## ATTACHMENT D

Technical Specifications for DC Quick Charging
Electric Vehicle Supply Equipment (EVSE)

1. **Introduction** - The scope of this specification includes DC Quick charging conductive charging EVSE. It is limited to wall mount or free standing units.

   The scope includes informational requests regarding siting, permitting, metering, monitoring, installing, training, operating, securing, or maintaining the EVSE. The scope also includes EVSE-related functionality such as smart communications, networking, usage payment and point-of-sale capabilities.

2. **Acronyms and Definitions -**
   a. **Acronyms:**
      EV - Electric Vehicle
      EVSE - Electric Vehicle Supply Equipment
      IEEE - Institute of Electrical and Electronics Engineers
      NEC - National Electrical Code
      NEMA - National Electrical Manufacturers Association
      ORS - Oregon Revised Statutes
      SAE - Society of Automotive Engineers
      UL - Underwriters Laboratories
      VAC - Voltage Alternating Current
   b. **Definitions:**
      DC Quick Charging - A charging method that allows an EV to be connected to permanently wired EVSE with DC (direct current) charging connection to the vehicle with input power levels rated at 208 - 480VAC and a three-phase circuit.

3. **Necessary Components** - Contractor shall provide all EVSE components, hardware, software, and parts necessary for the proper assembly and operation of the EVSE. All EVSE components, hardware and parts must be new and unused.

4. **Mandatory Specifications** – EVSE must meet the following minimum requirements. Contractor shall not deviate from any of the mandatory specifications without prior approval of the ODOT Agreement Administrator.
   **a. Power**
      i. Leakage/Ground Current Protection: The EVSE must be equipped with leakage and ground current monitors with interruption capabilities.
      ii. Operates using 208-240 volts, 3-phase or 480 volts, AC 3-phase power to automatically charge the Mitsubishi iMiEV and Nissan Leaf vehicles by communicating with the vehicle's battery management system.
      iii. Power supplied to the vehicle must be a minimum of 45 kW.

**b. Certifications**

i. The EVSE must comply with the NEC (2008 edition) Article 625 and related articles and tables.

ii. The EVSE electrical components, enclosures and mounting systems must be built to UL 2202 standards or equivalent in accordance with or otherwise meeting the requirements of ORS 479.610-760.

iii. The EVSE shall comply with state and local codes and certification requirements including but not limited to third party certification as appropriate. (Documentation to be included for each unit)

**c. Warranty, Documentation, and Technical Support**

i. Warranty: Contractor shall provide manufacturer's warranties or guaranties on all EVSE for a minimum period of one year. The warranty must recite that it is enforceable by the Authorized Purchaser. The warranty must commence on the date of acceptance by the Authorized Purchaser.

a) Contractor shall provide a warranty that includes repair or replacement of EVSE as necessary to correct any defects or failures. The warranty must include all materials, equipment, tools, labor and incidentals necessary to complete such repairs or replacements.

b) Contractor shall acknowledge the Authorized Purchaser's warranty repair requests within one (1) Business Day from the time the Authorized Purchaser makes initial contact.

c) Upon request of the Authorized Purchaser, Contractor shall initiate on-site repair or replacement services and have the EVSE repaired or replaced within three (3) Business Days from Contractor's acknowledgement of request.

ii. Documentation: On the first delivery of each type of EVSE to an Authorized Purchaser, Contractor shall provide a CD-ROM containing documentation for the EVSE that provides instructions on how to operate and maintain the EVSE. The electronic format of the documentation must be Adobe Acrobat PDF or Microsoft Word. Contractor shall allow Authorized Purchasers to post the documentation on their intranet site. Contractor shall notify Authorized Purchasers when documentation updates are published and provide updates free of charge to Authorized Purchasers upon request.

iii. Technical Support: Contractor shall provide customer support service (telephone or e-mail) during normal business hours (8:00 AM – 5:00 PM Pacific Time) to Authorized Purchasers during the warranty period and beyond the warranty period that allows Authorized Purchasers to request repairs and troubleshoot technical problems with Contractor's technicians.

**d. Physical Appearance, Function and Design**

i. Supports the connector and communication standards to charge the Nissan Leaf and Mitsubishi iMiev. (connector developed in Japan by the *CHAdeMO Organization* - often referred to as the "JARI/TEPCO Connector)

ii. The EVSE must be a minimum of four (4) feet in height and provide adequate visibility for EVSE users.

iii. Identification Plate: Manufacturers advertising is not allowed on the exterior of the EVSE. An identification nameplate shall be mounted on the EVSE housing bearing

the manufacturer's name, model and serial number, electrical rating (voltage and current).

iv. Printed Circuit Boards: Printed circuit boards must be conformal coated with silicon, acrylic, or equivalent conformal coating for protecting the electronics circuits from the environment.

v. The EVSE must utilize tamper-resistant screws and design, but provide a locked or easy opening mechanism for service work.

vi. EVSE Enclosure: The EVSE enclosure must be constructed for use outdoors in accordance with UL 50, Standard for Enclosures for Electrical Equipment, NEMA Type 3R or equivalent in accordance with or otherwise meeting the requirements of ORS 479.610-760.

vii. Environmental: The EVSE must be capable of operating without any decrease in performance over an ambient temperature range of minus 22 to 122 degrees Fahrenheit with a relative humidity of up to 95 percent.

viii. The EVSE must be capable of serving a minimum of one EV.

ix. Cord Management System: The EVSE must incorporate a cord management system or method to minimize the potential for cable entanglement, user injury or connector damage from lying on the ground and comply with NEC articles 625 as it applies to cord management systems.

x. Manual Reset: EVSE must include manual reset capabilities with instructions on the EVSE to enable the end user to reset the EVSE in the event of an abnormal shutdown.

xi. The EVSE must have payment or access control options to allow users to authenticate using a credit card, RFID device, password, or other identifying method. This access needs to also have backend capabilities to collect payment or provide reporting mechanisms such that another system would be able to collect payment. If these functions aren't available, the EVSE supplier must provide an alternative method.

xii. The EVSE must have an internal metering function to allow recording of energy usage data. This may be accessed using a computer connected to the device or web based access to this information, but shall have sufficient storage capabilities to retain data for a minimum of 90 days.

xiii. The EVSE or provided software or web based interface must have the capability to collect and provide data that meets the requirements of the DOE Idaho National Lab (INL) data requirements.

5. **Desirable Features** - EVSE should meet the following requirements.
   a. **Operator Display** - The EVSE should have a visible means of indicating the following conditions:
      i. Ready Light (e.g. there is power to EVSE)
      ii. Charging in progress
      iii. Amount of energy used
      iv. Fault or failure to connect for charge
      v. Time left to charge completion
   b. **Physical Appearance, Function and Design**
      i. Protection in Coastal Environments: It is desirable that a UL 50 Type 4X housing be used.

ii. The EVSE should be of modular design for easy upgrade if and when SAE adopts a replacement to the *CHAdeMO* connector standard.
iii. The EVSE may have the capability to serve multiple EVs at the same time from one unit.
iv. The EVSE may have the capability of having communication capabilities to alert the vendor or appropriate maintenance personnel of issues or problems with the charger or to show charger availability.
v. Have an input power connection that will accept up to a 3" conduit.