County Connection

INTER OFFICE MEMO

To: Board of Directors **Date:** 06/05/2017

From: Ruby Horta, Manager of Planning **Reviewed by**:

SUBJECT: Low-No Grant Route Selection

Background:

In 2016, County Connection was awarded a FTA Low-No grant for four additional electric buses and associated charging infrastructure including four additional depot plug-in chargers and one on route wireless charger. The work scope for this project calls for choosing an appropriate route and charger location that is driven by objective, data-driven information. The goal of this task was to reduce operational risk and ensure the lowest operational costs for the electric bus deployment during the early stages of the project. County Connection recently completed this process with support from the Center for Transportation and the Environment (CTE), who was included in the grant to provide technical assistance for deployment planning and technology assessment.

The Operations and Scheduling Committee reviewed the recommendation to deploy the next four electric buses on Route 5. This memo provides a brief summary of the work CTE conducted. A more complete presentation will be provided at the June Board of Directors meeting.

Summary:

Staff and CTE identified routes throughout the service area to begin the analysis process. However, most routes were eliminated due to operational constraints presented by the electric bus. Hilly and long distance routes were not feasible options. Of the three final routes, 5, 7, and 91X, Route 5 was selected as the ideal candidate for the next deployment of electric buses. Route 5 has a roundtrip distance similar to Route 4. The two routes will be able to share the inductive chargers at BART Walnut Creek and like Route 4; three buses are required to operate Route 5.

Recommendation:

The O&S Committee recommends that the Board endorse CTE's recommendation to deploy the next four electric buses on Route 5.

CENTER FOR TRANSPORTATION
AND THE ENVIRONMENT

County Connection Low-No BEB Deployment Project

Route Selection Analysis Results

June 15, 2017

Background

- FTA Low-No Award to procure and deploy 4 all-electric Gillig 29’ Low Floor Buses, 4 plug-in depot chargers, and 1 on-route wireless charger
- Center for Transportation and the Environment (CTE), was included in the grant to provide technical assistance for deployment planning and technology assessment

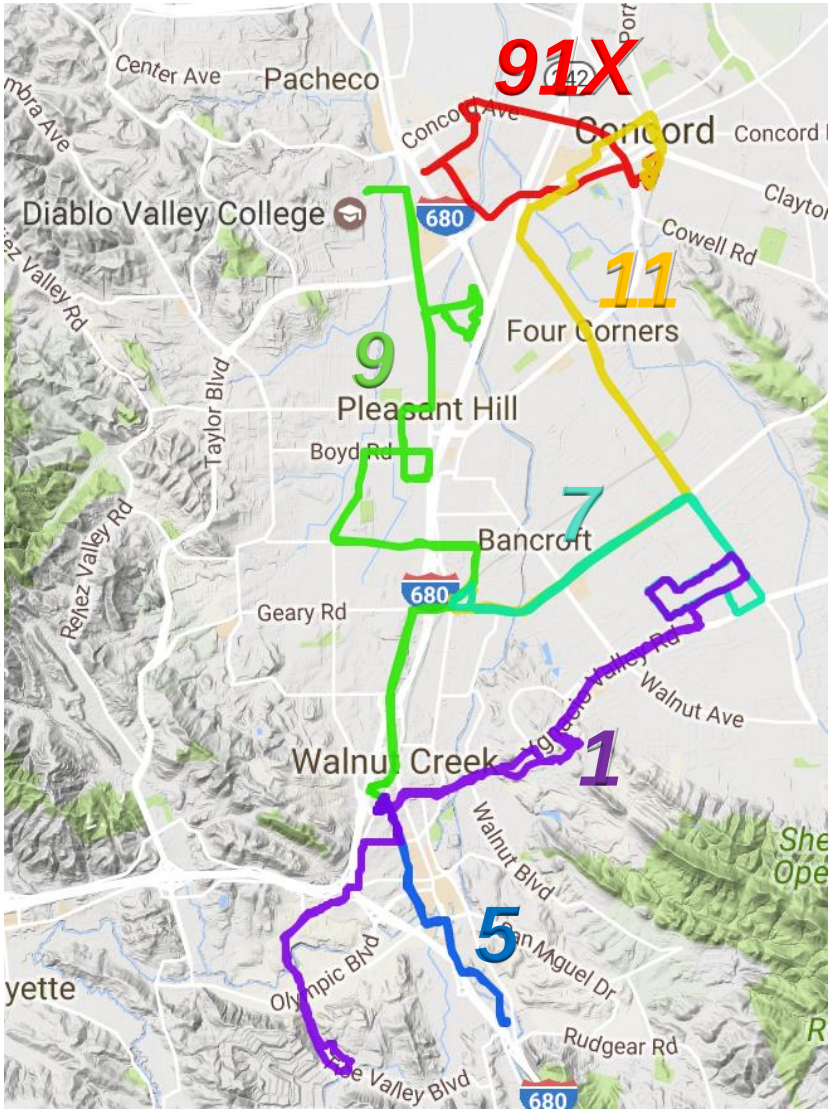
Goals

- Choose an appropriate route and charger location that is driven by objective, data-driven information
- Reduce operational risk and ensure the lowest operational costs for the electric bus deployment
- Educate and provide expectations to County Connection staff regarding how the electric buses will operate in service

