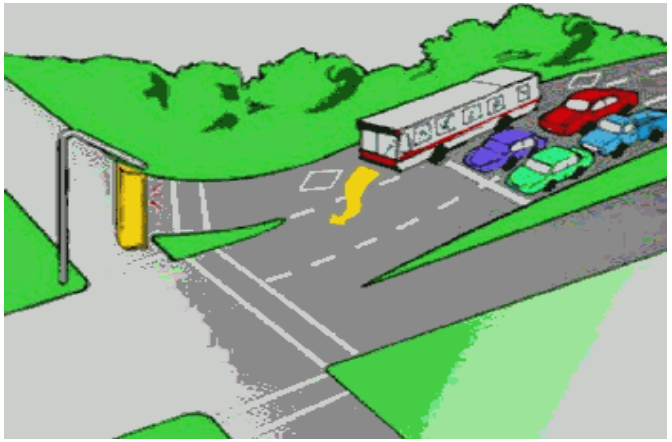
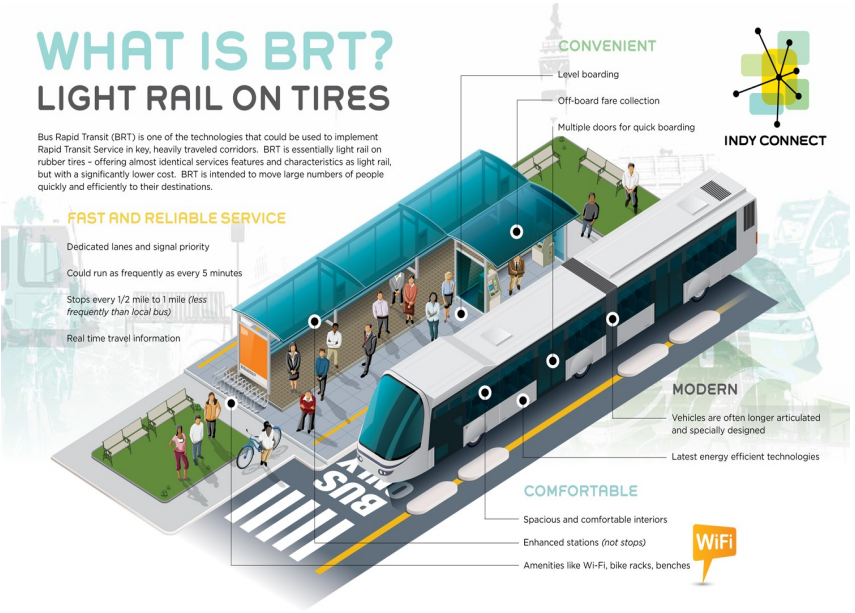
The Future of Transportation in Santa Cruz County





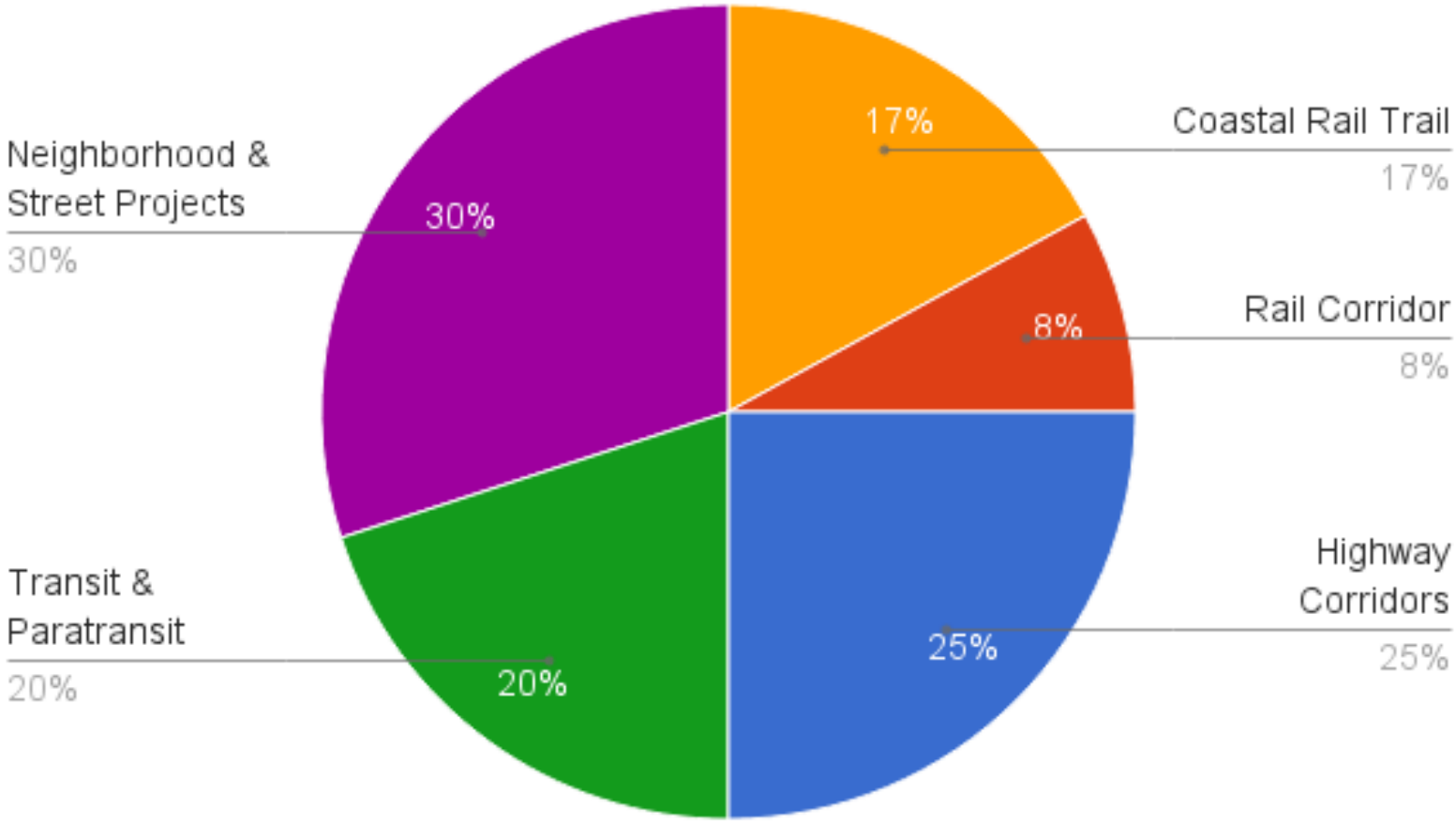
By Stanley Sokolow
stanleysokolow@gmail.com
Nov 2, 2017

