Santa Clara Valley Transportation Authority

# STATE ROUTE 85 CORRIDOR POLICY ADVISORY BOARD

Monday, February 26, 2018

10:00 AM

Cupertino Community Hall
10350 Torre Avenue
Cupertino, CA 95014

## AGENDA

## CALL TO ORDER

**1. ROLL CALL**

**2. PUBLIC PRESENTATIONS:**

This portion of the agenda is reserved for persons desiring to address the Committee on any matter not on the agenda. Speakers are **limited to 2 minutes**. The law does not permit Committee action or extended discussion on any item not on the agenda except under special circumstances. If Committee action is requested, the matter can be placed on a subsequent agenda. All statements that require a response will be referred to staff for reply in writing.

**3. ORDERS OF THE DAY**

**4.** Receive Committee Staff Report. (Verbal Report) (Augenstein)

## CONSENT AGENDA

**5.** ACTION ITEM - Approve the Regular Meeting Minutes of November 21, 2017.

**6.** ACTION ITEM - Approve the Regular Meeting Minutes of December 11, 2017.

## REGULAR AGENDA

**7.** INFORMATION ITEM - Receive an update on State Route (SR) 85 Transit Guideway Study.

**8.** INFORMATION ITEM - Receive a presentation on State Route (SR) 85 Transit Guideway Study funding status.

**9.** ACTION ITEM - Approve the 2018 State Route (SR) 85 Corridor Policy Advisory Board (PAB) Meeting Schedule.

**10.** INFORMATION ITEM - Receive a presentation on hypothetical transit travel speeds.

**11.** INFORMATION ITEM - Receive a presentation on light rail and bus costs components and peer agency comparison.

**12.** INFORMATION ITEM - Receive a presentation on State Route (SR) 85 corporate shuttle operations.

**13. ANNOUNCEMENTS**

**14. ADJOURN**

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All reports for items on the open meeting agenda are available for review in the Board Secretary's Office, 3331 North First Street, San Jose, California, (408) 321-5680, the Wednesday, Thursday, and Friday prior to the meeting. This information is available on VTA's website at http://www.vta.org and also at the meeting.

Santa Clara Valley Transportation Authority

# STATE ROUTE 85 CORRIDOR POLICY ADVISORY BOARD

Tuesday, November 21, 2017

**MINUTES**

## CALL TO ORDER

The Regular Meeting of the State Route 85 Corridor Policy Advisory Board (SR 85) was called to order at 2:00 p.m. by Chairperson McAlister in Mountain View City Hall, Council Chambers, 500 Castro Street, 2nd Floor, Mountain View, CA 94041.

### 1. ROLL CALL

| Attendee Name | Title | Representing | Status |
|---|---|---|---|
| Mary-Lynne Bernald | Alternate Member | City of Saratoga | n/a |
| Jeannie Bruins | Member | City of Los Altos | Absent |
| Barry Chang | Alternate Member | City of Cupertino | n/a |
| Burton Craig | Alternate Member | City of Monte Sereno | n/a |
| Sergio Jimenez | Member | City of San José | Absent |
| Larry Klein | Member | City of Sunnyvale | Present |
| Lynette Lee Eng | Alternate Member | City of Los Altos | Absent |
| John McAlister | Chairperson | City of Mountain View | Present |
| Russ Melton | Alternate Member | City of Sunnyvale | n/a |
| Howard Miller | Vice Chairperson | City of Saratoga | Present |
| Rob Rennie | Member | City of Los Gatos | Present |
| Paul Resnikoff | Alternate Member | City of Campbell | n/a |
| Marico Sayoc | Alternate Member | City of Los Gatos | n/a |
| Leonard Siegel | Alternate Member | City of Mountain View | n/a |
| Rod Sinks | Member | City of Cupertino | Present |
| Rowena Turner | Member | City of Monte Sereno | Present |
| Rich Waterman | Member | City of Campbell | Present |
| *Vacant* | Alternate Member | City of San José | n/a |
| *Vacant* | Member | County of Santa Clara | n/a |
| *Vacant* | Alternate Member | County of Santa Clara | n/a |
| Bijan Sartipi | Ex-Officio Member | Caltrans | Absent |
| Dan McElhinney | Alt. Ex-Officio Member | Caltrans | Present |

**A quorum was present.**

### 2. PUBLIC PRESENTATIONS

Meir Levi, Interested Citizen, commented on highway noise and requested an update at a future meeting.

### 3. ORDERS OF THE DAY

There were no Orders of the Day.

### 4. Committee Staff Report

Jim Unites, Deputy Director of Transit Planning & Capital Development, provided a brief report, highlighting the updated 2016 Measure B State Route (SR) 85 Program Area Guidelines as approved by the VTA Board of Directors (Board) on November 7, 2017.

## CONSENT AGENDA

### 5. Regular Meeting Minutes of September 25, 2017

**M/S/C (Klein/Sinks)** to approve the Regular Meeting Minutes of September 25, 2017.

**Public Comment**

Steven Levin, Interested Citizen, made the following comments referring to **Agenda Item #7:** State Route 85 Transit Guideway Study Community Engagement Plan and requested that future meeting minutes provide more detailed information about what was said.

Member Sinks agreed that more detail should be provided in meeting minutes regarding public comment as well as Committee discussion.

| | |
|---|---|
| **RESULT:** | **APPROVED [UNANIMOUS] – Agenda Item #5** |
| **MOVER:** | Larry Klein, Member |
| **SECONDER:** | Rod Sinks, Member |
| **AYES:** | Klein, McAlister, Miller, Rennie, Sinks, Turner, Waterman |
| **ABSENT:** | Bruins, Jimenez |

## REGULAR AGENDA

### 6. State Route (SR) 85 Outreach Efforts

David Lovato, Public Communication Specialist, provided a summary on community outreach efforts.

Discussion ensued on the following: 1) trends by community; 2) community feedback and concerns; and 3) conducting a second survey.

**On order of Chairperson McAlister** and there being no objection, the Committee received a presentation on Community Outreach to date.

### 7. State Route (SR) 85 Transit Travel Market Analysis

Adam Burger, Senior Transportation Planner, provided a presentation entitled, "State Route 85 (SR 85) Transit Guideway Study: Travel Market Analysis."

**Public Comment**

Doug Muirhead, Interested Citizen, made the following comments: 1) expressed concern about taking service from other routes; and 2) using the longer commute time on transit productively.

Roland Lebrun, Interested Citizen, commented on the following: 1) buses are faster than light rail; 2) tram trains in Europe; and 3) expressed concern that the meeting is not being video recorded and broadcast.

Cheriel Jensen, Interested Citizen, expressed support for transit along the SR 85 corridor.

Alternate Ex-Officio Member McElhinney took his seat at 2:33 p.m.

Members of the Committee discussed the following: 1) peak periods of transit travel; 2) reversible lanes along SR 85; 3) interim options while a permanent solution is built; 4) carpool lane speed; 5) farebox recovery; 6) autonomous vehicles; and 7) context of where transit is working well.

Members of the Committee made the following requests: 1) look at how other areas on the West Coast have made light rail work; 2) distribute at each meeting a placemat showing project process timeline; and 3) comparison of maintenance costs between buses and rail vehicles.

**On order of Chairperson McAlister** and there being no objection, the Committee received a presentation on State Route (SR) 85 Transit Travel Market.

**8. State Route (SR) 85 Right-of-Way Analysis**

Mr. Burger provided a presentation entitled, "SR 85 Transit Guideway Study: Light Rail/Bus Rapid Transit (BRT) Constraints Analysis."

**Public Comment**

Mr. Lebrun expressed support for a transit lane and offered the following suggestions: 1) utilize matching funds to build the project; and 2) create a transit lane with bus convoys.

Ms. Jensen advocated for using the air space above SR 85 for transit.

Mr. Levi made the following comments: 1) light rail vehicle life span versus bus life span; and 2) light rail serves the community and provides housing solutions through multi-family housing.

Members of the Committee commented on the following: 1) finding creative solutions; 2) terminus in the North; 3) Senate Bill 1 funding; and 4) station spacing and location.

Members of the Committee made the following requests: 1) a memo from Jarrett Walker describing why transit in the City of Portland works well; and 2) the number of people who travel on SR 85.

**On order of Chairperson McAlister** and there being no objection, the Committee received a presentation on SR 85 Right-of-Way Constraints.

## 9. ANNOUNCEMENTS

Member Sinks made the following announcements: 1) the cities which blocked the express lanes have settled with VTA and Caltrans; and 2) recording meetings held in Cupertino. Mr. Sinks will work with the City of Cupertino Staff to provide video recordings for meetings held in their Chambers.

## 10. ADJOURNMENT

**On order of Chairperson McAlister** and there being no objection, the meeting was adjourned at 3:29 p.m.

Respectfully submitted,

Thalia Young, Board Assistant
VTA Office of the Board Secretary

Santa Clara Valley Transportation Authority

**STATE ROUTE 85 CORRIDOR POLICY ADVISORY BOARD**

Monday, December 11, 2017

**MINUTES**

## CALL TO ORDER

The Regular Meeting of the State Route 85 Corridor Policy Advisory Board (SR 85) was called to order at 10:02 a.m. by Vice Chairperson Miller in Community Hall, 10350 Torre Avenue, Cupertino, California.

### 1. ROLL CALL

| Attendee Name | Title | Representing | Status |
|---|---|---|---|
| Mary-Lynne Bernald | Alternate Member | City of Saratoga | n/a |
| Jeannie Bruins | Member | City of Los Altos | Absent |
| Barry Chang | Alternate Member | City of Cupertino | n/a |
| Burton Craig | Alternate Member | City of Monte Sereno | Absent |
| Sergio Jimenez | Member | City of San José | Present |
| Larry Klein | Member | City of Sunnyvale | Present |
| Lynette Lee Eng | Alternate Member | City of Los Altos | Absent |
| John McAlister | Chairperson | City of Mountain View | Absent |
| Russ Melton | Alternate Member | City of Sunnyvale | n/a |
| Howard Miller | Vice Chairperson | City of Saratoga | Present |
| Rob Rennie | Member | City of Los Gatos | Absent |
| Paul Resnikoff | Alternate Member | City of Campbell | n/a |
| Marico Sayoc | Alternate Member | City of Los Gatos | Absent |
| Leonard Siegel | Alternate Member | City of Mountain View | Absent |
| Rod Sinks | Member | City of Cupertino | Present |
| Rowena Turner | Member | City of Monte Sereno | Absent |
| Rich Waterman | Member | City of Campbell | Present |
| *Vacant* | Alternate Member | City of San José | n/a |
| *Vacant* | Member | County of Santa Clara | n/a |
| *Vacant* | Alternate Member | County of Santa Clara | n/a |
| Bijan Sartipi | Ex-Officio Member | Caltrans | Absent |
| Dan McElhinney | Alt. Ex-Officio Member | Caltrans | Present |

**A quorum was not present and a Committee of the Whole was declared.**

### 2. PUBLIC PRESENTATIONS

There were no Public Presentations.

### 3. ORDERS OF THE DAY

There were no Orders of the Day.

### 4. Committee Staff Report

Chris Augenstein, Director of Planning & Programming and Staff Liaison, provided a brief report, highlighting the following: 1) staff is nearing the end of the first stage of the SR 85 Transit Guideway Study; 2) public meeting comments; and 3) the video survey data was received late and staff did not have sufficient time to review the data.

Discussion ensued on changing the meeting schedule for 2018 to meet more frequently.

**On order of Vice Chairperson Miller** and there being no objection, the Committee of the Whole received the Committee Staff Report.

## CONSENT AGENDA

### 5. Regular Meeting Minutes of November 21, 2017

**On order of Vice Chairperson Miller** and there being no objection, the Committee of the Whole deferred the Regular Meeting Minutes of November 21, 2017.

## REGULAR AGENDA

### 6. SR 85 Transit Guideway Study Progress

Adam Burger, Senior Transportation Planner, provided a presentation entitled "State Route (SR) 85 Transit Guideway Study: Study Progress."

**Public Comment**

Connie Cunningham, Interested Citizen, expressed support for light rail and urged the Committee to move forward with it.

Members of the Committee discussed the following: 1) the study schedule; and 2) factors affecting when a recommendation can be made to the Board of Directors.

