City of Tacoma

Questions and Answers

Battery Electric Locomotive Project
RFP Specification No. **TR24-0001F**

All interested parties had the opportunity to submit questions in writing by email to Sara Bird, Senior Buyer by January 24, 2025. The answers to the questions received are provided below and posted to the City's website at www.TacomaPurchasing.org: Navigate to *Current Contracting Opportunities* / *Supplies Solicitations*, and then click *Questions and Answers* for this Specification. This information IS NOT considered an addendum. Respondents should consider this information when submitting their proposals.

1. **There are conflicting requirements in the technical specifications related to the top speed of the locomotive. Is the requested top speed 40 MPH or 50 MPH?**

   Answer: Top speed is 50 MPH

2. **Can Tacoma Rail provide the desired energy capacity for the battery system? Battery capacity will be the leading cost driver for the project, and without a baseline requirement for capacity, it will be difficult to compare proposals.**

   Answer: 1.8 MWh – 2.4 MWh

3. **The specification requires AC traction motors to be installed in standard EMD-style Blomberg trucks. At this point, the supplier is not aware of a service-proven solution that meets this expectation. Will Tacoma Rail permit the use of service-proven and industry-standard D77/78 DC traction motors?**

   Answer: It is Tacoma Rail's preference to have AC traction motors.

4. **Can Tacoma Rail provide a desired path to compliance regarding locomotive crashworthiness? Will compliance with crashworthiness requirements through exemptions or exclusions be permitted for used frames, or is it desired to have designs that meet the newly built locomotive standards?**

   Answer: Please submit a proposal outlining your capabilities. If you offer multiple options, please provide proposals for each. The final deliverable must comply with all applicable federal requirements.

5. **The specification requests that the locomotive be designed with a fire suppression system. Can Tacoma Rail provide its vision for this system? The supplier is not currently aware of a fire suppression solution that will provide substantial mitigation should the onboard batteries enter thermal runaway. Thermal runaway protection will be provided by several layers of detection and control system responses. Fire suppression could be provided for systems other than the energy storage system to prevent other thermal events from migrating to the storage system.**

Answer: Respondents shall provide a narrative on how the locomotive battery compartment complies with the following codes/standards for fire protection safety features:

- Thermal runaway management systems to prevent thermal runaway.
- UL9540 listing for cell, module, or unit level as available.
- Full scale fire-testing data (UL9540A or similar) for the expected fire size if thermal runaway occurred.
- General compliance approach to NFPA 855.
- Describe how the battery compartment for the individual battery modules will be vented from explosive gases. i.e., vented up, vented on sides and complies with either NFPA 68 or NFPA 69.

6. **The City of Tacoma has two active RFPs, one of which includes requirements for Buy America compliance and another which does not require Buy America compliance. Is Tacoma Rail's expectation that all systems and components between both the Buy America-compliant and non-Buy America compliant locomotives be compatible with one another (that is parts interchangeability and operational compatibility between locomotives procured under separate procurements with separate requirements)? Also, is Tacoma Rail aware of or has Tacoma Rail identified a preferred vendor for an energy storage solution that is compliant with Buy America requirements?**

Answer: Tacoma Rail has issued two RFPs to maintain separate grant funding. These RFPs have been drafted in accordance with applicable grant requirements. Tacoma Rail expects all systems and components across the three locomotives to be fully compatible.

7. **Regarding the battery charging infrastructure, is there any limitation to simultaneously using up to three individual chargers to meet the 750 KW required capacity?**

Answer: Tacoma Rail will look at all proposals submitted that are considered responsive.

8. **Please provide an additional two-week period for follow up questions following the release of Tacoma's responses to the first round of questions.**

Answer: The submittal deadlines were previously extended to March 18, 2025.

9. **In reference to Section 1: Background:**

    a. **Please specify the type of compliance or certification required for the locomotives and battery charger(s)?**

Answer: This is a Request for Proposal (RFP), not a request for bid. The provided information is intended for manufacturers to conduct research.

    b. **Please provide reference numbers or details of the FRA compliance standards that may be applicable to these battery locomotives.**

Answer: This is a Request for Proposal (RFP), not a request for bid. The provided information is intended for manufacturers to conduct research.

