**Analyzing Transit Options**

The Transit Corridor Alternatives Analysis (TCAA) is evaluating public transit options along Santa Cruz Branch Rail Line right-of-way from Watsonville/Pajaro to Santa Cruz.

**Alternatives Analysis**

Alternatives are being evaluated to identify a locally-preferred alternative through a performance-based planning approach based on a triple bottom line sustainability framework.

**Creating an Integrated Transit Network**

The TCAA will define an integrated transit network with future inter-county and inter-regional connections to Monterey, Gilroy, the San Francisco Bay Area and beyond.
PROJECT GOALS FOCUS ON “TRIPLE BOTTOM LINE” APPROACH BASED ON:

- Economy
- Equity
- Environment

See RESOURCES for documentation from previous two project milestones.
Alternatives assessed for fiscal feasibility and ability to develop a well-integrated transportation system supporting economic vitality

Alternatives assessed for ability to provide an accessible, equitable, reliable, safer and more efficient multimodal transportation system

Alternatives evaluated for how well they promote a healthier environment addressing key elements such as greenhouse gas emissions, climate adaptation, ridership and other potential environmental impacts

Alternatives evaluated for technical feasibility, ability to integrate into existing system, meet regulatory requirements and minimize additional right-of-way needs

See RESOURCES to review Analysis Framework handout
Initial list of alternatives narrowed to four using high-level screening criteria based on “Triple Bottom Line” approach:

- Arterial & ROW Bus Rapid Transit (BRT)
- Electric Commuter Rail (CRT)
- Electric Light Rail (LRT)
- Autonomous Road “Train” (ART)

Four alternatives further analyzed to identify:

- Potential Ridership
- Cost Estimates
- Travel Times

Service Plans (stations & alignment)

Top performing options moved forward for more detailed and data-driven analysis using performance measures. See STATION 3 for Performance Measure Results.
Arterial & Right-of-Way Bus Rapid Transit (BRT)

**CHARACTERISTICS:**
- Fixed-route bus with propulsion type (electric–hydrogen fuel cell, battery)
- Operating primarily on:
  - Santa Cruz Branch Line as a dedicated right-of-way (ROW)
  - Highway 1 & local roadway network on shoulders/auxiliary lanes
- Defined stations with transit signal priority & off-board fare collection to reduce travel times
- Frequent, bi-directional service for substantial part of weekdays & weekends
- Operates on Santa Cruz Branch Line up to 65 mph (combination of one & two-way with reverse direction on parallel local streets)

**PROS**
- Strong transit ridership potential
- Integrates easily with overall transportation system
- Ability to adapt to new technologies
- Lowest costs (capital, operations & maintenance)
- No impact to Roaring Camp for access to boardwalk
- Greater number of stops
- Greater flexibility/resiliency to climate change

**CONS**
- Least reliable & longer travel times
- Utilizes less than 7 miles of rail ROW
- Incompatible with freight where BRT is on ROW
- Eliminates Roaring Camp connection to regional rail network
- Level boarding platforms less likely for stops on road network
- Limited capacity for bicycle & mobility devices
- Requires transfer to regional rail network
- Limited Transit-oriented Development potential
AUTONOMOUS ROAD TRAIN (ART) PROPOSED ALIGNMENT AND STATIONS

Station # Name
1 Natural Bridges Station
2 Fair/Almar Avenue Station
3 Bay Street Station
4 Depot Park Station
5 SC Metro Transit Center Station
6 Riverside/San Lorenzo Station
7 Seabright/Murray Station
8 7th Avenue Station
9 17th Avenue Station
10 41st Avenue Station
11 Capitola Village
12 Soquel/Park Station
13 Cabrillo College Station
14 Soquel/Mar Vista Station
15 Rancho Del Mar Center Station
16 Aptos Village Station
17 Rio Del Mar/Soquel Station
18 Main/Green Valley Station
19 Ramsay Park Station
20 Watsonville Transit Center Station
21 Main/Riverside Station
22 Porter/San Juan Station
23 Pajaro Station

BUS RAPID TRANSIT (BRT)
Weekday Service
Frequency: 15-minute headways all day
Service span: 5 a.m. – 12 a.m.
Electric Commuter Rail (CRT)

**CHARACTERISTICS:**
- Passenger rail service with electric propulsion (hydrogen fuel cell, battery)
- Operating on fixed rails with multiple individually-propelled cars
- Higher ridership capacity & longer distance between stops
- Operates on single track with rail sidings for two-way travel up to 30-60 mph
- Potential Positive Train Control and Centralized Traffic Control or similar signal system

**PROS**
- Faster, more reliable travel times
- Greater reduction in vehicle miles traveled & greenhouse gas emissions
- Strong transit ridership potential
- Operates with freight and recreational rail in shared-use corridor
- Supports transit-oriented development
- Shortest implementation time
- Best existing rail network integration (potential one-seat ride to Monterey & cross-platform transfers at Pajaro)
- Assures continuous transportation corridor
- More funding potential
- 91% of stations are within disadvantaged communities
- Flexible designs for seats, bicycles & mobility devices based on need
- Level boarding platforms at all stations
- More energy efficient per passenger mile

**CONS**
- Higher costs (capital, operations & maintenance)
- Lower ridership estimates than BRT and LRT
- Less resilience to climate change impacts
**COMMUTER RAIL TRANSIT (CRT)**

**Weekday Service**
- Frequency: 30-minute headways (peak)
- 60-minute headways (off peak)
- Service span: 6 a.m. – 9 p.m.