**On order of Vice Chairperson Miller** and there being no objection, the Committee of the Whole received a presentation on the State Route (SR) 85 Transit Guideway Study progress.

### 7. Online Survey Results, Public Meeting Input and Analysis

Mr. Burger provided a presentation entitled "State Route (SR) 85 Transit Guideway Study: Online Survey Results, Public Input."

**Public Comment**

Roland Lebrun, Interested Citizen, made the following comments: 1) Express buses are faster than driving; 2) people are driving to transit creating a parking issue; and 3) non-transit riders are parking in lot on Cottle Road.

Steve Levin, Interested Citizen, made the following comments: 1) the public knows what they need; 2) SR 87 is a light rail failure.

Jim Stallman, Interested Citizen, commented on the following: 1) Caltrain corridor could make a great light rail segment when it is electrified; 2) SR 85 can only support a certain level of traffic; and 3) a second HOV lane between SR 87 and Interstate 280 on SR 85.

Ms. Cunningham commented on the following: 1) advocated for light rail; 2) bus rapid transit would work since the roads are already in place; 3) as the area grows options are needed; and 4) look to future users and not the current users.

Cheriel Jensen, Interested Citizen, made the following comments: 1) a tram system was not an option on the survey; 2) original HOV lane was only up to Cupertino and not further North; and 3) traffic when a lane is eliminated.

Members of the Committee discussed the following: 1) day time travel while people are at work requires a car; 2) feasible transit options; 3) corporate car share; 4) flexibility is necessary for families; and 5) bike share compliments transit.

**On order of Vice Chairperson Miller** and there being no objection, the Committee of the Whole received a presentation on the State Route (SR) 85 Online Survey Results, Public Meeting Input and Analysis.

**8. Origin-Destination Trip Analysis**

Mr. Burger provided a presentation entitled "State Route (SR) 85 Transit Guideway Study: Origin-Destination Trip Analysis."

Discussion ensued on the following: 1) how stops affect travel time; 2) on and off ramp data; 3) light rail speed; and 4) surface streets are being used to avoid the SR 85 bottleneck.

**Public Comment**

Mr. Lebrun made the following comments: 1) suggested the Committee look at bike superhighways which go faster than transit; 2) expressed displeasure with the trip origin data presented; and 3) maximum speed for light rail is 55 miles per hour (mph) and 45 mph when passing through stations.

Mr. Levin made the following comments: 1) express light rail trips skip six stations and save four minutes; and 2) provided reasons why people do not take transit.

Ms. Jensen commented that when she is in San Francisco she uses transit because it goes where she wants to go.

Staff will return with a table illustrating time traveled by all viable modes of transportation (light rail, express light rail along SR 87, bus, Express bus, corporate bus, etc.) as requested by the Committee.

**On order of Vice Chairperson Miller** and there being no objection, the Committee of the Whole received a presentation on the State Route (SR) 85 Origin-Destination Trip Analysis.

## 9. SR 85 Video Survey Analysis

Mr. Burger stated that the data was received late on December 10, 2017, but noted that a detailed memo will be provided to the Committee when staff completes the review. A brief review of the data showed there are a significant number of tech buses along the corridor.

### Public Comment

Mr. Lebrun commented that people in South County cannot afford to use on demand ridesharing daily to where their jobs are in North County but can use vanpooling.

Mr. Levin commented on the following: 1) the Committee is making an issue of the superzones; 2) light rail service exists in the Almaden area, as well as Caltrain, but neither is well used; and 3) Express buses are in place from South County to North County.

**On order of Vice Chairperson Miller** and there being no objection, the Committee of the Whole received the State Route (SR) 85 Video Survey Analysis.

## 10. ANNOUNCEMENTS

There were no Announcements.

## 11. ADJOURNMENT

**On order of Vice Chairperson Miller** and there being no objection, the meeting was adjourned at 11:42 a.m.

Respectfully submitted,

Thalia Young, Board Assistant
VTA Office of the Board Secretary

Santa Clara Valley Transportation Authority

Date: February 20, 2018
Current Meeting: February 26, 2018
Board Meeting: N/A

**BOARD MEMORANDUM**

**TO:** Santa Clara Valley Transportation Authority
State Route 85 Corridor Policy Advisory Board

**THROUGH:** General Manager, Nuria I. Fernandez

**FROM:** Director - Planning & Programming, Chris Augenstein

**SUBJECT:** SR 85 Transit Guideway Study Overview and Schedule

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**FOR INFORMATION ONLY**

## BACKGROUND:

2016 Measure B identifies and estimated $350 million that will be collected over 30 years for the SR 85 corridor. Eligible uses of the funds are noise abatement--which is in development through a separate effort--installation of a "transit lane" on SR 85 and a study that will provide a definition for what the "transit lane" will be. The SR 85 Transit Guideway Study is that study. This memo provides an overview of the SR 85 Transit Guideway Study process, purpose and work conducted to date. It is intended to serve as a primer for new Policy Advisory Board (PAB) members.

## DISCUSSION:

The SR 85 Transit Guideway Study is an analysis of potential transit infrastructure projects that could be built on Highway 85. It will consider multiple project concepts including two that are mandated by Measure B: light rail with median stations and bus rapid transit (which presumably also uses median stations). The SR 85 Policy Advisory Board, which is overseeing the study, will work with VTA staff to develop potential projects that will subsequently be studied in an in-depth alternatives analysis. The alternatives analysis will produce a report that compares each of the alternatives across many metrics such as ridership, cost to build, cost to operate, travel speed, greenhouse gas emissions, etc. A full list of alternatives analysis metrics can be found in Attachment A. The purpose of the analysis is to provide the PAB and VTA's Board of Directors with a fair and accurate accounting of each project that can inform their decision about transit infrastructure investment on the SR 85 corridor.

### Work to Date

The PAB has been working on Task 1 of the study, which entails developing an understanding of the travel market on SR 85, engineering constraints along the corridor (such as whether there

sufficient space to build a transit project) as well as asking questions pertinent to transit service such as costs, capacity and travel speed. Staff has also conducted the first of two rounds of community outreach, holding three public meetings (two of which were webcasted) and an online survey.

*Understanding the Travel Market*

VTA's analysis has focused on where people are going, how fast they are traveling and whether a transit service can be competitive with driving along the corridor. In short, travel along the corridor is primarily auto-oriented and directional with long durations of congestion during the AM northbound and PM southbound commutes. An analysis of mobile device location data showed that SR 85 travelers are not necessarily traveling between a few major locations but that traffic on SR 85 is comprised of many diverse, overlapping trips. Many corporate shuttles make use of SR 85 on weekdays and these shuttles could be beneficiaries of a transit lane. An analysis of corporate shuttle volumes can be found later in this agenda packet.

An online survey that received nearly 2,500 responses showed that travelers along the corridor would welcome an alternative to driving on SR 85 during commute periods. The survey also revealed that respondents are quite time-sensitive and envision accessing SR 85 transit stations using automobiles, suggesting that the potential transit service must be fast and accommodate vehicle parking.

Transit trips are fundamentally different from driving trips as transit trips consist of four components: accessing the station, waiting for the transit vehicle to arrive, time onboard and accessing the destination. A central question is whether the project designs developed by the PAB can be fast and convenient enough to offset the time spent on the other transit trip components, and be competitive with driving.

For further discussion and analysis, see item 7 of the November 21, 2017 PAB meeting agenda packet and item 8 of the December 11 PAB meeting agenda packet.

*Constraints Analysis*

A new transit lane has the potential to require additional space. A light rail guideway would require 32 feet of space while a bus lane would require 24 feet of space. Our analysis of the corridor found that median widths south of McClellan Road are 45 feet wide or greater-more than enough space to accommodate a median transit lane-regardless of mode. However the portion of SR 85 north of McClellan Road is narrower, ranging from 32 feet wide at McClellan to 20 feet wide near SR 237. In the narrow segment, freeway widening-particularly at station areas-would be necessary and some bridges would need to be widened and some would need to be replaced entirely. Our engineers envision an aerial guideway being necessary between US 101 and somewhere south of El Camino Real to accommodate a transit lane.

For further discussion and analysis of constraints, see item 8 of the November 21, 2017 PAB meeting agenda packet.

<u>Future Work</u>

Once the PAB has an understanding of the travel market and corridor constraints, the PAB will begin Task 2, which will entail developing project designs that will be studied in the alternatives analysis. Task 2 will take on a workshop-style approach as ideas are considered and refined and new questions are asked. This iterative process will likely take a few months. Once the PAB is

content with the conceptual designs that have been developed, Task 3, the alternatives analysis will begin. During this time, VTA staff will spend a few months analyzing each of the project designs in detail and will produce a report comparing each of the designs. The PAB's work on the Transit Guideway Study will conclude with a recommendation to VTA's Board of Directors about which investment strategy they would like to see VTA pursue. The Board of Directors will subsequently consider the recommendation.

Express Lanes Context

A separate effort being pursued by VTA is the Silicon Valley Express Lanes Program. Express lanes allow HOVs (vehicles with two or more occupants) to use the express lane for free and allow single-occupant vehicles (SOVs) to purchase access to the lane at a price that varies based on congestion levels. This effort envisions converting HOV lanes to express lanes throughout Santa Clara County as well as installing new express lanes in some places. The Silicon Valley Express Lanes Program and the SR 85 Transit Guideway Study are both eyeing the same portion of SR 85 median between McClellan Road and SR 87 for their uses. As such, the decision about a transit investment on SR 85 is interconnected with an express lanes decision. VTA's Board of Directors will consider all options upon completion of the SR 85 Transit Guideway Study.

Schedule

The schedule of the SR 85 Transit Guideway Study is uncertain due to the continuing Measure B legal challenge. VTA's Board of Directors authorized non-2016 Measure B funding to advance work on Task 1 of the SR 85 Transit Guideway Study while the 2016 Measure B legal challenge was pending. The Board envisioned that the legal challenge would be resolved by the time Task 1 was completed and that subsequent work would be funded by Measure B. Though a Santa Clara County court ruled favorably in 2017, a subsequent appeal has continued to delay the flow of Measure B funds to Santa Clara County projects. As such, the study is set to pause work around April 2018, when Task 1 is completed. It is envisioned that Task 2, development of project alternatives, and Task 3, alternatives analysis, will take about 8 to 10 months to complete, once work has begun. A ruling on the appeal is expected within the next six to 12 months.

Prepared By: Adam Burger
Memo No. 6444

# Standard Alternatives Analysis Metrics and Considerations

The following metrics are standard for alternatives analysis—though they may be expanded or contracted per the Policy Advisory Board's direction.

1) Constructability
2) Right-of-Way Requirements
3) Cost (Capital and Operations/Maintenance)
4) Transit Operations
    a. Travel time savings
    b. Operating cost savings
    c. Transit Reliability
    d. Fleet Requirements – (potential autonomous vehicles and vehicle to infrastructure technology)
5) Potential Ridership
    a. Total ridership
    b. New transit riders
6) Traffic Operations/Safety
7) Potential Environmental Impacts/Mitigations Required
    a. Air Quality
    b. Noise
    c. Land Use (Parks, Open Space, Sensitive Receptors)
    d. Cultural Resources
    e. Hydrology
    f. Hazardous Materials
    g. Traffic/Transportation
    h. Biological
8) Consistency with Current Plans and Policies
9) Funding Potential
10) Institutional Considerations
11) Cost-Effectiveness and Cost-Benefit Assessment
12) Project Benefits
    a. Reduction of Drive Alone Trips
    b. VMT reduction – emissions
    c. Quality of Life/Mobility Choices
    d. Economic Benefits

# SR 85 Transit Guideway Study

## Study Progress

February 26, 2018

Santa Clara Valley Transportation Authority

*Solutions that move you*

# SR 85 Transit Guideway Study Process

| | |
|---|---|
| Task 1 | Travel Market Analysis, Constraints Analysis |
| Task 2 | Develop alternatives to be analyzed (2-4 months) |
| Task 3 | Alternatives Analysis (~6 months) |
| PAB | Recommendation to VTA Board of Directors |

Solutions that move you

Santa Clara Valley Transportation Authority

Date: February 16, 2018
Current Meeting: February 26, 2018
Board Meeting: N/A

**BOARD MEMORANDUM**

**TO:** Santa Clara Valley Transportation Authority
State Route 85 Corridor Policy Advisory Board

**THROUGH:** General Manager, Nuria I. Fernandez

**FROM:** Director - Planning & Programming, Chris Augenstein

**SUBJECT:** SR 85 Transit Guideway Study Funding Status

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**FOR INFORMATION ONLY**

## BACKGROUND:

The funding for the SR 85 Transit Guideway Study is intended come from the 2016 Measure B. Measure B is currently under legal challenge and the revenues being generated are being placed in an escrow account, unable to be spent until the legal challenge is resolved. Due to interest in advancing the SR 85 Transit Guideway Study, in May 2017, VTA's Board of Directors approved the allocation of $400,000 in 2000 Measure A funds to begin work on Task 1 of the study, which included a travel market analysis and corridor constraints analysis. Work on future tasks was to be funded by Measure B. At the time, the Board of Directors envisioned that the lawsuit would be resolved by the time Task 1 was completed. Though a Santa Clara County court ruled in VTA's favor in mid-2017, a subsequent appeal will continue to keep Measure B funds tied up for potentially six to 12 more months.

