THE UNIVERSITY OF UTAH

Commuter Services
Transportation Demand Management
311 Fort Douglas Blvd.
Salt Lake City, Utah 84113

Electric Vehicle Charging Station Plan 2032

Executive Summary

Electric vehicles are projected to increase to over 50% of new car sales by 2030. That projection and the carbon neutrality goals of the University necessitate a plan to support the adoption and growth of this new transportation mode. In 2021, 3% of our population used an EV to commute to the University. Forecasting the growth, we recommend the following plan.

- Increase Electric Vehicle Supply Equipment (EVSE) ports across campus.
    - Adopt a strategy of installing Level 1 EVSE for campus housing and staff parking areas, and use for fleet EV's overnight.
        - Install 68 new Level 1 charging ports by 2033
        - The ports in staff parking will be reserved for fleet charging overnight
    - Relocate existing Level 2 chargers to student commuter or visitor parking lots and add additional stations in underserved areas
        - Relocate 8 existing ports
        - Install 7 new Level 2 charging ports by 2033
        - These ports may be reserved for fleet overnight as needed
- EVSE costs
    - Cost estimates vary as the installation costs generally exceed the cost of the equipment due to length of utility runs from power sources. These are only the cost of equipment.
        - We have not installed any Level 1 EVSE
            - Equipment
                - Stations typically cost under $500
            - Installation
                - The installation cost will be similar to installing a dedicated 110v electrical circuit outdoors
        - Level 2 EVSE cost from our current vendor (ChargePoint):
            - Equipment
                - 2 port station: $2,000
            - Installation per station estimates
                - Garage installation cost estimate
                    - $30/foot from power source via surface mounted conduit
                - Outdoor installation cost estimate
                    - $50/foot from exterior power source
            - Annual O&M
                - Cloud Management & Network: $350/year per port
                - Warranty & Maintenance plan: $775/year per station

Background

The University of Utah is home to approximately 33,000 students and approximately 30,000 employees. 5,200 of the students reside on campus in dorms or other housing. That leaves 57,800 commuters travelling to campus throughout the week. The President's Strategy 2025 plans to increase the student population by 14% by 2025, and 31% by 2030, which is projected to require an increase of employees by 26% by 2030 to support this initiative. In addition, the plan calls out a goal of 50% carbon neutrality by the year 2025, 80% by 2030, and 100% by 2040. This projected growth and carbon neutrality goals will help us determine the quantity of electric vehicle service equipment (EVSE) required on campus.

EVSE and charging ports will both be used in this plan. EVSE is the equipment, while ports indicate the actual number of vehicles supported which can vary by manufacturer. EVSE are broken down into 3 categories: Level 1, Level 2, and Level 3:

- Level 1 'L1' ports are synonymous with regular power outlets, providing up to 110 volts at 15-20 amps.
    - These typically provide 3-5 miles of range per hour, but are ideal for vehicles that will remain stationary for long periods of time such as dormitories and employee parking areas.
    - These ports require dedicated circuits, but otherwise are the most economical.
- Level 2 'L2' ports are synonymous with a dryer or oven outlet, providing up to 240 volts at 15-60 amps.
    - These typically provide 10-20 miles of range per hour, ideal for visitors or student commuters who will only park for a short time.
- Level 3 'L3' also called 'DC fast' operate at much higher voltage and amperage than consumers typically see. These stations are evolving to decrease charging times.
    - These typically provide 200 miles of range per hour, ideally used as a 'gas station' for drivers needing a quick charge to make it home.

The University installed its first EVSE in 2014, and currently operates a single L3 and 31 L2 charging ports on campus. During the first 30 days of fall semester 2022, 60% of our stations were utilized at least once per day, however they were actively charging vehicles for only 13% of the peak hours, 8am to 6pm. A commuter incentive to reduce the cost of charging has been rolled out to better support the EV's on campus, reducing the charging cost for parking permit holders by 96%.

The 2021 Commuter Survey shows that only 3% of our nearly 58,000 commuters use an EV to commuter to campus. That equates to nearly 1,700 EV's travelling to campus at some time during a given week. The factors leading to these drivers not utilizing the current EVSE falls into 2 major categories: convenience, and necessity. The EVSE have been installed in locations that have required the lowest cost of installation, leading to less-than-ideal locations for our commuters, and often require drivers to relocate their car too frequently to be a viable solution for employees. The second factor is the average commute distance of 6.27 miles, with a median distance of only 3.57 miles. This indicates that most commuters do not need to charge on campus and can complete their entire commute and charge at home.

