



EV Dealer / Architect / GC Information Pack

Version 5 August 2011





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Purpose of this document

This document is intended to serve as a guide for Dealers wishing to undertake the infrastructure and electrical works for their EV charging docks. It sets out the specific approval process and the required oversight by NNA and its approved vendors. It also provides contact details for technical requires.

Accompanying Documents

- AV Installation Prep Sketches (version 2.3)
- AV Contractor Checklist (version 1.7)
- Key 'Get Rights' (version 1)

The Installation Prep Sketches document is owned and updated by AeroVironment and provides information for completing the enabling works in preparation for installation of the charging docks. Any questions should be directed to AV. (Contact details are provided at the end of this document).

Background for the EV program

The installation of EV charging docks at the facility is just one of four main requirements which Dealers must meet in order to become certified and eligible to sell the new Nissan LEAF.

To deliver this element, Nissan have partnered with Turner & Townsend (T&T) for program management and AeroVironment (AV) for supply and install of branded Nissan level 2 and 3 charging docks.

There are various parties involved in the process:

- EVOM's (Nissan) – The Electric Vehicle Operations Managers (EVOM's). Responsible for liaison with the Dealers. There are 5 EVOM's, one for each of NNA's regions.

- RCC's (Turner & Townsend) – Regional Construction Consultants. The RCC's work with Dealers to implement the NREDI program. Responsible for assisting Dealers going through NREDI process with their EV charging docks.
- NCT (Turner & Townsend & Nissan) – The National Core Team is based at NNA headquarters in Franklin. Responsible for: overall management and coordination of the program, assisting Dealers who wish to undertake their own infrastructure and electrical works but are not undertaking NREDI, and for approving charging dock locations.
- AeroVironment Sales Managers – Responsible for leading the AV assessment process, including producing quotes for the charging docks.
- AeroVironment Technical Resources – Responsible for providing technical information to contractors undertaking their own enabling works.



Process

Nissan and Turner & Townsend have developed a national roll out program for EV facility assessments. This schedule has been developed to ensure that Dealerships can be certified prior to receiving demo and customer vehicles when they are available in market. Dealers who have signed their commitment forms will be contacted by AV in accordance with the overall roll out schedule.

Dealers may choose to undertake their own infrastructure and electrical works. In this case, the Dealer will be responsible for undertaking all works up to the point of connection (including obtaining permits). AV will undertake the final install of the charging docks. The final equipment installation includes testing and training of dealer personnel. Below are the following required steps associated with this process:

Dealer responsibilities:

1. **Dealer** informs the EVOM that they plan to use their own GC for the infrastructure and electrical works.
2. **Dealer** appoints General Contractor (GC) and provides contact details to EVOM / AV
3. **AeroVironment** contacts dealer to discuss and agrees what charging equipment they will require. AV may issue a blank RFQ to the Dealer for this purpose.
4. **AeroVironment** to provide dealer with quotation for equipment and installation.
5. Within 5 days of receipt, the **Dealer** either approves the quotation and makes **payment** or requests a revised quote based on a new scope. Payment is made directly to AeroVironment for equipment and installation.
6. **AeroVironment** ships product to AV installer upon payment from dealer

GC responsibilities:

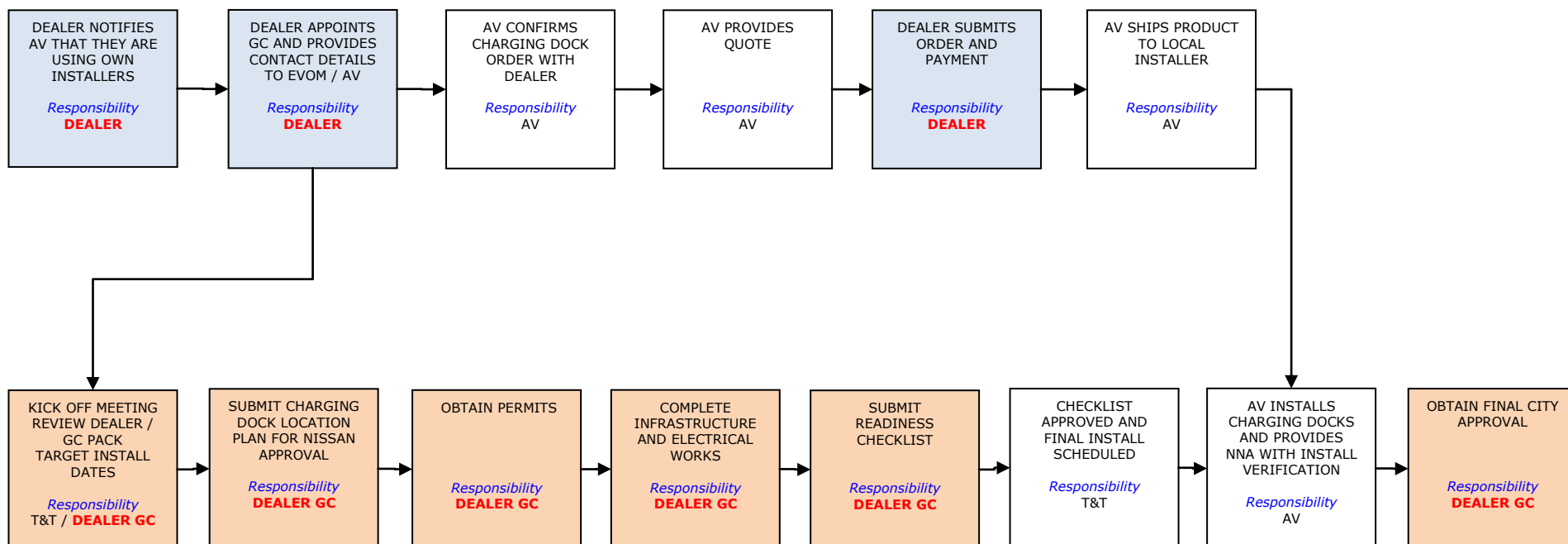
7. **T&T** will hold a kick off meeting (conference call) with the Dealer's GC to go through the requirements and the process. GC to provide estimate of when works will start and be complete.
8. **Dealer/Dealer's GC** submits a site and floor plan clearly indicating the charger locations and type of charging units to Turner & Townsend within 5 days of kick off meeting. The charging dock locations must meet NNA's requirements (see page 7 of this document). The EVOM or RCC can help define the appropriate locations. **Nissan** will review and approve locations. **Work should NOT proceed if drawings / locations have not been verified and approved by Nissan.** If the Dealer wishes to change locations after the plan has been approved, a new plan must be submitted to Turner & Townsend.
9. **Dealer GC** obtains relevant permits. **Please note that GC is responsible for ALL related permits as required by the local city**
10. **Dealer GC** completes infrastructure and electrical works inline with AeroVironment specifications.
11. **Dealer GC** submits readiness checklist and photographic evidence to T&T. **AV will schedule a final hookup within 10 working days of the checklist being approved. AV will not release product or attend site until the checklist has been approved.**
12. **AeroVironment** installs charging docks
13. **Dealer GC** obtains final city approval (if required).



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Responsibilities

Dealer	Dealer's GC or Electrical Contractor	AeroVironment	RCC / NCT (Turner & Townsend)	EVOM
Provide contact details for team (GC, architect, point of contact at Dealership)	Attend kick off meeting (conference call) to discuss requirements	Confirm charging dock requirements with Dealer and provide quote	Assist Dealer in preparing plan showing proposed charging dock locations	Overall responsibility for installation process
Hire reputable, capable electrical contractor to undertake installation work	Obtain technical specifications and drawings for construction from AeroVironment technical department	Provide detailed technical specifications and drawings for construction	Provide technical support to Dealer's GC / electrical contractor	Arrange Kick off meeting
Obtain all applicable landlord related permissions	Obtain all relevant permits	Provide technical support	Provide coordination between parties	Initiate process
Confirm charging dock requirements with AeroVironment	Determine whether city will require signage and advise Dealer	Install charging docks, test / commission and deliver training to Dealer staff		Assist Dealer with business related issues
Obtain approval from NNA for plan showing proposed charging dock locations	Complete infrastructure and electrical works including but not limited to: panel upgrades, conduits, wiring, cut and fill trenching, foundations, bollards / protection			
Inspect and sign off on installation	Arrange for final permit inspection and notify Dealer of completion			
	<p>Updates on progress against key milestones:</p> <ul style="list-style-type: none"> ▪ Permits applied for ▪ Permits approved ▪ Infrastructure and electrical works complete ▪ Install date ▪ Install complete <p>Sent to EVOM, RCC and AV</p>			



Locating the EV charging docks

Nissan has identified 4 key function locations that are to be served by charging docks (see descriptions below).