## DISCUSSION:

Work on Task 1 is expected to be complete in April 2018. At that point, work on the project will pause until favorable resolution of the 2016 Measure B legal challenge occurs.

Prepared By: Adam Burger
Memo No. 6438

# SR 85 Transit Guideway Study

## Funding Status

February 26, 2018

Santa Clara Valley Transportation Authority

*Solutions that move you*

# Tasks 2 and 3 require 2016 Measure B funding

| | |
|---|---|
| May 2017 | VTA Board authorizes $400,000 for Task 1 |
| April 2018 | Task 1 complete |
| Mid-Late 2018 | Judicial decision |

Solutions that move you

Santa Clara Valley Transportation Authority

Date: February 2, 2018
Current Meeting: February 26, 2018
Board Meeting: N/A

**BOARD MEMORANDUM**

**TO:** Santa Clara Valley Transportation Authority
State Route 85 Corridor Policy Advisory Board

**THROUGH:** General Manager, Nuria I. Fernandez

**FROM:** Board Secretary, Elaine Baltao

**SUBJECT:** 2018 SR 85 Corridor Policy Advisory Board Meeting Schedule

**Policy-Related Action: No** **Government Code Section 84308 Applies: No**

# ACTION ITEM

## RECOMMENDATION:

Approve the 2018 State Route (SR) 85 Corridor Policy Advisory Board (PAB) Meeting Schedule.

## BACKGROUND:

The VTA SR 85 Corridor PAB will generally meet quarterly on the fourth Monday of the month, except for the month of December, which will be held on the second Monday. The following meeting dates are proposed for 2018. The SR 85 Corridor PAB generally meets at Community Hall, 10350 Torre Avenue, Cupertino, at 10:00 a.m., or as otherwise posted.

| | |
|---|---|
| Monday, February 26, 2018 | 10:00 a.m. |
| Monday, May 21, 2018 | 10:00 a.m. |
| Monday, September 24, 2018 | 10:00 a.m. |
| Monday, December 10, 2018 (second Monday) | 10:00 a.m. |

## FISCAL IMPACT:

There is no fiscal impact as a result of this action.

Prepared by: Thalia Young
Memo No. 6436

Santa Clara Valley Transportation Authority

Date: February 16, 2018
Current Meeting: February 26, 2018
Board Meeting: N/A

**BOARD MEMORANDUM**

**TO:** Santa Clara Valley Transportation Authority
State Route 85 Corridor Policy Advisory Board

**THROUGH:** General Manager, Nuria I. Fernandez

**FROM:** Director - Planning & Programming, Chris Augenstein

**SUBJECT:** Hypothetical Transit Travel Speed Analysis

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**FOR INFORMATION ONLY**

## BACKGROUND:

At the December 2017 Policy Advisory Board meeting, members of the PAB expressed an interest in understanding the travel speeds and travel times that light rail and bus would be able to achieve between destinations along SR 85. The PAB wanted to understand how the different modes compared with each other as well as whether they could be time-competitive with driving. To be competitive, decreases in time spent traveling would need to offset the time required for the other aspects of a transit trip: accessing the station, waiting for the vehicle to arrive and accessing the destination.

At the PAB's request, staff has assembled a series of hypothetical stopping patterns and calculated travel times for bus and light rail for each. For context, staff has also calculated the average driving travel times during the AM peak, PM peak and off-peak periods. This high-level analysis is meant to provide a sense for how each travel mode and stopping pattern would affect overall travel times. Decisions about actual stop locations and which stopping patterns will be pursued will be subject to more rigorous analysis and discussion during later stages of the study.

## DISCUSSION:

### Stopping Patterns

Three stopping patterns were developed to be exemplary of the range of potential options:

- Local stopping pattern (every stop observed, slowest end-to-end travel time)
- Major stops stopping pattern (8 of 16 stops observed, moderate end-to-end travel time)
- Super-express stopping pattern (only stops at US 101 North to US 101 South, fastest possible travel time)

Speed and Dwell Time Assumptions

The hypothetical scenarios assumed the following:

| | Light Rail | Bus |
|---|---|---|
| Top Speed | 50 MPH | 65 MPH |
| Speed Passing Stations | 35 MPH | 35 MPH |
| Dwell Time at Stations | 30 seconds | 30 seconds |

This analysis assumes that the bus or light rail is traveling along the freeway median unimpeded by other vehicles and serving in-line stations. Should the PAB choose to pursue a route that makes deviations from the corridor, such as those found in Minneapolis/St. Paul's express bus system or Portland's airport light rail line, end-to-end travel times would be greater than those presented in this analysis. The same would be true of a bus-on-shoulder scenario that would be slowed by mixing with traffic entering or exiting the freeway.

California Public Utility Commission (CPUC) regulations require light rail vehicles to decrease travel speed to 35 miles per hour when passing stations during express portions of routes. CPUC does not govern bus operations and no situation currently exists where a VTA bus would pass immediately adjacent to a station at high speed so there is no precedent for how quickly buses may pass stations. However, VTA generally feels that slowing down while passing stations is a worthwhile safety endeavor so the 35 mile per hour restriction has been applied to bus speeds for this analysis.

Most dwell times for light rail last between 10 and 20 seconds. However, VTA allows about 30 seconds of dwell time in the highway segment of the light rail system. This extra time serves as cushion and can be shortened if the driver has fallen behind the schedule and needs to make up time. That 30-second standard has been applied to light rail and bus in this analysis. Actual operating experience would provide the best insight into whether dwell times can be shortened.

Speed Summary

Below is a summary of end-to-end travel times for each of the scenarios, ranked by travel speed.

| | End-to-end Travel Time (minutes) | Average Speed |
|---|---|---|
| Driving - Off Peak | 21:32 | 65.0 MPH |
| Bus - Super-express | 24:45 | 56.5 MPH |
| Bus - Major Stops Pattern | 29:16 | 47.8 MPH |
| Light Rail - Super-express | 30:36 | 45.7 MPH |
| Light Rail - Major Stops | 40.1 MPH | |
| Pattern34:49 | | |
| Bus - Local Pattern | 35:10 | 39.8 MPH |
| Light Rail - Local Pattern | 40:23 | 34.6 MPH |
| Driving - AM Northbound | 1:02:45 | 20.1 MPH |
| Driving - PM Southbound | 1:10:13 | 18.1 MPH |

Attachment A graphs travel speeds by segments. In that graph, lines that are closer to horizontal indicate faster travel speeds while lines that are closer to vertical indicate slower travel speeds. Attachment B shows travel times between stations for the six scenarios and driving.

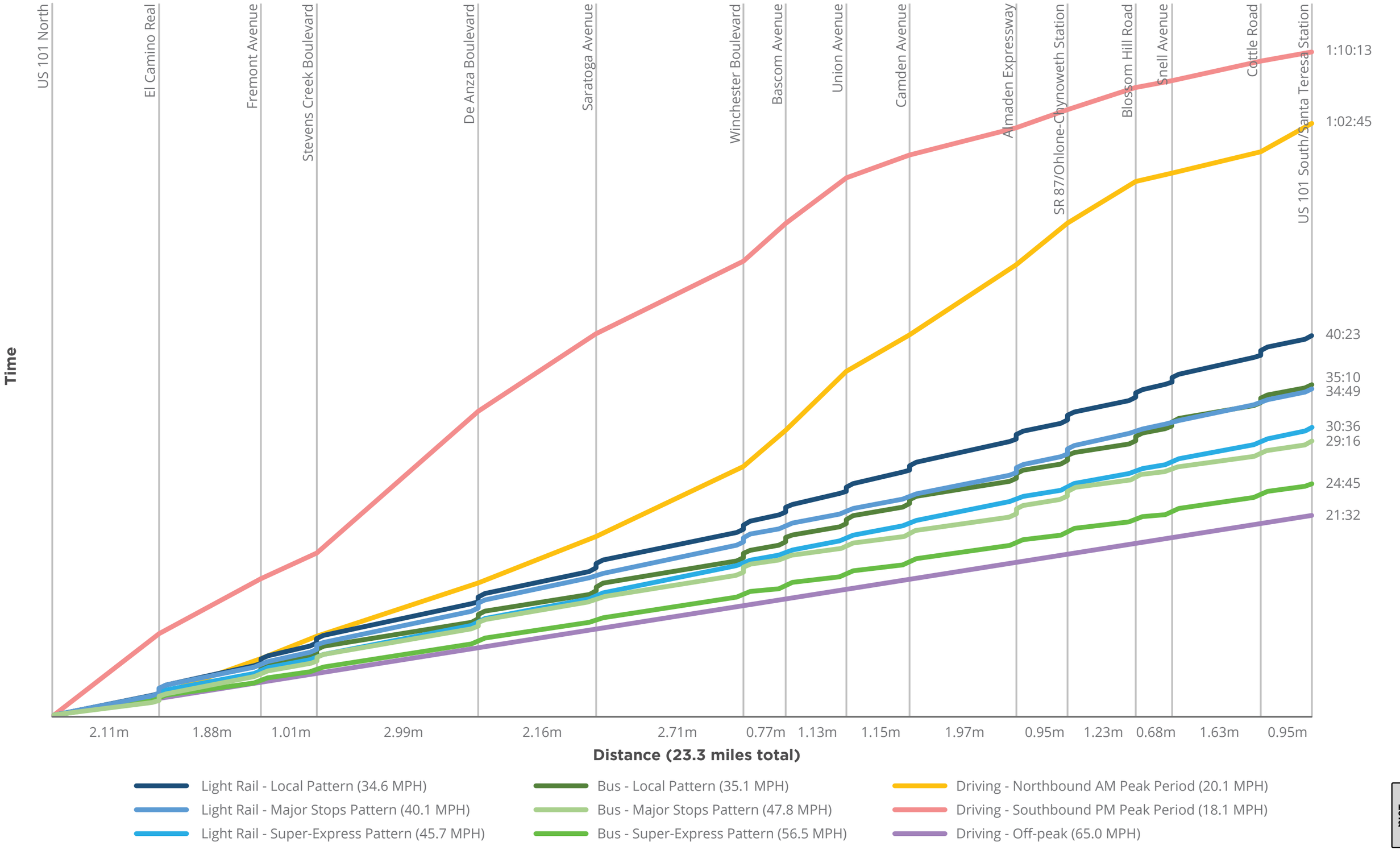
Transit Mode Choice Decision

These trip durations should be viewed in the context of being one portion of the transit trip. Transit riders will also spend time accessing a station, waiting for the transit vehicle to arrive and accessing their destination. Traveling faster on transit may not provide sufficient appeal to switch from driving to transit if the other portions of the trip result in an overall equal or longer travel time.

Non-time-related factors such as a change in stress, a change in trip cost, gaining productive time, not having automobile access during the day, parking costs, sharing a vehicle with strangers and pre-conceived notions about transit are also likely to affect each traveler's mode choice decision. As such, simply comparing overall trip durations will not provide a definitive assessment on who will or will not switch to transit. Rather, all travelers exist at different points along a spectrum of sensitivities and tolerances.

