

**SAN BERNARDINO COUNTY
TRANSPORTATION AUTHORITY**

REQUEST FOR INFORMATION (RFI) NO. 21-1002519

FOR

**“APPROACH TO HYDROGEN SUPPLY, STORAGE AND FUELING FOR A
HYDROGEN-BATTERY HYBRID ZERO EMISSION MULTIPLE UNIT RAIL
VEHICLE”**

INTRODUCTION

The San Bernardino County Transportation Authority (SBCTA) is issuing this Request for Information (RFI) to solicit industry feedback on the approach to hydrogen supply, storage and fueling technologies for the Arrow Maintenance Facility (AMF) to support the testing and operations of a zero-emission multiple unit (ZEMU) rail vehicle. The ZEMU vehicle is a hydrogen fuel cell and battery hybrid vehicle and will be integrated into the future Arrow Service to reduce overall emissions.

SBCTA is expanding its public transit network in the San Bernardino Valley by building the Redlands Passenger Rail Project (RPRP). The RPRP, or what will be known as the Arrow Service, will be operated initially with Diesel Multiple Unit (DMU) rail vehicles and will serve the communities between Redlands and San Bernardino. In conjunction with public transit expansion, SBCTA is also seeking to reduce greenhouse gas (GHG) emissions and local air pollutants on its systems by deploying a zero emissions train. In 2018, SBCTA was awarded a Transit and Intercity Rail Capital Program (TIRCP) grant for the development and purchase of an additional rail vehicle that will demonstrate the ability to provide zero emission service using multiple unit trainsets. A hydrogen-battery hybrid vehicle was selected as the technology of choice and design of the vehicle is currently underway.

A key component for the planned Arrow Service is the construction of a new rail vehicle storage and maintenance facility for the DMUs which will begin operations in 2021. SBCTA is currently constructing this new facility by repurposing the existing Inland Empire Maintenance Facility located east of the San Bernardino Depot and west of Interstate 215.

SBCTA is proposing future modifications to the AMF to facilitate operations of the ZEMU vehicle, specifically fueling. These modifications will include installation of hydrogen fueling infrastructure and hydrogen storage, and associated safety improvements. On site production of hydrogen is not a consideration at this time; however, SBCTA is interested in exploring opportunities in the future should additional ZEMU vehicles be procured. Modifications to the existing maintenance facilities, including the maintenance building, to accommodate the ZEMU vehicle is part of a larger project. However, this RFI is solely for the hydrogen fueling facility.

Operation of the proposed ZEMU vehicle is expected to commence in 2024, which will follow the Federal Railroad Administration (FRA) safety regulations and overlay with DMU and Metrolink

passenger train service. To this end, SBCTA is seeking information from industry on how to best meet the daily hydrogen demand of the ZEMU vehicle during both testing and revenue operations. This includes onsite hydrogen storage and refueling technologies as well as exploring procurement/development opportunities (design-build, public-private partnerships, etc.). SBCTA seeks responses from all entities involved in and supporting the hydrogen fuel sector, such as equipment manufacturers, energy and fuel brokerages, developers, and trade groups.

PURPOSE OF THE RFI

The purpose of this RFI is to gather information that will assist SBCTA in the eventual procurement of a contractor to provide hydrogen fuel and associated infrastructure to support storage and fueling of the ZEMU vehicle at the AMF site. In particular, SBCTA would like to better understand the proposed approach from potential suppliers to meet the daily hydrogen demand, while considering AMF site constraints and technical requirements set out by the vehicle designer and SBCTA. SBCTA is also open to exploring various contracting opportunities, including private partnerships, on fueling facilities. Future expansion and increase in daily hydrogen demand should also be a consideration as SBCTA does have goals to expand the ZEMU fleet.

PROJECT BACKGROUND AND DESCRIPTION OF AMF

The AMF site is located in San Bernardino, California, near the intersection of North J Street and 3rd Street (Figure 1). It is located to the northeast of the San Bernardino Santa Fe Depot and Metrolink Station platforms. The site is currently under construction but will be complete for the start of the Arrow Service in 2021. Figure 2 illustrates the AMF site plan as well as the anticipated hydrogen storage and refueling areas to facilitate the operation of the future ZEMU vehicle.