<table>
<thead>
<tr>
<th>Station #</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Natural Bridges Station</td>
</tr>
<tr>
<td>2</td>
<td>Bay Street Station</td>
</tr>
<tr>
<td>3</td>
<td>Downtown Santa Cruz/Boardwalk Station</td>
</tr>
<tr>
<td>4</td>
<td>Seabright Station</td>
</tr>
<tr>
<td>5</td>
<td>17th Avenue Station</td>
</tr>
<tr>
<td>6</td>
<td>41st Avenue Station</td>
</tr>
<tr>
<td>7</td>
<td>Capitola Village Station</td>
</tr>
<tr>
<td>8</td>
<td>Cabrillo College Station</td>
</tr>
<tr>
<td>9</td>
<td>Aptos Village Station</td>
</tr>
<tr>
<td>10</td>
<td>Downtown Watsonville Station</td>
</tr>
<tr>
<td>11</td>
<td>Pajaro Station</td>
</tr>
</tbody>
</table>

**DATA SOURCE:**
Calabasas, UC Santa Cruz, Watsonville, Watsonville Airport, Watsonville Downtown.
Electric Light Rail (LRT)

**CHARACTERISTICS:**
- Passenger rail service with electric propulsion (hydrogen fuel cell, battery)
- Operating on fixed rails with single or multiple individually-propelled cars
- Less ridership capacity
- Operates on single track with rail sidings for two-way travel up to 30-60 mph
- Potential Centralized Traffic Control or similar signal system

**PROS**
- Faster, more reliable travel times
- Greatest reduction in vehicle miles traveled & greenhouse gas emissions
- Strong transit ridership potential
- Operates with freight in shared-use corridor (may need temporal separation)
- Supports transit-oriented development
- Shortest implementation time
- Assures continuous transportation corridor
- 92% of stations are within disadvantaged communities
- Does not impede other rail use within corridor (current or future)
- Flexible design for seats, bicycles & mobility devices based on need
- Level boarding platforms at all stations
- More energy efficient per passenger mile

**CONS**
- Higher costs (capital, operations & maintenance)
- Lower ridership estimates than BRT
- Less resilience to climate change impacts
- May require transfer to connect with regional rail network
Autonomous Road “Train” (ART)

**CHARACTERISTICS:**
- Emerging transit mode with electric propulsion (hydrogen fuel cell, battery) combining benefits of BRT & LRT with autonomous driving features
- Rubber tires within dedicated pavement alignment
- Resembles LRT vehicles with similar passenger capacity
- Similar infrastructure to BRT including permanent stations, transit signal priority & frequent service
- Operates on single lane within Santa Cruz Branch Line ROW up to 40-45 mph (includes sidings for two-way travel)

*ART system recently deployed in City of Yibin, China*

**PROS**
- Strong transit ridership potential
- Supports greenhouse gas emission reduction goals
- Greater ability to adapt to new technologies
- Supports transit-oriented development
- 92% of stations are within disadvantaged communities
- Flexible design for seats, bicycles & mobility devices based on need
- Level boarding platforms at all stations

**CONS**
- Capital cost is highest – 50% more than rail transit
- Incompatible with freight rail
- To preserve freight in Watsonville, must transfer to local bus at Lee Rd. to access downtown Watsonville & Pajaro
- Longer travel time
- Less flexibility/resiliency to climate change
AUTONOMOUS ROAD TRAIN (ART)

Weekday Service
Frequency: 30-minute headways all day
Service span: 6 a.m. – 9 p.m.

<table>
<thead>
<tr>
<th>Station #</th>
<th>Name</th>
<th>Station #</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Natural Bridges Station</td>
<td>9</td>
<td>Capitola Village Station</td>
</tr>
<tr>
<td>2</td>
<td>Fair/Almar Avenue Station</td>
<td>10</td>
<td>Park Avenue/Cabrillo Station</td>
</tr>
<tr>
<td>3</td>
<td>Bay Street Station</td>
<td>11</td>
<td>Aptos Village Station</td>
</tr>
<tr>
<td>4</td>
<td>Downtown Santa Cruz Depot Park Station</td>
<td>12</td>
<td>La Selva Beach Station (seasonal)</td>
</tr>
<tr>
<td>5</td>
<td>Boardwalk Station (seasonal)</td>
<td>13</td>
<td>Lee Road Station</td>
</tr>
<tr>
<td>6</td>
<td>Seabright Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>17th Avenue Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>41st Avenue Station</td>
<td></td>
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</tr>
</tbody>
</table>

DATA SOURCE:
- Santa Cruz and Monterey Counties GIS Services
- Calabasas Rd
- Freedom Rd
- Buena Vista Dr
- Watsonville Airport
- Watsonville Downtown
- Watsonville
- Monterey
- Downtown

Points of Interest:
- Watsonville
- Watsonville
- Monterey
- Downtown

Service span: 6 a.m. – 9 p.m.
Frequency: 30-minute headways all day
PACIFIC OCEAN
ALTERNATIVE EVALUATION RESULTS
## ALTERNATIVE EVALUATION RESULTS: ECONOMY

<table>
<thead>
<tr>
<th>METRIC:</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPITAL COSTS</td>
<td>$410,000,000</td>
<td>$478,000,000</td>
<td>$465,000,000</td>
<td>$720,000,000</td>
</tr>
<tr>
<td>CAPITAL COST/MILE</td>
<td>$18,000,000</td>
<td>$22,000,000</td>
<td>$21,000,000</td>
<td>$31,000,000</td>
</tr>
<tr>
<td>CAPITAL COST/RIDER/30 YEARS</td>
<td>$6.40</td>
<td>$9.70</td>
<td>$8.90</td>
<td>$14.60</td>
</tr>
<tr>
<td>CAPITAL COST/PASSENGER MILE/30 YEARS</td>
<td>$1.40</td>
<td>$1.20</td>
<td>$1.00</td>
<td>$1.70</td>
</tr>
<tr>
<td>OPERATIONS &amp; MAINTENANCE (O&amp;M) COSTS/YEAR</td>
<td>$19,540,000</td>
<td>$25,000,000</td>
<td>$25,000,000</td>
<td>$28,000,000</td>
</tr>
<tr>
<td>O&amp;M COST/MILE/YEAR</td>
<td>$875,000</td>
<td>$1,126,000</td>
<td>$1,106,000</td>
<td>$1,217,000</td>
</tr>
<tr>
<td>O&amp;M COST/RIDER</td>
<td>$9.20</td>
<td>$15.20</td>
<td>$14.3</td>
<td>$17.00</td>
</tr>
<tr>
<td>O&amp;M COST/PASSENGER MILE</td>
<td>$1.20</td>
<td>$2.10</td>
<td>$1.90</td>
<td>$2.20</td>
</tr>
<tr>
<td>CAPTICAL COSTS</td>
<td>$410,000,000</td>
<td>$478,000,000</td>
<td>$465,000,000</td>
<td>$720,000,000</td>
</tr>
<tr>
<td>1% FUNDING LIKELY FROM EXISTING SOURCES</td>
<td>64%</td>
<td>59%</td>
<td>61%</td>
<td>36%</td>
</tr>
</tbody>
</table>