As a minimum:

- Dealerships with PV of 400 or greater – must provide a single Level 2 Charging Dock at each of the 4 locations
- Dealerships with PV of less than 400 - must provide a single Level 2 Charging Dock at 2 of the key locations; Customer Parking and the Service Workshop (numbers 1 and 3 on the example plan).
- All Dealerships must also provide a dedicated 120v 12A circuit for a level 1 charging in the Service Workshop

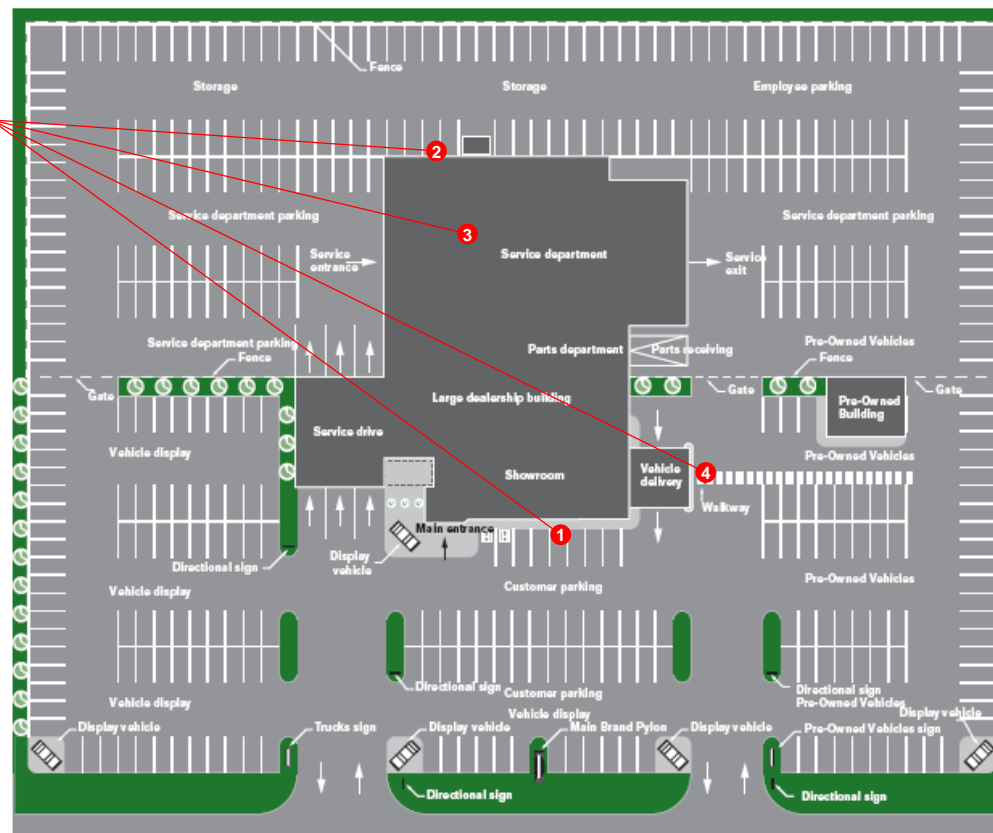
The exact locations of the charging docks serving these locations must be approved through the National Core Team either through the submission of a marked up plan by the Dealer or through the AV assessment process.

1. Customer Parking Area: For customer use and as an opportunity for signage. Located in the customer parking area at the front the building at a primary location. Ideally, this should be placed in an area where 2-4 parking spaces converge, to allow the greatest number of vehicles to have access to the charging dock.
2. Service Parking Area: For the Dealer to charge inventory and vehicles in for service. Located along an exterior wall near the rear of the building or on a pedestal to allow multiple vehicles to be charged.
3. Service Workshop: For Technician use during servicing and testing of vehicles. Located along a shop wall in-

between two bays, allowing access to multiple vehicles. These bays should ideally be located within view of the Service Lounge in NREDI buildings to promote EV visibility (see detail on workshop space planning)

4. New Vehicle Delivery: For demonstrating to new EV owners. Located at either the dedicated new vehicle delivery or another area that is ideal for delivering a new vehicle.