Since 2016 the number of EV vehicles registered in the US increased by 419%, and in Utah by 560%. While those percentages are very impressive, EV sales in the 3rd quarter of 2022 made up 5% of new car sales. According to a report from Bloomberg, analysts believe EV sales will increase to 25% of passenger car sales by 2027, and accelerate to just over 50% of passenger cars sold by 2030. This increase is projected using climate spending measures, the Inflation Reduction Act, and models from other countries

who have surpassed the 5% threshold. Applying this increase to our campus directly at our current level would require an increase of 3 L2 charging ports, or 12 L1 charging ports per year.

Proposed EVSE Development Plan 2027-2032

In order to apply a meaningful service to our campus community, we need to define our user groups related to EV charging using commute patterns, length of stay, and charging needs, EV commuters can be categorized into 3 groups: Long-stay commuters (residents & employees), and short-stay commuters (visitors & students).

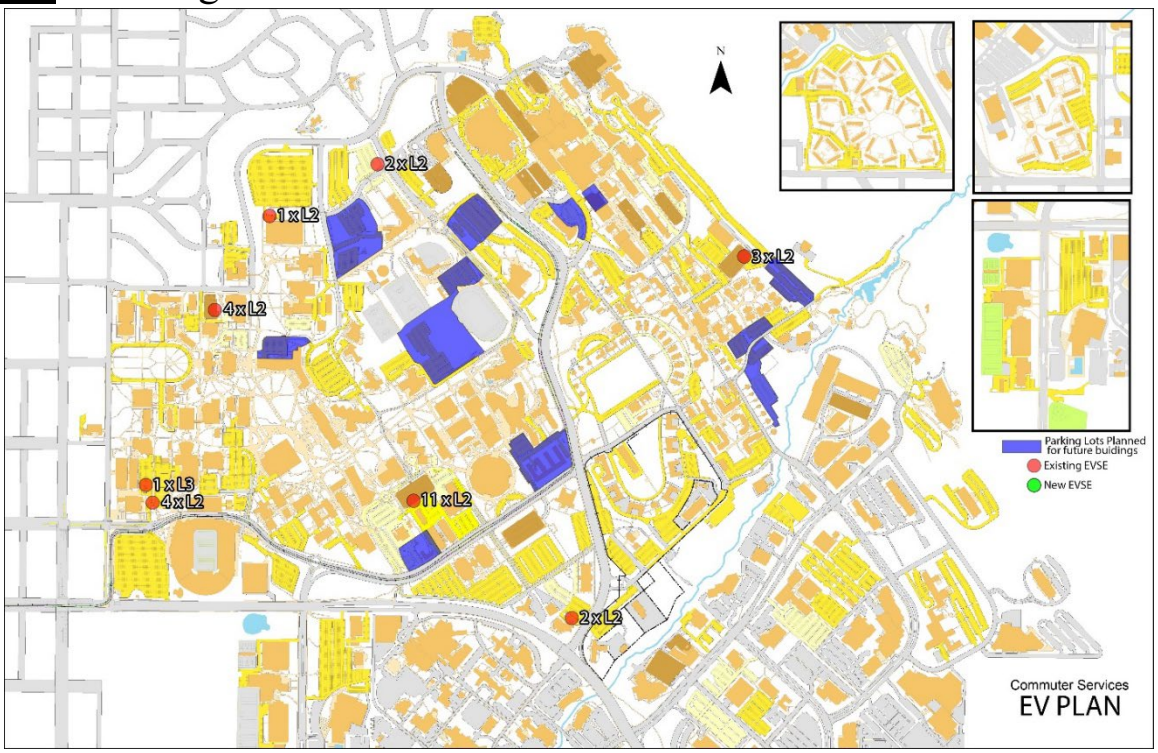
Long-stay commuters can utilize economical L1 EVSE because their vehicles do not typically move throughout the day. These chargers will need to be installed in greater quantity than the ports mentioned above due to the lack of turnover, and should be located in housing lots and employee parking areas to provide trickle charging over a work-day or overnight. For employees 3-5 miles per hour will provide 24-40 miles of charge

