

Solana Lake Condominium

# Electrical System Analysis for EV Charging Stations

Solana Lake Condominiums, Cape Canaveral Florida



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## Part II. Site Description

Solana Lake Condominium is located off Lake Drive, Cape Canaveral, FL 32920 and was built in 2000-2002. There are eight (8) buildings on site. Each building has five (5) floors with the 1<sup>st</sup> floor being a parking garage. The condo living units are located on the 2<sup>nd</sup> through 5<sup>th</sup> floors. Each floor has six (6) living units, for a total of 24 condo units per building.

## Part III. Site Evaluation

DDC Engineering was contracted to evaluate the conditions of the existing service and to determine the feasibility of the existing electrical service to handle car charging stations for each tenant in every building. The evaluation below is for one building and is typical for all buildings at this site.

The existing building has two (2) services. One 1200A service that supplies power to the tenant units, and one 400 A service that provides power to the general building spaces.

## Part IV. Recommendations

### A. Existing Building (2 EV Stations)

Existing general building service is 400A at 120/208V, 3-phase. The existing circuit breaker can only handle 80% of its rated load; therefore, the existing building service can handle 320A at 120/208V, 3-phase. Based on existing drawings provided to DDC, the existing connected load on the building is 93,053 kVA or 258A. Based on each charging station's power requirements, the existing system can handle two (2) 50A, 208V, 1-phase charging stations (Refer to Part V Calculations). See Part VI.A for Cost Estimate.

### B. Complete New Service (24 EV Stations)

According to existing drawings, provided by owner representatives, the existing building service is insufficient to accommodate the power to a car charging station for each condo unit in the building. New service for the car charging stations is estimated to be approximately 1000 Amps at 120/208V, 3-phase. To minimize the interruptions to building power, it is recommended to provide a new service to the building. Coordination with FPL will be required. FPL will either provide a new transformer on site or will upgrade the existing transformer to accommodate the additional loads from the car charging stations. The new transformer will provide service to a new 1000 A main circuit breaker panel with shunt-trip breaker. A new distribution panel will serve each tenant's car charging device at their assigned parking space. It is recommended that the car charging station have metering and user authentication, similar to Chargepoint EV charging stations. Authentication will allow only the intended user to charge their vehicle, to assure that the tenant is only being charged for their usage. Metering can be monitored by a third party and charged based on the condo association set price for kWh. Payments can be processed by third party and reimbursed to the property or condo board. See Part VI.B for Cost Estimate.



### C. Infrastructure Only for Future EV Stations

Alternately, due to the low number of residences requiring EV charging stations, the condo associating could provide the infrastructure only at this time. As needs rise, and tenants acquire electric vehicles, the tenant could pay for the connection back to the panel the condo association has provided for EV charging. This should reduce the initial cost to the association and be less of a burden to the tenants that do not have EV or plan to have them in the near future. Since the metering and billing is at the charging unit, it is recommended that all EV charging devices be from the same supplier/manufacturer, and should be part of the condo association guidelines. This should guarantee that all monitoring and billing is done through one company and one point of contact for the condo association. See Part IV.C for Cost Estimate.



Part V. Calculations

SERVICE CALCULATIONS (EXISTING + 2 EV STATIONS)			
	CONNECTED LOAD (VA)	DIVERSITY	CALCULATED CONNECTED LOAD (VA)
EXISTING RECEPTACLES	29256.00	0.50	14628.00
EXISTING LIGHTING	13356.00	1.25	16695.00
EXISTING HVAC	18688.00	1.00	18688.00
EXISTING MISC.	43042.00	1.00	43042.00
TOTAL EXISTING LOAD			93053.00
2 CAR CHARGING STATIONS	20800.00	1.00	20800.00
NEW CONNECTED LOAD			113853.00
AMPS @ 208v, 3-PHASE			316

SERVICE CALCULATIONS (24 EV STATIONS)			
	EXISTING CONNECTED LOAD (VA)	DIVERSITY	CALCULATED CONNECTED LOAD (VA)
24 CAR CHARGING STATIONS	249600.00	1.00	249600.00
NEW CONNECTED LOAD			249600.00
AMPS @ 208v, 3-PHASE			693



Part VI. Cost Estimate

A. Cost Estimate for Two (2) Car Charging Stations

Category	Item	Qty	Quantity		Material Cost per Unit	Material		Labor		Total
			Unit of Measure (U.S, EA)	Cost per Unit		Material Cost (\$)	Man Hrs	Labor Rate (\$)	Total Labor (\$)	
	40A circuit breaker	2	EA	\$600.00	\$1,200.00				\$1,200.00	
	Single charge station at two locations	2	EA	\$12,000.00	\$24,000.00				\$24,000.00	
	Copper Feeders	200	EA	\$5.00	\$1,000.00				\$1,000.00	
	Conduits	200	EA	\$3.00	\$600.00				\$600.00	
	Labor					40	\$200.00	\$8,000.00	\$8,000.00	
	<b>Total Materials</b>				\$26,800.00				\$26,800.00	
	<b>Total Labor</b>							\$8,000.00	\$8,000.00	
	<b>Sub Total</b>								\$34,800.00	
	<b>Profit &amp; Overhead</b>								\$3,480.00	
	<b>Total</b>								\$38,280.00	

