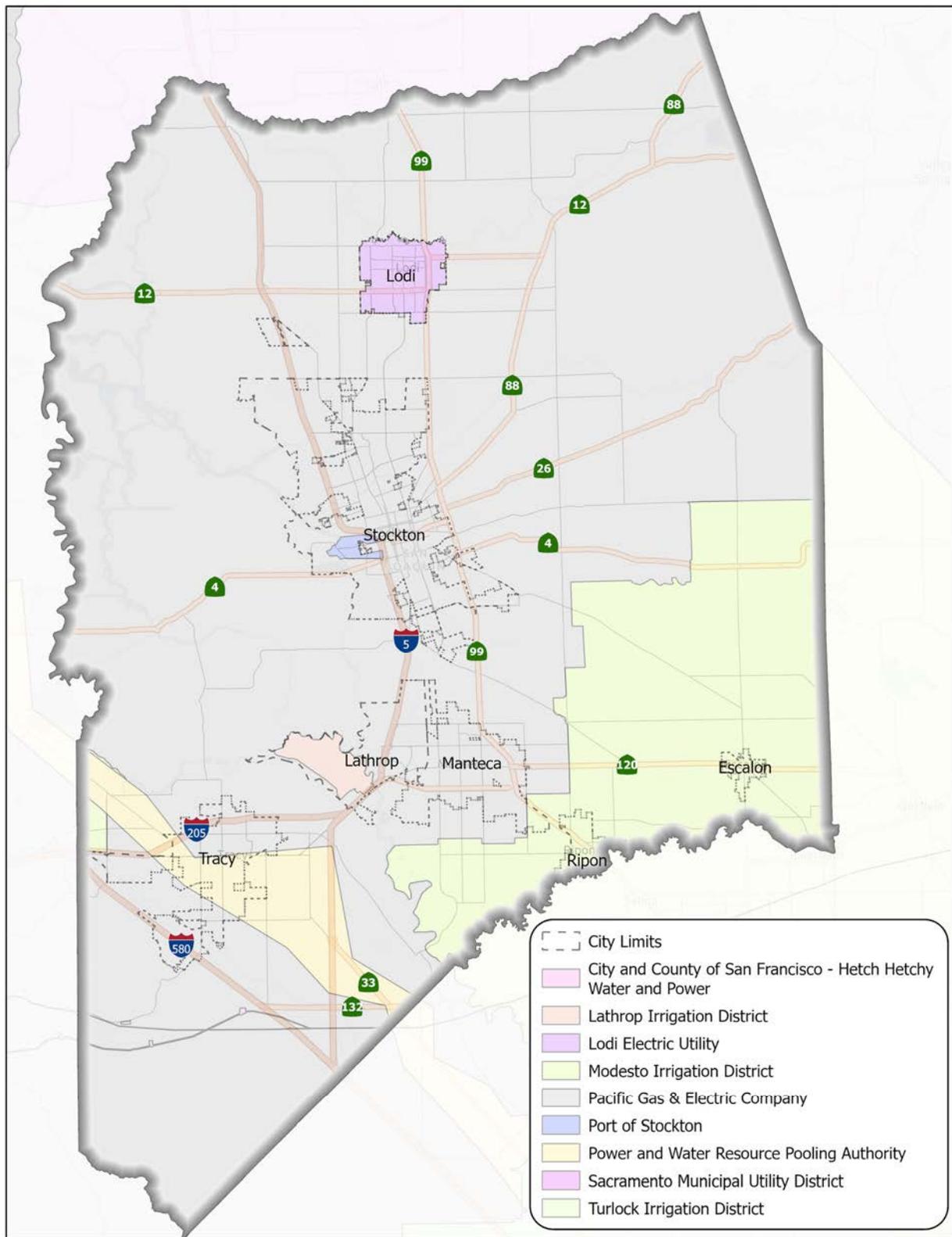


FIGURE 15: ELECTRIC UTILITIES IN SAN JOAQUIN COUNTY

3. Next, potential sites for charger installation should be identified. This chapter has provided area recommendations based on a number of factors. Potential *specific* sites will need to be evaluated further for the factors outlined in the previous section of this chapter titled *Charging Infrastructure Placement and Installation Guidelines*.
4. Select a contractor to facilitate the installation of the charging equipment and have them do an initial evaluation of the sites. This may be an electrician that works with contractors to complete the civil work such as trenching, or vice versa. They will need to work with the electric utility in the next step.
5. Once potential installation sites have been identified, a contractor and the number and type of chargers to be installed is known, the work with the utility's electrical engineers should begin immediately to determine transformer capacity and location of power available to the site. This step may take time, in some cases months.
 - a. Note: If only a small number of level 2 chargers will be installed, it may be possible to run electricity from an existing electrical panel if capacity is available. Always check with an electrician first if this may be the case. If enough capacity exists in a customer owned electrical panel and the existing service, the utility may not need to be involved as the electrical upgrades would only occur on "customer owned equipment" rather than "utility owned equipment".
6. There will likely be some back-and-forth communication with the utility engineer(s) as a design for the site is developed. The number of chargers may need to be reduced, transformers or electrical services may need to be upgraded or it may be determined that bringing the needed amount of power to the site would be cost prohibitive at that time.
7. This process helps the prioritization of sites based on the electrical infrastructure needed and the associated costs. Simpler installations may be done first as the "low hanging fruit" while more complicated or expensive installations may need to wait for appropriate grant funding or other factors.

As the transportation sector transitions from fossil fuels to electricity, the grid could be further impacted, especially if EV charging occurs during peak demand times. Solutions to this challenge include:

- Time of use (TOU) electrical rates incentivize EV owners to charge during off-peak times by charging lower electrical lower rates for EV charging.
- Demand response (DR) involves shifting or shedding electricity demand to provide flexibility in wholesale and ancillary power markets, helping to balance the grid. This would be facilitated by charge management software.
- Bidirectional charging, a feature becoming more common in newer EVs allows the EV battery to be discharged back to the grid (known as vehicle-to-grid or V2G) in order to sell power back to the grid. If enough EVs utilize this feature, the combined EV fleet could serve as an energy storage bank to help offset power capacity constraints.

- Battery Energy Storage (BES), or the use of stationary battery systems to store electricity to augment the grid during times of constrained capacity.

COMBINE GRID RESILIENCY AND EV CHARGING

With the ever-increasing impacts of climate change, grid resiliency is becoming an urgent topic. Fortunately, the very technologies used to reduce carbon emissions; ZEVs and renewable energy, can also be used together to provide resiliency. Solar and wind energy provide clean electricity; however, these are intermittent resources meaning they only produce electricity when the sun is shining or the wind is blowing. This is where battery storage, either in the form of back up batteries or by utilizing the batteries in electric vehicles with bi-directional charging can provide balance to these resources by storing energy when it's being produced by solar or wind and releasing it back to the grid when these resources are not generating electricity, but power is needed.

On a smaller scale, solar paired with battery storage or EVs with bi-directional charging and the ability to "island" or disconnect from the grid in times of power outages can provide a powerful resiliency solution. It's important (and typically mandated) to have the ability to disconnect from the grid to allow utility workers to safely work on utility equipment. For this reason, solar installations typically have an automatic cut-off during outages to keep utility workers safe, unless the system is set up to "island". There now exists many back-up battery systems that can be paired with solar, and the Ford F-150 Lighting can provide back-up power for a home as a standard feature (when paired with Ford's charging station).¹⁶ This is one of the first consumer level EV based resiliency products on the market. Together, these technologies could provide power to critical buildings during extended outages as well as residential homes with these systems in place.

The collaborative committee previously discussed can work to implement policies to encourage or even require technologies to enable islanding and back-up power. These policies could simultaneously address climate change in the reduction of carbon emissions while also preparing the region for resiliency.