The Campaign for Sensible Transportation

Sensibletransportation.org
www.facebook.com/sensibletransportation/

Measure D Transportation Tax – It passed. What's next? –

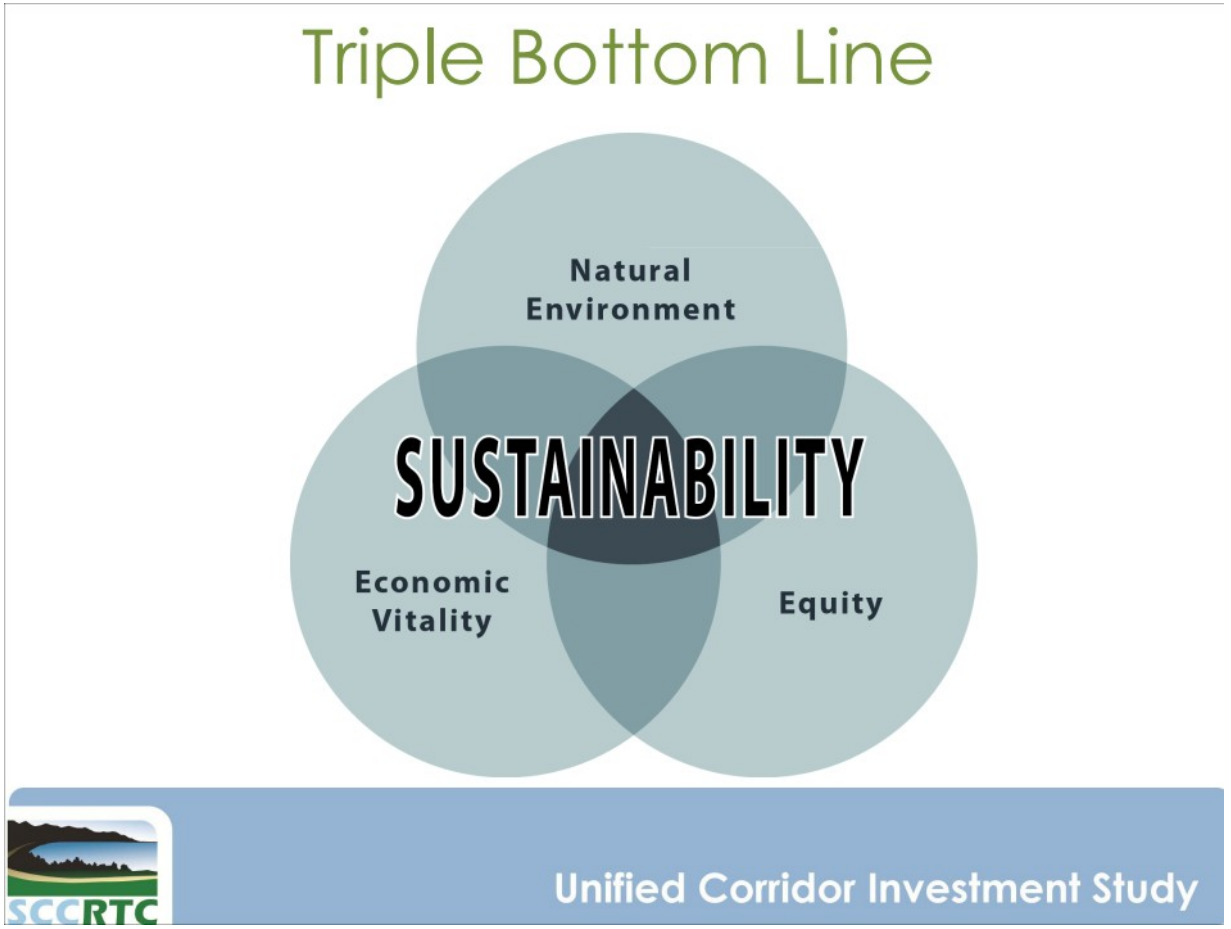
Measure-D-Funded Projects have been approved, but we need more.