Prepared By: Adam Burger
Memo No. 6439

# Theoretical Travel Times for Light Rail, Bus and Driving on SR 85



**Light Rail - Travel Times for Local Pattern**

**Attachment B**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:03:24 | 0:06:30 | 0:08:35 | 0:13:02 | 0:16:29 | 0:20:36 | 0:22:23 | 0:24:36 | 0:26:50 | 0:30:03 | 0:32:03 | 0:34:24 | 0:36:04 | 0:38:53 | 0:40:23 |
| El Camino Real | | - | 0:03:07 | 0:05:11 | 0:09:38 | 0:13:05 | 0:17:12 | 0:18:59 | 0:21:12 | 0:23:26 | 0:26:40 | 0:28:40 | 0:31:00 | 0:32:41 | 0:35:30 | 0:37:00 |
| Fremont Avenue | | | - | 0:02:04 | 0:06:31 | 0:09:58 | 0:14:05 | 0:15:52 | 0:18:05 | 0:20:19 | 0:23:33 | 0:25:33 | 0:27:53 | 0:29:34 | 0:32:23 | 0:33:53 |
| Stevens Creek Boulevard | | | | - | 0:04:27 | 0:07:54 | 0:12:01 | 0:13:48 | 0:16:01 | 0:18:15 | 0:21:29 | 0:23:29 | 0:25:49 | 0:27:29 | 0:30:18 | 0:31:48 |
| De Anza Boulevard | | | | | - | 0:03:27 | 0:07:34 | 0:09:21 | 0:11:34 | 0:13:48 | 0:17:02 | 0:19:02 | 0:21:22 | 0:23:02 | 0:25:51 | 0:27:21 |
| Saratoga Boulevard | | | | | | - | 0:04:07 | 0:05:54 | 0:08:07 | 0:10:21 | 0:13:35 | 0:15:35 | 0:17:55 | 0:19:35 | 0:22:24 | 0:23:54 |
| Winchester Boulevard | | | | | | | - | 0:01:47 | 0:04:00 | 0:06:14 | 0:09:28 | 0:11:28 | 0:13:48 | 0:15:29 | 0:18:18 | 0:19:48 |
| Bascom Avenue | | | | | | | | - | 0:02:13 | 0:04:27 | 0:07:41 | 0:09:41 | 0:12:01 | 0:13:42 | 0:16:30 | 0:18:00 |
| Union Avenue | | | | | | | | | - | 0:02:14 | 0:05:28 | 0:07:28 | 0:09:48 | 0:11:29 | 0:14:18 | 0:15:48 |
| Camden Avenue | | | | | | | | | | - | 0:03:13 | 0:05:13 | 0:07:34 | 0:09:14 | 0:12:03 | 0:13:33 |
| Almaden Expressway | | | | | | | | | | | - | 0:02:00 | 0:04:20 | 0:06:01 | 0:08:50 | 0:10:20 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | 0:02:20 | 0:04:01 | 0:06:50 | 0:08:20 |
| Blossom Hill | | | | | | | | | | | | | - | 0:01:41 | 0:04:30 | 0:06:00 |
| Snell Avenue | | | | | | | | | | | | | | - | 0:02:49 | 0:04:19 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:01:30 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Light Rail - Travel Times for Major Stops Pattern**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:03:24 | - | 0:07:53 | 0:12:20 | - | 0:19:12 | - | - | - | 0:26:34 | 0:28:34 | - | - | - | 0:34:50 |
| El Camino Real | | - | - | 0:04:30 | 0:08:57 | - | 0:15:49 | - | - | - | 0:23:11 | 0:25:11 | - | - | - | 0:31:27 |
| Fremont Avenue | | | - | 0:01:59 | 0:06:25 | - | 0:13:18 | - | - | - | 0:20:40 | 0:22:40 | - | - | - | 0:28:55 |
| Stevens Creek Boulevard | | | | - | 0:04:27 | - | 0:11:19 | - | - | - | 0:18:41 | 0:20:41 | - | - | - | 0:26:57 |
| De Anza Boulevard | | | | | - | - | 0:06:52 | - | - | - | 0:14:14 | 0:16:14 | - | - | - | 0:22:30 |
| Saratoga Boulevard | | | | | | - | 0:04:01 | - | - | - | 0:11:23 | 0:13:23 | - | - | - | 0:19:39 |
| Winchester Boulevard | | | | | | | - | - | - | - | 0:07:22 | 0:09:22 | - | - | - | 0:15:38 |
| Bascom Avenue | | | | | | | | - | - | - | 0:06:11 | 0:08:11 | - | - | - | 0:14:26 |
| Union Avenue | | | | | | | | | - | - | 0:04:39 | 0:06:39 | - | - | - | 0:12:55 |
| Camden Avenue | | | | | | | | | | - | 0:03:06 | 0:05:06 | - | - | - | 0:11:22 |
| Almaden Expressway | | | | | | | | | | | - | 0:02:00 | - | - | - | 0:08:16 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | - | - | - | 0:06:16 |
| Blossom Hill | | | | | | | | | | | | | - | - | - | 0:04:31 |
| Snell Avenue | | | | | | | | | | | | | | - | - | 0:03:32 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:01:25 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Light Rail - Travel Times for Super-Express Pattern**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0:30:36 |
| El Camino Real | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0:27:48 |
| Fremont Avenue | | | - | - | - | - | - | - | - | - | - | - | - | - | - | 0:25:23 |
| Stevens Creek Boulevard | | | | - | - | - | - | - | - | - | - | - | - | - | - | 0:24:00 |
| De Anza Boulevard | | | | | - | - | - | - | - | - | - | - | - | - | - | 0:20:15 |
| Saratoga Boulevard | | | | | | - | - | - | - | - | - | - | - | - | - | 0:17:29 |
| Winchester Boulevard | | | | | | | - | - | - | - | - | - | - | - | - | 0:14:04 |
| Bascom Avenue | | | | | | | | - | - | - | - | - | - | - | - | 0:12:58 |
| Union Avenue | | | | | | | | | - | - | - | - | - | - | - | 0:11:27 |
| Camden Avenue | | | | | | | | | | - | - | - | - | - | - | 0:09:54 |
| Almaden Expressway | | | | | | | | | | | - | - | - | - | - | 0:07:22 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | - | - | - | 0:06:04 |
| Blossom Hill | | | | | | | | | | | | | - | - | - | 0:04:25 |
| Snell Avenue | | | | | | | | | | | | | | - | - | 0:03:26 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:01:18 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Bus - Travel Times for Local Pattern**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:02:53 | 0:05:34 | 0:07:27 | 0:11:09 | 0:14:05 | 0:17:32 | 0:19:11 | 0:21:10 | 0:23:10 | 0:25:56 | 0:27:45 | 0:29:50 | 0:31:24 | 0:33:51 | 0:35:10 |
| El Camino Real | | - | 0:02:41 | 0:04:33 | 0:08:15 | 0:11:12 | 0:14:38 | 0:16:18 | 0:18:17 | 0:20:17 | 0:23:03 | 0:24:52 | 0:26:57 | 0:28:31 | 0:30:58 | 0:32:17 |
| Fremont Avenue | | | - | 0:01:53 | 0:05:35 | 0:08:31 | 0:11:58 | 0:13:37 | 0:15:36 | 0:17:36 | 0:20:22 | 0:22:11 | 0:24:16 | 0:25:50 | 0:28:17 | 0:29:36 |
| Stevens Creek Boulevard | | | | - | 0:03:42 | 0:06:38 | 0:10:05 | 0:11:44 | 0:13:43 | 0:15:44 | 0:18:29 | 0:20:19 | 0:22:23 | 0:23:58 | 0:26:24 | 0:27:44 |
| De Anza Boulevard | | | | | - | 0:02:56 | 0:06:23 | 0:08:02 | 0:10:01 | 0:12:02 | 0:14:47 | 0:16:36 | 0:18:41 | 0:20:15 | 0:22:42 | 0:24:01 |
| Saratoga Boulevard | | | | | | - | 0:03:27 | 0:05:06 | 0:07:05 | 0:09:05 | 0:11:51 | 0:13:40 | 0:15:45 | 0:17:19 | 0:19:46 | 0:21:05 |
| Winchester Boulevard | | | | | | | - | 0:01:39 | 0:03:38 | 0:05:39 | 0:08:24 | 0:10:14 | 0:12:18 | 0:13:53 | 0:16:19 | 0:17:39 |
| Bascom Avenue | | | | | | | | - | 0:01:59 | 0:03:59 | 0:06:45 | 0:08:34 | 0:10:39 | 0:12:13 | 0:14:40 | 0:15:59 |
| Union Avenue | | | | | | | | | - | 0:02:00 | 0:04:46 | 0:06:35 | 0:08:40 | 0:10:14 | 0:12:41 | 0:14:00 |
| Camden Avenue | | | | | | | | | | - | 0:02:46 | 0:04:35 | 0:06:40 | 0:08:14 | 0:10:41 | 0:12:00 |
| Almaden Expressway | | | | | | | | | | | - | 0:01:49 | 0:03:54 | 0:05:28 | 0:07:55 | 0:09:14 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | 0:02:05 | 0:03:39 | 0:06:06 | 0:07:25 |
| Blossom Hill | | | | | | | | | | | | | - | 0:01:34 | 0:04:01 | 0:05:20 |
| Snell Avenue | | | | | | | | | | | | | | - | 0:02:27 | 0:03:46 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:01:19 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Bus - Travel Times for Major Stops Pattern**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:02:53 | - | 0:06:42 | 0:10:25 | - | 0:16:03 | - | - | - | 0:22:14 | 0:24:03 | - | - | - | 0:29:16 |
| El Camino Real | | - | - | 0:03:49 | 0:07:31 | - | 0:13:10 | - | - | - | 0:19:21 | 0:21:10 | - | - | - | 0:26:23 |
| Fremont Avenue | | | - | 0:01:45 | 0:05:28 | - | 0:11:06 | - | - | - | 0:17:17 | 0:19:06 | - | - | - | 0:24:19 |
| Stevens Creek Boulevard | | | | - | 0:03:42 | - | 0:09:21 | - | - | - | 0:15:32 | 0:17:21 | - | - | - | 0:22:34 |
| De Anza Boulevard | | | | | - | - | 0:05:39 | - | - | - | 0:11:49 | 0:13:39 | - | - | - | 0:18:52 |
| Saratoga Boulevard | | | | | | - | 0:03:20 | - | - | - | 0:09:30 | 0:11:20 | - | - | - | 0:16:33 |
| Winchester Boulevard | | | | | | | - | - | - | - | 0:06:11 | 0:08:00 | - | - | - | 0:13:13 |
| Bascom Avenue | | | | | | | | - | - | - | 0:05:09 | 0:06:58 | - | - | - | 0:12:11 |
| Union Avenue | | | | | | | | | - | - | 0:03:54 | 0:05:43 | - | - | - | 0:10:56 |
| Camden Avenue | | | | | | | | | | - | 0:02:37 | 0:04:27 | - | - | - | 0:09:40 |
| Almaden Expressway | | | | | | | | | | | - | 0:01:49 | - | - | - | 0:07:02 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | - | - | - | 0:05:13 |
| Blossom Hill | | | | | | | | | | | | | - | - | - | 0:03:45 |
| Snell Avenue | | | | | | | | | | | | | | - | - | 0:02:55 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:01:13 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Bus - Travel Times for Super-Express Pattern**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0:24:45 |
| El Camino Real | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0:22:28 |
| Fremont Avenue | | | - | - | - | - | - | - | - | - | - | - | - | - | - | 0:20:32 |
| Stevens Creek Boulevard | | | | - | - | - | - | - | - | - | - | - | - | - | - | 0:19:24 |
| De Anza Boulevard | | | | | - | - | - | - | - | - | - | - | - | - | - | 0:16:26 |
| Saratoga Boulevard | | | | | | - | - | - | - | - | - | - | - | - | - | 0:14:13 |
| Winchester Boulevard | | | | | | | - | - | - | - | - | - | - | - | - | 0:11:31 |
| Bascom Avenue | | | | | | | | - | - | - | - | - | - | - | - | 0:10:36 |
| Union Avenue | | | | | | | | | - | - | - | - | - | - | - | 0:09:21 |
| Camden Avenue | | | | | | | | | | - | - | - | - | - | - | 0:08:05 |
| Almaden Expressway | | | | | | | | | | | - | - | - | - | - | 0:06:03 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | - | - | - | 0:04:58 |
| Blossom Hill | | | | | | | | | | | | | - | - | - | 0:03:38 |
| Snell Avenue | | | | | | | | | | | | | | - | - | 0:02:48 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:01:05 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Driving - Northbound AM Peak Period**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:02:35 | 0:06:28 | 0:08:51 | 0:14:28 | 0:19:16 | 0:26:39 | 0:30:30 | 0:36:40 | 0:40:30 | 0:47:53 | 0:52:16 | 0:56:37 | 0:57:32 | 0:59:45 | 1:02:45 |
| El Camino Real | | - | 0:03:53 | 0:06:17 | 0:11:53 | 0:16:41 | 0:24:04 | 0:27:55 | 0:34:05 | 0:37:55 | 0:45:18 | 0:49:42 | 0:54:02 | 0:54:57 | 0:57:10 | 1:00:10 |
| Fremont Avenue | | | - | 0:02:23 | 0:08:00 | 0:12:48 | 0:20:11 | 0:24:02 | 0:30:12 | 0:34:02 | 0:41:25 | 0:45:48 | 0:50:09 | 0:51:04 | 0:53:17 | 0:56:17 |
| Stevens Creek Boulevard | | | | - | 0:05:36 | 0:10:24 | 0:17:48 | 0:21:39 | 0:27:49 | 0:31:39 | 0:39:02 | 0:43:25 | 0:47:45 | 0:48:41 | 0:50:54 | 0:53:54 |
| De Anza Boulevard | | | | | - | 0:04:48 | 0:12:11 | 0:16:02 | 0:22:12 | 0:26:02 | 0:33:26 | 0:37:49 | 0:42:09 | 0:43:04 | 0:45:17 | 0:48:17 |
| Saratoga Boulevard | | | | | | - | 0:07:23 | 0:11:14 | 0:17:24 | 0:21:14 | 0:28:38 | 0:33:01 | 0:37:21 | 0:38:16 | 0:40:29 | 0:43:29 |
| Winchester Boulevard | | | | | | | - | 0:03:51 | 0:10:01 | 0:13:51 | 0:21:14 | 0:25:37 | 0:29:58 | 0:30:53 | 0:33:06 | 0:36:06 |
| Bascom Avenue | | | | | | | | - | 0:06:10 | 0:10:00 | 0:17:23 | 0:21:46 | 0:26:07 | 0:27:02 | 0:29:15 | 0:32:15 |
| Union Avenue | | | | | | | | | - | 0:03:50 | 0:11:13 | 0:15:36 | 0:19:57 | 0:20:52 | 0:23:05 | 0:26:05 |
| Camden Avenue | | | | | | | | | | - | 0:07:23 | 0:11:46 | 0:16:07 | 0:17:02 | 0:19:15 | 0:22:15 |
| Almaden Expressway | | | | | | | | | | | - | 0:04:23 | 0:08:44 | 0:09:39 | 0:11:52 | 0:14:52 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | 0:04:20 | 0:05:16 | 0:07:29 | 0:10:29 |
| Blossom Hill | | | | | | | | | | | | | - | 0:00:55 | 0:03:08 | 0:06:08 |
| Snell Avenue | | | | | | | | | | | | | | - | 0:02:13 | 0:05:13 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:03:00 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Driving - Southbound PM Peak Period**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:09:14 | 0:14:53 | 0:17:33 | 0:32:30 | 0:40:36 | 0:48:21 | 0:52:12 | 0:57:02 | 0:59:20 | 1:02:09 | 1:04:07 | 1:06:25 | 1:07:16 | 1:09:16 | 1:10:13 |
| El Camino Real | | - | 0:05:38 | 0:08:19 | 0:23:16 | 0:31:22 | 0:39:06 | 0:42:57 | 0:47:48 | 0:50:06 | 0:52:55 | 0:54:53 | 0:57:11 | 0:58:01 | 1:00:02 | 1:00:59 |
| Fremont Avenue | | | - | 0:02:40 | 0:17:37 | 0:25:43 | 0:33:28 | 0:37:19 | 0:42:09 | 0:44:27 | 0:47:16 | 0:49:14 | 0:51:32 | 0:52:23 | 0:54:24 | 0:55:21 |
| Stevens Creek Boulevard | | | | - | 0:14:57 | 0:23:03 | 0:30:48 | 0:34:39 | 0:39:29 | 0:41:47 | 0:44:36 | 0:46:34 | 0:48:52 | 0:49:43 | 0:51:43 | 0:52:40 |
| De Anza Boulevard | | | | | - | 0:08:06 | 0:15:51 | 0:19:42 | 0:24:32 | 0:26:50 | 0:29:39 | 0:31:37 | 0:33:55 | 0:34:46 | 0:36:46 | 0:37:43 |
| Saratoga Boulevard | | | | | | - | 0:07:45 | 0:11:36 | 0:16:26 | 0:18:44 | 0:21:33 | 0:23:31 | 0:25:49 | 0:26:40 | 0:28:40 | 0:29:37 |
| Winchester Boulevard | | | | | | | - | 0:03:51 | 0:08:42 | 0:11:00 | 0:13:48 | 0:15:46 | 0:18:05 | 0:18:55 | 0:20:56 | 0:21:53 |
| Bascom Avenue | | | | | | | | - | 0:04:51 | 0:07:09 | 0:09:57 | 0:11:55 | 0:14:14 | 0:15:04 | 0:17:05 | 0:18:02 |
| Union Avenue | | | | | | | | | - | 0:02:18 | 0:05:07 | 0:07:05 | 0:09:23 | 0:10:14 | 0:12:14 | 0:13:11 |
| Camden Avenue | | | | | | | | | | - | 0:02:49 | 0:04:47 | 0:07:05 | 0:07:56 | 0:09:56 | 0:10:53 |
| Almaden Expressway | | | | | | | | | | | - | 0:01:58 | 0:04:16 | 0:05:07 | 0:07:07 | 0:08:04 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | 0:02:18 | 0:03:09 | 0:05:09 | 0:06:06 |
| Blossom Hill | | | | | | | | | | | | | - | 0:00:50 | 0:02:51 | 0:03:48 |
| Snell Avenue | | | | | | | | | | | | | | - | 0:02:01 | 0:02:58 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:00:57 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