INCENTIVES

Regulatory

Appendix B provides information on current and upcoming regulations supporting the ZEV and alternative fuel transition. As codes undergo regular updates and changes referencing the California Energy Codes and Standards website¹⁷ can provide helpful, up-to-date examples for local agencies, planning commissions and partners. At the County and City level, enforcing State codes and adopting aggressive requirements for new construction can support the ZEV transition by preparing more parking spaces to be EV Ready or EV Capable which will reduce the cost of adding this infrastructure later.

¹⁶ <https://www.ford.com/trucks/f150/f150-lightning/2022/features/ev-charging/ford-charge-station-pro/>

¹⁷ <https://localenergycodes.com/content/adopted-ordinances>

The California Green Building Standards (CALGreen) requires “EV Capable” parking spaces, meaning that the building has capacity in the electrical panel and spacing for wiring for a building inhabitant to install wires, circuits, and plugs for EV charging later. **Figure 16** outlines the different levels of EVSE support.



FIGURE 16: DEGREES OF EVSE SUPPORT BUILDING CODE

CALGreen Codes have mandatory compliance that all California jurisdictions must enforce, and some codes have voluntary compliance levels that jurisdictions can enforce or use as an incentive. The EVSE requirements have two voluntary levels called Tier 1 and Tier 2.

The 2022 CALGreen codes mandatory requirements include:

- Single-family residences, including townhomes and duplexes, be EV Capable
- Non-residential new construction and major alterations (\$200,000 or 1,000 sq feet) to have up to 10% of parking spaces be EV Capable.
- New multifamily dwellings and new hotels/motels with 20 units or more must have 10% of all parking spaces EV Ready. (This includes parking spaces that are designated for guests or shared with ancillary business, like a banquet hall or a casino.)
- Tier 1 requires that 10% of spaces are EV Capable for a property with 19 or fewer units; for properties with 20 or more units, 25% of the dwelling unit spaces must be EV Capable.
- Tier 2 applies only to properties with 20 or more units and requires the 5% of total parking spaces be EV Installed and at least one EVSE must be in a common area.

- New non-residential buildings must have EV Ready and EV Capable spaces as shown in **Figure 17**

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	NUMBER OF EVCS (EV CAPABLE SPACES PROVIDED WITH EVSE) ²
0-9	0	0
10-25	4	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 and over	20 percent of total ¹	25 percent of EV capable spaces ¹

1. Calculation for spaces shall be rounded up to the nearest whole number.
2. The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count toward the total number of required EV capable spaces shown in column 2.

FIGURE 17: EV REQUIREMENTS FOR NON-RESIDENTIAL BUILDINGS

New grocery stores, retail stores with planned off-street loading, and warehouses must be EV Ready for medium- and heavy-duty charging based on the square footage of the building, as shown in **Figure 18**.

BUILDING TYPE	BUILDING SIZE (SQ. FT.)	NUMBER OF OFF-STREET LOADING SPACES	ADDITIONAL CAPACITY REQUIRED (KVA) FOR RACEWAY & BUSWAY AND TRANSFORMER & PANEL
Grocery	10,000 to 90,000	1 or 2	200
		3 or Greater	400
	Greater than 90,000	1 or Greater	400
Retail	10,000 to 135,000	1 or 2	200
		3 or Greater	400
	Greater than 135,000	1 or Greater	400
Warehouse	20,000 to 256,000	1 or 2	200
		3 or Greater	400
	Greater than 256,000	1 or Greater	400

FIGURE 18: CALGREEN REQUIREMENTS FOR LOADING DOCKS

Enforcing CALGreen codes and adopting Tier 1 or Tier 2 as mandatory can support the ZEV transition by:

- Enabling more residential, public, workplace, and multifamily charging stations as it will be less costly and faster to install them.
- Encouraging more public and workplace charging which will support increased EV adoption and ZEV miles traveled.
- Provide tax revenue through a network of charging stations that accept payment.
- Encourage visitors and in-bound commuters to drive ZEVs to utilize public charging in the region.

Additional Building Codes to Potentially Adopt to Support EV Readiness:

- Adopt Tier 1 or Tier 2 as a mandatory code or voluntary compliance in all new multifamily and hotel construction.
 - **Benefits:** It will increase the number of charging stations in the region without incentives. It will reduce the costs of adding charging stations at a later date. Adopting Tier 1 or Tier 2 do not require a regulatory filing.
 - **Constraints:** Additional costs for installing a 220-volt plug and the supporting circuit add construction cost. Although the cost may be small, costs add up and influences affordability. It will be necessary to evaluate the cost of EV support at new developments aimed at lower-income populations.
- Require single-family homes to comply with CALGreen code (EV Capable) for EVSE when an alteration requires an upgrade to the electrical panel. CalGREEN does not require compliance for single family residential remodels.
 - **Benefit:** Could add thousands of locations for home charging at existing houses at minimal cost to the homeowner. Because it a panel upgrade, the utility will already be involved to ensure the property can support the additional electrical load.
 - **Constraints:** Could be costly for a significant number of homes that were not originally designed to run power from the panel to a parking space. Could deter homeowners and landlords from making other home upgrades the reduce energy use.
- In conjunction with community stakeholders, developers could clearly identify alternatives to on-site charging that could include ¼-mile access to public charging, on-site electric car share, or within two miles of a public hydrogen station.
 - **Benefits:** May encourage developers to collaborate on central facilities.
 - **Constraints:** Could have a negative impact on initiatives to reduce VMT.

Funding Recommendations

Multiple funding opportunities exist federally as well as in in the state of California, with eligible applicants ranging from private customers, state and local government agencies, tribal governments, school districts, transit agencies, utilities, fleet owners and operators, ports, and in some cases vehicle dealers and charging infrastructure vendors. Funding programs typically have a fixed term and a limited allocation of funds. Examples of funding opportunities can be found in **Appendices A** as well as summary tables for Federal, State and local funding opportunities.

As funding opportunities frequently change, the project team also recommends regularly monitoring the resources listed below:

- Alternative Fuels Data Center Overview of Federal and State Laws and Incentives: <https://afdc.energy.gov/laws>
- California Governor’s Office of Business and Economic Development (GO-Biz) ZEV Funding Resources library: <https://business.ca.gov/industries/zero-emission-vehicles/zev-funding-resources/>
- PlugStar searchable database by ZIP code: <https://plugstar.com/tools/incentives>
- DSIRE (database of clean energy programs): <https://programs.dsireusa.org/system/program>

To prepare for grant and other funding opportunities consider the following:

- Identify sites and project stakeholders/partners ahead of time. Ensure the owner of a potential installation site is on board and an active participant in the process and make this known in the application for funding.
- Complete site evaluations as suggested previously in this chapter and complete as much of the design as possible to show you have done your due diligence and will be prepared to utilize the funding without delay. Projects should be as close to “shovel ready” as possible.
- Plan ahead for staff to manage grant funding and completing reporting requirements and outline your plan in your funding application.
- Carefully review funding applications and requirements to ensure nothing is missed. Particularity with competitive grant applications at the federal and state level.

Explore Revenue Opportunities

Public EV chargers can generate revenue for their owners directly through the sale of electrons to motorists charging their vehicles to cover the cost of the electricity consumed. As with any commodity, revenues from charging are a factor of supply and demand for charging as well as the costs of installed chargers and the price of electricity.

Revenues can also be generated indirectly through the sale of Low Carbon Fuel Standard credits. The Low Carbon Fuel Standard (LCFS) is a market-based approach to incentivizing clean energy administered by the California Air Resources Board¹⁸. The LCFS creates a marketplace where air polluters may acquire credits to continue to operate, while clean energy users sell credits to generate revenue.