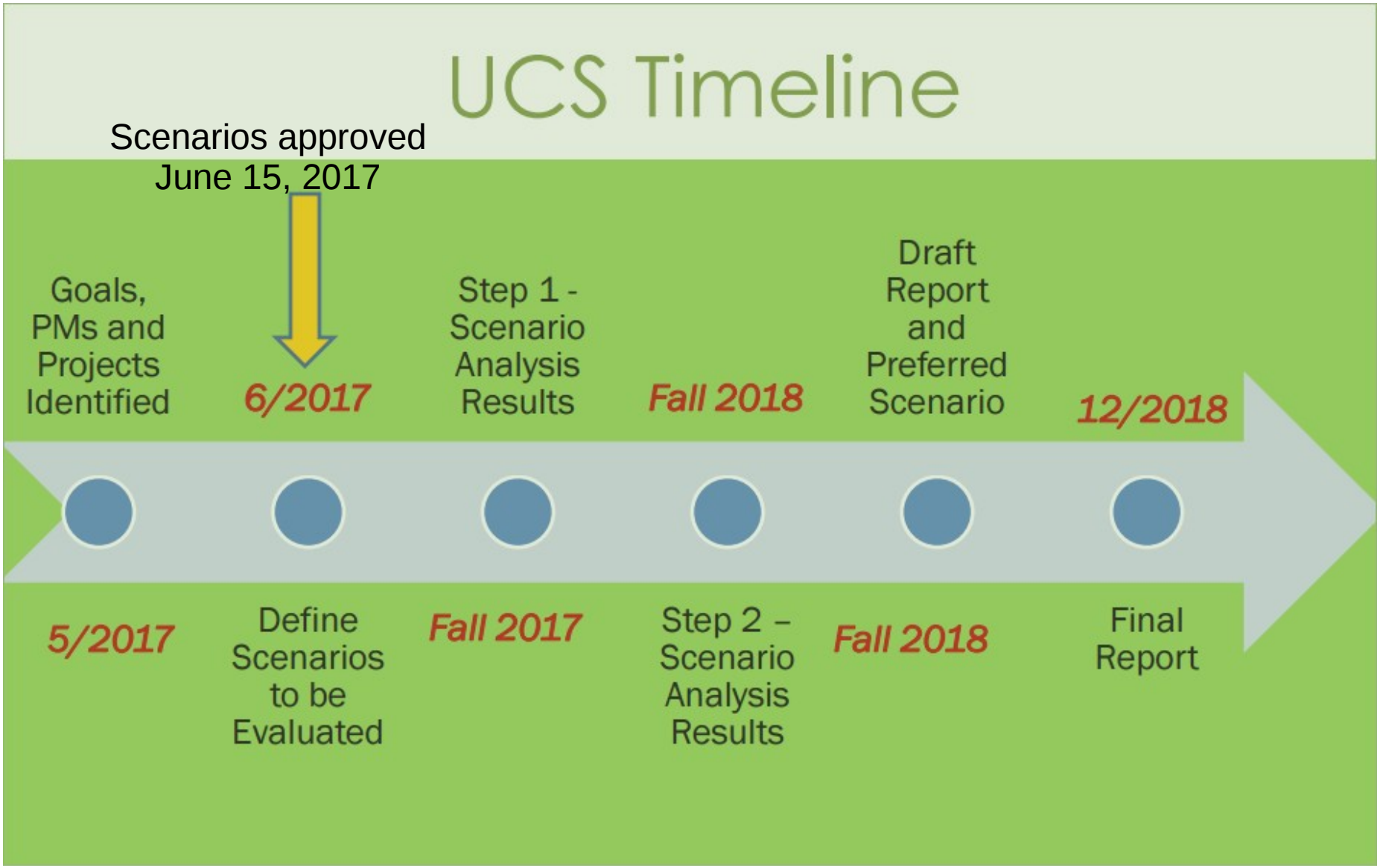


Unified Corridors Investment Study (UCIS)

Project Area Map

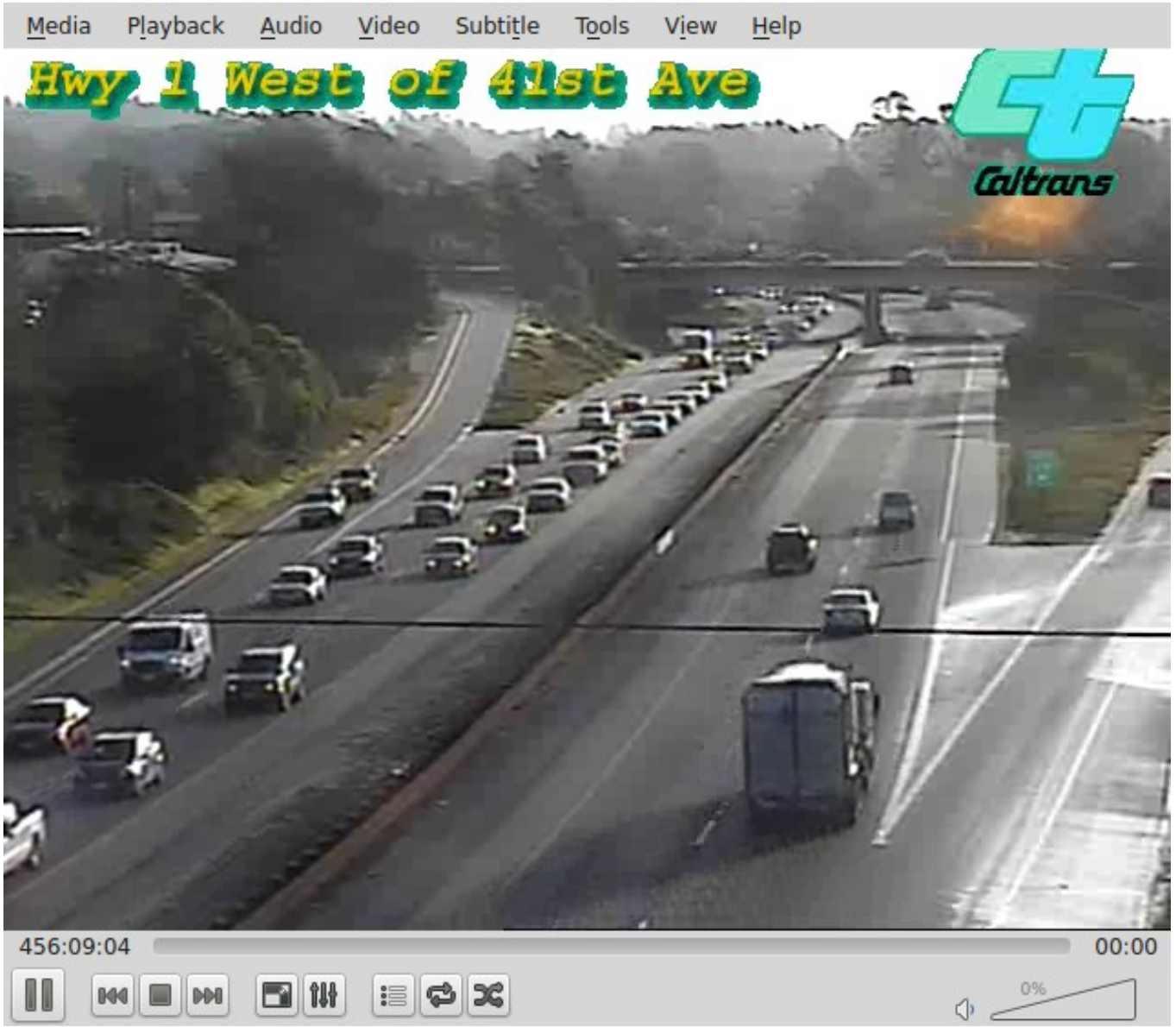
Goals of the UCIS





Phase I: Created **computer models** for transportation planning in SC County.
Phase II: Consultants will **use the models to forecast impacts of projects in the chosen scenarios by year 2035** time horizon.

Highway 1 at 8:37 am




Hwy 1 at Freedom Blvd
Caltrans
2017-09-07 08:48

I-405 Sepulveda Pass Widening

< Before >

< During

After >

Duration of construction: **5 years**; cost = **$1.1 Billion**; **added HOV lanes, more ramps**.
Study immediately after construction found

