



October 11, 2019

Madison Metro Transit Electric Bus Integration Fee Narrative

The design activities outlined in this narrative were performed from August through October of 2019. The total design fee as enumerated in this proposal is a product of multiple design solutions and technological revisions, based on the evolution of the support needed to charge current and future electric buses at the 1101 East Washington Avenue facility.

The first and original design proposal was for three 60-kilovolt (KV) charging stations (for three buses) to be located on a mezzanine space created for the new Phase 1 Service Lane project, with dispensers located adjacent to the electric bus parking stalls. This design solution incorporates the new charging stations and support within the existing building without the need to upgrade the electric service or modify the existing building. These documents were finalized for construction pricing.

The second design iteration was to change the three 60-KV charging stations to 125-KV units (to lower the charging time needed for three individual buses), located on the mezzanine space created by the Phase 1 Service Lane project with the dispensing stations adjacent to the electric bus parking locations. This design solution required additional structural design verification for the mezzanine for the increased weight of the new charging stations and a review of the existing building electrical service for total loading. Subsequent discussion with MG&E verified the total building load and led to incorporating a new building service and distribution panels to accommodate requirements for the revised charging stations. Construction documents were modified but not finalized.

The third design iteration involved the discussion to plan for up to 50 electric buses and what that would potentially look like for bus parking and support systems. This involved planning all the layouts for future charging stations and dispensers and bus parking. The mezzanine created in Phase 1 was used to accommodate up to 30 charging units, with additional charging units placed on islands created between the bus parking stalls. MG&E was brought in to discuss the planning of future electrical service sizes and locations. This solution accommodated a mixture of 125-KV and 60-KV charging stations to satisfy the overall charging needs. Mezzanine floor design loading was verified to accept future loads of additional charging stations. This was a more of a design study on maximizing the concepts that were already created.

The fourth design iteration came as a result of MG&E requesting that they would approve of and we provide for a new electrical service to accommodate the bus charging only. This service would be independent of the building service, would allow for a more seamless transition as electric busses are

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added to the fleet and would allow for separate metering of the electric bus charging. However, this would require a separate electrical distribution space or room. The need for a separate electrical room was determined by the height needed for the distribution equipment. Locations interior to the building on the mezzanine were reviewed, and it was determined that the preferred solution was to create a new space for the electrical distribution equipment for the electric bus service. Also, this design review provided an opportunity to maximize space available for future charging stations on the mezzanine. Several meetings with MG&E were needed to place the new service locations and modify site plans and building layouts to create space for the new service and distribution. This resulted in modifications to the construction documents from the Phase 1 Service Lane Project, which is currently under construction. The documents from this fourth iteration were finalized for construction pricing. Prior, to finalizing the construction documents for pricing, we verified the sizing of the charging equipment as the manufacture had noted changes. The new unit configuration meant the weight of the unit had increased, and its height also increased by 30 inches. This rendered the location of the charging units on the mezzanine created by the Phase 1 project infeasible

The fifth and final design iteration of the electric bus charging station involved taking three of the proposed charging stations and creating islands between the bus parking for charging stations and dispenser units. Also, at this time the 125-KV unit from a different manufacturer was evaluated, and a design was created for placement of these units on the mezzanine for future bus charging. A new electrical room was designed for the new electric distribution for the electric buses, and site plan documents were finalized for the new service locations and entrance into the building. The City and Metro Transit and MG&E have reviewed these documents, and the documents have been finalized and delivered to the Phase 1 Service Lane contractor for pricing.

Sincerely;

MEAD & HUNT

A handwritten signature in black ink that reads "RICHARD C. LUNDEEN". The signature is stylized and written in all caps.

Richard Lundeen
Project Manager