Owners of EV chargers, utility distributors, and EV owners may be eligible for California LCFS credits, as long as the EV charging is metered, outlined in the funding section of this report (**Appendix A**) below. Since EV charging must be metered to qualify for LCFS credits, Level 1 chargers are usually not eligible unless they are individually metered like a Level 2 or DC Fast charger. The owner of a public charger can claim LCFS credits as long as the charger is publicly available. While in the case of residential charging, the base LCFS credit (similar to the LCFS credit from a public charger) may be claimed by the utility distributor while an incremental credit may be claimed by the EV owner as long as charging is metered.

¹⁸ About Low Carbon Fuel Standard. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/about>

ALTERNATIVE FUELS CORRIDOR PROGRAM

One of the key goals of this plan is to align San Joaquin County with the FHWA's Alternative Fuels Corridor Program and California's *Deployment Plan for the National Electric Vehicle Infrastructure (NEVI) Program* (adopted August 2022). Between Round 1 and Round 6, the FHWA has identified select highways nationwide as either "Ready" or "Pending" for each of a number of alternative fuel or power sources including:

- Electric (EV)
- Compressed Natural Gas (CNG)
- Liquid Natural Gas (LNG)
- Propane (LPG)
- Hydrogen (H)

Figure 19 through **Figure 22** show the FHWA highways within San Joaquin County that have been identified by the FHWA as either "Ready" or "Pending" for each fuel type.

Figure 19 shows that Interstate 5 and State Route 99 have been identified as EV Corridor Ready for their entire length within San Joaquin County, as is the portion of State Route 12 west of State Route 99. The figure also shows that portions of State Route 4 from Stockton to the eastern County line and State Route 120 from Interstate 5 to the eastern County line are identified as EV Corridor Pending. The California Energy Commission (CEC) has identified two charger locations in San Joaquin County as meeting NEVI requirements (at least four DC Fast Chargers with power output of at least 150 kW, located within one mile of a highway interchange, and available to multiple EV makes and models). Both are Electrify America stations, with eight charge ports at a Walmart location in Stockton and four charge ports at a Walmart location in Tracy.

Figure 20 shows that Interstate 5 north of State Route 4 and south of Interstate 205, State Route 99 throughout the County, and Interstate 205 west of Interstate 5 are all identified as CNG Corridor Ready. Interstate 580 and State Route 120 are both identified for their entire length in the County as CNG Corridor Pending. There are currently six CNG stations in San Joaquin County. Of these, two are located in Stockton, two are located in Lathrop, one is located in Lodi, and one is located in Ripon. None of the existing CNG stations are located adjacent to either of the corridors identified as CNG Pending by the FHWA.

Figure 21 shows that Interstate 5 and State Route 99 for their entire lengths in San Joaquin have been identified as LNG Corridor Ready, while Interstate 205 and Interstate 580 have been identified as LNG Corridor Pending. There is currently only one LNG station in San Joaquin County. This station is located at Clean Energy's site in Lathrop.

Figure 22 shows that Interstate 5 and State Route 99 for their entire lengths in San Joaquin are identified as Hydrogen Corridor Pending. There are no Hydrogen Corridor Ready highways in San Joaquin County, nor are there any existing hydrogen stations.

No highways in San Joaquin have been identified as either Propane Corridor Ready or Propane Corridor Pending.

