



# DASH Zero Emissions Bus Implementation Study



## Executive Summary

June 9<sup>th</sup>, 2021

## **Background**

In the fall of 2020, DASH and City staff had commenced Phase 1 of the DASH Zero Emissions Bus (ZEB) Implementation Study, which is intended to help staff understand and layout the framework for the DASH fleet and facility to transition towards a Zero Emissions fleet. Phase 1 of the ZEB Implementation Study includes the following tasks: compilation of known data, facilities assessment, facilities layout, short range infrastructure & equipment needs, and analysis of facility layout.

## **Findings**

The study's final report confirmed the recommended method of expansion and introduction of zero emissions bus infrastructure would be to utilize the existing facility expansion project and land that is immediately to the west of the current DASH facility. This expansion site is commonly known as the current "impound lot." DASH has identified and secured a total of \$8.1 Million in capital funds that is intended to fund the Facility Expansion project and Zero Emissions Bus Infrastructure.

## **Recommendations**

The following are recommendations and considerations provided by the WSP consulting firm:

1. To incorporate zero emissions infrastructure and provisions for expansion with the forthcoming DASH Facility Expansion Project.
2. The DASH Zero Emissions Bus fleet conversion is best implemented using battery electric technology. WSP has confirmed that hydrogen fuel cell technology is cost prohibitive considering DASH's current facility and operating constraints.
3. Charging technology most feasible to meet program requirements is determined to be overhead pantograph style charger. This is designed to complement the usage of the current ground-mount plug-in chargers.

4. A scalable framework to be initially built with the Facility Expansion. This framework is intended to support a final amount of 40 dispensers, charging cabinets, switchgears, pantograph style dispensers, and transformers.
5. The framework is easily scalable and is recommended to accommodate for DASH's initial \$8.1 million budget which would allow for the framework to be built with equipment to support 20 initial dispensers.
6. The initial buildout of 20 dispensers with the identified budget of \$8.1 million will support the DASH fleet until approximately FY27, or roughly 50 ZEB buses. Further capacity to support the continual growth of the ZEB fleet may be added by way of platooning or the buildout of additional charging dispensers (up to 40 maximum in the expanded facility).

### **Summary**

- Battery electric buses are more feasible for DASH fleet implementation over hydrogen fuel cell due to the cost prohibition and facility constraints.
- Current project funding of \$8.1 million (NVTA & SmartScale) will support facility expansion and transition of DASH fleet to ZEB until approximately FY27, roughly 50% of fleet conversion.
- Given the program goals and fiscal constraints, the facility expansion is recommended to be a standalone facility on the site of the current impound lot.
- Facility platooning and/or automated bus yard technology will need to be considered to maximize cost effectiveness of infrastructure vs. fleet requirements.

### **Next Steps**

DASH has secured DRPT funding to commence Phase II of the ZEB Implementation Study. Phase II further builds on the concept and recommendations developed by Phase I, and includes the tasks of maintenance Assessment, evaluation of utility

grid infrastructure, and total cost of ownership analysis. Phase II is expected to be completed within FY22.

Concurrently, DASH and City Staff has commenced the solicitation process for the Predesign work of the DASH Facility Expansion project. The DASH Facility Expansion will incorporate the concepts, recommendations, and requirements that are provided by Phase I of the ZEB Implementation Study. The Predesign of the DASH Facility Expansion is also expected to be completed within FY22.

Lastly, DASH has been operating its first set of six (6) Zero Emissions Buses in regular daily service. Its next eight (8) Zero Emissions Buses are expected to be delivered throughout the summer of 2021 and is intended to support the launch of the New DASH Network in the fall.