**EV Charging Dock
Required Locations**





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Charging Systems & Types

The Electric Power Research Institute (EPRI), with the cooperation of the auto and electric industries, code officials, and government agencies have agreed and identified three basic types of charging known as Levels 1, 2, and 3 (Level 3 also being known as fast charging). The table below provides more detail regarding the charging levels and categorization.

For Level's 1 & 2 the SAE has approved a standard connector (the SAE 1772). The SAE has not yet approved an industry standard connector for Level 3 chargers and is not expected to do so until later in 2010. Installation of Level 3 DC Fast Chargers is not recommended at this time.

Charging Level	Type	Power Supply - Load (Recommended)	Connection to Power Source	Charger	Connection to Vehicle	Charger Draw	Charging Time (24 kWh)
Level 1 'Trickle Charger'	Normal	120V - 12A AC Single Phase (20A Breaker)	3-prong plug Grounded	On-board Vehicle	SAE Standardized Connector	1.4 kW	~ 20 h
Level 2 'Charging Dock'		208V or 240V - 32A AC Single Phase (40A Breaker)	Hard-wired One dedicated line per connector			6.6KW	~ 4h
Level 3* 'DC Fast Charger'	Fast	480V - 80A AC 3-Phase (100A Breaker)	Hard-wired One dedicated line per connector	Charging Hardware	TBD	30-60 kW	~ 30 m to 80% charge



Future Proofing

To prepare for future expansion of your charging capability, you may wish to consider laying additional conduit in any trenches that may be required so that cabling for further Charging Docks can be easily run at a later date. Similarly you may also want to allow additional capacity / space within any new electrical panels and or cupboards.

The high power involved in Level 3 Charging is beyond the capacity of most utility transformers that serve residential areas and even some that serve commercial areas. Utility distribution system upgrades may be required to accommodate Level 3 charging. As part of a renovation or new build construction project which does not have 3-phase electric service, you may want to consider upgrading your electrical service in anticipation of offering Level 3 fast charging service to your EV customers.

Due to the quick charging times, it is anticipated that only 1 (suitably located) Level 3 DC Fast Charger would be needed at a Dealership (when they are available). The ideal location for the DC Fast Charger would be a high traffic location in the parking area so it is convenient for both customers and the dealership.

Service Workshop Requirements

There are a number of special requirements in regard to the location of the charging docks in the Service Workshop. Failure to take account of these requirements may prevent effective servicing of the LEAF.

Charging Equipment:

The Service Workshop requires a dedicated Level 2 Charging Dock and an 120V 12A circuit for a Level 1 Trickle Charger to be plugged in. The Charging Dock can be a single head, wall mounted unit. It is recommended that a dedicated circuit be used for the level 1 charging. If using a non dedicated circuit then be aware that the draw could be up to 12A. The Charging Dock and circuit should ideally be wall mounted between the two bays identified for EV and battery servicing.

Space Planning:

It is important to understand the general servicing requirements for the LEAF and its battery in order to accommodate this within the Service Workshop. In addition to servicing the vehicle, on occasion it may be necessary to remove and service the battery pack and its component modules. The battery must be removed from beneath the vehicle and moved to a space where the individual modules can be extracted and worked on. This will typically be the adjacent service bay but could be any area that meets the general requirements and can be easily accessed by the technician when moving the battery.



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Space requirements:

- 1 bay with a compliant lift (has a minimum clearance of 49" in the center for the battery and pallet to be lowered from underside of the car and either no center bar or one less than 1.5" high so that the Lift table, battery and pallet can be removed from beneath the vehicle)
- An area roughly 10' x 20' ideally in close proximity to the service bay, for servicing the batteries (typically the adjacent bay). This area does not need to be a dedicated space.