Figure 1 – Location Map

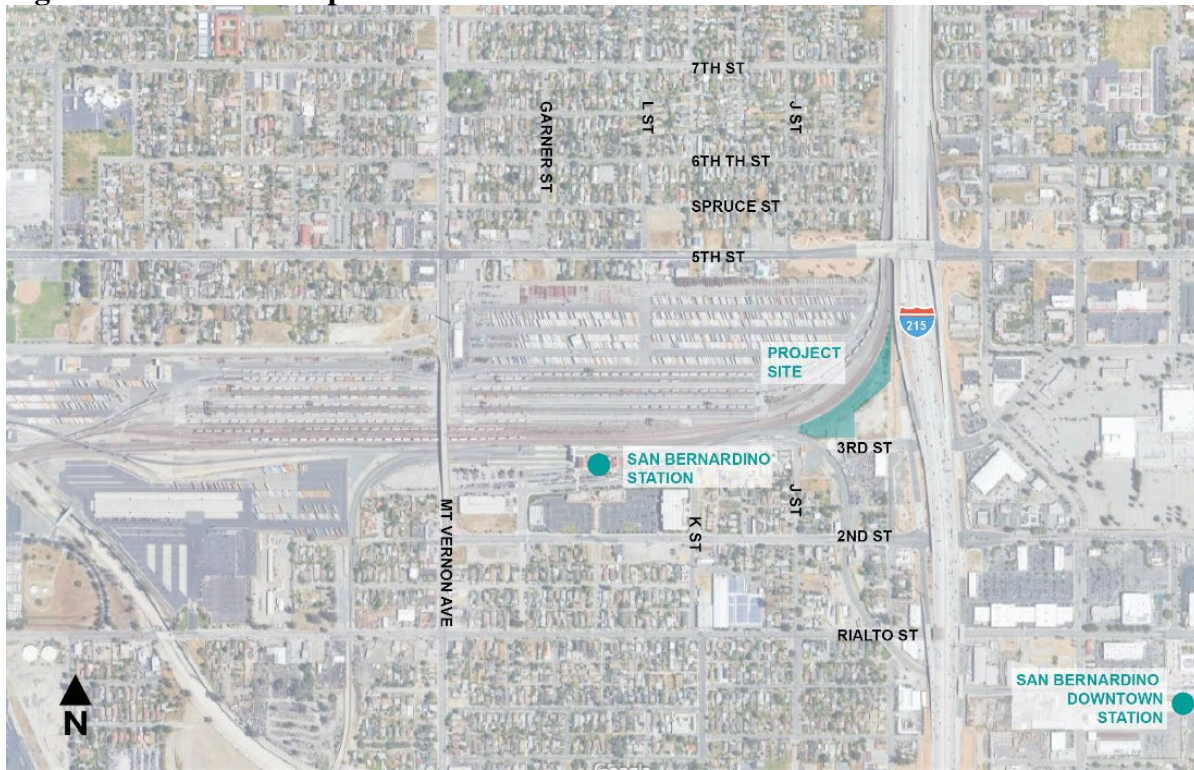
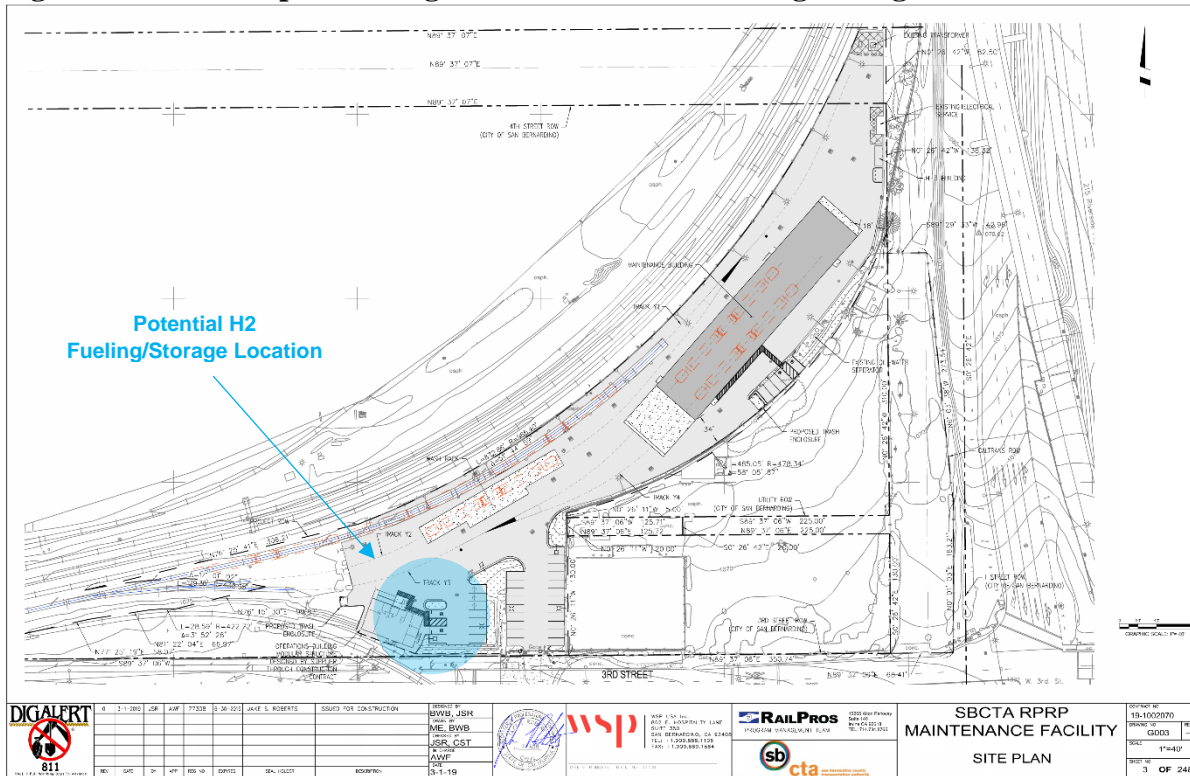