**Driving - Off-peak**

| | US 101 North | El Camino Real | Fremont Avenue | Stevens Creek Boulevard | De Anza Boulevard | Saratoga Boulevard | Winchester Boulevard | Bascom Avenue | Union Avenue | Camden Avenue | Almaden Expressway | Ohlone-Chynoweth Station | Blossom Hill | Snell Avenue | Cottle Road | Santa Teresa Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| US 101 North | - | 0:01:57 | 0:03:41 | 0:04:37 | 0:07:23 | 0:09:22 | 0:11:52 | 0:12:35 | 0:13:37 | 0:14:41 | 0:16:30 | 0:17:23 | 0:18:31 | 0:19:09 | 0:20:39 | 0:21:32 |
| El Camino Real | | - | 0:01:44 | 0:02:40 | 0:05:26 | 0:07:25 | 0:09:55 | 0:10:38 | 0:11:41 | 0:12:44 | 0:14:33 | 0:15:26 | 0:16:34 | 0:17:12 | 0:18:42 | 0:19:35 |
| Fremont Avenue | | | - | 0:00:56 | 0:03:42 | 0:05:41 | 0:08:11 | 0:08:54 | 0:09:56 | 0:11:00 | 0:12:49 | 0:13:42 | 0:14:50 | 0:15:28 | 0:16:58 | 0:17:51 |
| Stevens Creek Boulevard | | | | - | 0:02:46 | 0:04:45 | 0:07:15 | 0:07:58 | 0:09:01 | 0:10:04 | 0:11:53 | 0:12:46 | 0:13:54 | 0:14:32 | 0:16:02 | 0:16:55 |
| De Anza Boulevard | | | | | - | 0:02:00 | 0:04:30 | 0:05:12 | 0:06:15 | 0:07:19 | 0:09:08 | 0:10:00 | 0:11:08 | 0:11:46 | 0:13:16 | 0:14:09 |
| Saratoga Boulevard | | | | | | - | 0:02:30 | 0:03:13 | 0:04:15 | 0:05:19 | 0:07:08 | 0:08:01 | 0:09:09 | 0:09:47 | 0:11:17 | 0:12:09 |
| Winchester Boulevard | | | | | | | - | 0:00:43 | 0:01:45 | 0:02:49 | 0:04:38 | 0:05:31 | 0:06:39 | 0:07:16 | 0:08:47 | 0:09:39 |
| Bascom Avenue | | | | | | | | - | 0:01:03 | 0:02:06 | 0:03:55 | 0:04:48 | 0:05:56 | 0:06:34 | 0:08:04 | 0:08:57 |
| Union Avenue | | | | | | | | | - | 0:01:04 | 0:02:53 | 0:03:45 | 0:04:54 | 0:05:31 | 0:07:01 | 0:07:54 |
| Camden Avenue | | | | | | | | | | - | 0:01:49 | 0:02:42 | 0:03:50 | 0:04:28 | 0:05:58 | 0:06:50 |
| Almaden Expressway | | | | | | | | | | | - | 0:00:53 | 0:02:01 | 0:02:38 | 0:04:09 | 0:05:01 |
| Ohlone-Chynoweth Station | | | | | | | | | | | | - | 0:01:08 | 0:01:46 | 0:03:16 | 0:04:09 |
| Blossom Hill | | | | | | | | | | | | | - | 0:00:38 | 0:02:08 | 0:03:01 |
| Snell Avenue | | | | | | | | | | | | | | - | 0:01:30 | 0:02:23 |
| Cottle Road | | | | | | | | | | | | | | | - | 0:00:53 |
| Santa Teresa Station | | | | | | | | | | | | | | | | - |

# SR 85 Transit Guideway Study

## Hypothetical Transit Travel Speeds

February 26, 2018

Santa Clara Valley Transportation Authority

*Solutions that move you*

# Assumptions

- Unimpeded travel along dedicated guideway
- US 101 North to Santa Teresa Station

| | Light Rail | Bus |
|---|---|---|
| Top Speed | 50 MPH | 65 MPH |
| Speed Passing Stations | 35 MPH | 35 MPH |
| Dwell Time at Stations | 30 seconds | 30 seconds |

Solutions that move you

# Three Stopping Patterns

Local Stopping Pattern (all 16 stops)

Major Stops Pattern (8 of 16)

Super Express Pattern (2 stops)