**FUNDING LIKELY FROM POTENTIAL FUTURE SOURCES**

- $80M additional funding sources (local or other) needed to provide extra capital and operations & maintenance funds to fully fund project for 25 years
- $50M additional funding sources (local or other) needed to provide extra capital and operations & maintenance funds to fully fund project for 25 years
- $510M additional funding sources (local or other) needed to provide extra capital and operations & maintenance funds to fully fund project for 25 years
- $910M additional funding sources (local or other) needed to provide extra capital and operations & maintenance funds to fully fund project for 25 years

**WILL THE PROJECT INCREASE DEVELOPMENT ALONG THE CORRIDOR?**

- Likely to increase transit-oriented development (TOD) in segments along rail ROW where BRT guideway is built, less likely where BRT runs on roadway network
- More likely to generate TOD on entire route
- More likely to generate TOD on entire route
- More likely to generate TOD on majority of route

| TOTAL NUMBER OF JOBS (DIRECT & INDIRECT) GENERATED THROUGH CONSTRUCTION IN THE NEAR TERM | 4,100 | 5,100 | 4,900 | 7,400 |
| TOTAL NUMBER OF JOBS (DIRECT & INDIRECT) GENERATED LONGER TERM THROUGH O&M ACTIVITY | 210 | 270 | 270 | 300 |

**IMPACTS ON FREIGHT RAIL OPERATIONS**

- Assumes freight rail can only be accommodated between Pajaro up to Park Ave. at Coronado St. in Capitola
  - Converts railway to a paved guideway between Park Ave. in Capitola & Natural Bridges Dr.
  - Freight would need to be abandoned north of Park Ave.
- Allows freight & passenger rail to comingle with positive train control
  - Passenger rail frequency may make it more challenging to run freight at same time as passenger rail, but can be accommodated
  - Freight rail can also run outside of passenger service hours
- Can run with or without FRA-compliant vehicle
  - With: freight impact same as CRT
  - Without: freight cannot comingle with passenger rail & required to be temporarily separated
- Assumes freight rail can only be accommodated within Watsonville up to Lee Rd.
  - Converts railway to a paved guideway between Lee Rd. in Watsonville & Natural Bridges Dr. in Santa Cruz
  - Freight rail would need to be abandoned north of Lee Rd.
### Alternative Evaluation Results: Economy

