

SACSIM Transit Updates

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Key Transit Updates for SACSIM23

- Change congested transit speed assumptions
- More options to model bus-only lanes (work in progress)



SACSIM23 Transit Updates

UPDATING CONGESTED TRANSIT SPEED ASSUMPTIONS

Transit Speed vs. Travel Time

- Link travel time formula
 - $(\text{car travel time}) * (\text{time factor})$
- **Time factor**
 - captures elements that affect transit speed (dwell time, larger vehicle harder to move, etc.)
 - Time factor varies with context (urban vs. suburban, arterial vs. freeway)

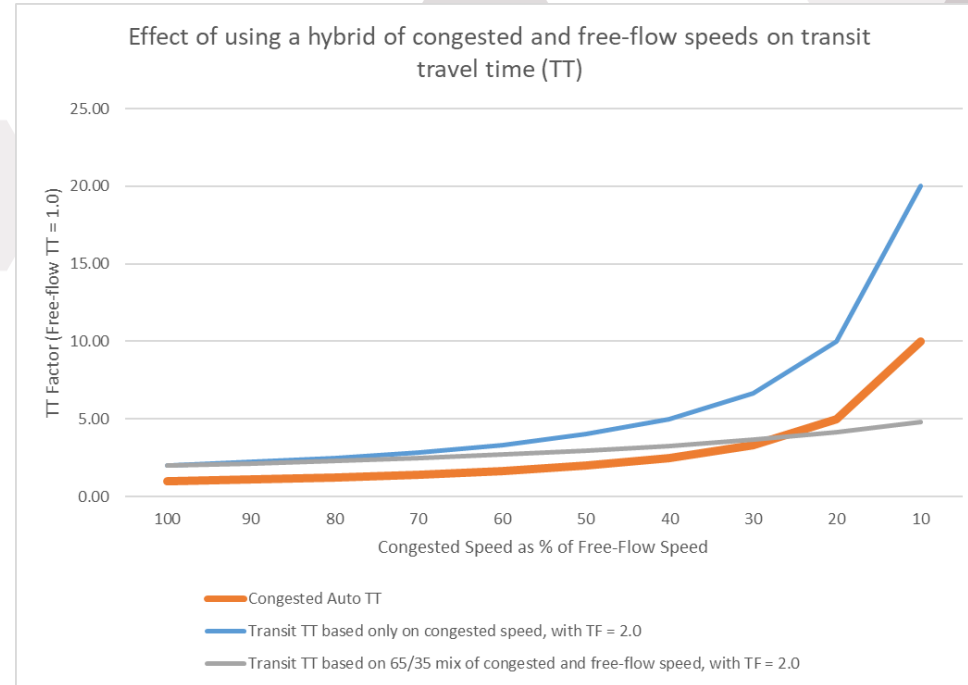


Problems with using only auto speed for travel time

- Time factor is constant
 - E.g., if $TF = 2$, assumes transit takes twice as long as auto regardless of congestion levels.
- In reality, travel time difference between transit and cars decreases as congestion increases.
- Adjusting transit speed to be “hybrid” of congested and free-flow auto speeds helps...

Using a “hybrid” speed for travel time

- “Hybrid” speed formula:
 - $H = 0.65 * C + 0.35 * F$
 - C = congested auto speed
 - F = Free-flow auto speed
- Hybrid approach (gray line) captures decreasing difference in car vs. transit travel times as congestion increases.
- But, may not be reasonable to assume transit is faster than cars in very congested conditions



Effects of using Hybrid Speed

Expected results:

- Faster (relative to car speed) transit in congested conditions
- Fewer transit service-hrs
- Transit modestly more appealing

Output	Difference after applying hybrid speed	Percent Diff
Regional VMT	-398,234.5	-0.9%
Person-hours of travel	-4.0	0.0%
Total daily transit service hours	-1.2	0.0%
Daily transit boardings	+3,122.9	2.3%