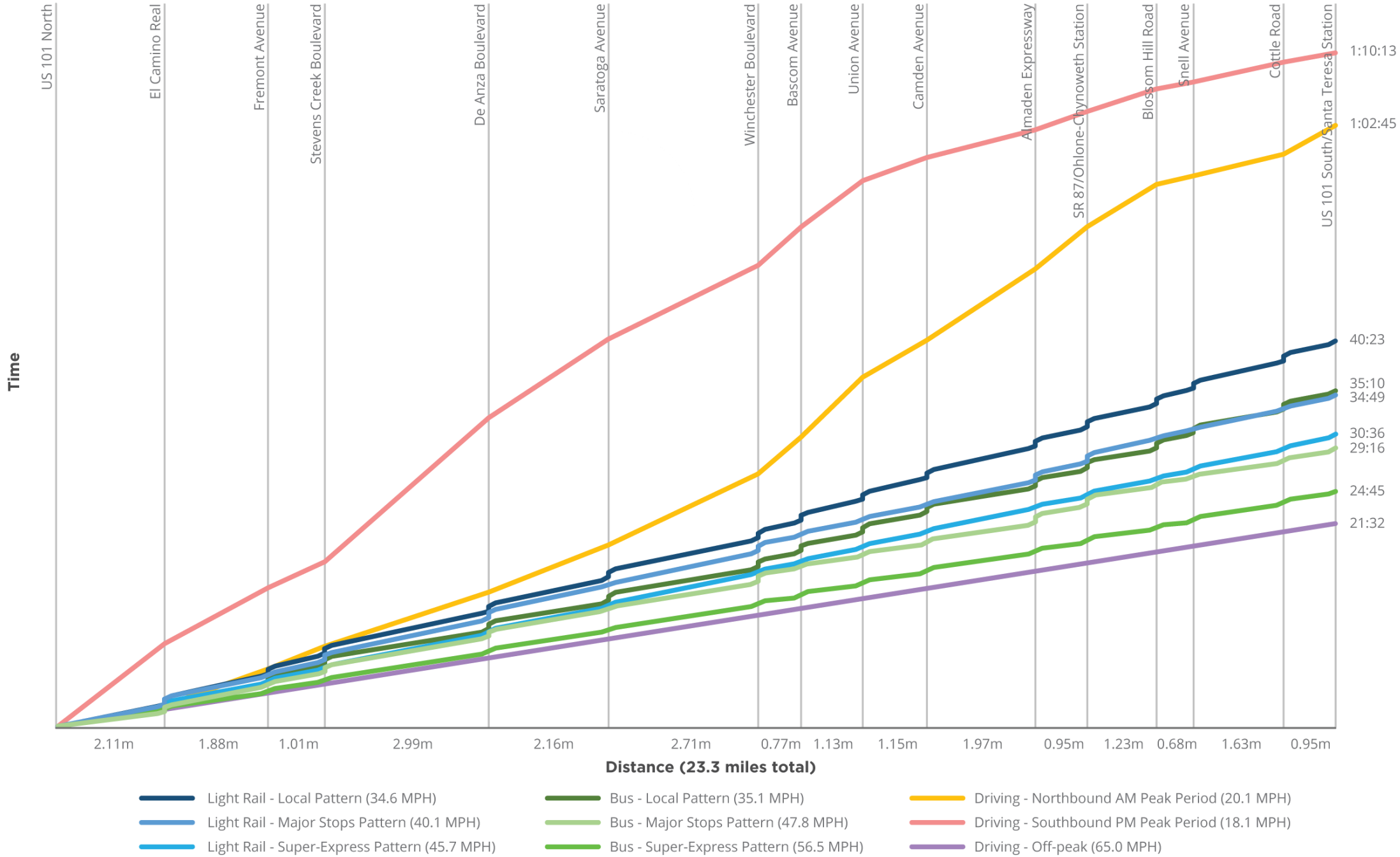
Solutions that move you

# End-to-End Travel Times

| Travel Options | End-to-End Travel Time | Average Speed |
|---|---|---|
| Driving – Off Peak | 21:32 | 65 MPH |
| Bus – Super Express | 24:45 | 57 MPH |
| Bus – Major Stops | 29:16 | 48 MPH |
| Light Rail – Super Express | 30:36 | 46 MPH |
| Light Rail – Major Stops | 34:49 | 40 MPH |
| Bus – Local Pattern | 35:10 | 40 MPH |
| Light Rail – Local Pattern | 40:23 | 35 MPH |
| Driving – AM Northbound | 1:02:45 | 20 MPH |
| Driving – PM Southbound | 1:10:13 | 18 MPH |

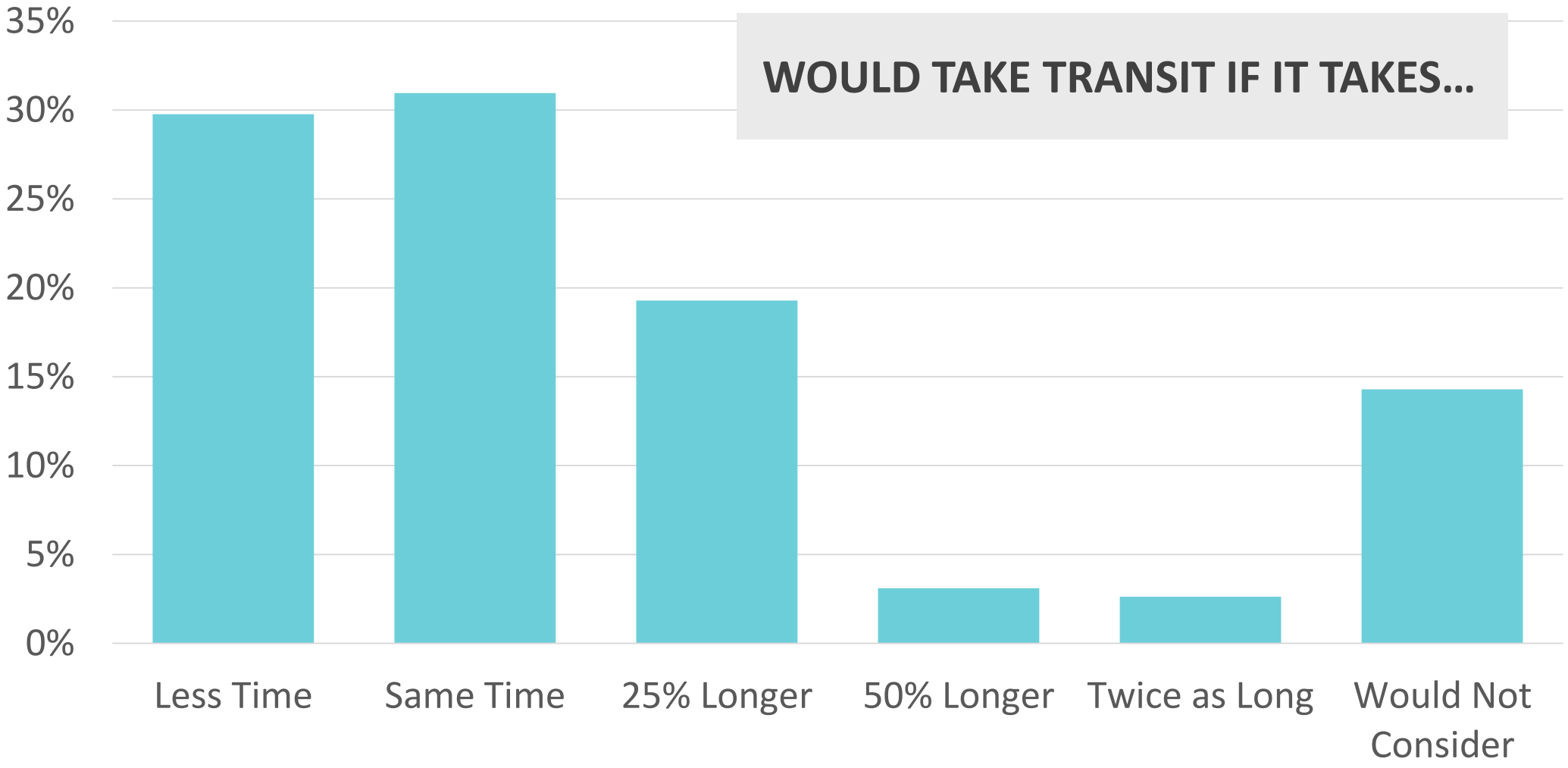
VTA Express Route 185 travels about 38 MPH in AM NB and 35 MPH in PM SB on SR 85 segment.

## Theoretical Travel Times for Light Rail, Bus and Driving on SR 85



# SR 85 Travelers are Time-Sensitive

Responses from online survey with ~2,500 respondents



# Transit Trip Components

- Time accessing the station
- Time waiting for transit vehicle to arrive
- Time onboard transit vehicles
- Time accessing the destination

How does total travel time compare to driving?

Solutions that move you

Santa Clara Valley Transportation Authority

Date: February 16, 2018
Current Meeting: February 26, 2018
Board Meeting: N/A

**BOARD MEMORANDUM**

**TO:** Santa Clara Valley Transportation Authority
State Route 85 Corridor Policy Advisory Board

**THROUGH:** General Manager, Nuria I. Fernandez

**FROM:** Director - Planning & Programming, Chris Augenstein

**SUBJECT:** Transit Costing Analysis and Peer Agency Comparison

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**FOR INFORMATION ONLY**

## BACKGROUND:

Discussion at the December 2017 Policy Advisory Board meeting elicited questions about why hourly operating costs for light rail are higher than bus and the reasons for the difference. This memo is intended to be a primer on the components of operating costs for light rail and bus and will be a resource in later stages of the project when the PAB develops project designs that will be studied in the alternatives analysis.

This analysis compares transit metrics from 17 agencies (including VTA) that operate light rail and bus and employ union labor. All data cited comes from 2016 National Transit Database Data-the most recent year for which national data is available. Tables showing the data referenced can be found in Attachment A.

## DISCUSSION:

There are many metrics by which to evaluate transit service cost-effectiveness. Cost per hour and cost per passenger are commonly cited, but neither of these metrics-either individually or collectively-paint a complete picture of operating costs. Costs for labor, maintenance and electricity can vary considerably among transit operators, skewing these metrics. Urban areas and the travel patterns within them also vary. As a result, transit systems are designed to achieve different objectives, some of which are more cost-effective than others. Lastly, urban form and demographics, which are largely outside of a transit agency's control-play a large role in the level of transit patronage. High-ridership systems can mask cost inefficiencies and, inversely, efficient systems with low ridership can appear cost-ineffective by these metrics. Understanding the full story is key.

Light Rail Peer Cost Comparison

Light rail is more expensive to operate than bus on an hourly basis, but some light rail systems

are more cost-effective than bus on a per-passenger basis. All 17 transit agencies studied had a higher hourly operating cost for light rail than bus. This is likely due to the infrastructure maintenance and operating costs (rail, catenary, signals and operations control center) that are present in rail service but not bus service. Additionally, maintenance costs on a per-vehicle basis are higher for light rail.

The systems that had a lower cost per passenger on light rail than bus benefited from a combination of the following factors:

- Much higher ridership on light rail than bus. The higher the ridership, the lower the cost per passenger. Additionally, more riders correlates with greater fare revenue, which can partially offset operating costs.
- A greater share of riders making short trips. The shorter the passenger trip, the more times the transit operator can sell the seat, accommodating more rider trips per vehicle trip and increasing fare revenue.
- Fast travel speeds. The faster the train, the more stops it can serve and boardings it can accommodate per hour. Faster trains are also more attractive to riders, which increases ridership. The faster the trains, the fewer trains need to operate a route at the same frequency. So, faster trains cost less to operate per hour than slower trains.
- Multiple-car trains. Multiple car trains provide additional capacity without requiring more drivers. Demand must be sufficient to justify the cost of adding cars to a train.
- A high ratio of light rail service hours to miles of track. Light rail operating costs include the cost of maintaining infrastructure. The more service hours operated, the lower the infrastructure cost borne per hour of service. More service hours means a higher overall cost, but lower hourly cost.
- Low light rail operating costs or light rail operating costs that are relatively close to bus hourly operating costs. Cities where the hourly operating cost for light rail was less than double the cost of operating bus were more likely to have cost per passenger figure that favored light rail.

The takeaway from this analysis is that to justify the cost of operating light rail transit and the cost of constructing the guideway, the travel market would ideally be able to support a level of ridership that will reasonably fill multiple-car trains at a frequent level of service. Ideally, most trips would be short which would maximize the ability to re-sell seats and therefore increase fare revenue. To maximize the value of the infrastructure investment and achieve a low hourly cost, operating productive service all-day and seven days a week is a near necessity.

These are the conditions in Boston's light rail system, which records a moderate cost per hour of light rail service ($265), and lowest cost per ride ($2.88 per ride) of the 17 agencies despite labor costs that are on par with SF Muni and VTA. Boston operates the highest number of light rail hours (703,128 annually) of any of the agencies, records the most boardings (64,538,406 annually) and has the most favorable ratio of hours of light rail service per miles of track (13,787 hours per track mile). Boston's metrics also benefit from a dense urban form, walkable street network and one of the lowest car-ownership rates of major American cities.

VTA's light rail service appears on the other end of the spectrum, ranking 14th in hourly operating cost ($423), 17th in cost per ride ($8.62), 10th in hours of service (218,459 annually),

11th in boardings (10,721,047 annually) and 15th in light rail hours per miles of track (2,679 hours per track mile) of the 17 agencies studied. Santa Clara County has a generally low-density, single-use land use pattern with some areas of poor pedestrian connectivity, and was found by a 2014 University of Michigan study to have the highest rate of car-ownership nationally.

Bus Peer Cost Comparison

Hourly operating costs for bus are lower than light rail largely because bus operation lacks the infrastructure maintenance costs that light rail operation requires. Light rail infrastructure maintenance costs account for 47 percent of VTA's light rail operations spending, but are absent on the bus side. As a result, the cost of labor (driving and vehicle maintenance) is the main component of bus operating cost-accounting for about 80 percent of VTA's bus operating cost. Labor costs correlate with the local cost of living, which explains much of the discrepancy between agencies. Among the peer agencies studied, expensive places like San Francisco, San Jose, Boston, Seattle and Los Angeles appear among the highest hourly bus costs while more affordable places like Charlotte, Dallas and St. Louis are among the lowest hourly bus costs.