General conditions for the EV and battery servicing areas:

- Must be free of water or excessive moisture (including water on the floor)
- Must be free of dust and debris (such as brake dust caused by brake rotor resurfacing dust, dust / debris from leaf blowing etc.)
- Air tools should not be used in Battery servicing area as they can be a cause of dust and moisture.
- Area must be well lit

Most enclosed Workshops will meet these requirements. If however you have a Workshop that is open to the elements (see photo upper right) then you will need to make provision to isolate an area for working on the battery. This may be accomplished using a tent or industrial curtain (see examples below right)





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Process for removing the battery for servicing:

1. Empty Battery Pallet is placed on EV Lift Table
2. Lift Table and Pallet are positioned under vehicle and Pallet is raised into position directly under vehicle
3. Battery is lowered onto Pallet and Lift Table is lowered
4. Battery, Pallet and Lift Table are removed from under vehicle
5. Stacker is used to lift Battery and Pallet from the Lift Table onto the floor of the battery servicing area (within the area to be cordoned off)
6. Battery servicing area (including the Pallet and the LEAF Tool Box) is cordoned off using Safety Cones / Crossbars
7. Battery case is opened
8. Floor Crane is used to lift a Module from the Battery onto the insulated LEAF Tool Box. It is here that the technician will work on the module.



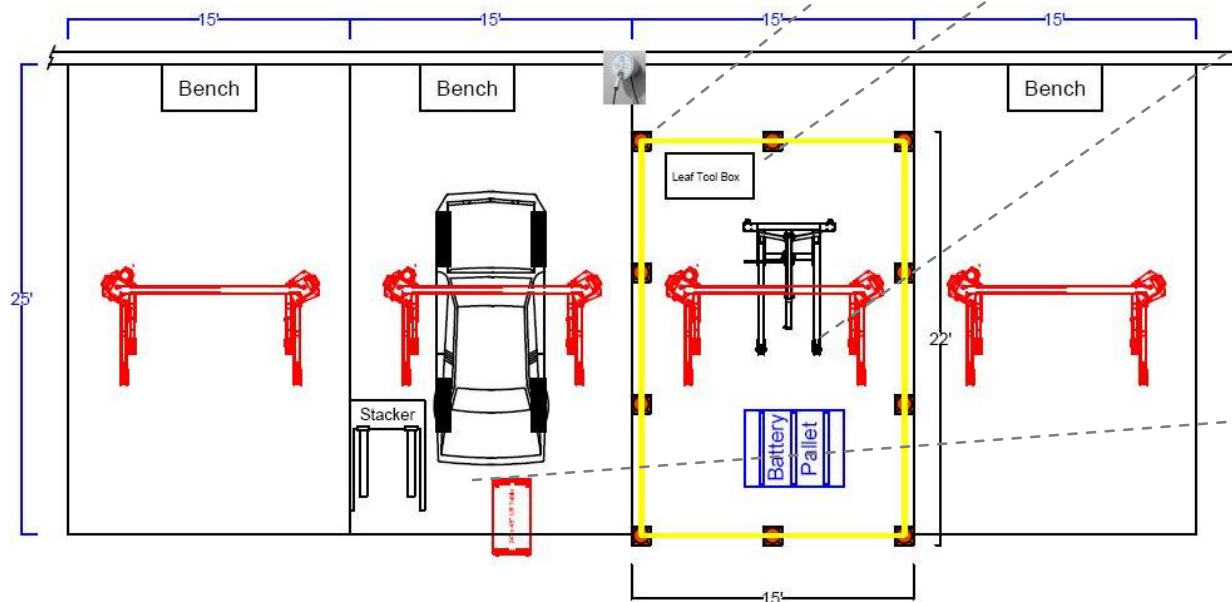
(Protection)



(LEAF Tool Box)



(Floor crane with battery)



(Stacker removing battery & pallet from Lift Table)



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Next Steps

Dealer

Work with RCC to get an approved plan showing charging dock locations.

Electrical Contractor

Read the accompanying documents:

- Key 'get rights'
- AV Installation Prep Sketches
- Contractor Checklist

AeroVironment Contact Details

The Installation Prep Sketches document is owned and updated by AeroVironment and provides information for completing the enabling works in preparation for installation of the charging docks. Any questions should be directed to AV.

Dealer GC support:

Toll Free at: 888-700-8035

Call center is open from 6am to 6pm PST

Or via email at:

evdealersupport@avinc.com