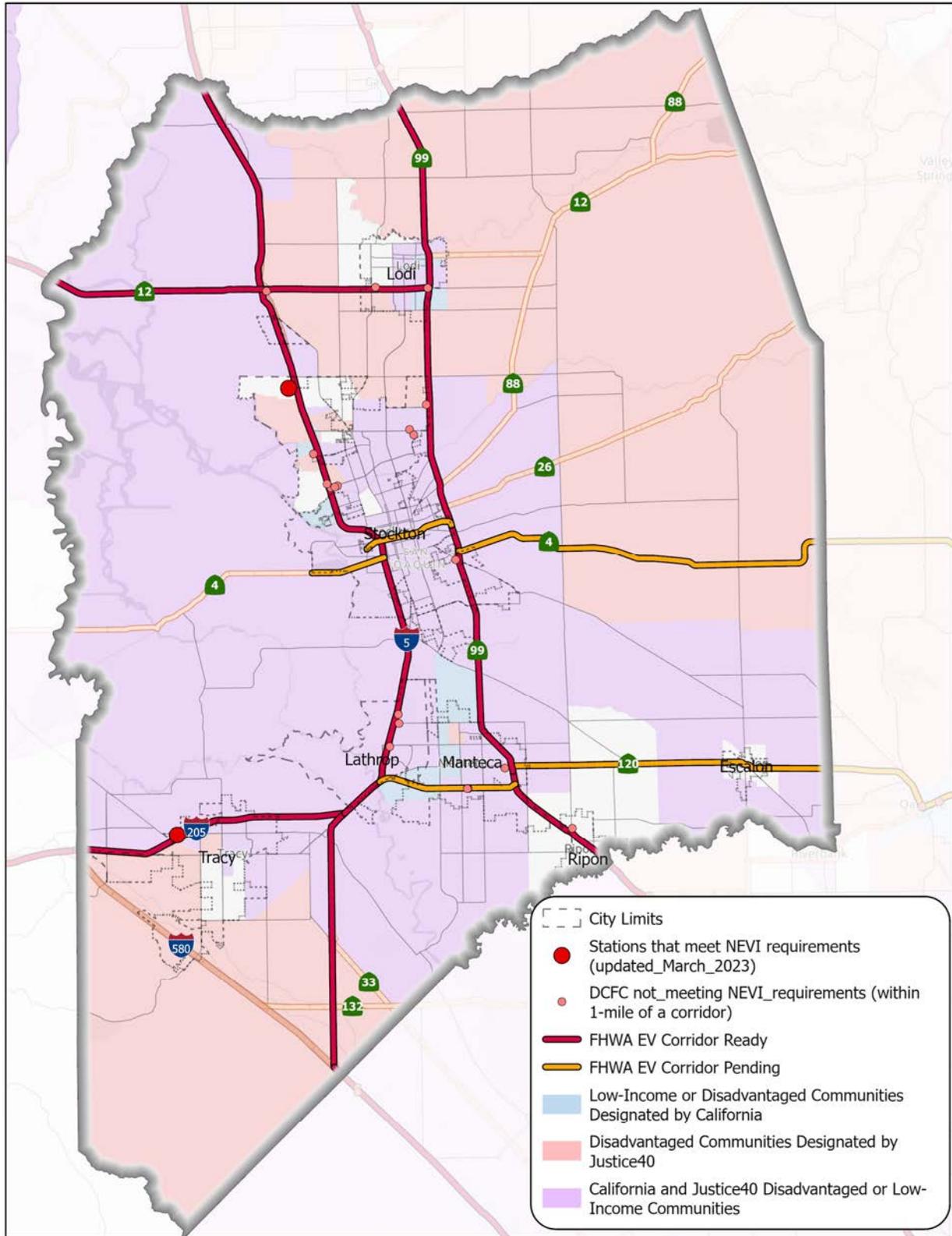


FIGURE 19: FHWA EV CORRIDORS

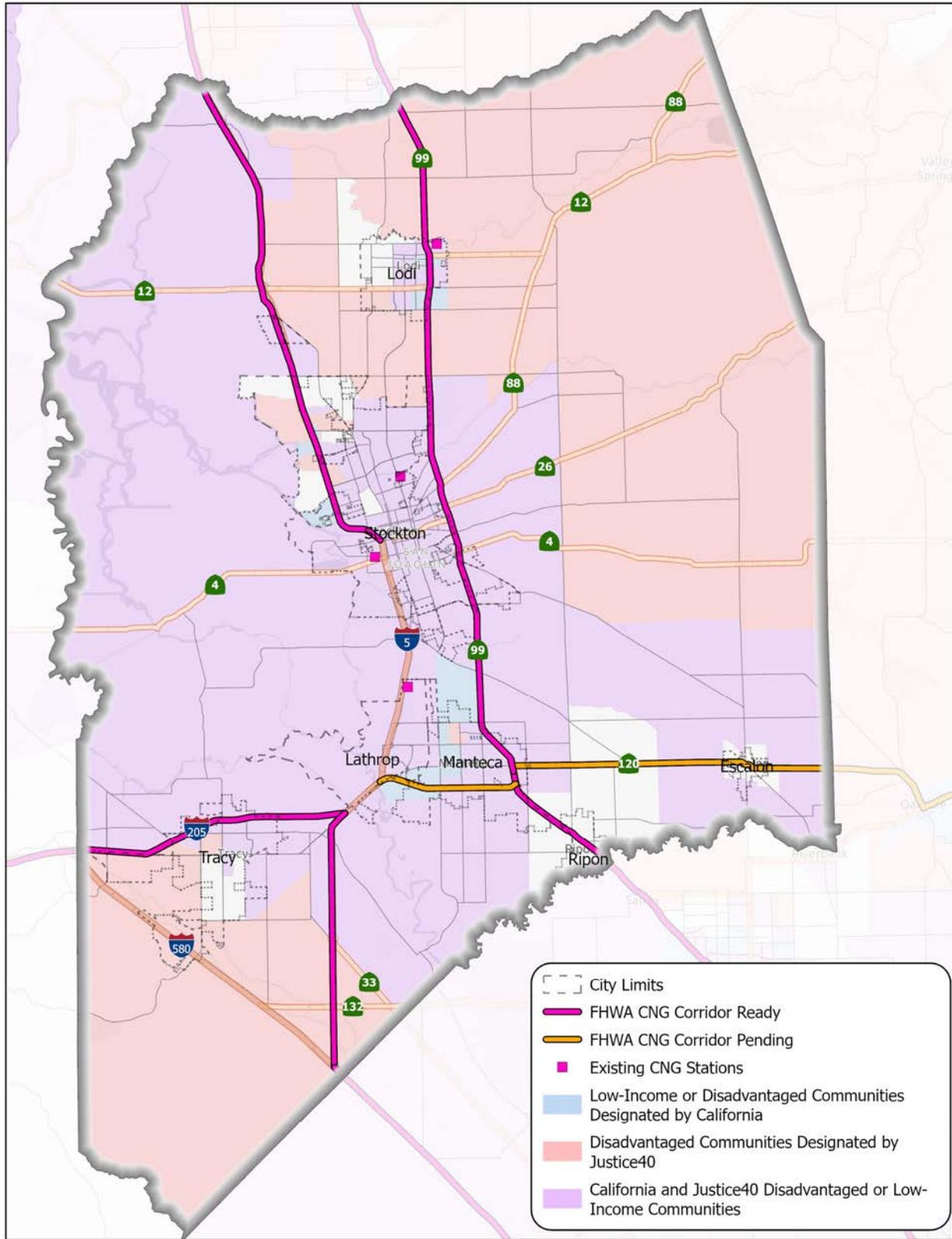


FIGURE 20: FHWA CNG CORRIDORS

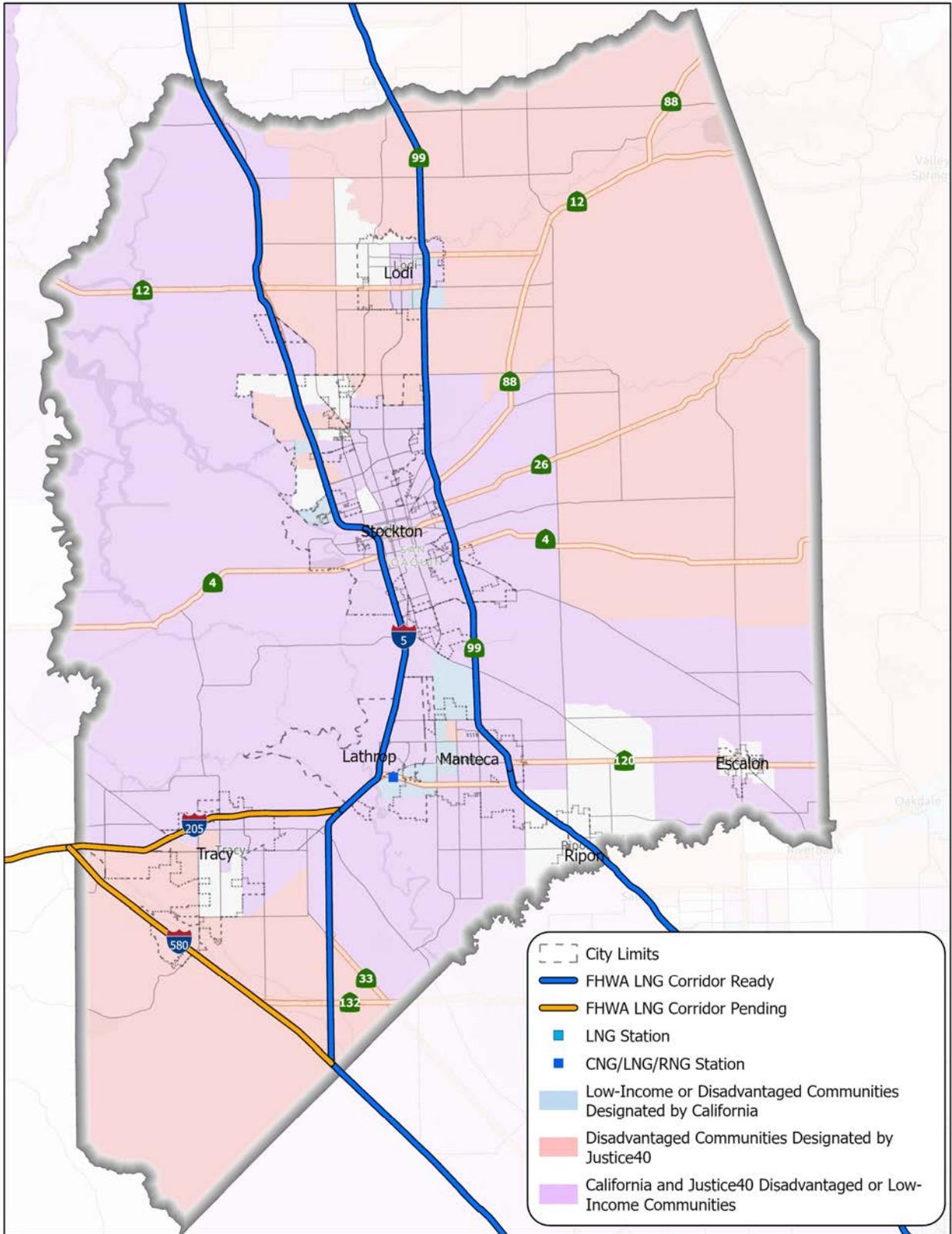


FIGURE 21: FHWA LNG CORRIDORS

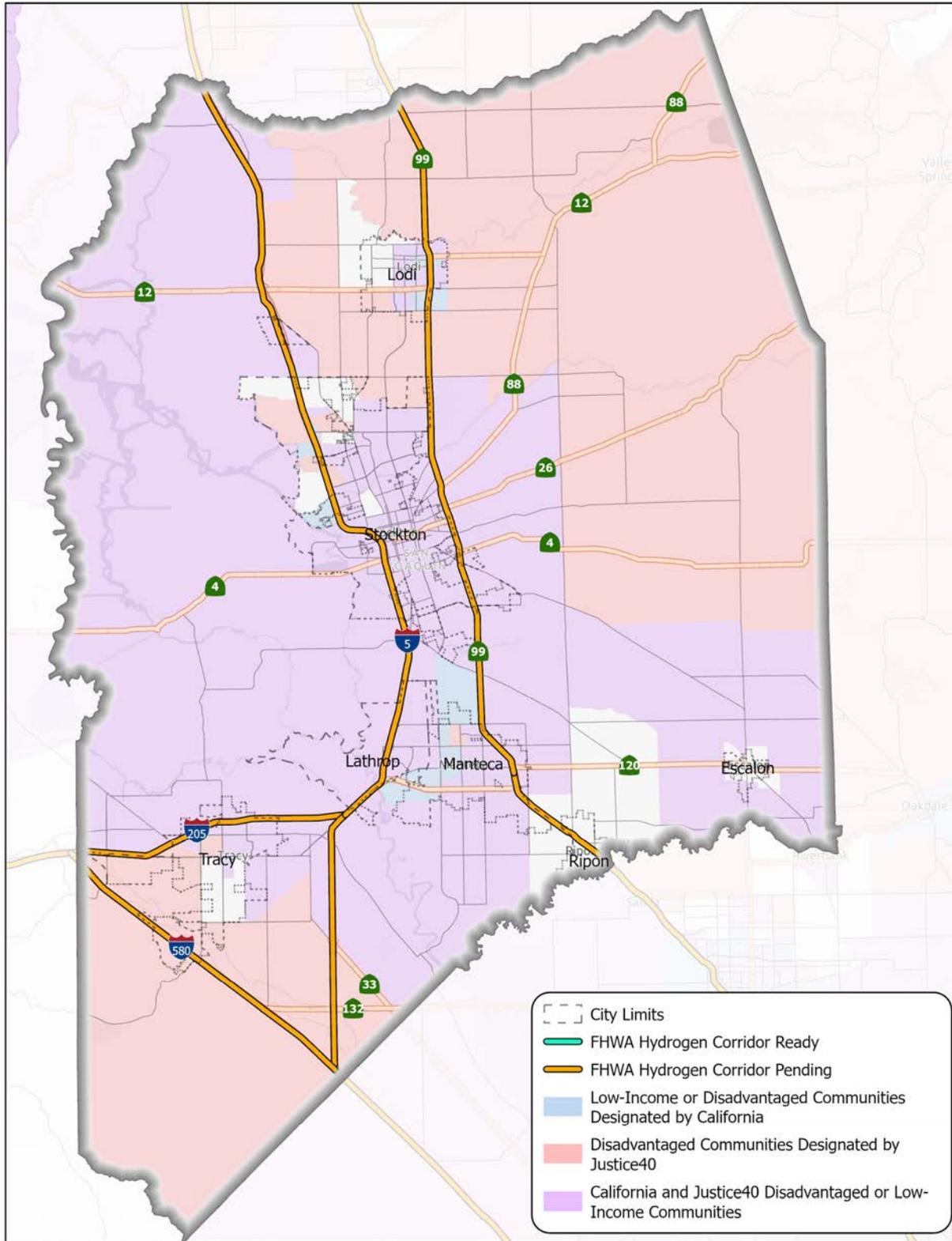


FIGURE 22: FHWA HYDROGEN CORRIDORS

APPENDICIES

CONTENTS

APPENDIX D: GAP ANALYSIS METHODOLOGY

APPENDIX E: SITE PRIORTIZATION MAPS BY RANK

APPENDIX D: GAP ANALYSIS METHODOLOGY

METHODOLOGY

Data sources include commercially available sources such as Streetlight Data and ESRI Business Analyst, as well as data received from the Team's outreach efforts and generalized mapping efforts. Using data compiled from these sources, along with a series of criteria weighted by relevance and impact on future EVSE siting, the Project Team has ranked locations using a points system. Point totals have been calculated based on a "grid" of 1,540 approximately one (1) square mile hexagons. This fabric of hexagons allows for preparation of maps displaying density of desired data sets on a consistent geographic fabric. The consistent geography also allows for analysis and combination of different data geographies described below, including highway interchange buffers, existing fueling stations, and other larger geographic features. Error! Reference source not found. below shows the hexagon grid system for the entire County, along with the geographies of the Streetlight