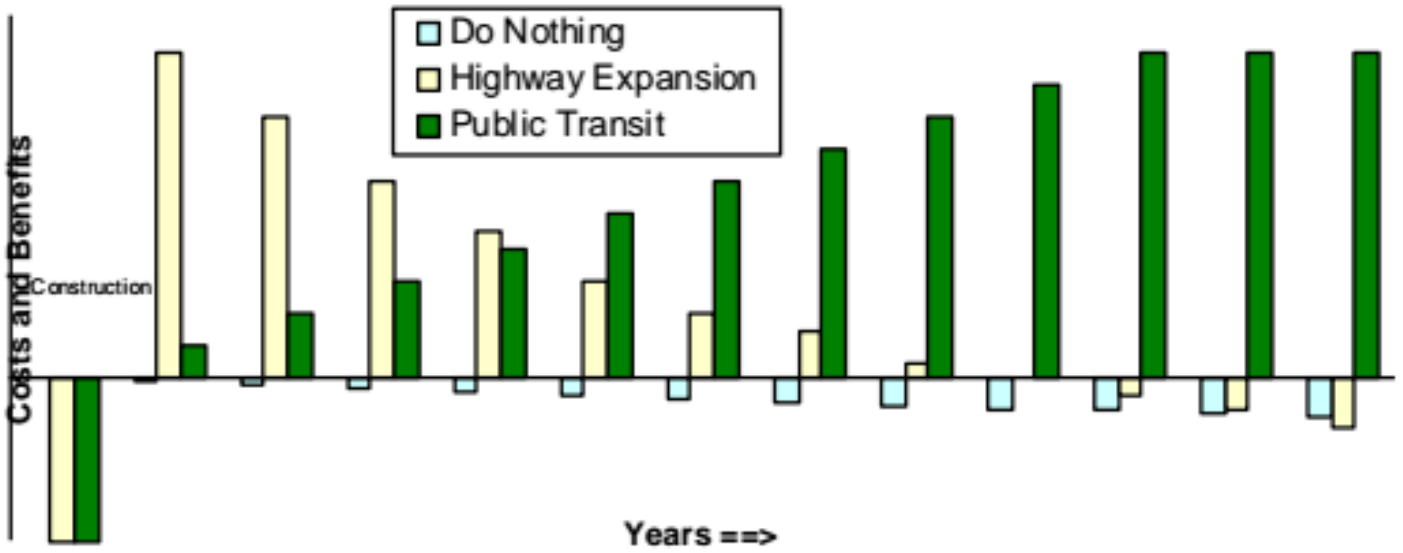
congestion slightly worse than before.

Why **WIDENING WON'T WORK**: Induced & Generated Traffic

- **When road capacity increases, peak-period trips also increase until congestion again limits further traffic growth.**
- Short term: people change their routes and take trips they previously avoided (latent & generated traffic).
- Long term: people move to more distant locations because travel became easier (induced travel).

Increased road capacity: it fills up and benefit declines. Transit on separate R.O.W.: benefit slowly climbs.

Figure 10 **Road Widening Versus Transit Congestion Impacts**



A Do Nothing causes congestion costs to increase in the future. Highway expansion imposes short term construction delays, then large congestion reduction benefits, but these decline over time due to generated traffic. Grade-separated public transit provides smaller benefits in the short-term but these increase over time as public transit ridership grows.

Highway 1 projects in the Unified Corridors Study

- **bus lane on Hwy 1 (median) shoulder**
- add more auxiliary lanes beyond those in Measure D
- **HOV lanes** (2 or more persons)
- increase transit frequency
- metering signals on Hwy 1 on-ramps
- add lanes on Hwy 1 bridge over San Lorenzo River
- Mission Street intersection improvements
- rail transit on Hwy 1 between SC and Watsonville
- self-driving cars (study their impacts)

Soquel Ave/Dr & Freedom Blvd

- **Bus Rapid Transit (BRT) “lite”**
  - **Faster boarding**
  - **Transit signal priority**
  - **Queue jumps**
- Dedicated lane for buses and bicycles
- Remove parking to make way for bus & bikes
- Buffered or protected bike lanes
- Express buses, more frequency
- Intersection improvements
  - For autos
  - For bicycles & pedestrians

Rail Corridor

- Multi-use trail shared by bicycles & pedestrians
  - This is already committed for a 12' to 16' wide trail.
- Separate trails for bicycles & pedestrians
  - Being pushed by SCC Greenway group.
- **Passenger train service (local & inter-regional)**
- **Bus Rapid Transit (BRT)**
- Freight service on railroad
  - Currently freight is only on the 4 track-miles northward from Pajaro.
  - While Cemex cement plant was operating before it closed in 2010, only 2% of county's freight went by rail. Cemex had been the biggest shipper.
  - Iowa Pacific contract expires in 2022.

Overall Projects

- Bicycle & pedestrian facility improvements
- Additional transit connections (routes? stops?)
- Bike share (rent-a-bike by the hour)
  - City of Santa Cruz is going to do it.
- Bike amenities (secure parking?)
- Transit amenities (wifi? Sheltered stops?)
- Park-and-ride lots
- Multi-modal transportation hubs
- Transit incentive programs (employer, residences)
- Public education & enforcement (electric vehicles, motorist safety, bicycle safety)

Projects not being considered which some people have suggested

- Personal Rapid Transit (PRT = pods on elevated track)
- Toll lanes with congestion-based pricing
- Increased parking fees
- A lane on coastal trail for electric bikes & velomobiles
- Train to UCSC campus
- Train through tunnels to San Jose
- Parking meters on every street
- Build affordable housing closer to jobs

The Great Santa Cruz Trail: SCC Greenway wants only a trail

But, is it equitable to Watsonville commuters?

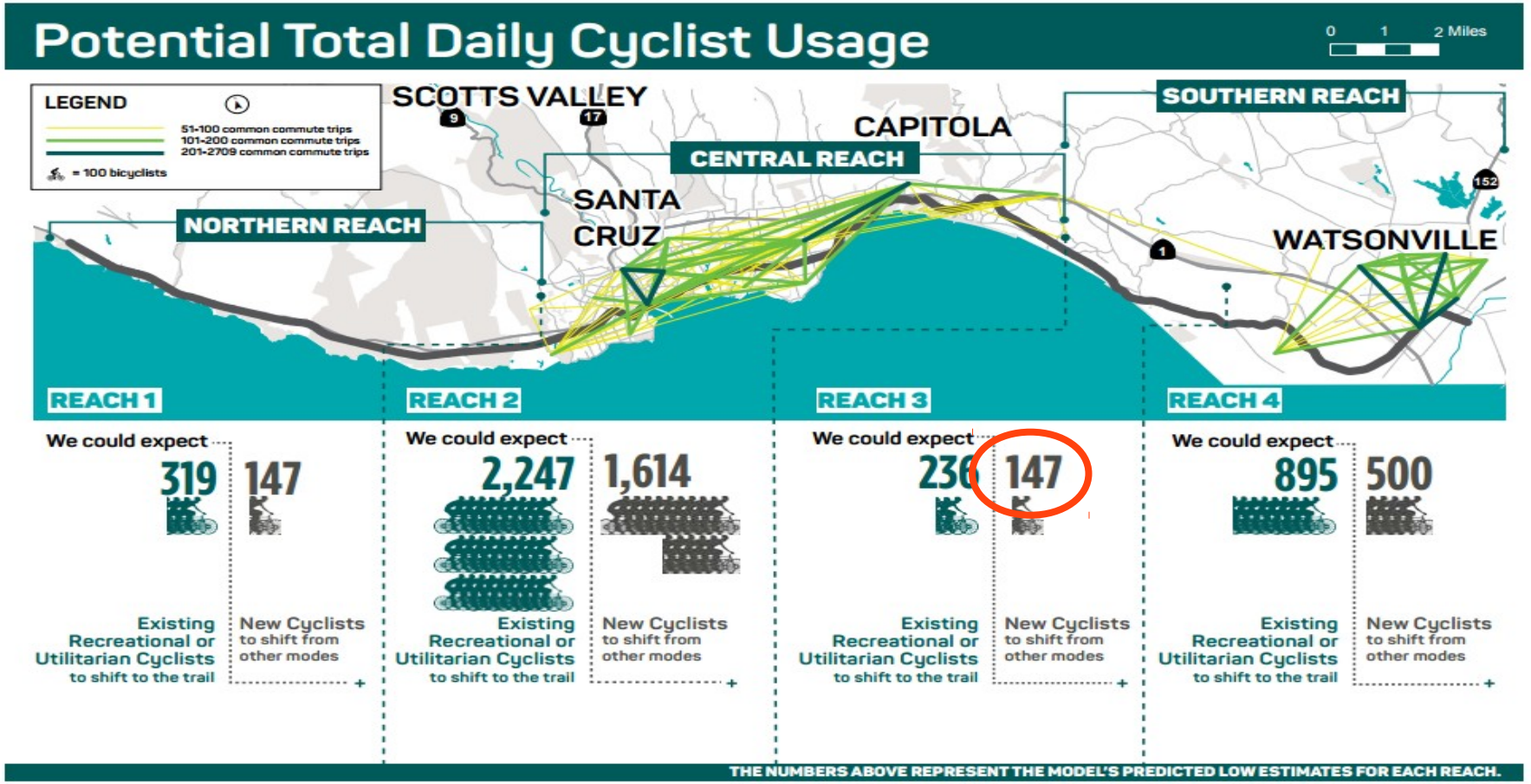
Coastal Rail Santa Cruz group wants this.