The majority of the new stations over the next 5 years should be dedicated L1 EVSE to support our growing student residents and employee commuters. The existing L2 stations have ample availability currently, and new L2 EVSE should only be installed once utilization increases. These new L1 stations can support the University's fleet conversion to EV. Utilizing both the L1 and L2 stations outside of residential areas for fleet vehicles can reduce the need for additional infrastructure. This will also distribute the fleet throughout campus to make it easier for employees to park and use their fleet vehicles near their parking location. Due to the long charging times that L1 EVSE require, when calculating the number of ports to meet projected demand, we much multiply the 3 L2 stations by the difference in charging rate. L2 EVSE charge 3-4 times faster than L1, so rather than 3 ports per year we should anticipate low turnover and plan on 12 L1 ports per year.

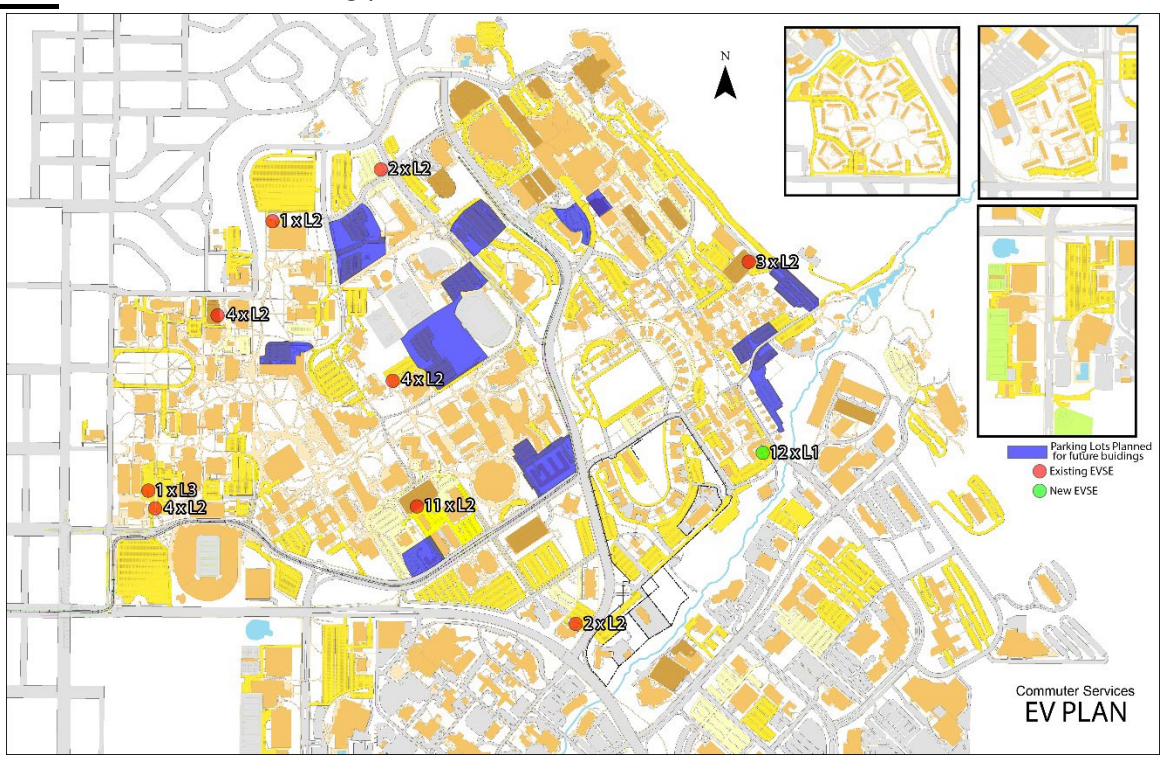
Short-stay commuters need to be able to receive an adequate charge while attending a class or event with L2 EVSE. The existing L2 stations should either be relocated to visitor pay lots or signage guiding visitors to EVSE locations should be installed. Future installations should be focused in student commuter lots to provide ample charging while attending classes and events. The existing L3 station should remain a reserve option for commuters and members of the surrounding neighborhood communities who need to top up before travelling.
EVSE installation is the largest portion of the overall cost. The University's planning department referenced existing master plans and upcoming buildings to provide a map of parking lots that are slated to remain in place. The table below outlines a linear approach to slowly install the number of chargers outlined. This table should be used as a guide to indicate a potential method to distribute growth across the next 10 years. Funding and installation costs may determine that installing more stations at once, with years between without new EVSE to be more cost effective. The Campus Master Plan and our current parking permit distribution in each lot were used in the development of the maps outlining where EVSE infrastructure should be installed. Changes to the parking distribution over the next 10 years, and any development of new EV technology may require modification to the guides provided to accomplish our goals.