**Goal:** Well-integrated transportation system that supports economic vitality

<table>
<thead>
<tr>
<th>Metric</th>
<th>BRT</th>
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<th>LRT</th>
<th>ART</th>
</tr>
</thead>
</table>
| **Impacts on Santa Cruz Big Trees & Pacific Railway (SCBG)** | • Expected to bypass boardwalk area via San Lorenzo Blvd. & Laurel St. to access Pacific Ave. Metro Transit Center allowing SCBG to continue accessing boardwalk via east leg of the Wye  
• Utilizes west leg of Wye & thus alternatives would be needed for SCBG to turn their trains  
• Eliminates access for SCBG to bring rail cars in/out of greater rail network via Pajaro | • Can share same set of tracks with SCBG if scheduling allows, since vehicles are both FRA-compliant  
  – Siding may be beneficial for SCBG in boardwalk area to allow commuter rail to pass SCBG while boarding/alighting  
• If there are scheduling challenges for SCBG with high frequency commuter rail & freight rail equipment, SCBG could benefit from separate set of tracks from east leg of Wye to boardwalk area although expense & ROW needed to accommodate additional set of tracks along Beach St. may make this infeasible  
• Another option is for SCBG boarding/alighting to occur at Depot Park Station although this is not of interest to SCBG given potential significant impact on their business  
• Allows SCBG & Pacific Railway to bring rail cars in/out via Pajaro as long as there is proper coordination with passenger & freight rail services | • With FRA-compliant vehicle has same impact on SCBG as CRT (see explanation under CRT)  
• If not FRA-compliant, SCBG & LRT can share same set of tracks if there’s temporal separation between vehicles  
  – Length of time may be short enough to allow this but needs further investigation  
  – Technological changes in rail signaling may also reduce time for temporal separation even further  
• If need for temporal separation is too limiting or there are scheduling challenges between SCBG with high frequency light rail, SCBG could benefit from a separate set of tracks from east leg of Wye to boardwalk area although expense & ROW needed to accommodate additional set of tracks along Beach St. may make this infeasible  
  – Another potential option is for SCBG boarding/alighting to occur at Depot Park Station although this is not of interest to SCBG given potential significant impact on their business  
• With non-FRA compliant vehicle, allows SCBG to bring rail cars in/out via Pajaro as long as there’s proper coordination with passenger and freight rail service | • Requires paved, dedicated guideway through boardwalk area, along Beach St. & up to Depot Park Station  
• SCBG existing route served with a set of tracks parallel to ART guideway from east leg of Wye to boardwalk area  
  – Beach St. would need to accommodate ART guideway, one set of tracks, a cycle track for bikes, one vehicle lane at minimum, & sidewalks on both sides which may be infeasible  
  – A set of tracks & ART guideway crossing through Wharf roundabout should be challenging  
• Another option is for SCBG boarding/alighting to occur at Depot Park Station although this is not of interest to SCBG given potential significant impact on their business  
• Alternative configurations would be needed for SCBG to reverse their trains as they currently use entire Wye  
• Eliminates access for SCBG to bring in/out rail cars or locomotives of greater rail network via Pajaro |
| **Impacts on Existing & Future Freight Rail Businesses & Rail Volumes** | • Not compatible with freight rail north of Park Ave. near Highway 1  
• Increased freight rail volumes limited between Park Ave. near Highway 1 & Lee Rd. in Watsonville with exception of Buena Vista Landfill that could benefit from freight rail  
• Potential freight customers include Buena Vista Landfill plus existing & future customers in Watsonville including agricultural, fuel, lumber & food products | • Freight rail customers could be served along entire length of rail line from Pajaro to Davenport  
• Potential freight customers include construction materials, agricultural, lumber, fuel & food products plus material from Buena Vista Landfill  
• Freight volumes in Watsonville & Pajaro could increase for existing & future customers including additional agricultural, fuel, lumber & food products  
• Transload site for transferring goods to/from rail would increase freight volumes with potential site location in Watsonville | • Freight rail customers could be served along entire length of rail line from Pajaro to Davenport  
• Potential freight customers include construction materials, agricultural, lumber, fuel & food products plus material from Buena Vista Landfill  
• Freight volumes in Watsonville & Pajaro could increase for existing & future customers including additional agricultural, fuel, lumber & food products  
• Transload site for transferring goods to/from rail would increase freight volumes with potential site location in Watsonville | • Freight Rail would be limited to freight customers between Lee Rd. in Watsonville to Pajaro  
• Freight volumes in Watsonville & Pajaro could increase from existing & future customers including additional agricultural, fuel, lumber & food carloads  
• Transload site for transferring goods to/from rail would increase freight volumes with potential site location in Watsonville |
| **What is the Level of Risk that the Corridor Will Not Remain Continuous? Will Alternative Best Utilizes Rail Corridor & Preserve Future Options?** | • Implementation would require petitioning Surface Transportation Board for abandonment of freight rail service north of Park Ave. & to railbank  
  – There are no guarantees the petition would be granted so there are risks that RTC could lose control of all or portion of Rail ROW | • Utilizes 22.2 miles of rail ROW from Pajaro Station to Natural Bridges Dr., thus has no risks of losing rail corridor continuity  
• Utilizes 22.6 miles of rail ROW from Pajaro Station to Natural Bridges Dr. & if freight rail continues, has no risks of losing rail corridor continuity | • Implementation would require petitioning Surface Transportation Board for abandonment of freight rail service north of Lee Rd. & to railbank  
  – There are no guarantees petition would be granted so there are risks that RTC could lose control of all or portion of Rail ROW |
### GOAL: Promotes active transportation

<table>
<thead>
<tr>
<th>METRIC:</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
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<tbody>
<tr>
<td><strong>BICYCLE CAPACITY ON TRANSIT/EVERY 30 MINUTES DURING PEAK PERIOD</strong></td>
<td>• Standard storage is 2-4 bicycles per articulated BRT (eight bicycles for two BRT every 30 mins.)</td>
<td>• Standard storage is 2-4 bicycles per car (Marin’s SMART has space for 12 bicycles per car. A three car train set could accommodate 36 bicycles every 30 mins.)</td>
<td>• Standard storage is 2-4 bicycles per car (Siemens S70 has 24 bikes for each 3-car trainset every 30 minutes)</td>
<td>• Flexible design to include seats, space for bicycles and mobility devices</td>
</tr>
</tbody>
</table>

| LEVEL BOARDING ABILITY FOR BICYCLISTS | • Able to provide level boarding platforms at all stations along rail ROW | • Able to provide level boarding platforms at all stations | • Able to provide level boarding platforms at all stations | • Able to provide level boarding platforms at all stations |

| EFFECTS ON RAIL TRAIL & CALIFORNIA COASTAL TRAIL | • No change to coastal rail trail location as planned in Monterey Bay Sanctuary Scenic Trail Master Plan with exception of minor station adjustments where passing sidings may be needed | • No change to coastal rail trail location as planned in Monterey Bay Sanctuary Scenic Trail Master Plan with exception of minor adjustments at siding locations | • No change to coastal rail trail location as planned in Monterey Bay Sanctuary Scenic Trail Master Plan with exception of passing sidings and station locations | • No change to coastal rail trail location as planned in Monterey Bay Sanctuary Scenic Trail Master Plan with exception of passing sidings and station locations |
| | • Single guideway in two narrow sections of ROW (California St. to Laurel St. & 30th Ave. to 47th Ave.) with two-way signaled operation so both transit and trail could coexist | • A few potential locations identified for passing sidings where coastal rail trail may need to be shifted to immediately adjacent public way & physically separated from traffic | • A few potential locations identified for passing sidings where coastal rail trail could be shifted to immediately adjacent public way & physically separated from traffic | • A few potential locations identified for passing sidings where coastal rail trail could be shifted to immediately adjacent public way & physically separated from traffic |

### GOAL: Supports safer transportation for all modes

| ANNUAL COLLISIONS BY TRANSIT ALTERNATIVE PER YEAR | 2.00 | 0.05 | 0.91 | 0.80 |
| CHANGE IN TOTAL ANNUAL FATAL & INJURY COLLISIONS PER YEAR (CONSIDERING REDUCED AUTO TRAVEL) | 0.46 | -1.89 | -1.18 | -1.16 |
| ANNUAL CHANGE IN COST OF COLLISIONS | -$62,700 | -$612,800 | -$52,100 | -$92,600 |
**GOAL:** Provides accessible & equitable transportation system that is responsive to the needs of all users