Train crossing signals & booms are not shown, but would be required.

Some want Bus Rapid Transit like this busway in Cambridge UK

The Great Santa Cruz Trail study forecasts extremely low Watsonville-to-Santa Cruz bicycle commute usage.

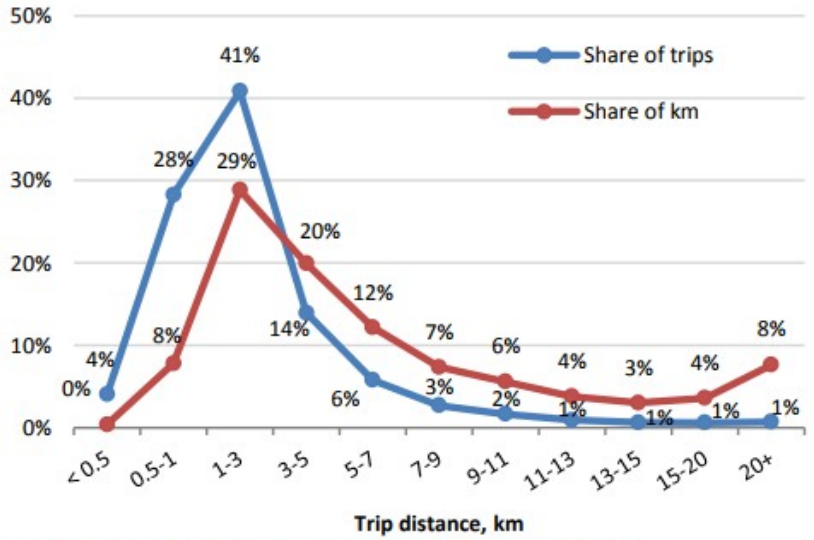
*Model estimates indicate that the Great Santa Cruz Trail has the potential to draw **6,105** daily cyclists (sum of all numbers in the chart below), including commuters, students, and those cycling for recreation. The numbers below represent the low estimates for each reach.*



Even in Denmark, 87% of bicycle trips are less than 3 miles.

Trip distance

In Denmark, 87 % of all trips and 57 % of the overall driven kilometers on bike are made up of trips that are shorter than 5 km. Only 4 % of the trips are longer than 11 km, but due to the length of the trips they account for 18 % of the overall driven kilometers on bike.



Distribution of trips on bike across trip distance (km), 2011-2013

Less than 1% of trips are more than 12.4 miles.
Bicycle commuting won't solve freeway congestion.

HOV or bus lanes on freeway

- Caltrans determined:
  - Only southernmost few miles of freeway have enough width in the median.
  - A switchable lane is not feasible.
  - Toll lanes are not worth the cost in our situation.
  - Widening requires rebuilding 2 railroad bridges and 4 overpasses to accommodate wider freeway plus widening the freeway bridge over Aptos Creek.
  - Must purchase more land in a few places.
  - Estimated cost **$640 million** in 2015 dollars.
  - https://sccrtc.org/projects/streets-highways/hwy1corridor/

Passenger train study findings

- Existing **railroad infrastructure is not adequate** for passenger service, needs upgrades.
- Between Santa Cruz & Watsonville: **$133,200,000**
- Annual operating & maintenance = $9,882,000 (**$727/revenue-hour**)
- SC Metro bus system O&M = **<$200/revenue-hour.**
- 5 DMU trains @ $8,500,000 each
- **Train replacement annualized** = $42,500,000 / 30 years = **$1.4 million/year.**

How full would any train be at the most?

TABLE 6-13: PEAK PASSENGER LOAD

Scenario	Scenario	Peak Load
B	Santa Cruz ←→ Capitola (Limited)	55
D	Santa Cruz ←→ Watsonville (Peak Express)	44
E	Santa Cruz ←→ Aptos (Local)	62
G	Santa Cruz ←→ Watsonville (Expanded Local)	64
J	Santa Cruz ←→ Pajaro (Expanded Local)	44