Fiscal Year	Total L1 EVSE	New L1 EVSE	Total L2 EVSE	New L2 EVSE	Total L3 EVSE	New L3 EVSE
FY23	0	0	31	0	1	0
FY24	0	12	31	0	1	0
FY25	12	12	31	0	1	0
FY26	24	12	31	0	1	0
FY27	36	12	31	0	1	0
FY28	48	12	31	0	1	0
FY29	48	0	31	3	1	0
FY30	48	12	34	0	1	0
FY31	60	8	34	1	1	0
FY32	68	0	35	3	1	0
FY33	68	TBD	38	TBD	1	0

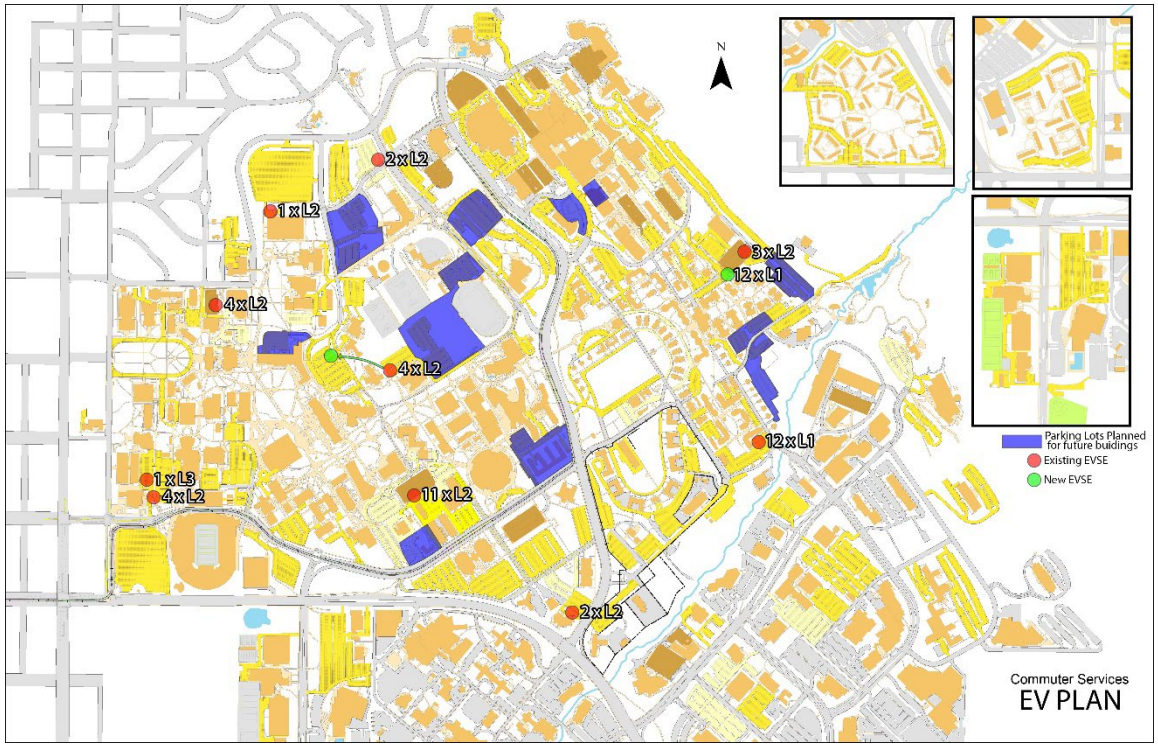
FY23: Existing Conditions



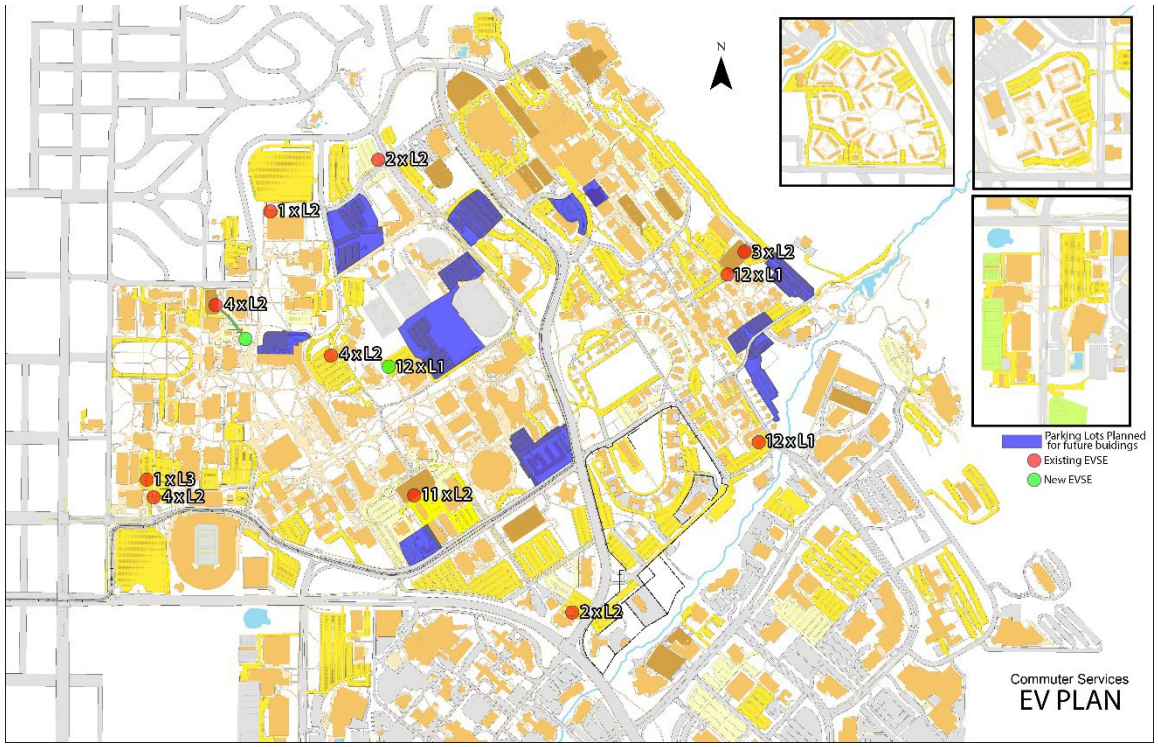
FY24: +12xL1 in Lot 87



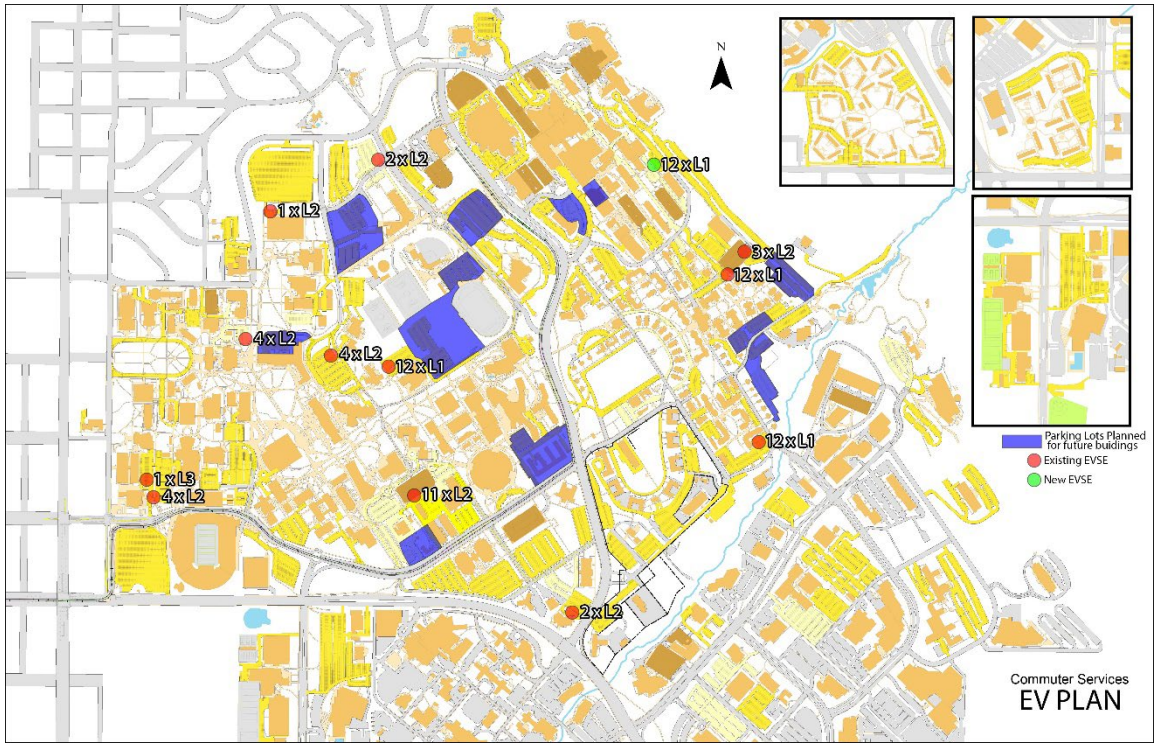
FY25: +12xL1 in Lot 81, move 4xL2 from Lot 24 to Lot 28