Data described below. For each gridded hexagon, points have been awarded based on the relative magnitude (by standard deviation, where applicable) of each data category multiplied by weighting factors determined by the Project Team via survey. Weighting factors have been developed for three project goals, including providing fueling options for varied use cases, including:

- Environmental Justice (access for at-risk populations and disadvantaged communities)
- Light Duty Vehicles (including workplace, home, and opportunity charging)
- Medium/ Heavy Duty Vehicles

The data sources, categories, and weighting factors are described in detail in the following sections.

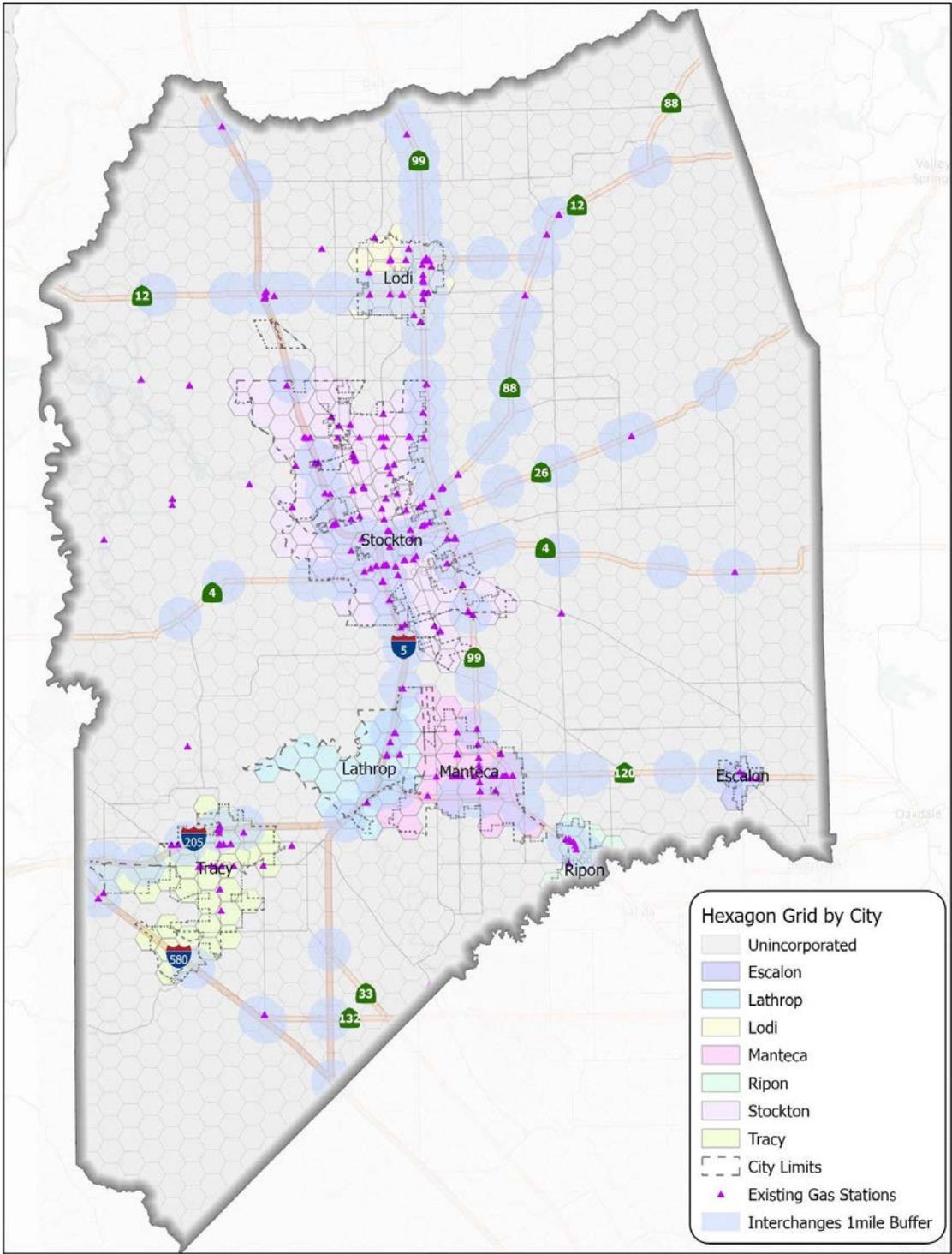


FIGURE 23. STUDY AREA GEOGRAPHY

DATA SOURCES

Streetlight Data

DKS contracted with Streetlight Data (a prominent provider of “Big Data”) for a dataset consisting of detailed travel data for the study area. For each of the study interchange “zones” including existing fueling (gas) stations where people currently fuel their vehicles and highway interchanges (one-mile buffers, as a crow flies) Streetlight Data (SLD) provided DKS with a comprehensive report of travel data for either the gas station parcel or the interchange one-mile radius area. Within the San Joaquin County study area, the dataset included travel data for 218 gas station parcels and 111 highway interchange one-mile buffer areas.