10. **The Required Insurance and Limits appear to be a blanket list of all possible requested coverages (i.e., Aircraft General Liability Insurance, Garage Keepers Legal Liability Insurance, Inland Marine (Cargo) Insurance, among many others) and associated limits and not those applicable to this specific program, especially when compared to the coverages and limits presented in RFP TR24-0146F. The Contractor requests the City of Tacoma review the requested coverages and their applicability to RFP TR24-0001F and align them with those in RFP TR24-0146F to reduce the number of exceptions and requests for deviations from the bidders.**

Answer: The insurance documentation in the Request for Proposals are preliminary and subject to change. Final insurance requirements will be determined during contract negotiations. For submittal purposes, the coverages outlined in TR24-0146F can be used as a reference.

11. **In reference to Section 1.1: Grant Funding and Requirements:**

    a. **FRA Letter of Concurrence requires many safety and operational requirements that are to be complied with by the locomotive owner and operator. These will and can only be complied with by Tacoma Rail and not by the locomotive supplier.**
    As battery locomotive supplier we will provide to Tacoma Rail all the information related to the battery locomotive and as required by FRA. Tacoma Rail will need to compile it together with their own details and submit to FRA for issuance of letter of concurrence.
    The above explanation matches with the FRA letter of concurrence requirement in this RFP mentioned under 'Technical Specifications - Locomotives - Required Features'

    Please confirm that the procedure defined in 'Required Features' is the correct one?

Answer: RFP states: Locomotives must meet all applicable FRA regulations, and the Respondent must be prepared to work with the City and the FRA to meet any requirements necessary to obtain a letter of concurrence from the FRA for deployment of the battery-electric/alternate fuel locomotives.

Requests that the respondent includes in their submittal, any prior FRA letter of concurrence for equipment that was placed into service withing the last five years.

In reference to Section 2: Minimum Requirements:

12. **Bidder intends to acquire GP38 or GP40 or similar style of locomotive from the market and convert it to battery electric locomotive for this project. Please confirm if it is acceptable to utilize existing frame or if the bidder is required to provide a new frame for the battery electric locomotive project?**

Answer: Tacoma Rail invites manufacturers to submit proposals for their available solutions, including multiple options if applicable.

13. **Please confirm if these battery electric locomotives will be treated as new addition to the fleet or as replacement for two old diesel locomotives in the Tacoma Rail fleet.**

Answer: Not applicable to the submittal process.

14. **In case of replacement, will the old diesel locomotives be given to the bidder (free-of-cost) after the successful delivery of the battery locomotives to Tacoma Rail? (This will have an impact on the overall price of the bid.)**

Answer: Per the RFP: Tacoma Rail requires that the battery-electric locomotives be built and delivered without the requirement of surrendered locomotive cores. It is Tacoma Rail's intent to purchase the proposed locomotives outright.

15. **Please confirm that the bidder's compliance to FRA safety and design requirements will be limited to those that are directly applicable to the battery locomotive as an equipment and not related to operational safety requirements that will have to be complied with by Tacoma Rail?**

Answer: The bidder's compliance to FRA safety and design requirements will be for the manufacturing of the locomotives. The locomotives must meet all applicable FRA safety and design requirements at time of delivery.

16. **RFP asks for batteries to be manufactured in US. There are no known and proven battery cell manufacturers in US who have a successful track record of supplies being used on battery locomotives. Using a lesser-known source for batteries will impact the overall warranty on the locomotive.**

    a. **Can Tacoma Rail provide the names of any battery suppliers that you have considered and who you believe will comply with this requirement?**

Answer: Respondent to specify in submittal whether batteries are manufactured or assembled in the U.S.

    b. **If there are no known or preferred battery suppliers from the US, then can we request an exemption for this requirement?**

Answer: Please see Section 2 (MINIMUM REQUIREMENTS), Certificate of Non-Compliance with Buy America Requirements.