Route Evaluation

Initial review of service characteristics narrowed down to six potential routes for evaluation:

- Route 1
- Route 5
- Route 7
- Route 9
- Route 11
- Route 91X



Route Characterization

Selection Process

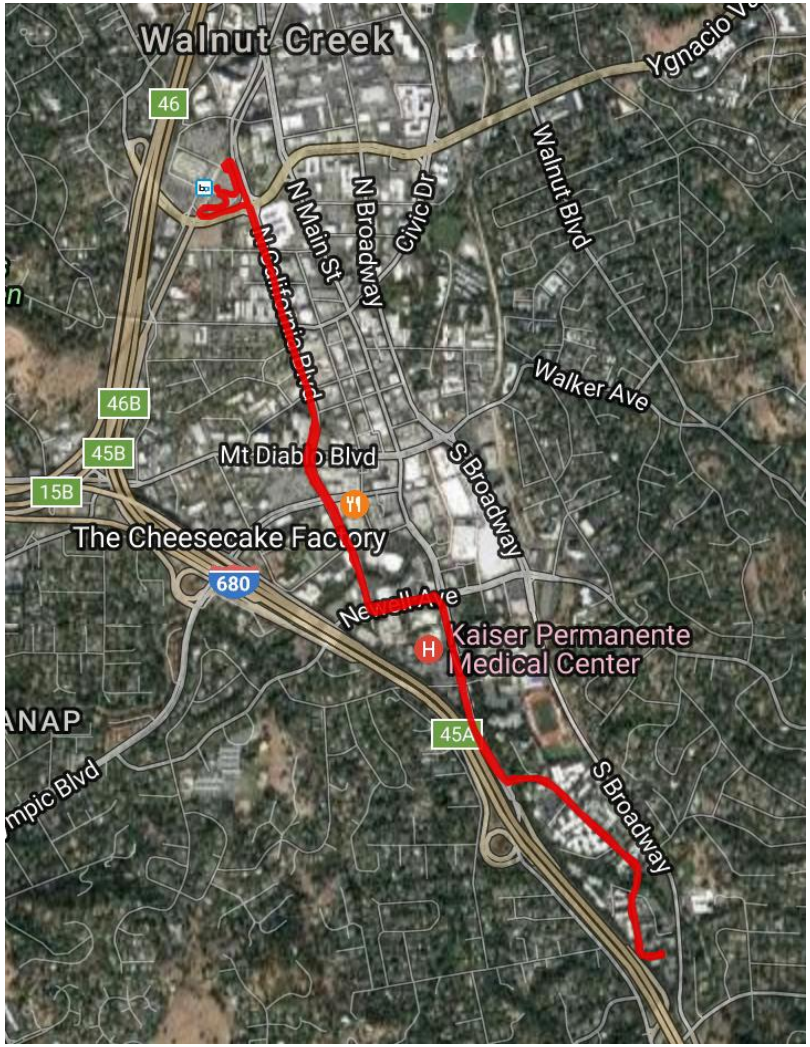
- Assessed routes based on current system status
- Determined which routes could be supported by a 29’ electric bus and wireless charging system
- Used modeling and simulation to determine which routes the buses are capable of meeting existing service requirements
- Evaluated and compared additional route characteristics and electric bus impacts to down select optimal route

Route Data Collection

Collected real-world bus GPS data to accurately capture:

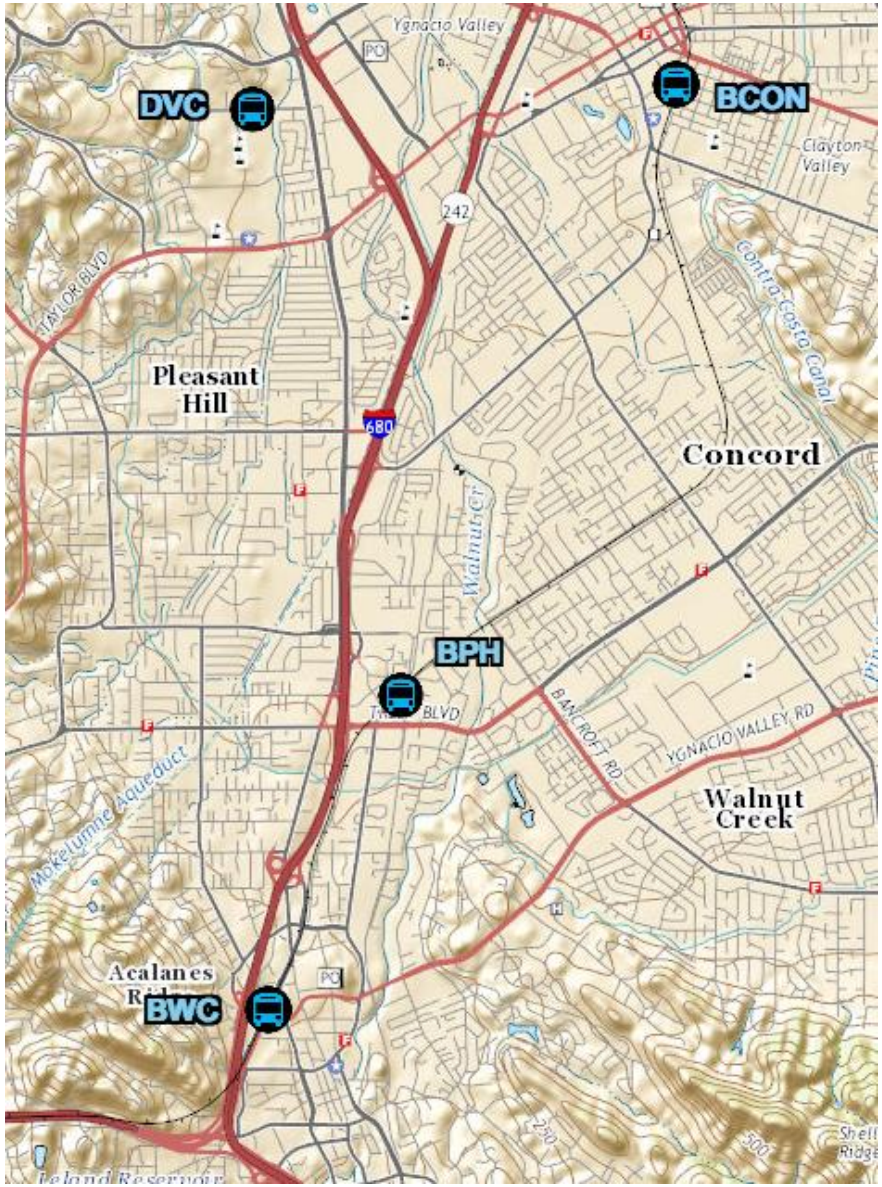
- time on route
- route distance
- roadway grade
- baseline bus speed
- baseline bus acceleration

Baseline GPS data was collected on actual routes from County Connection buses in regular service from Feb 1-7



On Route Charging Considerations

Considered charging locations at BART Concord, BART Pleasant Hill, Diablo Valley College (DVC), or second charger at BART Walnut Creek.



Bus Modeling

Route 91X

Description:

- Total distance is 33 miles per block
- Two bus blocks, one in the morning and one in the afternoon
- The wireless charger would need to be installed at BART Concord station

Pros:

- Service can easily be met under moderate and strenuous conditions

Cons:

- Only one bus needed for service; getting four buses
- No charger redundancy in case station goes down
- Lower ridership at 12 boardings per hour

Route 7

Description:

- Six bus blocks, 3 buses in the morning pull out and 3 in the afternoon pullout
- Total distance ranges from 45 to 61 miles
- The wireless charger would need to be installed at BART Pleasant Hill station
- A charging station at BART Pleasant Hill could potentially also help serve Routes 9 and 11, if electrified

Pros:

- Service can be met under most all conditions
- Good ridership at 20 boardings per hour

Cons:

- No charger redundancy in case station goes down
- Rare worst case conditions should be monitored for bus energy and prepared for – additional charge time or bus change out
- Two buses (assuming the spare bus is available) would need to be charged immediately upon returning to the bus yard in order to be ready 3-4 hours later

Route 5 - Recommended

Description:

- Four blocks with one bus running all day, two buses in the morning and two in the afternoon
- Total distance ranges from 37 to 88 miles
- The wireless charger would need to be installed at BART Walnut Creek station with existing charger

Pros:

- Service can be met under most all conditions
- Great ridership at 30 boardings per hour
- Redevelopment activities at BART Walnut Creek also allow for site design and construction activities to be considered, included and potentially absorbed into existing efforts

Cons:

- Rare worst case conditions should be monitored for bus energy and prepared for – additional charge time or bus change out

Route Comparison Summary

	Route 5	Route 7	Route 91X
Charger Location	*Bart Walnut Creek*	*Bart Pleasant Hill*	*Bart Concord*
Projected ability to meet max route operating requirements under nominal conditions			
Ability to mitigate risk with smaller blocks			
Ability to mitigate risk with extra layover time			
Number of buses serving route			
Charger redundancy			
Future Route Plans - potential to change or go away?			
BEB scale up consideration - ability to serve other routes			
Ridership - Promotion			
Other Considerations			

Conclusions

- The Gillig all-electric buses and wireless charger could serve routes 5, 7, 91X.
- Route 5 provides best opportunity to reduce operational risk, potentially reduce upfront cost, and promote clean zero emission service.

Questions?

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