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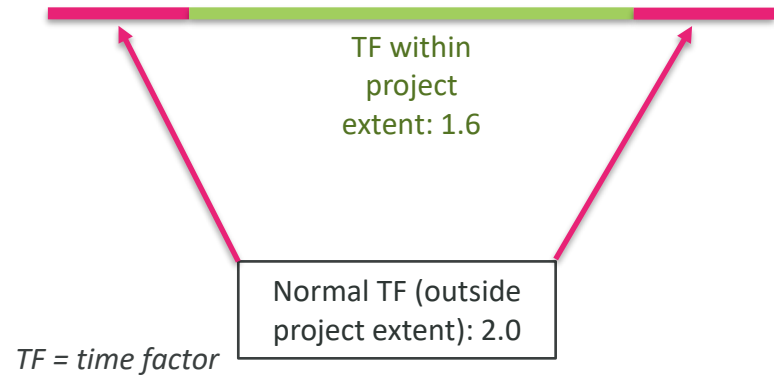
CAPTURING BUS-ONLY LANES



Option 1: Adjusting time factors

- Changes assumptions of transit speed vs. car speed.
- Very coarse, heavily judgement-based
- Must coordinate with road network changes

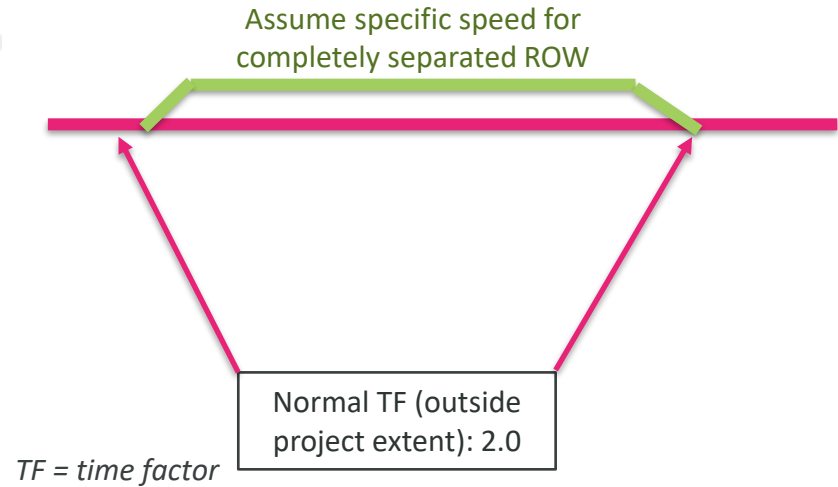
Example project: assume bus lanes and/or signal priority increase speeds ~20%



Option 2: Make dedicated transit links

- Currently used for rail transit routes
- Could be used for fully-separated BRT
- Assume links are completely unaffected by car traffic
- Must coordinate with road network changes

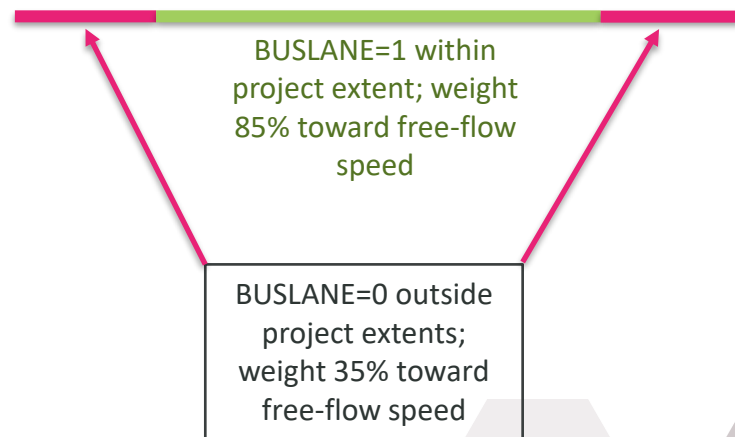
Example project: assume bus lanes completely remove transit from car traffic