Project: Solano Lake Two (2) EV Stations  
 Date: 4/12/2022  
 Estimator: DDC ENGINEERING  
**Construction Cost Estimate**



4083 S. US Highway #1, Ste 101  
 Rockledge, FL 32955-5308  
 (321) 633-4522 (w)  
 (321) 633-4528 (f)

B. Cost Estimate for Twenty Four (24) Car Charging Stations

Category	Item	Quantity		Material		Labor		Total
		Qty	Unit of Measure (U.S.EA)	Cost per Unit	Material Cost (\$)	Man Hrs	Labor Rate (\$)	
	Main Panel	1	EA	\$30,000.00	\$30,000.00			\$30,000.00
	40A circuit breaker	24	EA	\$600.00	\$14,400.00			\$14,400.00
	Single charge station at 24 locations	24	EA	\$12,000.00	\$288,000.00			\$288,000.00
	Service Feeders	1800	EA	\$30.00	\$54,000.00			\$54,000.00
	Branch Copper Feeders	4120	EA	\$5.00	\$20,600.00			\$20,600.00
	Service Conduits	450	EA	\$15.00	\$6,750.00			\$6,750.00
	Branch Conduits	4120	EA	\$3.00	\$12,360.00			\$12,360.00
	Labor					120	\$200.00	\$24,000.00
	Total Materials				\$426,110.00			\$426,110.00
	Total Labor							\$24,000.00
	Sub Total							\$450,110.00
	Profit & Overhead							\$45,011.00
	Total							\$495,121.00

Project Solano Lake Twenty Four (24) EV Stations  
 Date 4/12/2022  
 Estimator DDC ENGINEERING



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C. Cost Estimate for Infrastructure Only

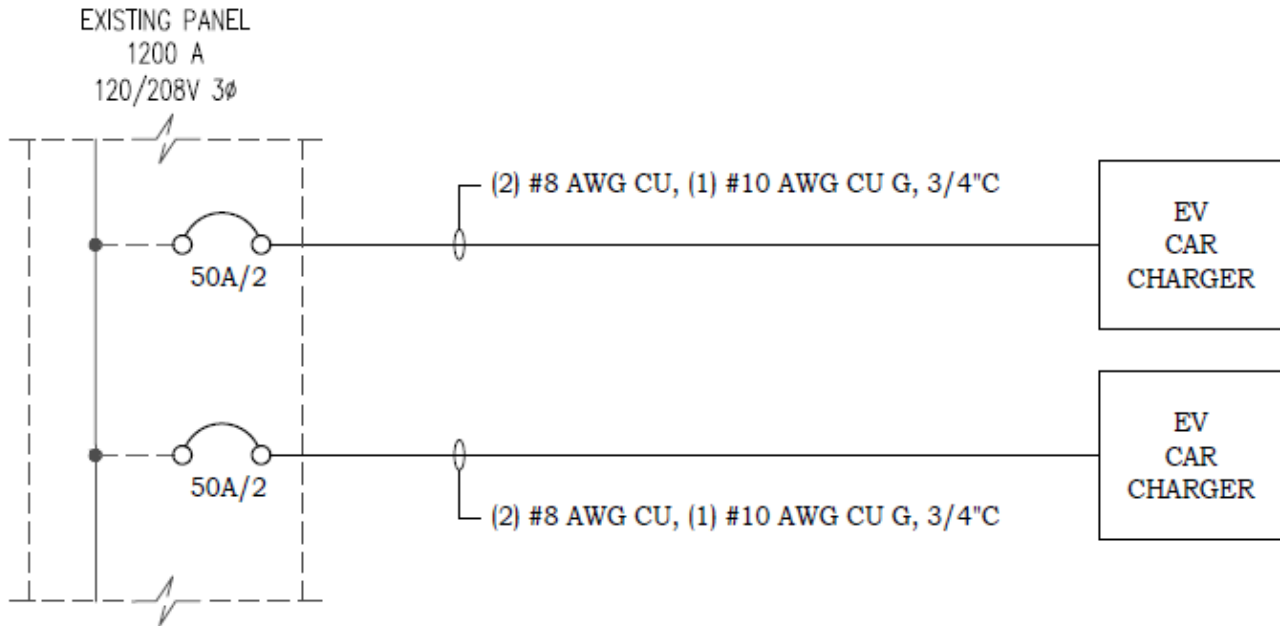
Project Solano Lake Infrastructure Only  
 Date 4/12/2022  
 Estimator DDC ENGINEERING