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<thead>
<tr>
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<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER OF STATIONS/STOPS</td>
<td>23</td>
<td>11</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>NUMBER OF STATIONS/STOPS WITHIN DISADVANTAGED CENSUS TRACTS</td>
<td>17</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>% OF STATIONS/STOPS WITHIN DISADVANTAGED CENSUS TRACTS</td>
<td>74%</td>
<td>91%</td>
<td>92%</td>
<td>91%</td>
</tr>
<tr>
<td>NUMBER OF STATIONS/STOPS WITHIN 1/2 MILE OF DISADVANTAGED CENSUS TRACTS</td>
<td>22</td>
<td>11</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>% OF STATIONS/STOPS WITHIN 1/2 MILE OF DISADVANTAGED CENSUS TRACTS</td>
<td>96%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>TRANSIT FREQUENCY (# PER HOUR) OFF PEAK</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>TRANSIT PASSENGER CAPACITY MILES TRAVELED</td>
<td>204,000</td>
<td>209,800</td>
<td>299,000</td>
<td>262,000</td>
</tr>
<tr>
<td>TRANSIT FARE&lt;br&gt;Fare range depending on distance traveled</td>
<td>• Typical service fare (similar to options evaluated): $2-5 per one-way trip (based on average of Santa Cruz METRO &amp; five San Francisco Bay Area transit agencies)&lt;br&gt;• Average fare per trip assumed to be $3.50 for estimating funding revenues</td>
<td>• Typical service fare (similar to options evaluated): $2.75-5.75 per one-way trip (based on average of seven CA commuter rail systems)&lt;br&gt;• Average fare per trip assumed to be $4.50 for estimating funding revenues</td>
<td>• Typical service fare (similar to options evaluated): $1.75-3.25 per one-way trip (based on survey of five CA light rail &amp; two Pacific Northwest systems)&lt;br&gt;• Average fare per trip assumed to be $4.50 for estimating funding revenues</td>
<td>• No data available for ART system so LRT fares assumed to be representative of an ART fare&lt;br&gt;• Average fare per trip assumed to be $4.50 for estimating funding revenues</td>
</tr>
<tr>
<td>MOBILITY DEVICE CAPACITY ON TRANSIT EVERY 30 MINUTES DURING PEAK PERIOD</td>
<td>• Typical capacity is two ADA accessible seats per articulated BRT (four seats for two BRT every 30 mins.)&lt;br&gt;• Flexible design to include seats, space for bicycles &amp; mobility devices</td>
<td>• Typical capacity is two ADA accessible seats per car (six seats for each three car trainset every 30 mins.)&lt;br&gt;• Flexible design to include seats, space for bicycles &amp; mobility devices</td>
<td>• Typical capacity is four ADA accessible seats per car (12 seats for each three car trainset every 30 mins.)&lt;br&gt;• Flexible design to include seats, space for bicycles &amp; mobility devices</td>
<td>• Typical capacity is four ADA accessible seats per car (12 seats for each three car trainset every 30 mins.)&lt;br&gt;• Flexible design to include seats, space for bicycles &amp; mobility devices</td>
</tr>
<tr>
<td>INDEPENDENT ACCESSIBILITY FOR ALL AGES &amp; ABILITIES INCLUDING LEVEL BOARDING</td>
<td>• Able to provide level boarding platforms at all stations along rail ROW&lt;br&gt;• Stops along roadway alignment may not accommodate level boarding due to space limitations</td>
<td>• Able to provide level boarding platforms at all stations</td>
<td>• Able to provide level boarding platforms at all stations</td>
<td>• Able to provide level boarding platforms at stations between Natural Bridges Dr. &amp; Lee Rd. Station&lt;br&gt;• Local bus connection from Lee Rd. Station to downtown Watsonville &amp; Pajaro Station with no level boarding</td>
</tr>
</tbody>
</table>
### GOAL: Offers reliable & efficient transportation choices that serve the most people

<table>
<thead>
<tr>
<th>METRIC:</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRANSIT TRAVEL TIME DURING PEAK PERIODS</strong></td>
<td>Average end-to-end Travel Time in minutes (includes station dwell time)</td>
<td>90</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td><strong>AUTO TRAVEL TIME ON HWY 1 NB A.M. PEAK (MINS)</strong></td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td><strong>AUTO TRAVEL TIME ON HWY 1 SB A.M. PEAK (MINS)</strong></td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>AUTO TRAVEL TIME ON HWY 1 NB P.M. PEAK (MINS)</strong></td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td><strong>AUTO TRAVEL TIME ON HWY 1 SB P.M. PEAK (MINS)</strong></td>
<td>61</td>
<td>61</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td><strong>NUMBER OF AT-GRADE CROSSINGS &amp; MITIGATION MEASURES</strong></td>
<td>34 grade crossings (26 public/8 private) Assumes appropriate active warning devices, traffic signal interconnects &amp; improved sight distances</td>
<td>70 grade crossings (41 public/29 private) Assumes appropriate active warning devices, traffic signal interconnects, quiet zones &amp; improved sight distances</td>
<td>70 grade crossings (41 public/29 private) Assumes appropriate active warning devices, traffic signal interconnects, quiet zones &amp; improved sight distances</td>
<td>62 grade crossings (35 public/27 private) Assumes an appropriate active warning devices, traffic signal interconnects, quiet zones &amp; improved sight distances</td>
</tr>
<tr>
<td><strong>IMPACTS AT GRADE CROSSINGS - ESTIMATED SIGNAL GATE DOWN TIME EACH TIME TRANSIT PASSES GRADE CROSSING (SECONDS)</strong></td>
<td>60</td>
<td>90</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td><strong>REGIONAL CONNECTIVITY</strong></td>
<td>Would connect with planned regional &amp; intercity rail service at Pajaro Station via a transfer from BRT to rail</td>
<td>Would connect to proposed intercity rail service at Pajaro via a cross-platform transfer for access to Gilroy, planned High Speed Rail line plus Salinas &amp; destinations south</td>
<td>Would connect to proposed intercity rail service at Pajaro via a cross-platform transfer for access to Gilroy, planned High Speed Rail line plus Salinas &amp; destinations south</td>
<td>On Santa Cruz Branch Rail Line would need transfer to local bus service at Lee Rd. plus transfer from bus to regional &amp; intercity rail service at Pajaro Station</td>
</tr>
</tbody>
</table>
**GOAL:** Offers reliable & efficient transportation choices that serve the most people