Like rail, high ridership and short rider trips can bring in more fare revenue, which partially offsets operating costs. Faster travel speeds can lower the total amount that an agency spends to operate bus service.

Projected VTA Light Rail Operating Costs FY2018

| | **FY 2018 Projected Expenditure** | **Percentage of Light Rail Cost** |
|---|---|---|
| **Operations** | $22,635,442 | 25.2% |
| **Maintenance** | $52,390,941 | 58.4% |
| **Other** | $13,884,997 | 15.5% |
| **Planning and Engineering** | $841,887 | 0.9% |
| **Total** | **$89,753,266** | **100%** |

Projected VTA Bus Operating Costs FY2018

| **FY 2018 Projected Expenditure Percentage of Bus Cost** | | |
|---|---|---|
| **Operations** | $139,878,117 | 58.6% |
| **Maintenance** | $81,663,491 | 34.3% |
| **Other** | $14,642,473 | 6.1% |
| **Planning and Engineering** | $2,371,265 | 1.0% |
| **Total** | **$238,555,346** | **100%** |

A detailed breakdown of VTA light rail and bus operating costs can be found in **Attachment A**.

Prepared By: Adam Burger
Memo No. 6443

Light Rail Operating Statistics (2016 NTD Data)

| Agency | Annual LRT Revenue Hours | LRT Boardings | Light Rail Cost per Car-Hour | Cost Per LRT Ride | LRT Boardings Per Revenue Hour |
|---|---|---|---|---|---|
| Charlotte Area Transit System | 65,043 | 4,899,790 | $ 220.58 | $ 2.93 | 75 |
| Cleveland Regional Transit Authority | 57,683 | 2,468,330 | $ 234.72 | $ 5.49 | 43 |
| Dallas Area Rapid Transit | 473,059 | 29,762,161 | $ 377.15 | $ 5.99 | 63 |
| LA Metropolitan Transportation Authority | 663,023 | 62,085,975 | $ 479.94 | $ 5.13 | 94 |
| Maryland Transportation Authority (Baltimore, MD) | 162,173 | 7,431,060 | $ 268.32 | $ 5.86 | 46 |
| Massachusetts Bay Transportation Authority (Boston, MA) | 703,128 | 64,538,406 | $ 264.56 | $ 2.88 | 92 |
| Metropolitan Transit Authority of Harris County (Houston, TX) | 302,455 | 18,532,122 | $ 202.45 | $ 3.30 | 61 |
| New Jersey Transit Corporation | 164,900 | 21,175,280 | $ 603.24 | $ 4.70 | 128 |
| Niagara Frontier Transportation Authority (Buffalo, NY) | 85,611 | 5,212,083 | $ 275.47 | $ 4.52 | 61 |
| Port Authority of Allegheny County (Pittsburgh, PA) | 170,551 | 8,132,130 | $ 353.57 | $ 7.42 | 48 |
| Sacramento Regional Transit District | 245,203 | 12,216,162 | $ 240.34 | $ 4.82 | 50 |
| Salt Lake City | 354,954 | 19,220,024 | $ 189.33 | $ 3.50 | 54 |
| SF Muni | 541,930 | 52,124,572 | $ 395.57 | $ 4.11 | 96 |
| Sound Transit (Seattle, WA)/King County DOT | 204,345 | 19,011,368 | $ 416.56 | $ 4.48 | 93 |
| St. Louis Metro | 265,590 | 15,777,584 | $ 299.67 | $ 5.04 | 59 |
| TriMet (Portland, OR) | 616,337 | 40,198,185 | $ 208.72 | $ 3.20 | 65 |
| Valley Transportation Authority | 218,459 | 10,721,047 | $ 423.09 | $ 8.62 | 49 |

Bus Operating Statistics (2016 NTD Data)

| Agency | Annual Bus Revenue Hours | Bus Boardings | Bus Cost per Hour | Cost Per Bus Ride | Bus Boardings Per Revenue Hour |
|---|---|---|---|---|---|
| Charlotte Area Transit System | 793,770 | 19,474,668 | $ 101.37 | $ 4.13 | 25 |
| Cleveland Regional Transit Authority | 1,155,747 | 30,156,644 | $ 148.86 | $ 5.71 | 26 |
| Dallas Area Rapid Transit | 2,159,188 | 33,521,239 | $ 112.85 | $ 7.27 | 16 |
| LA Metropolitan Transportation Authority | 6,938,327 | 312,787,609 | $ 153.73 | $ 3.41 | 45 |
| Maryland Transportation Authority (Baltimore, MD) | 1,778,027 | 75,619,281 | $ 153.04 | $ 3.60 | 43 |
| Massachusetts Bay Transportation Authority (Boston, MA) | 2,223,094 | 113,777,520 | $ 185.60 | $ 3.63 | 51 |
| Metropolitan Transit Authority of Harris County (Houston, TX) | 2,851,972 | 58,852,033 | $ 113.58 | $ 5.50 | 21 |
| New Jersey Transit Corporation | 5,714,354 | 159,895,729 | $ 167.47 | $ 5.99 | 28 |
| Niagara Frontier Transportation Authority (Buffalo, NY) | 786,100 | 22,680,510 | $ 129.31 | $ 4.48 | 29 |
| Port Authority of Allegheny County (Pittsburgh, PA) | 1,588,792 | 53,671,684 | $ 189.69 | $ 5.62 | 34 |
| Sacramento Regional Transit District | 554,524 | 12,104,565 | $ 142.98 | $ 6.55 | 22 |
| Salt Lake City | 1,102,789 | 19,467,724 | $ 116.67 | $ 6.61 | 18 |
| SF Muni | 1,669,527 | 101,846,949 | $ 186.54 | $ 3.06 | 61 |
| Sound Transit (Seattle, WA)/King County DOT | 2,995,805 | 101,903,014 | $ 159.41 | $ 4.69 | 34 |
| St. Louis Metro | 1,382,193 | 27,701,279 | $ 113.44 | $ 5.66 | 20 |
| TriMet (Portland, OR) | 1,837,409 | 59,982,440 | $ 136.74 | $ 4.19 | 33 |
| Valley Transportation Authority | 1,354,373 | 32,624,190 | $ 180.58 | $ 7.50 | 24 |

Light Rail and Bus Comparison (2016 NTD Data)

| Agency | LRT to Bus Hourly Cost Ratio | Annual LRT Revenue Hours | Miles of Track | Annual LRT hours per mile of track |
|---|---|---|---|---|
| Charlotte Area Transit System | 2.18 | 65,043 | 18.6 | 3,497 |
| Cleveland Regional Transit Authority | 1.58 | 57,683 | 30.4 | 1,897 |
| Dallas Area Rapid Transit | 3.34 | 473,059 | 182.4 | 2,594 |
| LA Metropolitan Transportation Authority | 3.12 | 663,023 | 171.9 | 3,857 |
| Maryland Transportation Authority (Baltimore, MD) | 1.75 | 162,173 | 57.6 | 2,816 |
| Massachusetts Bay Transportation Authority (Boston, MA) | 1.43 | 703,128 | 51 | 13,787 |
| Metropolitan Transit Authority of Harris County (Houston, TX) | 1.78 | 302,455 | 41.8 | 7,236 |
| New Jersey Transit Corporation | 3.60 | 164,900 | 46.5 | 3,546 |
| Niagara Frontier Transportation Authority (Buffalo, NY) | 2.13 | 85,611 | 12.4 | 6,904 |
| Port Authority of Allegheny County (Pittsburgh, PA) | 1.86 | 170,551 | 49.6 | 3,439 |
| Sacramento Regional Transit District | 1.68 | 245,203 | 84.9 | 2,888 |
| Salt Lake City | 1.62 | 354,954 | 93.9 | 3,780 |
| SF Muni | 2.12 | 541,930 | 64.4 | 8,415 |
| Sound Transit (Seattle, WA)/King County DOT | 2.61 | 204,345 | 40.4 | 5,058 |
| St. Louis Metro | 2.64 | 265,590 | 91.1 | 2,915 |
| TriMet (Portland, OR) | 1.53 | 616,337 | 118.9 | 5,184 |
| Valley Transportation Authority | 2.34 | 218,459 | 81 | 2,697 |

# SR 85 Transit Guideway Study

## Transit Operating Costs and Peer Comparison

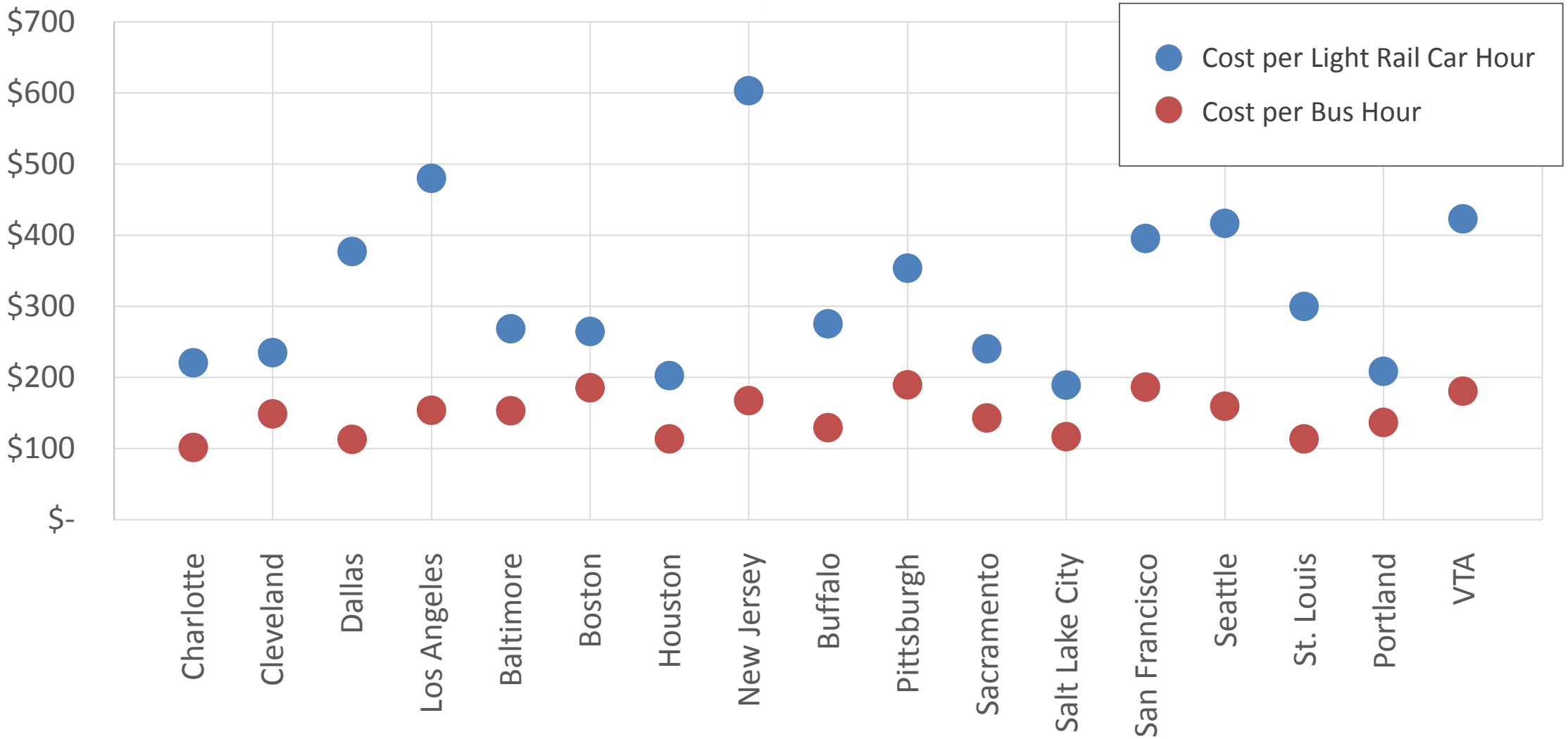
February 26, 2018

Santa Clara Valley Transportation Authority

*Solutions that move you*

# Light Rail and Bus Hourly Operating Cost

Peer Agency Comparison, 2016 National Transit Database Data



# Reasons for light rail operating cost variation

- Cost of labor
- Size of rail infrastructure
- Transit service level, travel speed
- Number of cars per train
- Cost of electricity
- Age of the system
- Ridership/farebox recovery rate