Category	Item	Quantity		Material		Labor		Total
		Qty	Unit of Measure (LS,EA)	Cost per Unit	Material Cost (\$)	Man Hrs	Labor Rate (\$)	
	Main Panel	1	EA	\$30,000.00	\$30,000.00			\$30,000.00
	40A circuit breaker	24	EA	\$600.00	\$14,400.00			\$14,400.00
	Service Feeders	1800	EA	\$30.00	\$54,000.00			\$54,000.00
	Service Conduits	450	EA	\$15.00	\$6,750.00			\$6,750.00
	Labor					60	\$200.00	\$12,000.00
	<b>Total Materials</b>				\$105,150.00			
	<b>Total Labor</b>							\$12,000.00
	<b>Sub Total</b>							\$117,150.00
	<b>Profit &amp; Overhead</b>							\$11,715.00
	<b>Total</b>							\$128,865.00



## Part VII. Electrical One Line Diagram

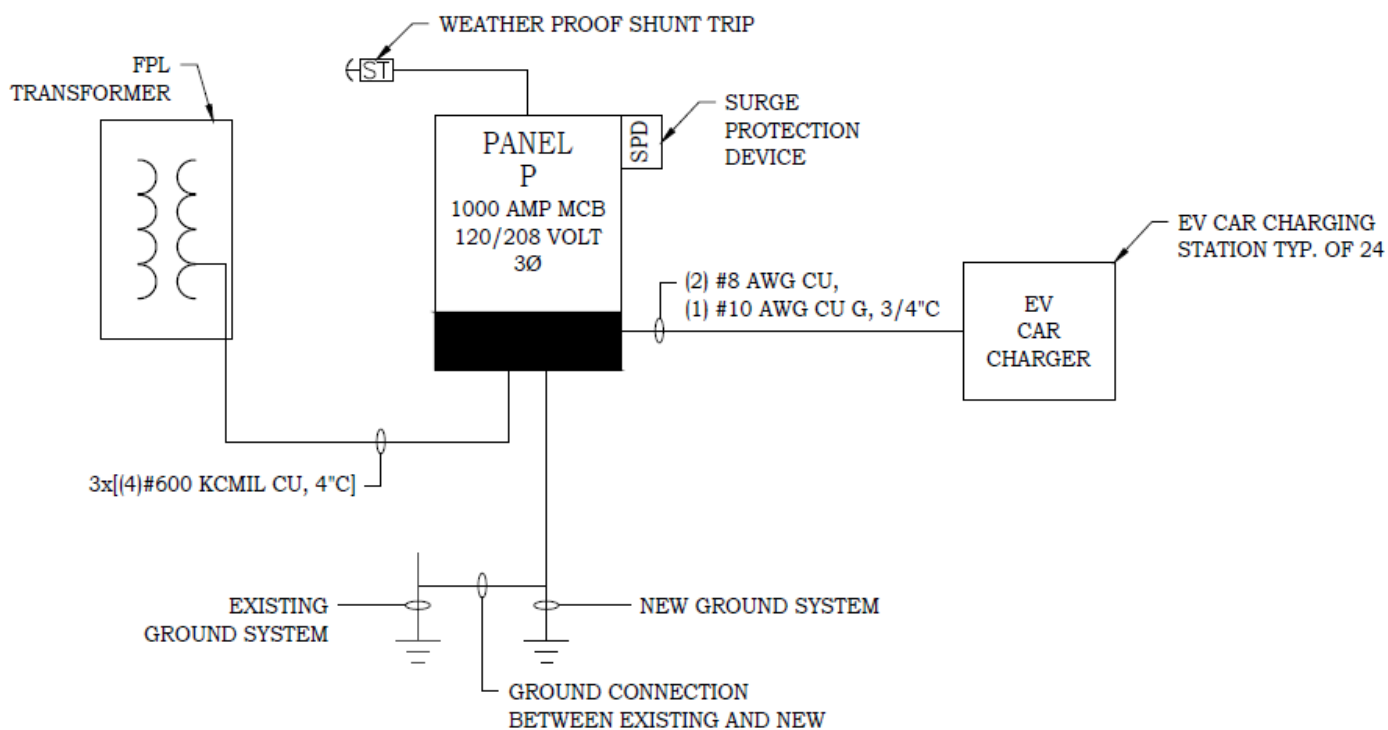
### A. One Line Diagram for Two (2) Car Charging Stations



# RISER DIAGRAM 2 EV STATIONS

N.T.S.

B. One Line Diagram for Twenty Four (24) Car Charging Stations



# RISER DIAGRAM 24 EV STATIONS

N.T.S.