Data provided by SLD includes total daily volume (number of vehicles starting or stopping trip legs within each zone), breakdown of trips by “dwell” time increments (in minutes), breakdown of trips by trip length (in miles) and trip duration (in minutes), breakdown of vehicle drivers by income (in \$5,000 increments), breakdown of drivers by education level, breakdown of drivers by race and ethnicity, breakdown of drivers with a disability, and breakdown of drivers by place of residence (own or rent home, type of residence, etc.). Streetlight Data’s datasets are unique in that they provide data related to the drivers actually traveling to, from, or through a particular location, as opposed to providing data about the location itself, such as Census data. “Dwell” time data represents a unique data analysis by Streetlight Data where the time spent within a given zone for each vehicle is estimated. This data is key to assist in planning for the different needs of slower (Level 2) chargers (i.e., need for longer stops) or faster (DC Fast Charge) chargers (i.e., need for shorter stops).

ESRI Business Analyst

ESRI (Environmental Systems Research Institute) is one of the largest purveyors of GIS (geographic information systems) software, services, and data. DKS maintains a subscription to ESRI’s Business Analyst service, which allows users to prepare location-based analyses for business siting and analysis. For this project, DKS utilized this service to download point based data for the project study area including various business types pertinent to EVSE demand and siting analysis. These data downloads include full serve and fast food restaurants, grocery and super-center shopping locations, other shopping locations, gas stations, and recreational locations (such as campgrounds and RV parks). These business locations all represent locations where EV drivers tend to stop to eat, shop, or stay while fueling or charging their vehicles. Gas stations are a useful data source as they represent where people with traditionally fueled vehicles can currently fuel their vehicles.

Project Outreach Data

The Project team has completed an extensive Outreach program for this project (documented previously in this report and in **Appendix x**) that includes focus groups, stakeholder and public

workshops and presentations, and an online geographically located suggestion board (Social Pinpoint website). The data compiled from the Outreach program include general requests for additional charging infrastructure in portions of the study area, as well as specific requests for charging infrastructure (slower Level 2 or faster DC fast charging) at specific locations, including study interchanges. Approximately 25 Social Pinpoint requests were received for the County.

Disadvantaged Community/ Environmental Justice Data

California's *Deployment Plan for the National Electric Vehicle Infrastructure (NEVI) Program* (published August 2022) identified disadvantaged communities (DAC's) as defined by the state with CalEnviroScreen 4.0 and by the federal government with Justice40. The Deployment Plan identifies areas within the county study area by the following three categories:

- California-designated Low-income and/or Disadvantaged Communities
- Justice40-designated Disadvantaged Communities
- Disadvantaged and/or Low-income communities designated by both California and Justice40

US Census American Community Survey (ACS) Housing Data

The United States Census prepares 5-year running estimates of housing and population based on the annual American Community Survey (ACS). This data is curated and published for public consumption by ESRI in their Living Atlas online data repository and website. One dataset available includes number of households in structure. This data is divided into the following classifications of households: single unit detached, single unit attached, 2 units, 3 to 4 units, 5 to 9 units, 10 to 19 units, 20 to 49 units, 50 plus units, mobile homes, and boat, RV, or van as home. For the purposes of analysis used in this document, multi-unit dwellings (MUD's) are assumed to be housing units of 5 or more units in structure. The current "vintage" of five-year data is listed as 2017-2021 and was last updated on ESRI's Living Atlas website December 2022.

DATA CRITERIA WEIGHTING AND POINTS

In order to calculate total "Points" for each study interchange for ranking purposes, the relative value of each particular data type is calculated (by standard deviation to account for huge variances in data magnitude) and multiplied by a weighting factor to promote criteria deemed to be more relevant than others. The weighting factors used in this analysis range from a high of +3 to a low of -3. A value of +3 represents the highest weighting (most desirable for additional EVSE siting. A value of +1 represents an average weighting (the criteria is not weighted higher or lower than "typical"). A value of 0 (zero) represents a criteria that is not used in the points calculation. A negative value (-3 to -1) represents a criteria that lowers the perceived need for additional charging infrastructure. The only criteria with a negative value currently is Existing EVSE (representing areas that currently have good access to charging and may have less of a need for

additional charging). While some locations may receive negative points based on existing EVSE, it is possible that the positive points received from other criteria far outweigh the negative points received based on existing EVSE. As stated previously, weighting factors for three use cases were developed using input from a survey deployed to SJCOG and other Team members. Error! Reference source not found. shows the relative weighting factors (between -3 and +3) for all local environment factors (land use, existing charging, and disadvantaged communities) for each use case, while Error! Reference source not found. shows the relative weighting factors (between -3 and +3) for all trip-based factors (derived from Streetlight Data) for each use case. In both tables, factors of greater than +1 (neutral) are shown in bold.

TABLE 4: WEIGHTING CRITERIA - LAND USE AND LOCAL AREA CHARACTERISTICS

CRITERIA	ENVIRONMENTAL JUSTICE	LIGHT DUTY	MEDIUM/ HEAVY DUTY
EXISTING CHARGERS WITHIN 1/2 MILE OF LOCATION	-1	-1	-1
APARTMENT COMPLEXES WITHIN 1/4 MILE OF LOCATION	+3	+1	+1
MULTI-UNIT DWELLINGS (MUD) WITHIN 1/4 MILE OF LOCATION	+3	+3	+3
LOCATED WITHIN DISADVANTAGED COMMUNITY - CALENVIROSCREEN 4.0	+2	+2	+2
LOCATED WITHIN DISADVANTAGED COMMUNITY - JUSTICE40	+2	+2	+2
LOCATED WITHIN DISADVANTAGED COMMUNITY - CALENVIROSCREEN 4.0 AND JUSTICE40	+2	+2	+2
SHOPPING LOCATIONS WITHIN 1/4 MILE OF LOCATION - GROCERY/SUPERCENTER	+1	+1	+1
SHOPPING LOCATIONS WITHIN 1/4 MILE OF LOCATION - OTHER	+1	+1	+1
RESTAURANTS WITHIN 1/4 MILE OF LOCATION - FULL SERVICE	+1	+1	+1
RESTAURANTS WITHIN 1/4 MILE OF LOCATION - FAST FOOD	+1	+1	+1