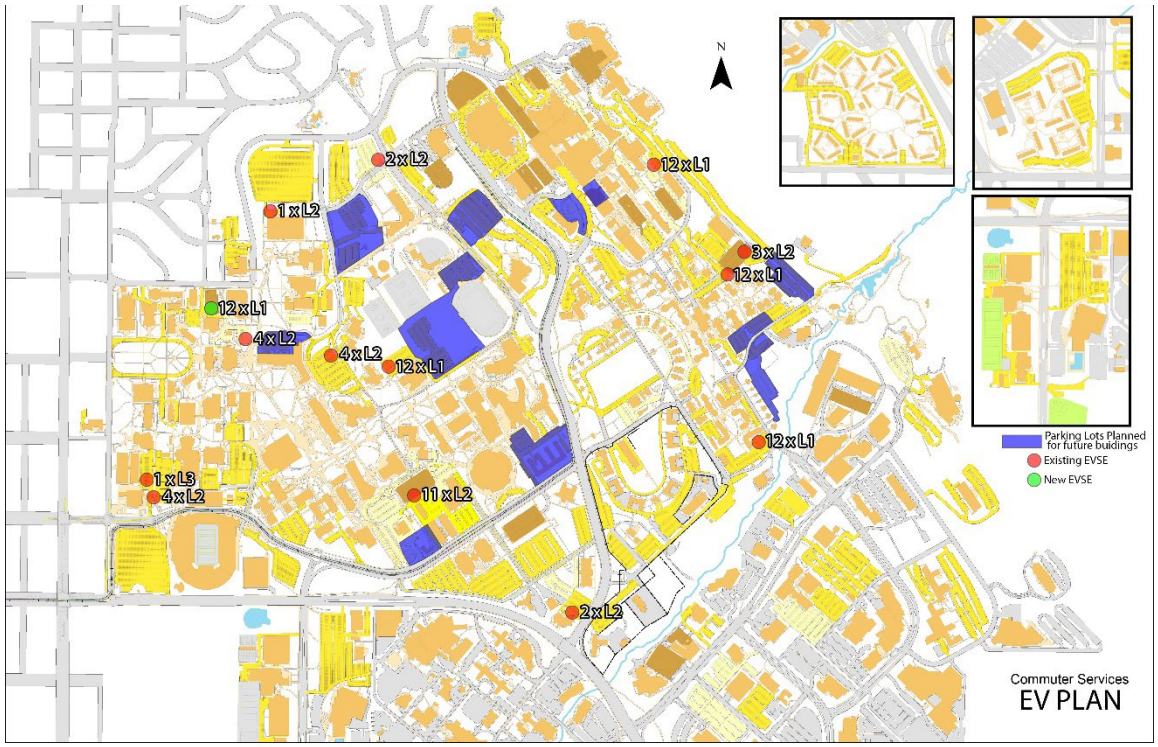
FY26: +12xL1 in Lot 24, move 4xL2 from Lot 38 to Lot 33