Solutions that move you

# VTA/Boston Light Rail Comparison

Ranks of 17 Peer Agencies

| Light Rail Metric | Boston | Boston Rank | VTA | VTA Rank |
|---|---|---|---|---|
| Annual Revenue Hours | 703,128 | 1 | 218,459 | 10 |
| Annual Boardings | 64,538,406 | 1 | 10,721,047 | 12 |
| Boardings per Revenue Hour | 92 | 5 | 49 | 14 |
| Cost per Car-Hour | $265 | 7 | $423 | 15 |
| Cost per Ride | $2.88 | 1 | $8.62 | 17 |
| Miles of Track | 51 | 10th Largest | 81 | 7th Largest |
| Light Rail Hours per Track Mile | 13,787 | 1 | 2,697 | 15 |

Solutions that move you

# VTA Operating Costs

| Light Rail Cost Component | FY2018 Projected Expenditure | Percentage of Light Rail Op. Cost |
|---|---|---|
| Operations | $22,635,442 | 25.2% |
| Maintenance | $52,390,941 | 58.4% |
| Other | $13,884,997 | 15.5% |
| Planning and Engineering | $841,887 | 0.9% |
| **Total** | **$89,753,266** | **100%** |

| Bus Cost Component | FY2018 Projected Expenditure | Percentage of Bus Op. Cost |
|---|---|---|
| Operations | $139,878,117 | 58.6% |
| Maintenance | $81,663,491 | 34.3% |
| Other | $14,642,473 | 6.1% |
| Planning and Engineering | $2,371,265 | 1.0% |
| **Total** | **$238,555,346** | **100%** |

Solutions that move you

Santa Clara Valley Transportation Authority

Date: February 21, 2018
Current Meeting: February 26, 2018
Board Meeting: N/A

**BOARD MEMORANDUM**

**TO:** Santa Clara Valley Transportation Authority
State Route 85 Corridor Policy Advisory Board

**THROUGH:** General Manager, Nuria I. Fernandez

**FROM:** Director - Planning & Programming, Chris Augenstein

**SUBJECT:** Corporate Shuttle Operations Analysis

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**FOR INFORMATION ONLY**

## BACKGROUND:

One of the designs that the SR 85 Transit Guideway Study may consider is a bus-only lane that allows corporate shuttles. To understand the potential of that design to move people, VTA sought input on corporate shuttle operation and occupancy from shuttle operators along the SR 85 corridor. However, none of the companies that VTA contacted opted to share information about their programs.

As a result, the best information that VTA has about corporate shuttles comes from video surveys that were conducted along the corridor on Tuesday, November 14 and Wednesday, November 15, 2017. This memo discusses the vehicle count data and provides some estimates as to the number of people carried by corporate shuttles along SR 85.

## DISCUSSION:

### Methodology

Cameras were placed along SR 85 at six locations: Middlefield Road, El Camino Real, McClellan Road, Quito Road, Leigh Avenue and Blossom Hill Road. The survey focused on weekday peak periods, which were defined as 6:00 AM to 10:00 AM and 4:00 PM to 8:00 PM. Counts are presented below by each commute period as well as by the peak hour. The peak hour is the 60-minute period with the greatest volume of shuttles and is not necessarily the same for each location.

Corporate Shuttle Counts

Commute Period Shuttle Counts (6:00 AM to 10:00 AM and 4:00 PM to 8:00 PM)

| | Northbound | | Southbound | |
|---|---|---|---|---|
| | AM | PM | AM | PM |
| Middlefield Road | 97 | 106 | 73 | 88 |
| El Camino Real | 111 | 130 | 105 | 150 |
| McClellan Road | 70 | 69 | 60 | 81 |
| Quito Road | 69 | 63 | 57 | 88 |
| Leigh Avenue | 49 | 31 | 22 | 38 |
| Blossom Hill Road | 42 | 35 | 18 | 36 |

Peak Hour Shuttle Counts (60-minute period with highest shuttle count)

| | Northbound | | Southbound | |
|---|---|---|---|---|
| | AM | PM | AM | PM |
| Middlefield Road | 34 | 30 | 27 | 29 |
| El Camino Real | 45 | 37 | 37 | 48 |
| McClellan Road | 30 | 18 | 19 | 26 |
| Quito Road | 34 | 19 | 22 | 29 |
| Leigh Avenue | 22 | 12 | 11 | 17 |
| Blossom Hill Road | 14 | 12 | 7 | 15 |

Video Survey Findings and Educated Assumptions

*Shuttle Volumes*

Corporate shuttle volumes were higher at the northern end of SR 85, with El Camino Real recording the highest volumes. This is intuitive as the employment sites these shuttles serve are relatively clustered around the northern end of the corridor while employees' residences are dispersed throughout the county. It also indicates that corporate shuttle routes form a collective branching pattern, like a piece of rope that is frayed at both ends.

*Shuttle Stopping Patterns*

While we have a sense for shuttle volumes along the corridor, stopping patterns for the routes remain unknown. Routes may serve one origin and one destination and provide a direct trip between the two or they may make stops along the way, picking up passengers. Anecdotally, we know that some areas--like behind the Oaks Shopping Center in Cupertino--have become de facto park-and-ride lots for corporate shuttles and are likely mid-route stops. Additionally, when we reached out to shuttle operators for information on their operations through the Silicon Valley Leadership Group, we instead received requests to construct park-and-ride lots along the corridor. Apparently, shuttle operators are constrained by the number and size of parking lots with excess capacity along the corridor that they can use as stops, which supports the model of making stops along the route. As such, it is likely that the number of passengers on board is greater closer to the employment sites.

*Infrastructure Value Maximization Strategy*

The branching route design and likelihood that corporate shuttles gain passengers as they near employment sites has implications for the cost-effectiveness of infrastructure improvements. Since the northern portion of SR 85 sees three to four times the shuttle volumes as the southern portion and is the portion of the route that has the highest passenger loads, prioritizing investment in this area may make sense as the passenger-carried-per-dollar-spent is higher.

*Deadheading*

It is likely that around half of the corporate shuttles trips carry no passengers. 46 percent of the shuttles observed across both peak periods were traveling in the off-peak direction, indicating that they were likely traveling to or returning to the starting point of their route to pick up new passengers. The necessity of returning to the route's starting point without any passengers onboard, known as "deadheading," is an inherent inefficiency of serving directional markets as four trips must be made to transport a person two times. The actual number of deadhead trips may be closer to 50 percent as some empty trips may occur outside the peak period. The Mercury News has reported that former corporate shuttle drivers indicated that their shifts begin before the peak period designated in this analysis.

*Passenger Volume Estimates*

It is unclear how many passengers corporate shuttles carry though we can make some educated guesses based on the cost per passenger carried. When corporate employers began operating shuttles, they employed contracted labor, which has an hourly operating cost about half that of VTA, which would be around $80-90 per hour. In the last year or so, many corporate shuttle drivers have organized and negotiated higher wages, benefits, and employer contributions to retirement plans. Google's drivers have reportedly successfully lobbied for healthcare benefits and 25-percent increases in wages. Accordingly, for the purpose of this memo, we estimate that the operating cost of these shuttles may now be around $120 per hour.

*260 weekdays x 8-hour shifts x $120 per hour = $249,600 annual operating cost per bus*

Prior to the increase in costs, transit experts estimated that shuttle operators pay about $8,000 to $10,000 annually per passenger carried. These costs may be closer to $12,000 to $15,000 annually, now.

*$249,600/$15,000 = ~16 riders per hour* *$249,600/$10,000 = ~25 riders per hour*

If we assume that shuttles traveling in the peak direction generally carry about 16 to 25 passengers per hour and that the average shuttle trip that uses SR 85 takes an hour, we get the figures in the table below. For context, a lane of general use traffic can accommodate around 1800-2000 vehicles per hour.

Estimates of hourly corporate shuttle volumes during peak periods (6:00 AM to 10:00 AM and 4:00 PM to 8:00 PM)

| | Peak-direction buses per hour | | Passengers per bus at $15,000 per passenger | | Passengers per bus at $10,000 per passenger | |
|---|---|---|---|---|---|---|
| | AM | PM | AM | PM | AM | PM |
| Middlefield Road | 24 | 22 | 388 | 352 | 606 | 550 |
| El Camino Real | 28 | 38 | 444 | 600 | 694 | 938 |
| McClellan Road | 18 | 20 | 280 | 324 | 438 | 506 |
| Quito Road | 17 | 22 | 276 | 352 | 431 | 550 |
| Leigh Avenue | 12 | 10 | 196 | 152 | 306 | 238 |
| Blossom Hill Road | 11 | 9 | 168 | 144 | 263 | 225 |

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Memo No. 6441

# SR 85 Transit Guideway Study

## Corporate Shuttle Operations Analysis

February 26, 2018

Santa Clara Valley Transportation Authority

*Solutions that move you*

# Methodology

Cameras were placed at six locations on Tuesday, November 14 and Wednesday, November 15.

- Middlefield Road
- El Camino Real
- McClellan Road
- Quito Road
- Leigh Avenue
- Blossom Hill Road

Counts focused on peak commute periods and peak hour.

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# Corporate Shuttle Counts on SR 85

Commute Period (6:00AM to 10:00 AM, 4:00 PM to 8:00 PM)

| | Northbound | | Southbound | |
|---|---|---|---|---|
| | AM | PM | AM | PM |
| Middlefield Road | 97 | 106 | 73 | 88 |
| El Camino Real | 111 | 130 | 105 | 150 |
| McClellan Road | 70 | 69 | 60 | 81 |
| Quito Road | 69 | 63 | 57 | 88 |
| Leigh Avenue | 49 | 31 | 22 | 38 |
| Blossom Hill Road | 42 | 35 | 18 | 36 |

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# Corporate Shuttle Counts on SR 85

Peak Hour (60-minute period with highest volumes, varies by location)

| | Northbound | | Southbound | |
|---|---|---|---|---|
| | AM | PM | AM | PM |
| Middlefield Road | 34 | 30 | 27 | 29 |
| El Camino Real | 45 | 37 | 37 | 48 |
| McClellan Road | 30 | 18 | 19 | 26 |
| Quito Road | 34 | 19 | 22 | 29 |
| Leigh Avenue | 22 | 12 | 11 | 17 |
| Blossom Hill Road | 14 | 12 | 7 | 15 |

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# Corporate shuttle ridership is a mystery

Educated Assumptions:

- Shuttle routes use parts of SR 85, highest volume at El Camino
- About half of observed buses are not carrying passengers
- Corporate shuttles cost about $250,000 annually per bus
- Shuttle operators spend about $12,000 to $15,000 per rider per year
- Average ridership peaks in 16-25 range per peak-direction trip
- Shuttles gain riders along route in peak direction

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# Hourly Corporate Shuttle Ridership Estimates

| | Peak-direction buses per hour | | Estimated Ridership per hour | |
|---|---|---|---|---|
| | AM | PM | AM | PM |
| Middlefield Road | 24 | 22 | 400-600 | 350-550 |
| El Camino Real | 28 | 38 | 450-700 | 600-900 |
| McClellan Road | 18 | 20 | 300-450 | 300-500 |
| Quito Road | 17 | 22 | 300-450 | 350-550 |
| Leigh Avenue | 12 | 10 | 200-300 | 150-250 |
| Blossom Hill Road | 11 | 9 | 150-250 | 150-200 |

For comparison, a freeway lane can accommodate 1,800 to 2,000 vehicles per hour

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# VTA Express Route Ridership and Cost Metrics

| Route | Boardings/Trip | Cost/Boarding | Annual Cost/Rider |
|---|---|---|---|
| 101 – Camden/SR 85 to Palo Alto | 13 | $35 | $17,800 |
| 102 – South San Jose to Palo Alto | 22 | $20 | $10,300 |
| 122 – South San Jose to Lockheed | 20 | $20 | $10,300 |
| 103 – Eastridge to Palo Alto | 20 | $22 | $11,000 |
| 182 – Bailey to Palo Alto | 14 | $30 | $14,400 |
| 185 – Gilroy to Shoreline | 9 | $75 | $37,800 |

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