<table>
<thead>
<tr>
<th>METRIC:</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>TRAVEL TIME RELIABILITY DURING PEAK PERIODS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The 95th percentile planning reliability time (in mins) in 2040 conditions, estimated using reliability factors presented in Highway Capacity Manual</td>
<td>132</td>
<td>56</td>
<td>69</td>
<td>78</td>
</tr>
</tbody>
</table>

- Lowest travel time reliability due to traveling on mixed traffic roadways 70% of route
- Utilizes exclusive 6.7 miles guideway on ROW
- Operates in mixed traffic for 6.6 miles on Highway 1 between Airport & Rio Del Mar Blvds.
  - Travels in bus shoulders/auxiliary lane for 1 mile on Highway 1 between Freedom & Rio Del Mar Blvd.
- Operates in mixed traffic on local roadways in Watsonville, Aptos, Soquel & downtown Santa Cruz
  - Could utilize bus priority system designs (i.e. queue jumps & signal priority) at many of the 9 miles of local road intersections to provide travel time reliability benefits

<table>
<thead>
<tr>
<th><strong>TRAVEL TIME RELIABILITY DURING PEAK PERIODS</strong></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| Highest travel time reliability due to traveling nearly exclusively on dedicated facility
| Delays may occur if not separated into dedicated facility in areas where ROW is shared use with autos such as on Walker St. in Watsonville & Beach St. in Santa Cruz
| Highest travel time reliability due to traveling nearly exclusively on dedicated facility
| Delays may occur if not separated into dedicated facility in areas where ROW is shared use with autos such as on Walker St. in Watsonville & Beach St. in Santa Cruz
| Highest travel time reliability due to traveling nearly exclusively on dedicated facility
| Delays may occur if not separated into dedicated facility in areas where ROW is shared use with autos such as on Walker St. in Watsonville & Beach St. in Santa Cruz
- Could utilize bus priority system designs (i.e. queue jumps & signal priority) at many of the 3.2 miles of local road intersections to provide travel time reliability benefits
## Goal: Promotes a healthier environment

### Will project substantially increase transit ridership?

<table>
<thead>
<tr>
<th>Metric:</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday Transit Ridership in Corridor in 2040 (daily)</td>
<td>6,650</td>
<td>5,150</td>
<td>5,450</td>
<td>5,150</td>
</tr>
<tr>
<td>Weekday Transit Ridership in Corridor in 2040 - Considers Future General Plan Updates (daily)</td>
<td>7,650</td>
<td>7,150</td>
<td>7,300</td>
<td>7,000</td>
</tr>
<tr>
<td>Weekday Transit Ridership in Corridor in 2040 - Assumes 10% Additional Ridership due to Transit Oriented Developments Once Transit Facility is Operational (daily)</td>
<td>8,400</td>
<td>7,900</td>
<td>8,000</td>
<td>7,700</td>
</tr>
<tr>
<td>Weekend Transit Ridership in Corridor - Local/Regional Trips in 2040 (daily)</td>
<td>3,400</td>
<td>2,800</td>
<td>3,000</td>
<td>2,800</td>
</tr>
<tr>
<td>Countywide Transit Ridership (daily)</td>
<td>37,500</td>
<td>34,500</td>
<td>34,300</td>
<td>34,100</td>
</tr>
<tr>
<td>Transit Passenger Capacity/3-Hour Peak Period</td>
<td>1,440</td>
<td>2,700</td>
<td>2,650</td>
<td>2,650</td>
</tr>
</tbody>
</table>

### Does project support the goal of minimizing emissions? How long will the project take to implement?

<table>
<thead>
<tr>
<th>Metric:</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Vehicle Miles Traveled Reduced/DAY</td>
<td>-16,280</td>
<td>-20,490</td>
<td>-22,020</td>
<td>-20,650</td>
</tr>
<tr>
<td>Reduction in Greenhouse Gas Emissions - In Annual Metric Tons in Year 2040</td>
<td>3.00</td>
<td>3.78</td>
<td>4.06</td>
<td>3.78</td>
</tr>
<tr>
<td>Length of Time to Implement (in years)</td>
<td>15-17</td>
<td>11-13</td>
<td>11-13</td>
<td>20-24</td>
</tr>
<tr>
<td>Criteria Pollutants - In Annual Metric Tons in Year 2040</td>
<td>0.0070</td>
<td>0.0088</td>
<td>0.0094</td>
<td>0.0088</td>
</tr>
</tbody>
</table>

### Will project adapt to climate change?

<table>
<thead>
<tr>
<th>Metric:</th>
<th>BRT</th>
<th>CRT</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Climate Change Resilience Length of alignment with potential for coastal erosion impacts due to 88 cm sea level rise with 100 year storm event (miles)</td>
<td>0.57</td>
<td>1.85</td>
<td>1.85</td>
<td>1.85</td>
</tr>
</tbody>
</table>
### Are there effects of the project on biological resources, visual, noise & vibration?