TABLE 5: WEIGHTING CRITERIA - TRIP CHARACTERISTICS

CRITERIA	ENVIRONMENTAL JUSTICE	LIGHT DUTY	MEDIUM/ HEAVY DUTY
TOTAL AVERAGE DAILY VEHICLE TRIPS BEGINNING OR ENDING IN ZONE	+1	+1	+1
MEDIUM/HEAVY DUTY VEHICLE TRIPS BEGINNING OR ENDING IN ZONE	+1	+1	+3
AVERAGE TRIP LENGTH FOR ALL VEHICLES	+1	+1	+1
AVERAGE TRIP LENGTH FOR MEDIUM/HEAVY DUTY VEHICLES	+1	+1	+3
PERCENT OF VEHICLES WITH DWELL TIME OF 5 TO 10 MINUTES		+1	+2
PERCENT OF VEHICLES WITH DWELL TIME OF 10 TO 20 MINUTES		+1	+2
PERCENT OF VEHICLES WITH DWELL TIME OF 20 TO 60 MINUTES	+2	+2	
PERCENT OF VEHICLES WITH DWELL TIME OF 60 TO 20 MINUTES	+2	+2	
PERCENT OF VEHICLES WITH DWELL TIME OF 120 TO 240 MINUTES	+3	+3	
PERCENT OF VEHICLES WITH DWELL TIME OF 240 MINUTES OR MORE	+3	+3	
PERCENT OF VEHICLES WITH TRAVEL DISTANCE OF 0 TO 20 MILES	+1	+1	+1
PERCENT OF VEHICLES WITH TRAVEL DISTANCE OF 50 TO 100 MILES	+1	+1	+1
PERCENT OF VEHICLES WITH TRAVEL DISTANCE OF 100 MILES OR MORE	+1	+1	+1
PERCENT OF VEHICLES WITH DRIVER INCOME LESS THAN \$25K	+2	+1	+1
PERCENT OF VEHICLES WITH DRIVER EDUCATED 12TH GRADE OR LESS	+1	+1	+1
PERCENT OF VEHICLES WITH MINORITY DRIVER	+1	+1	+1
PERCENT OF VEHICLES WITH DRIVER WITH DISABILITY	+1	+1	+1
PERCENT OF VEHICLES WITH DRIVER WHO LIVES IN MULTI-UNIT DWELLING	+3	+2	+2

APPENDIX E: SITE PRIORTIZATION MAPS BY RANK

FIGURE 24: SITE PRIORITIZATION – RANK 1-5



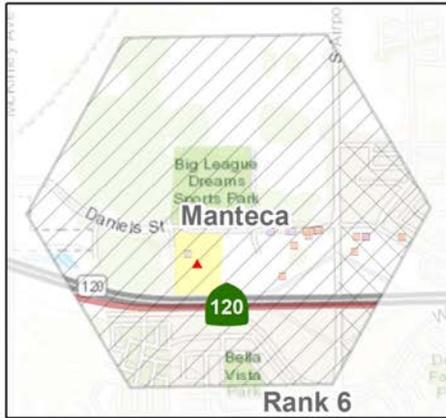
County Rank	1	2	3	4	5
Grid	AA-36	R-24	T-13	S-23	R-19
City	Ripon	Stockton	Lodi	Stockton	Stockton
Total Points (Equity)	1,225	1,200	1,033	1,007	903
Total Points (Light Duty)	1,082	1,052	901	870	744
Total Points (Medium/Heavy Duty)	988	992	836	829	739
Total Daily Volume (Gas Stations)	12,537	1,544	2,795	624	12,010
Total Daily Volume (Interchanges)	139,830	252,007	223,773	195,555	-
Level 2 Chargers within 1 mile	2	0	2	22	45
DCFC Chargers within 1 mile	4	0	2	0	0
In Justice40 Area	No	Yes	Yes	Yes	Yes
In CalEnviroScreen 4.0 Area	No	Yes	No	Yes	No
Full Serve Restaurants within 1 mile	11	12	9	17	29
Fast Food Restaurants within 1 mile	8	5	5	1	7
Grocery/ Super-Center within 1 mile	1	5	0	14	7
Other Shopping within 1 mile	5	6	5	13	14
MUD Units within 1 mile	0	31	187	215	1,238
Percent of Gas Station Dwell Times Less than 20 minutes	72%	88%	82%	90%	47%
Percent of Interchange Dwell Times Less than 20 minutes	81%	86%	87%	88%	-
Percent of Gas Station Dwell Times Greater than 60 minutes	14%	7%	10%	5%	13%
Percent of Interchange Dwell Times Greater than 60 minutes	44%	46%	49%	43%	-
Percent of Drivers with income less than \$25k	14%	27%	19%	29%	20%
Percent of Drivers who live in MUD housing	8%	15%	12%	15%	11%



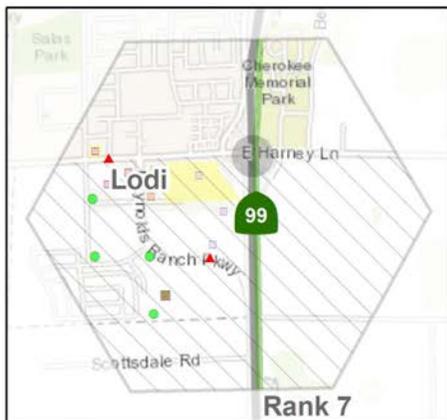
DAC (CES 4.0)	DCFC Only	Hydrogen	Multi Unit Dwelling Locations
DAC (Justice40)	L2 and DCFC	Tesla Supercharger	Restaurant Locations
Gas Stations	Level 2 Only	Highway Interchange	Shopping Locations
EV Corridor Ready	EV Corridor Pending		

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FIGURE 25: SITE PRIORITIZATION – RANK 6-10



County Rank	6	7	8	9	10
Grid	T-34	T-14	H-36	L-13	G-36
City	Manteca	Lodi	Tracy	-	Tracy
Total Points (Equity)	866	814	770	720	660
Total Points (Light Duty)	780	703	710	619	598
Total Points (Medium/Heavy Duty)	730	663	675	596	540
Total Daily Volume (Gas Stations)	12,700	11,272	3,155	9,562	10,263
Total Daily Volume (Interchanges)	48,779	126,351	19,091	0	0
Level 2 Chargers within 1 mile	0	9	5	2	0
DCFC Chargers within 1 mile	0	0	20	3	4
In Justice40 Area	No	No	No	Yes	No
In CalEnviroScreen 4.0 Area	Yes	No	Yes	No	No
Full Serve Restaurants within 1 mile	7	1	40	2	2
Fast Food Restaurants within 1 mile	4	4	22	4	2
Grocery/ Super-Center within 1 mile	0	1	2	0	0
Other Shopping within 1 mile	6	5	23	1	4
MUD Units within 1 mile	156	652	216	216	216
Percent of Gas Station Dwell Times Less than 20 minutes	48%	49%	74%	68%	38%
Percent of Interchange Dwell Times Less than 20 minutes	-	87%	84%	36%	-
Percent of Gas Station Dwell Times Greater than 60 minutes	12%	11%	11%	14%	17%
Percent of Interchange Dwell Times Greater than 60 minutes	-	43%	41%	19%	-
Percent of Drivers with income less than \$25k	14%	15%	10%	17%	9%
Percent of Drivers who live in MUD housing	8%	10%	9%	13%	8%

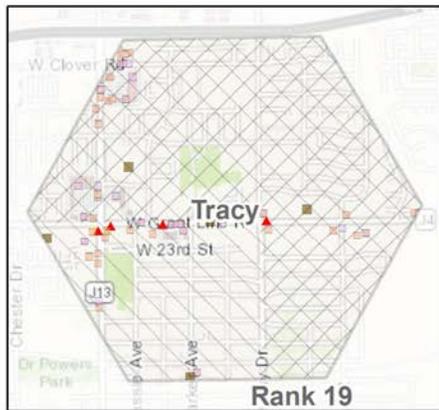
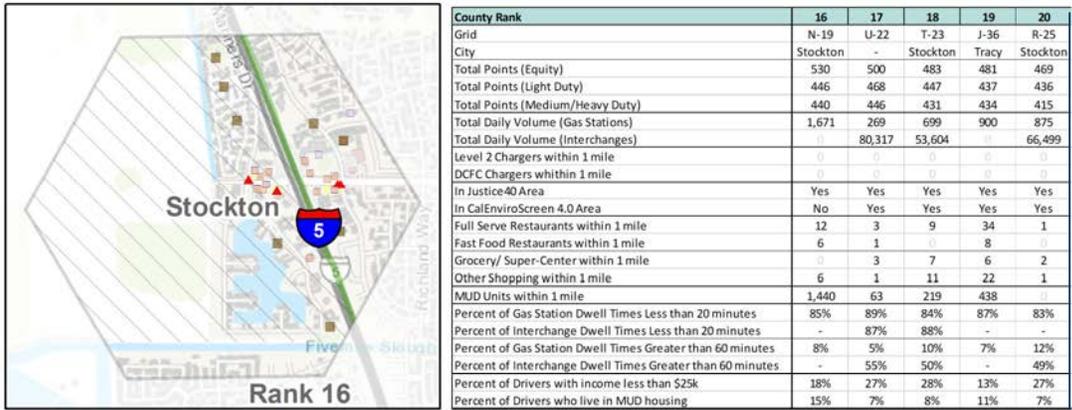