17. **For Lithium-ion batteries, the biggest risk is thermal runaway in case of fire. Suppression of such fire will require huge amount of water that cannot be stored or carried on a locomotive.**

    a. **Please explain what type of suppression system is being asked for in the RFP?**

Answer: Respondents shall provide a narrative on how the locomotive battery compartment complies with the following codes/standards for fire protection safety features:

- Thermal runaway management systems to prevent thermal runaway.
- UL9540 listing for cell, module, or unit level as available.
- Full scale fire-testing data (UL9540A or similar) for the expected fire size if thermal runaway occurred.
- General compliance approach to NFPA 855.
- Describe how the battery compartment for the individual battery modules will be vented from explosive gases. i.e., vented up, vented on sides and complies with either NFPA 68 or NFPA 69.

    b. **Please confirm if Tacoma Rail will accept a battery manufacturer's recommendation for a fire control system such as installation and use of fire extinguishers instead of a fire suppression system?**

Answer: Respondents shall provide a narrative on how the locomotive battery compartment complies with the following codes/standards for fire protection safety features:

- Thermal runaway management systems to prevent thermal runaway.
- UL9540 listing for cell, module, or unit level as available.
- Full scale fire-testing data (UL9540A or similar) for the expected fire size if thermal runaway occurred.
- General compliance approach to NFPA 855.
- Describe how the battery compartment for the individual battery modules will be vented from explosive gases. i.e., vented up, vented on sides and complies with either NFPA 68 or NFPA 69.

18. **"Respondents must demonstrate they have obtained FRA approval for the locomotive(s) and charging equipment they are proposing, and both have been authorized for use in the general railroad system of the United States." This clause is in conflict with the procedure mentioned under 'Technical Specifications - Locomotives - Required Features' Please confirm that the procedure mentioned under this 'Required Features' is the acceptable procedure?**

Answer: Tacoma Rail will need clarification on this question. Some battery-electric locomotives have been built outside of the U.S. and would not comply with current FRA standards.

19. **"Provide battery degradation assumptions of proposed batteries." Please elaborate on this requirement, preferably with an example to better understand the requirement.**

Answer: Provide the assumptions of the battery life expectancy and the degradation over that period.

20. **In Reference to Section 28.1: Please confirm that any delays, in placing the locomotive in service, because of reasons attributable to Tacoma Rail will be adjusted from the locomotive overall warranty period?**

Answer: This point is subject to negotiation if the proposal is recommended for award, prior to contract execution.

In reference to Technical Specifications:

21. **"All of Tacoma Rail's current fleet is equipped with DC traction motors. To turn the wheels, we use a DC welder to power the traction motors. Please list your capabilities to program the locomotives for use of the locomotive batteries or to install an inverter to allow our current wheel cutting equipment to work with AC traction motors." This point is not clear. Can you please explain further details for this requirement?**

Answer: To cut wheels, we currently us a DC welder to power the traction motors. We would like the locomotive to have an inverter to convert DC to AC, or, for the locomotive to have a software that allows the same utilizing the locomotive batteries.

22. **"Locomotives must meet all applicable FRA regulations, and the Respondent must be prepared to work with the City and the FRA to meet any requirements necessary to obtain a letter of concurrence from the FRA for deployment of the battery-electric/alternate fuel locomotives." This we believe is a valid approach to obtain a letter of concurrence from the FRA. As a supplier, we will provide all technical, safety and other documents to support Tacoma Rail in getting the FRA approval. The request for FRA approval is to be approached by the locomotive owner and operator as it can be location or application specific. Tacoma Rail will be the owner and operator of the battery locomotives and will have to meet many of the FRA safety and other regulatory requirements to be able to get the letter of concurrence/approval. Therefore, any request for a letter of compliance/approval should come from Tacoma Rail and not by the locomotive supplier. As mentioned, Tacoma Rail would have the full support of the supplier during this process. This clause is however in conflict with some other clauses in this RFP where it says that FRA approved locomotive is to be supplied (meaning FRA approval had already been obtained prior to delivery). Please confirm if it is ok to presume that this clause will be the valid clause and it will supersede other clauses which are in conflict with this clause?**

Answer: Tacoma Rail understands that it will be a collaborative effort to obtain the FRA letter of concurrence after delivery. The bidder's compliance to FRA safety and design requirements will be for the manufacturing of the locomotives. The locomotives must meet all FRA safety and design requirements at time of delivery. Section **10.1** Requests that the respondent includes in their submittal, prior FRA letter of concurrence for equipment that was placed into service withing the last five years.