<table>
<thead>
<tr>
<th>METRIC: EFFECTS ON BIOLOGICAL RESOURCES, VISUAL, NOISE &amp; VIBRATION</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric BRT quieter than diesel powered bus</td>
<td>• Noisier than other alternatives, but quiet zones would eliminate need for sounding horns at roadway crossings &amp; are included in cost estimates</td>
<td>• Electric BRT quieter than diesel powered bus</td>
<td>• Moderate noise level, but quiet zones would eliminate need for sounding horns at roadway crossings &amp; are included in cost estimates</td>
<td>• Noise level unknown, but sounding horns at roadway crossings are not required due to rubber wheel option</td>
</tr>
<tr>
<td>Not visually obstructive &amp; least likely to cause vibration</td>
<td>• Not visually obstructive &amp; moderate level of vibration</td>
<td>• Not visually obstructive &amp; moderate level of vibration</td>
<td>• Not visually obstructive &amp; least likely to cause vibration</td>
<td>• Not visually obstructive &amp; least likely to cause vibration</td>
</tr>
<tr>
<td>Least impact on environmentally sensitive areas as it's primarily in vicinity of the sloughs in Watsonville</td>
<td>• Increased rail service along ROW may impact environmentally sensitive areas including biological resources as it utilizes ROW in vicinity of the sloughs west of Watsonville</td>
<td>• Increased rail service along ROW may impact environmentally sensitive areas including biological resources as it utilizes ROW in vicinity of the sloughs west of Watsonville</td>
<td>• Increased rail service along ROW may impact environmentally sensitive areas including biological resources as it utilizes ROW in vicinity of the sloughs west of Watsonville</td>
<td>• Increased rail service along ROW may impact environmentally sensitive areas including biological resources as it utilizes ROW in vicinity of the sloughs west of Watsonville</td>
</tr>
</tbody>
</table>

### Does project support the goal of reduced energy usage?

<table>
<thead>
<tr>
<th>REDUCTION OF ENERGY/FUEL CONSUMPTION BASED ON AUTO MODE SHIFTS TO THE ALTERNATIVES (AVERAGE BTU/PASSENGER MILE)</th>
<th>BRT</th>
<th>CRT</th>
<th>LRT</th>
<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,957</td>
<td>1,528</td>
<td>1,500</td>
<td>1,500-1,957</td>
<td></td>
</tr>
</tbody>
</table>
## ALTERNATIVE EVALUATION RESULTS: OTHER GOALS

### GOAL: Addresses project-specific concerns

<table>
<thead>
<tr>
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<th>ART</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IS PROJECT TECHNICALLY FEASIBLE?</strong></td>
<td>Traditional, tested technology &amp; technically feasible</td>
<td>Traditional, tested technology &amp; technically feasible</td>
<td>Traditional, tested technology &amp; technically feasible</td>
<td>Existing, testing infrastructure, but not traditional &amp; introduces new technological risks</td>
</tr>
<tr>
<td><strong>IS PROJECT CONSISTENT WITH OTHER LOCAL, STATE &amp; FEDERAL PLANNING EFFORTS?</strong></td>
<td>SCC Regional Transpo Plan • Unified Corridor Study • CA State Rail Plan • MBSSST Master Plan</td>
<td>SCC Regional Transpo Plan • Unified Corridor Study • CA State Rail Plan • MBSSST Master Plan</td>
<td>SCC Regional Transpo Plan • Unified Corridor Study • CA State Rail Plan • MBSSST Master Plan</td>
<td>CA State Rail Plan • MBSSST Master Plan</td>
</tr>
<tr>
<td><strong>IS PROJECT CONSISTENT WITH LOCAL, STATE AND FEDERAL REGULATORY REQUIREMENTS?</strong></td>
<td>SB375/other GHG regulations • Coastal Commission</td>
<td>SB375/other GHG regulations • Coastal Commission • Proposition 116 • FAST Act (travel time reliability)</td>
<td>SB375/other GHG regulations • Coastal Commission • Proposition 116 • FAST Act (travel time reliability)</td>
<td>SB375/other GHG regulations • Coastal Commission • FAST Act (travel time reliability)</td>
</tr>
<tr>
<td><strong>DOES PROJECT INTEGRATE INTO EXISTING TRANSPORTATION INFRASTRUCTURE?</strong></td>
<td>Connects with local bus service at Santa Cruz Metro Center &amp; Watsonville Transit Center • Existing local bus service connects at four future stations • Local bus service could be provided to/from all future stations</td>
<td>Connects with local bus service at seven future stations (Watsonville Downtown, Aptos Village, 41st Ave., 17th Ave., Seabright Ave., Downtown Boardwalk, Natural Bridges Dr.) • Local bus service could be provided to/from all future stations</td>
<td>Connects with local bus service at eight future LRT stations (Watsonville Downtown, Ohlone Parkway, Aptos Village, 41st Ave., 17th Ave., Seabright Ave., Downtown Boardwalk, Natural Bridges Dr.) • Local bus service could be provided to/from all future stations</td>
<td>Connects with local bus service at six future ART stations (Aptos Village, 41st Ave., 17th Ave., Seabright Ave., Downtown Boardwalk, Natural Bridges Dr.) • Local bus service could be provided to/from all future stations • Local bus connector service from Lee Rd. station to Pajaro would also connect to Watsonville Downtown Transit Center</td>
</tr>
<tr>
<td><strong>DOES PROJECT HAVE ABILITY TO ADAPT TO FUTURE TECHNOLOGY?</strong></td>
<td>More flexibility adapting to new technologies due to more flexible infrastructure with pavement and lower vehicle costs/shorter useful life</td>
<td>Less flexibility adapting to new technologies due to less flexible infrastructure due to fixed guideway and higher vehicle cost/longer useful life</td>
<td>Less flexibility adapting to new technologies due to less flexible infrastructure due to fixed guideway and higher vehicle cost/longer useful life</td>
<td>Moderate flexibility adapting to new technologies due to more flexible infrastructure due to pavement and higher vehicle costs/longer useful life</td>
</tr>
<tr>
<td><strong>HOW EASILY CAN PROJECT BE INTEGRATED INTO EXISTING RIGHT-OF-WAY?</strong></td>
<td>No significant ROW expected to be needed to construct facility on ROW • Additional ROW could be required at larger stations that include parking or other amenities that require more space</td>
<td>No significant ROW expected to be needed to construct facility on ROW</td>
<td>No significant ROW expected to be needed to construct facility on ROW</td>
<td>No significant ROW expected to be needed to construct facility on ROW • Additional ROW could be required at larger stations that include parking or other amenities needing more space</td>
</tr>
</tbody>
</table>