Figure 2 – AMF Proposed Design and Potential H2 Fueling/Storage Location



The AMF site layout will require minimal modifications to accommodate the operation of one ZEMU vehicle, however, additional infrastructure will be required to support the hydrogen delivery, storage and fueling. It is expected that hydrogen will be delivered to the site in either liquid or gaseous form. At a high level, SBCTA expects that the following improvements will be required to meet the needs of the project:

Hydrogen Delivery and Storage

It is anticipated that hydrogen will be delivered to the site via 3rd Street. The storage area is currently proposed for the southwest corner of the site, as shown in Figure 2. The area can include either mobile or permanent storage, as well as any other infrastructure required for liquid or gaseous hydrogen storage and delivery.

Hydrogen Refueling

The refueling area for the ZEMU vehicle is proposed to be adjacent to the storage. This area will contain any infrastructure required to facilitate fueling including compressors, chillers, fueling units, hoses, dispensers, etc. This will also include any necessary safety elements to meet applicable codes, standards, and permitting requirements.

PROJECT SPECIFICATIONS

To solicit targeted feedback, SBCTA has provided a summary of project specifications which may be required in the future contract for this project. It should be noted that this information is preliminary and is subject to change as the concept design of the vehicle and infrastructure advances:

- Daily demand of hydrogen for one ZEMU vehicle is between 250 kg – 300 kg once full revenue service is underway. A lesser demand is initially expected for a testing period of approximately 6 – 12 months from mid-2023.
- SBCTA, at a minimum, requires fueling of a single ZEMU vehicle, but may be open to increasing storage capacity to support a second ZEMU vehicle, should it be financially and technically feasible.
- The on-board vehicle storage will contain gaseous hydrogen at a maximum operating tank pressure of 350bar.
- Maximum allowable temperature inside the hydrogen tanks on the vehicle is estimated to be ~185 degrees Fahrenheit.
- The target fuel fill time to deliver approximately 250 kg of hydrogen onto the vehicle is 15 to 30 minutes. Longer refueling times may be considered based on economic feasibility of the target times.
- The vehicle design is expected to have two fueling ports per side and the vehicle is expected to be fueled in either side, but may be able to accommodate filling via all four concurrently. SBCTA is looking for supplier's recommendations to meet the stated refueling targets.
- Hydrogen purity per ISO14687:2019 (EC) / SAEJ271
- Fueling of the vehicle will occur adjacent to the hydrogen storage facility. Some underground or elevated conduits/ducts may be required to facilitate fueling on a far track

as well as a track adjacent to the hydrogen storage location. SBCTA is looking to understand whether there are any concerns with fueling location relative to the storage area or any other locations within the AMF.