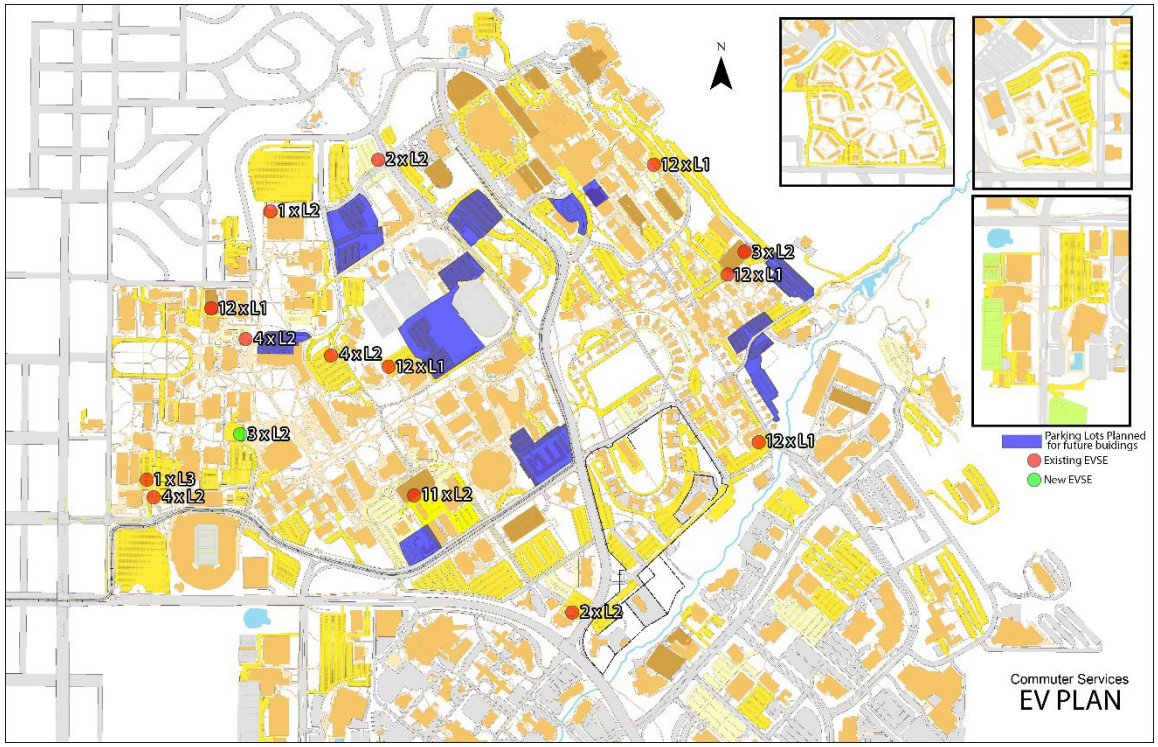
FY27: +12xL1 in Lot 66



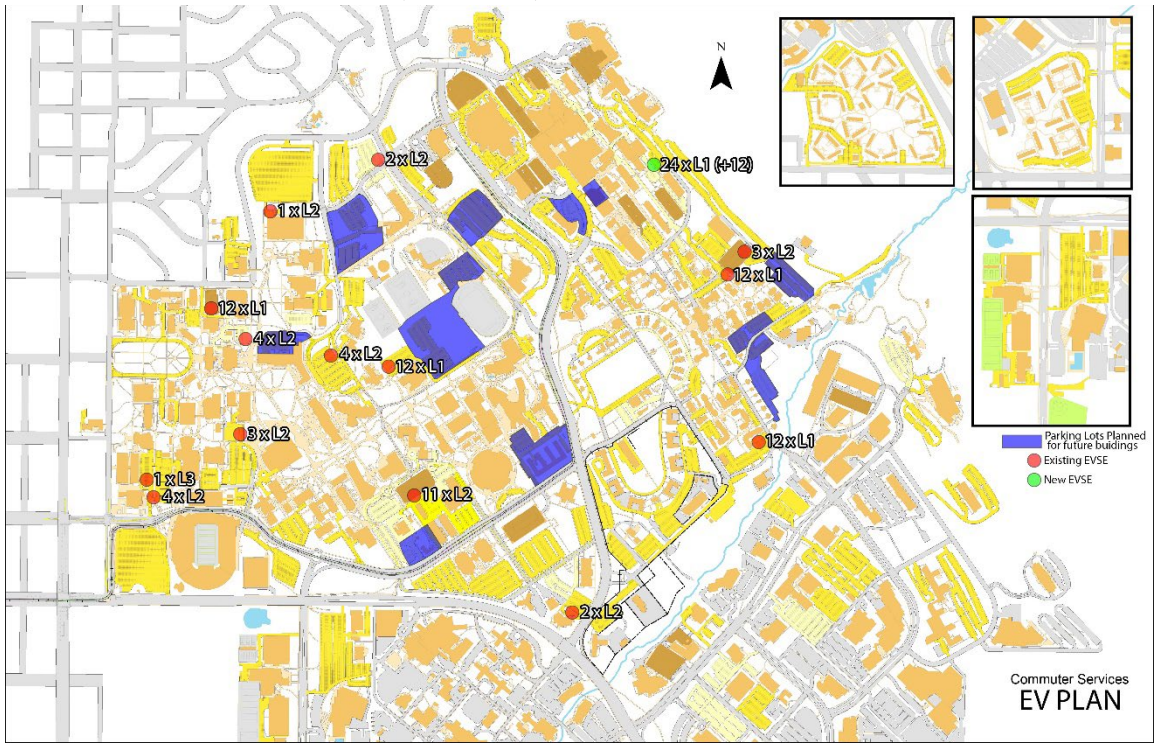
FY28: +12xL1 in Lot 38



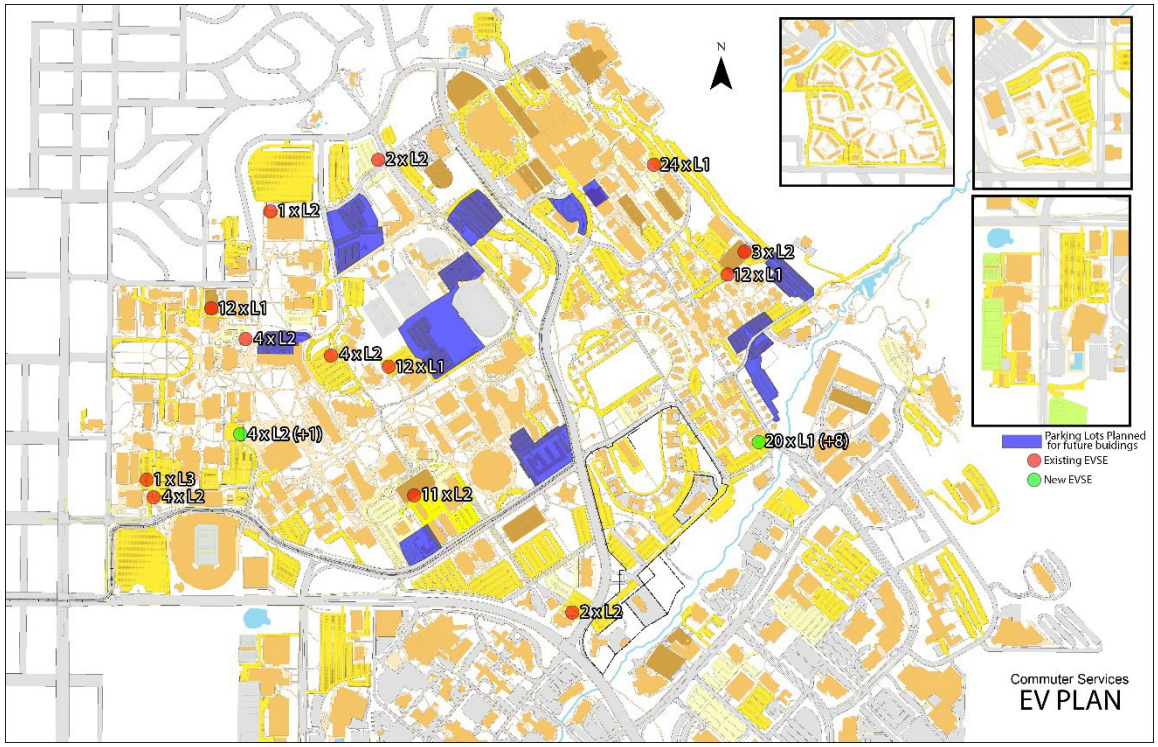
FY29: +3xL2 in Lot 6



FY30: +12xL1 in Lot 66 (24 total)



FY31: +8xL1 in Lot 87 (20 total), +1xL2 in Lot 6 (4 total)



FY32: +3xL3 in Lot 39 (4 total)