In Reference to Equipment Requirement – Minimum Specification

23. **"Minimum 2000 hp Traction capable of achieving and maintaining a speed of 50 MPH in mainline service." In the RFP document it is mentioned that the battery locomotive should be 2000HP equivalent. This is very useful information but is not sufficient to calculate the battery size that will be needed for the battery locomotive to meet the daily operating requirements. To be able to accurately calculate the battery bank size we request Tacoma Rail to provide following additional information:**

    a. **What is the notch-wise daily usage of the locomotive (maybe Tacoma Rail can provide the event recorder download for about 20-30 days considering low usage and high usage times)?**

Answer: Tacoma Rail's research has led us to believe that 1.8 MWh is the minimum requirement that we would need.

    b. **What is the maximum haulage load (connected load in tons) that the battery locomotive will be expected to pull?**

Answer: Approximately 5,000 tons.

    c. **How many hours per day the locomotive is expected to operate?**

Answer: 24

    d. **How many total hours of locomotive charging time will be available per day?**

Answer: Charging will occur as needed. Charging systems will be within the yard of operation.

    e. **Will this charging time be available as a continuous time (such as overnight), or will it be intermittent charge times? If it is intermittent charge time, then we need to know the minimum amount of charge time that will be available each time the loco is put for charging.**

Answer: Tacoma Rail is a 24/7 operation and charging will happen when needed. There will be enough time for the locomotives to become fully charged at each charging event.

f. What is the maximum total distance the locomotive will travel in a single day (or between re-charge)?

Answer: Locomotives will work in a switching yard within the Port of Tacoma. Distances will vary.

g. Can you provide track profile details so that we can know about gradients, curvatures and crossing details so that battery size can be calculated?

Answer: Locomotives will perform yard switching with track curvatures of 30° and will run mainline freight hauling in all weather conditions. Grades within the Port of Tacoma range approximately 0 – 1 percent.

h. If Tacoma Rail has already calculated the required battery bank size (or energy consumption per day or between charges) can these details be shared? (That way we do not need to re-calculate the battery size but will consider Tacoma Rail battery size calculation as the basis for proposal.)

Answer: Tacoma Rail will not be providing the data used to calculate the minimum battery size.

i. Is the maximum speed for the battery-electric locomotive 40mph or 50mph?

Answer: Maximum of 50 mph.

24. "Retention tank capable of catching all fluid, or water leaked or discharged from locomotives. Tank drain apparatus must be operational. Vendor will be required to certify that the tank is free of residue accumulations." With the removal of the Engine and Engine cooling system, there is only a fraction of the original fluids left on the locomotives.

a. Please explain the expected usage of the retention tank that has been specified as a minimum specification.

Answer: Located in the Pacific Northwest, where rainfall is abundant, Tacoma Rail is committed to environmental responsibility. We take diligent measures to capture pollutants from runoff. To ensure proper containment, retention must involve a drainable vessel capable of collecting all runoff from the locomotive battery and compressor compartments that may be contaminated.

b. Is this meant to capture fluids that could leak from the battery cooling and compressor?

Answer: Yes.

c. Is a retention tank needed, or is some other containment system also be acceptable?

Answer: Located in the Pacific Northwest, where rainfall is abundant, Tacoma Rail is committed to environmental responsibility. We take diligent measures to capture pollutants from runoff. To ensure proper containment, retention must involve a drainable vessel capable of collecting all runoff from the locomotive battery and compressor compartments that may be contaminated.

25. "Battery compartment HVAC system"

a. Please explain the requirement of an HVAC system in the battery compartment area.

Answer: To maintain battery compartment temperatures for safety and to protect the battery function and lifecycle expectancy.

b. If the proposed battery compartment design is a self-ventilated type and does not need an HVAC unit to maintain the battery temperature in required range, is that acceptable?

Answer: Explanation of non-compliance or deviation from RFP requirements should be included in respondent's submission.

26. Installing a battery compartment HVAC system could become counter-productive to the battery temperature control system that will be proposed in our bid. The ultimate need of HVAC system will depend on battery chemistry and the battery stack layout design. LFP batteries are considered to be safer compared to NMC batteries, we plan to offer LFP batteries.

a. Please confirm if LFP batteries will be acceptable?

Answer: This is a Request for Proposal. Tacoma Rail is looking for manufacturers to propose what they can offer.

b. If not, then please specify your preference for battery chemistry?

Answer: This is a Request for Proposal. Tacoma Rail is looking for manufacturers to propose what they can offer.

27. What type of communication support will be provided with the brake system supplier to implement the interface between the locomotive control system and the CCBII brake system?