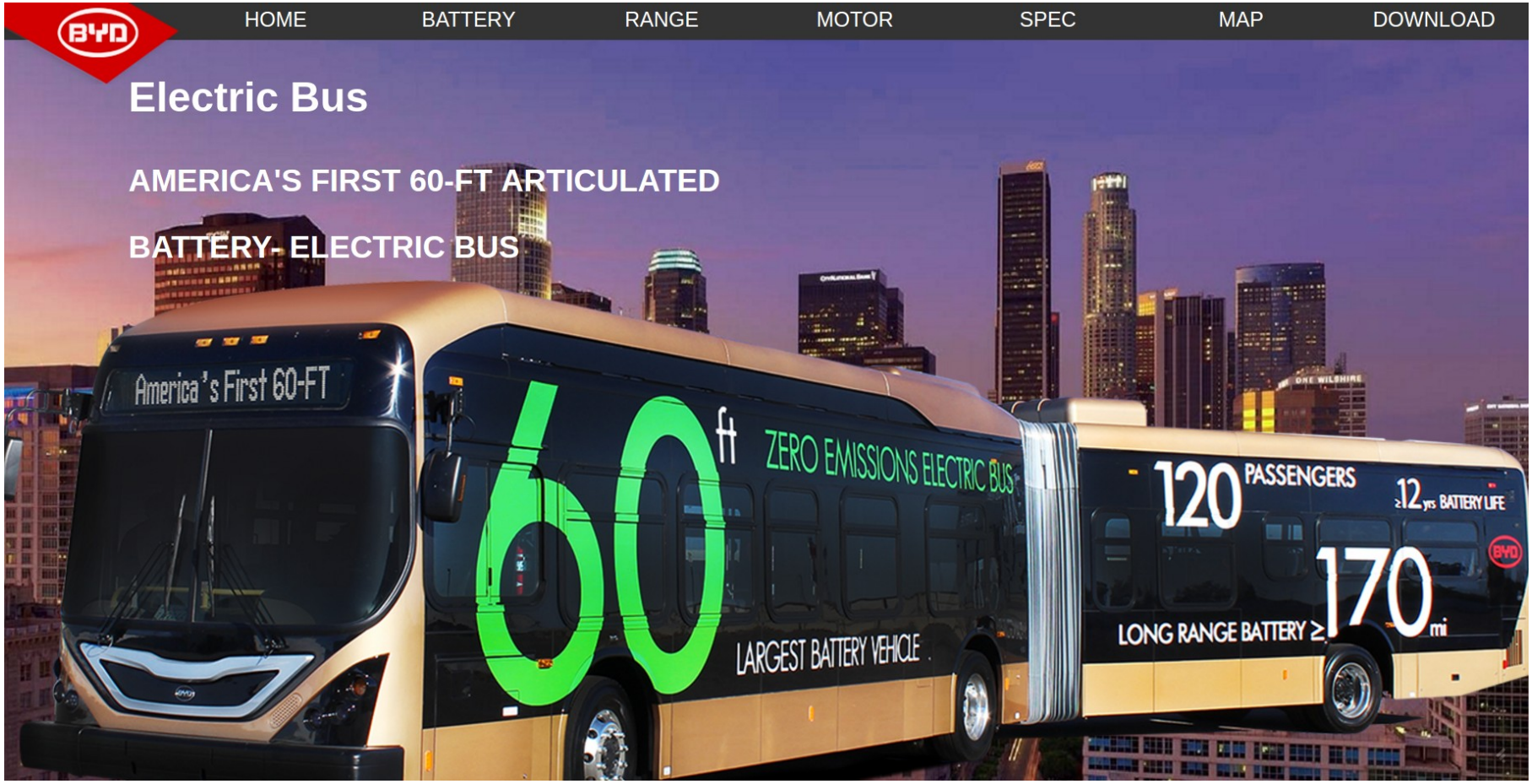
Source: Fehr & Peers, 2015

Peak passenger load = 64 riders

Typical light-rail train

Stadler Diesel: Capacity 200 to 220 riders.

BYD Articulated Battery-Bus



Capacity = 120 passengers, seated & standing

Electric Bus Capital Cost

- **Initial purchase of 5 DMU @ $8.5 million each = $42,500,000.**
- **Initial purchase of 10 BYD articulated buses @ $1.4 million each = $14,000,000.**
- **Annualized replacement cost of buses is less than replacement of trains.**
- **Paving 1 lane 19 miles @ $2 million/mile = $38 million.**

Coastal Bus versus Train

- Bus can drive off of the corridor.
  - Direct service possible.
  - Can detour around obstructions.
- Lower cost, but service life is 14 years.
- Quieter, lighter weight so less vibration, no mandatory horn blasts, ordinary signal lights at crossings; no bells.
- Self-driving buses are being tested in several cities.

- Train is stuck on the corridor rails.
  - Trunk and feeder only.
  - Can't detour. Obstructions stop trains.
- More expensive but last longer (30-years).
- Horns at crossings (possible quiet zones), wheel screech on curves, vibrations, bells at crossings.
- Self-driving trains exist already.

Autonomous mini-buses will reduce operating cost, increase span, and make direct service (taxi bus) feasible.

TECHNOLOGY NEWS | Mon Mar 6, 2017 | 9:07pm EST

Self-driving bus with no back-up driver nears California street

An EasyMile EZ10 shared autonomous vehicle is seen during a deployment demonstration at Bishop Ranch in San Ramon, California March 6, 2017. REUTERS/Stephen Lam 6/14

Chinese autonomous bus in testing.

Drove itself 20 miles through the busy city of Zhengzhou in 2015, including lane changes, passing, and responding to traffic lights. Notice that the driver has his arms up to show **he's not steering**. Speed was up to 42 mph.

http://www.citylab.com/tech/2015/10/china-rolls-out-the-worlds-first-driverless-bus/408826/

There was a time when every elevator had an operator.

Will the bus driver go the way of the elevator operator? How soon?

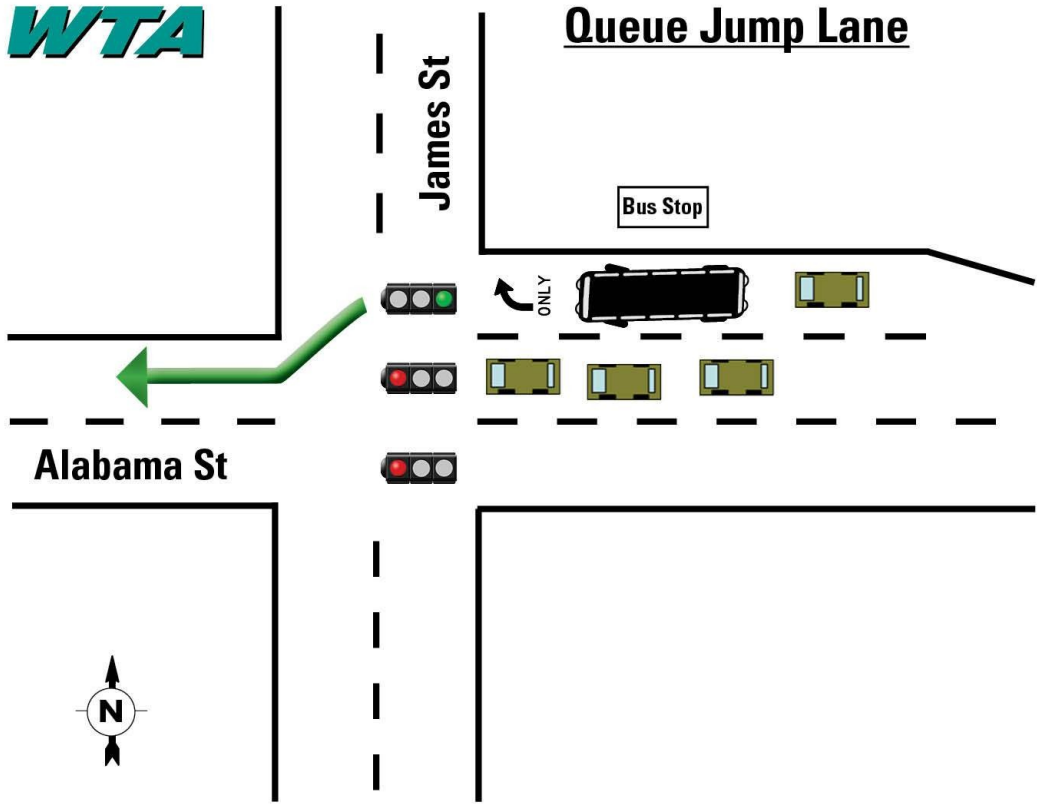
Autonomous Shuttles May Soon Upend Public Transportation