DAC (CES 4.0)	DCFC Only	Hydrogen	Multi Unit Dwelling Locations
DAC (Justice40)	L2 and DCFC	Tesla Supercharger	Restaurant Locations
Gas Stations	Level 2 Only	Highway Interchange	Shopping Locations
0.5 0.25 0 0.5 Miles	EV Corridor Ready	EV Corridor Pending	DKS SHAPING A SMARTER TRANSPORTATION EXPERIENCE

FIGURE 26: SITE PRIORITIZATION – RANK 11-15



FIGURE 27: SITE PRIORITIZATION – RANK 16-20



0.5 0.25 0 0.5 Miles

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FIGURE 28: ADDITIONAL SITES – LATHROP ND ESCALON



County Rank	34	46	88	99	76
Grid	R-31	R-32	R-34	Q-34	AI-33
City	Lathrop	Lathrop	Lathrop	Lathrop	Escalon
Total Points (Equity)	379	339	209	190	246
Total Points (Light Duty)	356	319	201	184	226
Total Points (Medium/Heavy Duty)	335	308	193	180	215
Total Daily Volume (Gas Stations)	1,610	2,506	0	752	328
Total Daily Volume (Interchanges)	53,428	0	31,273	0	39,670
Level 2 Chargers within 1 mile	0	0	0	0	0
DCFC Chargers within 1 mile	1	0	0	0	0
In Justice40 Area	No	No	No	No	No
In CalEnviroScreen 4.0 Area	Yes	Yes	Yes	Yes	No
Full Serve Restaurants within 1 mile	3	14	0	0	10
Fast Food Restaurants within 1 mile	0	11	0	1	3
Grocery/ Super-Center within 1 mile	0	2	0	0	3
Other Shopping within 1 mile	3	2	0	0	9
MUD Units within 1 mile	0	167	0	57	44
Percent of Gas Station Dwell Times Less than 20 minutes	89%	86%	0%	88%	91%
Percent of Interchange Dwell Times Less than 20 minutes	85%	0%	74%	0%	-
Percent of Gas Station Dwell Times Greater than 60 minutes	4%	5%	0%	8%	4%
Percent of Interchange Dwell Times Greater than 60 minutes	50%	0%	63%	0%	-
Percent of Drivers with income less than \$25k	14%	15%	14%	15%	16%
Percent of Drivers who live in MUD housing	6%	10%	8%	12%	6%



0.5 0.25 0 0.5 Miles

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FIGURE 29: ADDITIONAL SITES – MANTECA AND TRACY



County Rank	33	40	45	29	44
Grid	X-34	W-34	U-34	I-35	K-35
City	Manteca	Manteca	Manteca	Tracy	Tracy
Total Points (Equity)	384	362	347	403	344
Total Points (Light Duty)	361	330	323	373	324
Total Points (Medium/Heavy Duty)	353	314	305	354	307
Total Daily Volume (Gas Stations)	0	0	0	1,088	1,419
Total Daily Volume (Interchanges)	54,916	85,371	87,880	73,479	32,659
Level 2 Chargers within 1 mile	0	0	0	0	0
DCFC Chargers within 1 mile	0	0	0	0	0
In Justice40 Area	Yes	No	No	No	No
In CalEnviroScreen 4.0 Area	Yes	Yes	Yes	Yes	Yes
Full Serve Restaurants within 1 mile	2	1	1	2	3
Fast Food Restaurants within 1 mile	0	0	0	4	1
Grocery/ Super-Center within 1 mile	1	0	0	0	0
Other Shopping within 1 mile	3	1	1	3	3
MUD Units within 1 mile	434	154	0	97	0
Percent of Gas Station Dwell Times Less than 20 minutes	-	-	-	87%	84%
Percent of Interchange Dwell Times Less than 20 minutes	-	86%	86%	81%	-
Percent of Gas Station Dwell Times Greater than 60 minutes	-	-	-	6%	9%
Percent of Interchange Dwell Times Greater than 60 minutes	-	49%	52%	43%	-
Percent of Drivers with income less than \$25k	14%	15%	15%	11%	11%
Percent of Drivers who live in MUD housing	10%	9%	9%	10%	9%

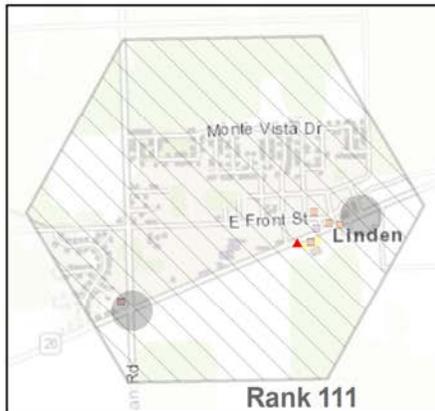
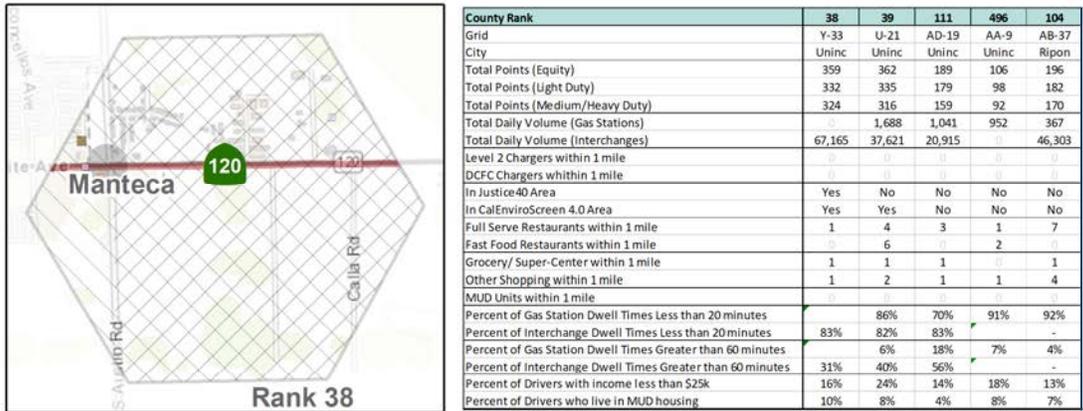


DAC (CES 4.0)	DCFC Only	Hydrogen	Multi Unit Dwelling Locations
DAC (Justice40)	L2 and DCFC	Tesla Supercharger	Restaurant Locations
Gas Stations	Level 2 Only	Highway Interchange	Shopping Locations
EV Corridor Ready	EV Corridor Pending		

0.5 0.25 0 0.5 Miles

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FIGURE 30: ADDITIONAL SITES – UNINCORPORATED COUNTY AND RIPON



DAC (CES 4.0)	DCFC Only	Hydrogen	Multi Unit Dwelling Locations
DAC (Justice40)	L2 and DCFC	Tesla Supercharger	Restaurant Locations
Gas Stations	Level 2 Only	Highway Interchange	Shopping Locations
EV Corridor Ready	EV Corridor Pending		

0.5 0.25 0 0.5 Miles

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