Answer: This is information the manufacturer would research and provide.

28. Locomotives shall be equipped with an FRA compliant Wabtec TTX-REC-M6FRA event recorder." Please confirm if Tacoma Rail will also accept other make of FRA compliant event recorder system?

Answer: Tacoma Rail is in the process of equipping their entire fleet with the TTX-REC-M6FRA event recorder. Tacoma Rail will only accept the stated recorder.

29. "New toilet positioned with front access to valve and conductors side dump outlet." If the core locomotive GP38 / GP40 being acquired was originally not equipped with a toilet then is it still required to provide a toilet in battery locomotive?

Answer: Yes.

30. "Upgradable microprocessor control system to allow for future PTC equipment" The PTC system is a safety-critical system and works independent of the locomotive control system. The PTC system can still be installed on the battery locomotive without needing to make any changes to the control system. Please confirm what type of interface or upgrade is being referred to under this requirement?

Answer: Tacoma Rail utilizes Wabtec PTC equipment. If we were to install PTC on these locomotives, we would need to ensure compatibility, given the available technologies.

31. "New AC Cabinet (new contactors and fuses)" All the features and components of the AC cabinet on a diesel locomotive will be housed within the new traction cabinet of the battery locomotive. This will eliminate the need of a separate AC cabinet on the battery locomotive. Is it acceptable to not have a separate AC Cabinet on the battery locomotive if it is not needed as per the battery locomotive design being proposed?

Answer: Yes.

32. "Refurbished or new Cab" The GP38 / GP40 cab is not crash-worthy. If a refurbished cab is used, does it need to be rebuilt to meet crash-worthy standards?

Answer: The manufacturer must specify whether the locomotive is refurbished or new and ensure it meets FRA and AAR standards.

33. Correct AC Traction Motors, oil filled with speed sensor, NEW or REBUILT? (please specify) GP style standard 2 axle trucks reconditioned/ remanufactured.

a. This point of AC traction motors is not clear. As per overall review of the RFP document, we are assuming that it is a typing error and for the converted battery locomotive use of DC traction motor will be acceptable. Please Confirm?

Answer: Tacoma Rail is requesting AC traction motors.

b. Standard GP style trucks are configured for DC motors. Converting to AC will result in a non-standard configuration. Please confirm?

Answer: Tacoma Rail is requesting AC traction motors.

34. Mounting brackets, antennas and power feeds are required for End of Train devices.

a. Since the purchase of the EOT is not in the bid, will Tacoma Rail provide these items as free-of-cost material so that it can be installed on the battery locomotive during assembly, or will they be installed after delivery?

Answer: The manufacturer is to install all the cabling, antenna, and associated wiring. Tacoma Rail will install the HOT in house.

b. What make and model of End of Train device will be used?

Answer: Tacoma Rail will be installing a Wabtec TrainLink II integrated head of train device.

Technical Specifications: Chargers:

35. "The proposer shall include Dispenser-level, revenue-grade 15-minute interval energy consumption in kilowatts (kW) and kilo-watt hours (kWh) to measure net energy delivered to a Battery Electric Locomotive." Can you please elaborate on this requirement?

Answer: Tacoma Rail must have the capability to monitor electric energy usage.

36. "Locomotive charging station 750kw"

a. We believe that the 750kW rating refers to the charging capacity of the complete charging station and not for a single charger. Can you confirm?

Answer: The rating refers to each (1 each) charger.

b. Will Tacoma Rail accept wayside charging station (total capacity at least 750kW) instead of reverse pantograph chargers?

Answer: No.

c. How much charging time has been considered from zero to full charge while using a 750kW charging station?

Answer: Tacoma Rail is hoping for 3 – 5 hours.

d. How much total charging time will be available per day?

Answer: 3 – 5 hours.

e. Is this charging time continuous or it will be in smaller timeslots?

Answer: Whatever is needed for a full charge when the locomotive comes in for a charge.

f. If these are in smaller timeslots, can you provide estimations on those timeslots?

Answer: Whatever is needed for a full charge when the locomotive comes in for a charge.

37. The specifications do not list what type of batteries are preferred. Are you looking at both Thin Plate Pure Lead (TPPL) systems and Lithium-Ion or is there no preference?

Answer: We are looking at Lithium.