New option: BUSLANE tag

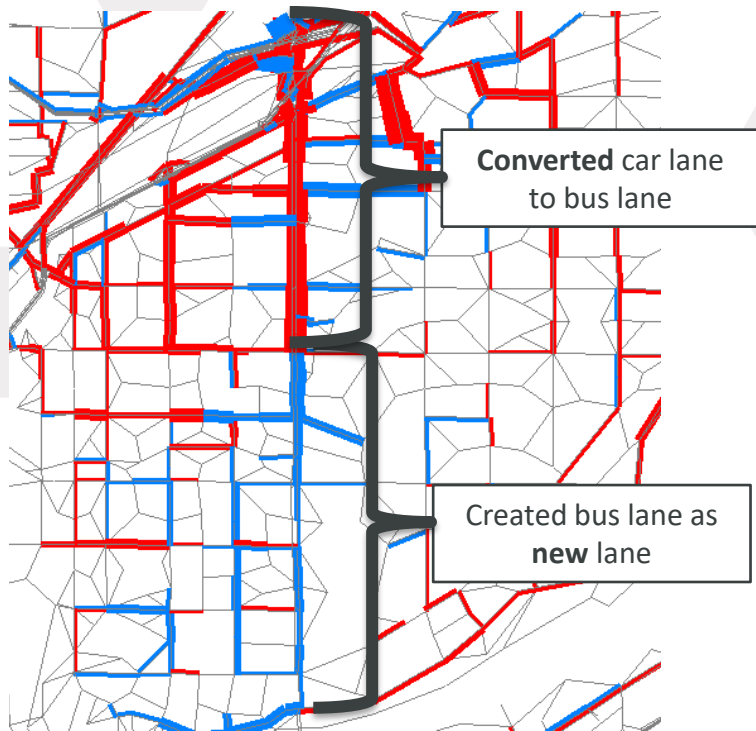
- Road network attribute
- Ideal for on-street bus-only lanes
- If $BUSLANE = 1$, weight transit speed 85% toward *free-flow* car speed
- Does not affect time factors

Example project: assume bus lanes enable transit to run at near-free-flow speed all day.

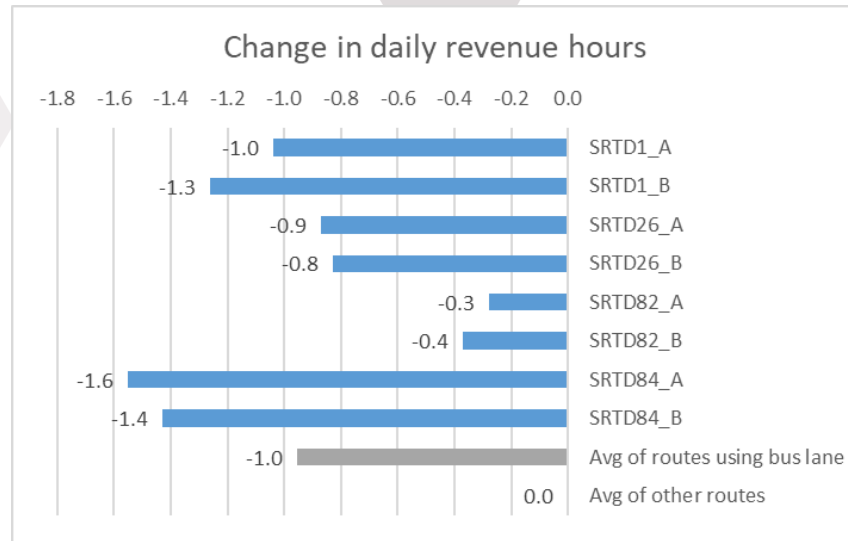


Test: Bus lane conversion on Watt Ave

Change in car volume/capacity



Change in transit service hours



Advantages of BUSLANE flag

- Potential for easier data management (automatically updating road network lane counts based on BUSLANE tag value)
- Flexibility and customizability (e.g., different BUSLANE values correspond to different actions to take on the road network, different speed assumptions, etc.)
- Facilitates analyses related to transit priority area (TPA) legislation

Next Steps for BUSLANE development

- Integrate as standard part of SACSIM23 model run scripts
- Add ability to specify what time of day bus lanes apply (e.g., peak-hour lanes)