Car and Driver, OCTOBER 3, 2016

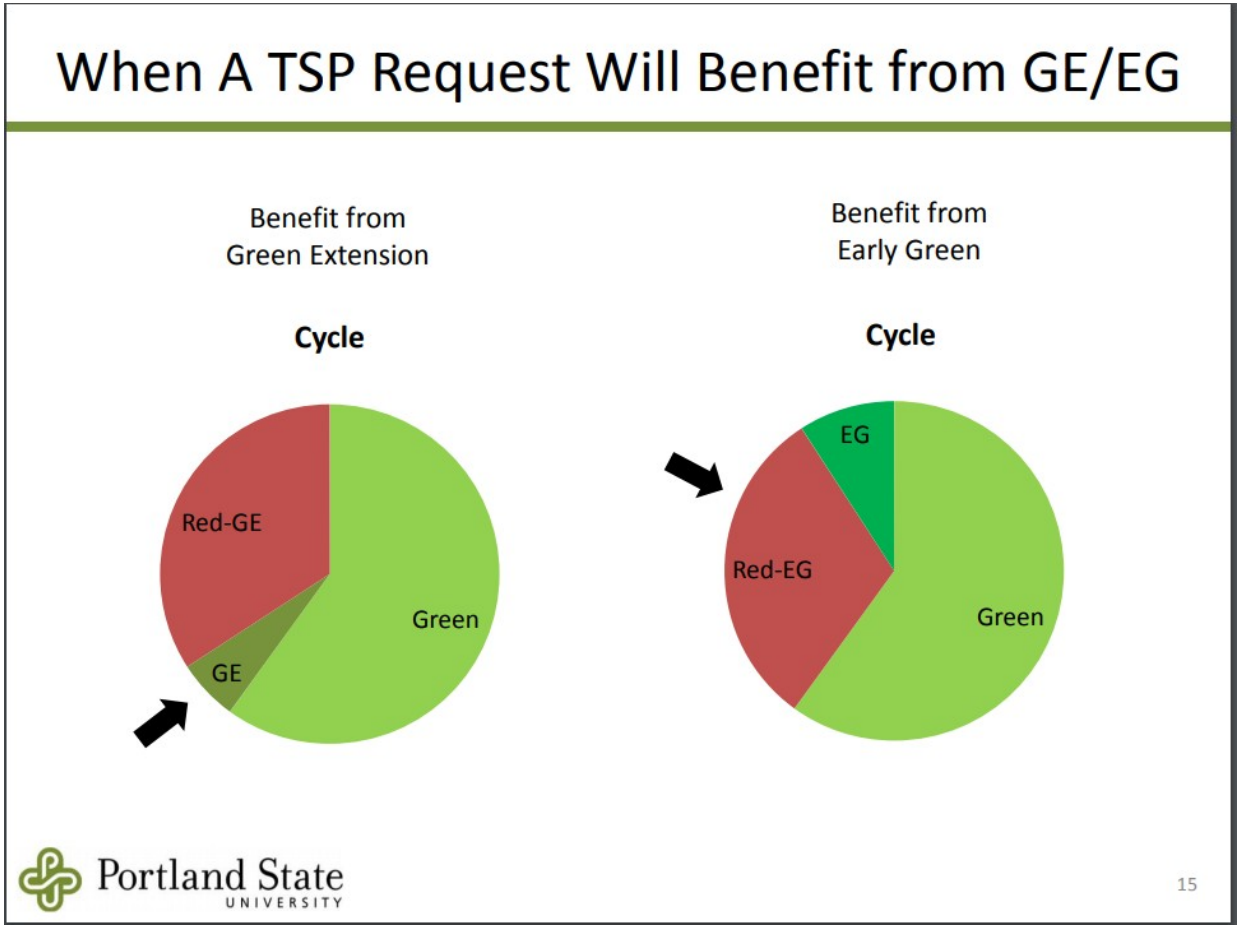
- **Researchers modeled 8- and 16-passenger autonomous buses in Lisbon, Portugal.**
- **50 percent reduction in prices for trips.**
- **Congestion disappeared.**
- **Emissions fell by a third, even though the modeled buses were not electric.**
- **Space needed for public parking fell by 95 percent.**

- http://blog.caranddriver.com/bye-bye-buses-autonomous-shuttles-may-soon-upend-public-transportation/