---

**SCCRTC**

**SANTA CRUZ METRO**
Electric Passenger Rail - Commuter (CRT) / Light Rail (LRT)

CRT and LRT operate on a single-track with rail sidings to allow for two-way travel. A decision on whether the rail option will be CRT or LRT is not recommended as part of this planning study. The infrastructure needed for either CRT or LRT is similar enough as to not impede further preliminary engineering or environmental studies of the corridor for rail transit. Deferring this decision will maintain flexibility for future decisions on the rail vehicle type, while clean energy rail technology advances.

**USER BENEFITS**
- Fastest travel time with greatest reliability
- Serves longer distance trips
- Flexible design for seats, bicycles, & mobility devices
- 91% of stations are within disadvantaged communities
- Level boarding at station platforms for universal access
- Greatest integration with regional and state rail network
- Potential for one-seat ride to Monterey and cross-platform transfers at Pajaro
- Greatest opportunity for transit-oriented development at stations

**OPERATIONAL BENEFITS**
- Compatible with State Rail Plan and Monterey Rail Plan
- Doesn’t impede freight or recreational rail use within the corridor (current or future)
- Assures continuous transportation corridor
- Utilizes full rail right-of-way between Pajaro & the west side of Santa Cruz
- More energy efficient per passenger mile
- Shortest implementation time
- More potential funding sources
COMMUTER RAIL TRANSIT (CRT)

Weekday Service
Frequency: 30-minute headways (peak)
60-minute headways (off peak)
Service span: 6 a.m. – 9 p.m.

<table>
<thead>
<tr>
<th>Station #</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Natural Bridges Station</td>
</tr>
<tr>
<td>2</td>
<td>Bay Street Station</td>
</tr>
<tr>
<td>3</td>
<td>Downtown Santa Cruz/Boardwalk</td>
</tr>
<tr>
<td>4</td>
<td>Seabright Station</td>
</tr>
<tr>
<td>5</td>
<td>17th Avenue Station</td>
</tr>
<tr>
<td>6</td>
<td>41st Avenue Station</td>
</tr>
<tr>
<td>7</td>
<td>Capitola Station</td>
</tr>
<tr>
<td>8</td>
<td>Cabrillo Station</td>
</tr>
<tr>
<td>9</td>
<td>Aptos Station</td>
</tr>
<tr>
<td>10</td>
<td>Downtown Watsonville Station</td>
</tr>
<tr>
<td>11</td>
<td>Pajaro Station</td>
</tr>
<tr>
<td>12</td>
<td>Soquel/Park Station</td>
</tr>
<tr>
<td>13</td>
<td>Soquel/Mar Vista Station</td>
</tr>
<tr>
<td>14</td>
<td>State Beach Station</td>
</tr>
<tr>
<td>15</td>
<td>Mission St Station</td>
</tr>
<tr>
<td>16</td>
<td>Pajaro Station</td>
</tr>
<tr>
<td>17</td>
<td>Watsonville Airport</td>
</tr>
<tr>
<td>18</td>
<td>Watsonville Downtown</td>
</tr>
<tr>
<td>19</td>
<td>Watsonville Airport</td>
</tr>
<tr>
<td>20</td>
<td>Watsonville Airport</td>
</tr>
<tr>
<td>21</td>
<td>Watsonville Airport</td>
</tr>
<tr>
<td>22</td>
<td>Watsonville Airport</td>
</tr>
<tr>
<td>23</td>
<td>Watsonville Airport</td>
</tr>
</tbody>
</table>

LEGEND

- **Santa Cruz Branch Rail Line**
- **ART Proposed Alignment**
- **ART Proposed Stations**
- **PACIFIC OCEAN**
- **COMMUTER RAIL TRANSIT (CRT)**
- **AUTONOMOUS ROAD TRAIN (ART) PROPOSED ALIGNMENT AND STATIONS**
- **Light Rail Transit (LRT)**
- **Bus Rapid Transit (BRT)**
- **Commuter Rail Transit**
- **San Jose Light Rail**
- **Highway 152**
- **Highway 129**
LIGHT RAIL TRANSIT (LRT)

Weekday Service
Frequency: 30-minute headways all day
Service span: 6 a.m. – 9 p.m.

DATA SOURCE:
Santa Cruz and Monterey Counties GIS Services

Station #  Name                                                  Station #  Name
1    Natural Bridges Station                                      9    Capitola Station
2    Fair /Almar Avenue Station                                  10   State Beach Station
3    Bay Street Station                                           11   Aptos Station
4    Downtown Santa Cruz Depot Park Station                     12   La Selva Beach Station (seasonal)
5    Boardwalk Station (seasonal)                                13   Ohlone Parkway Station
6    Seabright Station                                           14   Downtown Watsonville Station
7    17th Avenue Station                                         15   Pajaro Station
8    38th/41st Avenue Station                                    

PACIFIC OCEAN

1 mile

NORTH
Please be sure to fill out the survey regarding the Performance Analysis Results and proposed Locally Preferred Alternative.