- Initial assessments of the AMF site layout indicate that the max allowable delivery vehicle size is a WB40.
- Facility will need to meet all applicable codes and standards and be granted approval/permitted by local fire departments. Contractor is expected to obtain all necessary permits and approvals.

INFORMATION REQUEST

This RFI seeks detailed feedback and comments for the following. Please note respondents are not required to provide a response to all questions:

- Provide a summary of your proposed approach to meet the daily hydrogen demand for the vehicle based on the technical specifications listed above.
 - Identify, at a high level, the approach to onsite storage (i.e., mobile or permanent), and the anticipated quantity of hydrogen storage onsite.
 - If possible, identify the necessary processes to facilitate fueling (i.e., cooling, compressors, evaporators, etc.).
 - Identify any other key infrastructure required (i.e., interfaces, communications, electrical equipment, etc.).
- Provide specifics on the hydrogen supply (gaseous or liquid), percentage of renewable hydrogen, purity, production method, reliability of supply and the approximate delivery distance from the AMF site. It is important to note that SBCTA has a desire for the hydrogen fuel to be sourced from a local and renewable source.
 - Where is the plant from which the hydrogen fuel will be predominately sourced and what percentage is considered renewable?
 - Are there back up hydrogen supply locations available? What is the farthest distance from which you would supply hydrogen in a back-up scenario?
 - Provide a discussion on preferred hydrogen delivery methods (i.e., tube trailer, pipeline, liquid tanker, etc.).
- How can you as a provider ensure the hydrogen purity requirements for the rail vehicle comply with ISO standards?
- What electrical power supply requirements are needed for on-site hydrogen fueling? Include specifics if possible.
- Are there any additional utility requirements?
- Provide a discussion on meeting the target refueling rate of 15 to 30 mins. Do you feel this is achievable based on the information provided? What processes or design considerations on the vehicle and/or on the infrastructure may be necessary to ensure this target refueling can be met?
- Provide a summary or discussion on the anticipated key technical challenges for this project (i.e., fueling rate for rail vehicle, permitting for new facility type, etc.).
- Explain the process for safety/hazard assessments as well as commissioning and permitting for a fueling station of this scale.

- Provide any additional recommendations related to the safety, hazard and risk assessment processes.
- As to scalability, can an increase in hydrogen requirements be accommodated should SBCTA choose to increase its daily demand? I.e., if additional vehicles are procured.
- What experience do you have implementing/constructing on-site hydrogen fueling?
 - Please provide any relevant examples and/or local examples.
- What available contracting and financial mechanisms could be employed to develop and implement the hydrogen fueling station? Responses should include preferred contracting models, including terms and conditions that would be required to implement these approaches.
- Once the facility is constructed, how do you propose the maintenance and operation of the facility will be handled?
- Confirm that training for the operations of the fueling facility can be provided.
- There is a potential for the vehicle to be tested in another location outside of California. What options could you propose to fuel the vehicle during this testing period? Could the hydrogen, with the same purity requirements, be supplied in other states in the US besides California? Are you able to provide a mobile direct “truck to train” fueling solution for contingency type scenarios?

Since the information received in response to this RFI may be used to procure the fueling provider and made available to the public, **respondents should not include any proprietary, sensitive, or confidential information.**

WRITTEN QUESTIONS/CLARIFICATIONS

All questions and or clarifications to this RFI must be put in writing and submitted electronically to procurement@gosbcta.com, and they must be received by SBCTA no later than **4:00 p.m., on Wednesday, December 2, 2020**. Questions received after the date and time specified may or may not be responded to, at the sole discretion of SBCTA. All questions/clarifications must be clearly labeled “**Written Questions**”. SBCTA is not responsible for failure to respond to questions that are not appropriately marked. SBCTA’s responses to the questions received by the date and time identified herein, including SBCTA’s answers will be posted on the Vendor Portal on SBCTA’s website at www.gosbcta.com, click on “Doing Business”, which will take you to the “Bids & RFPs” page. There, click on the tab “Vendor Portal”.

SUBMITTAL PROCESS

RFI’s will be submitted electronically through SBCTA’s Vendor Portal PlanetBids no later than 2:00 PM on December 17, 2020. Only electronic responses will be accepted. Respondents should try and provide answers to all questions discussed in this RFI.

Respondents are requested to provide the following information at the start of their response to this RFI:

- Company / institution name;
- Company / institution contact;
- Contact’s address, phone number, and email address