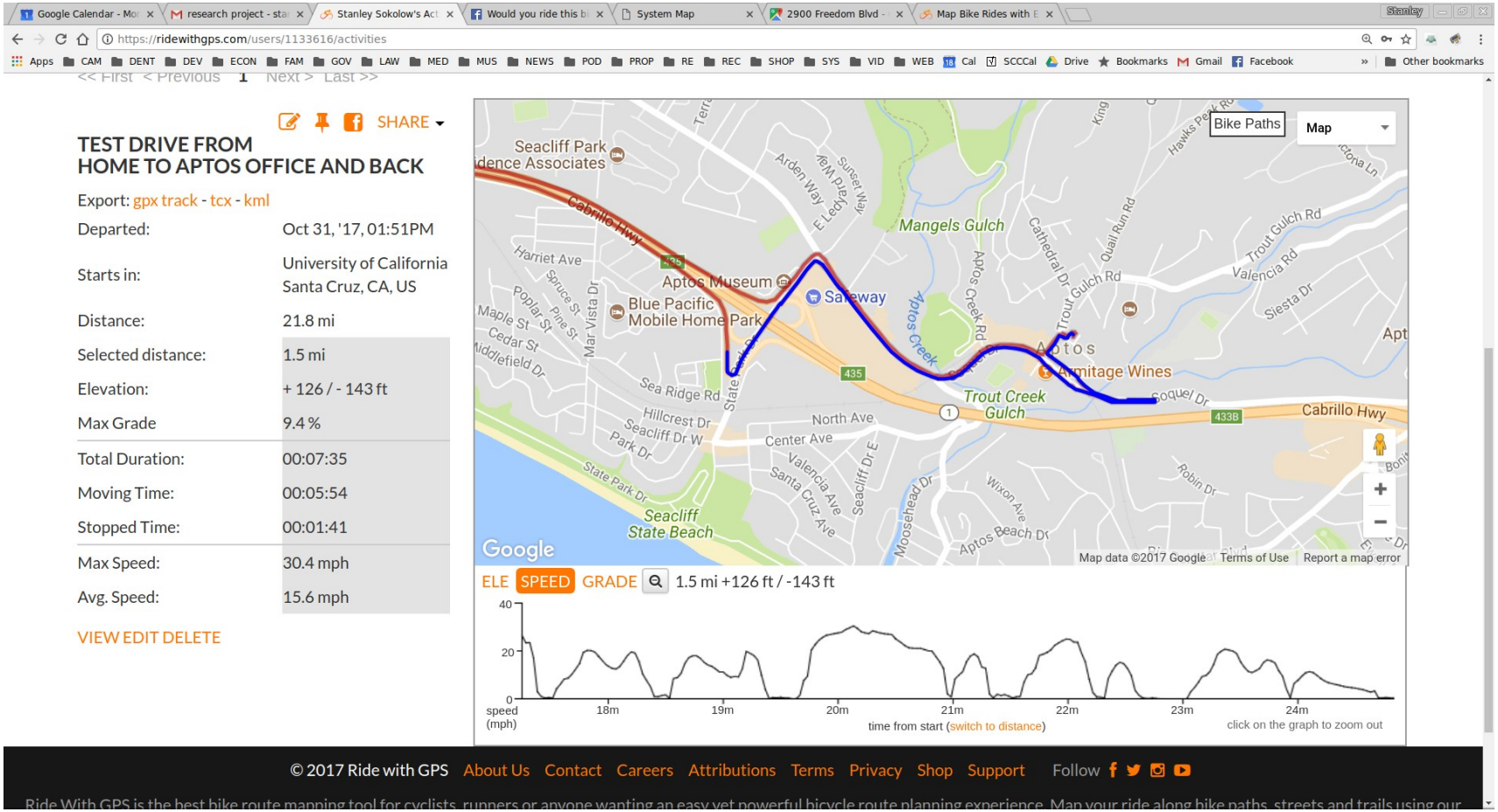
Bus Queue Jumping



Transit Signal Priority gives buses a green light



Can Smart Phone Help Us & RTC Figure It Out?

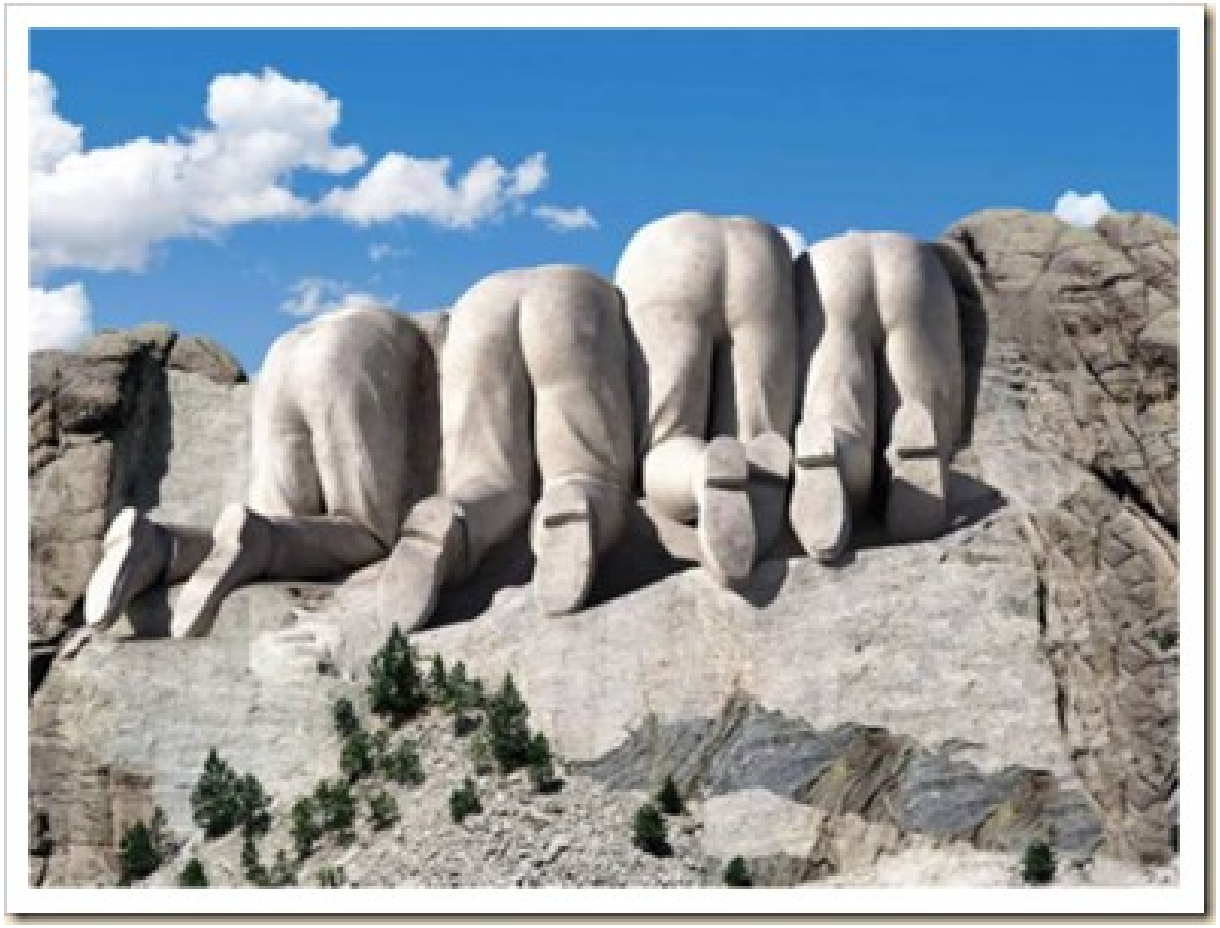


Join Our Study Group:
http://SensibleTransportation.org/contact/

Parking Demand Management Instead of More Parking Garages

East-West Sections

The End



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