

West Alisal St. Road Diet

Salinas, CA



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History - Salinas, CA

- 1850** - The purchase of Rancho Nacional and Rancho Sausal
 - Over 15,000 acres bought by James Hill and Jacob Leese for large scale farming
- 1867** - First streets laid out
- 1868** - From 14 Buildings to 125
- 1872** - Southern Pacific Railroad
- 1915** - Highway 101 and fully paved streets



History - Hartnell College

1920 - Founded as Salinas Junior College

- One of the oldest educational institutions in California

- The first junior college in California

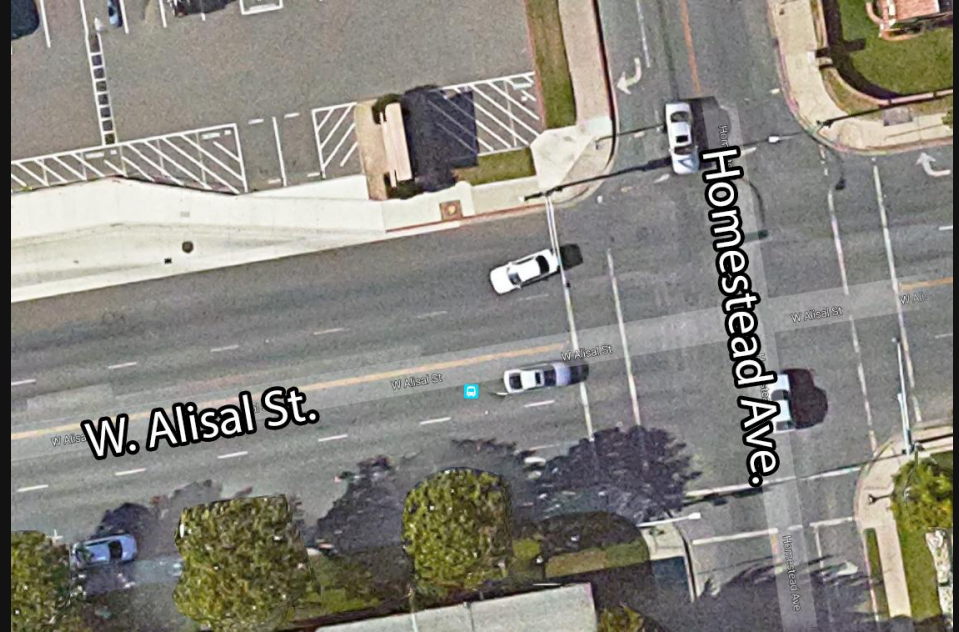
1948 - Renamed Hartnell College after William Hartnell

Today - Serves nearly 10,000 students each year



Issue

- The Sustainable City Year Project - Salinas
 - CSUMB students analyze W. Alisal as case study for road diet
- W. Alisal
 - On-street parking
 - 4 lane bi-way
- Road Diet
 - 3 lane bi-way
 - 1 shared left turn lane in center
 - Bike lanes
- Nearby community college produces high level of pedestrians



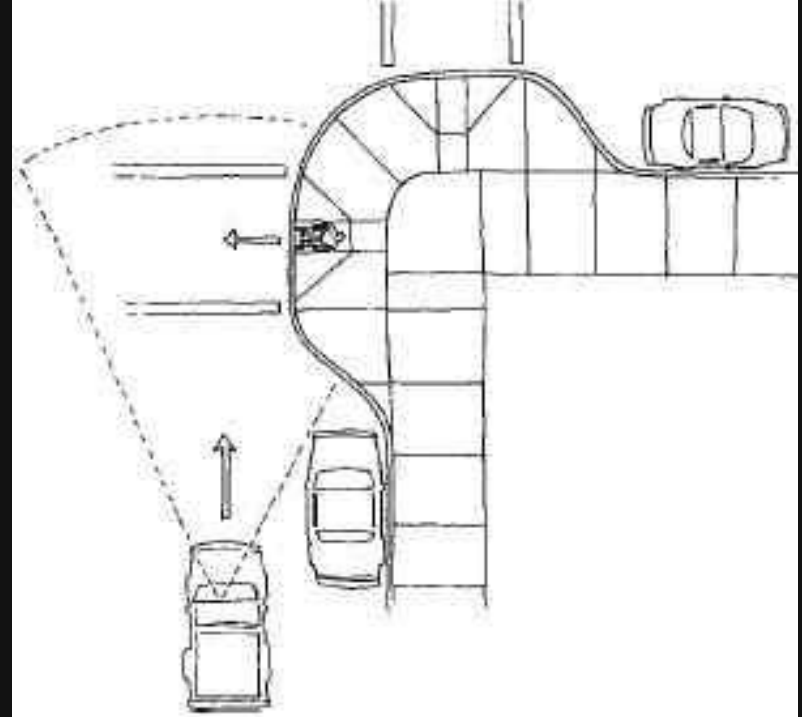
Stakeholders

Three major stakeholders

1. Residents on West Alisal
2. Students attending Hartnell College
3. Commuters within the city who use the road

Main Goal

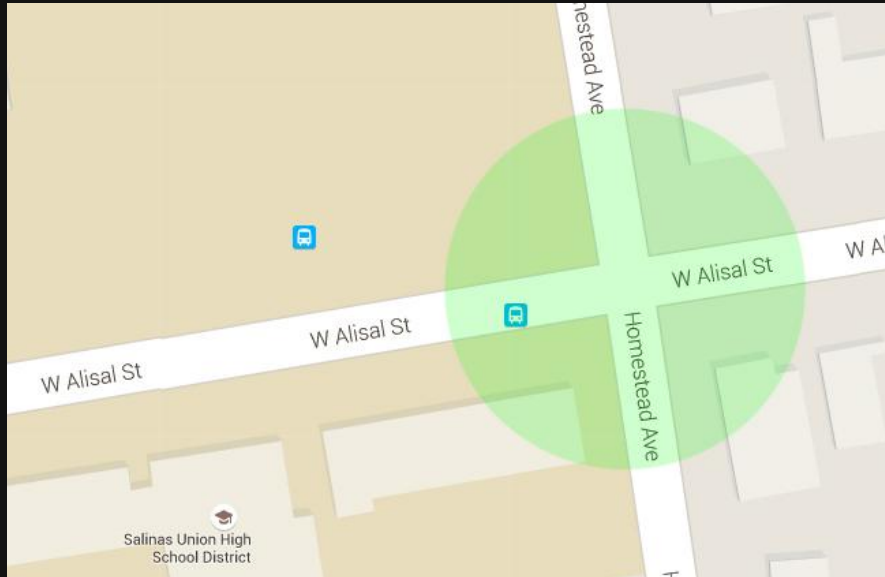
- See how W. Alisal corridor can accommodate more pedestrians, bikes, and busses
- Model Road Diet effects on
 - Traffic
 - Safety
 - Walking, biking, busing behavior
- Model parameters
 - 3 lane road width
 - Bike lane additions
 - (Optional) Crosswalk bulb outs



Example of a crosswalk bulb out <http://www.greatstreetsmv.org/wp-content/uploads/2012/09/curb-ext-diagram-fhwa.jpeg>

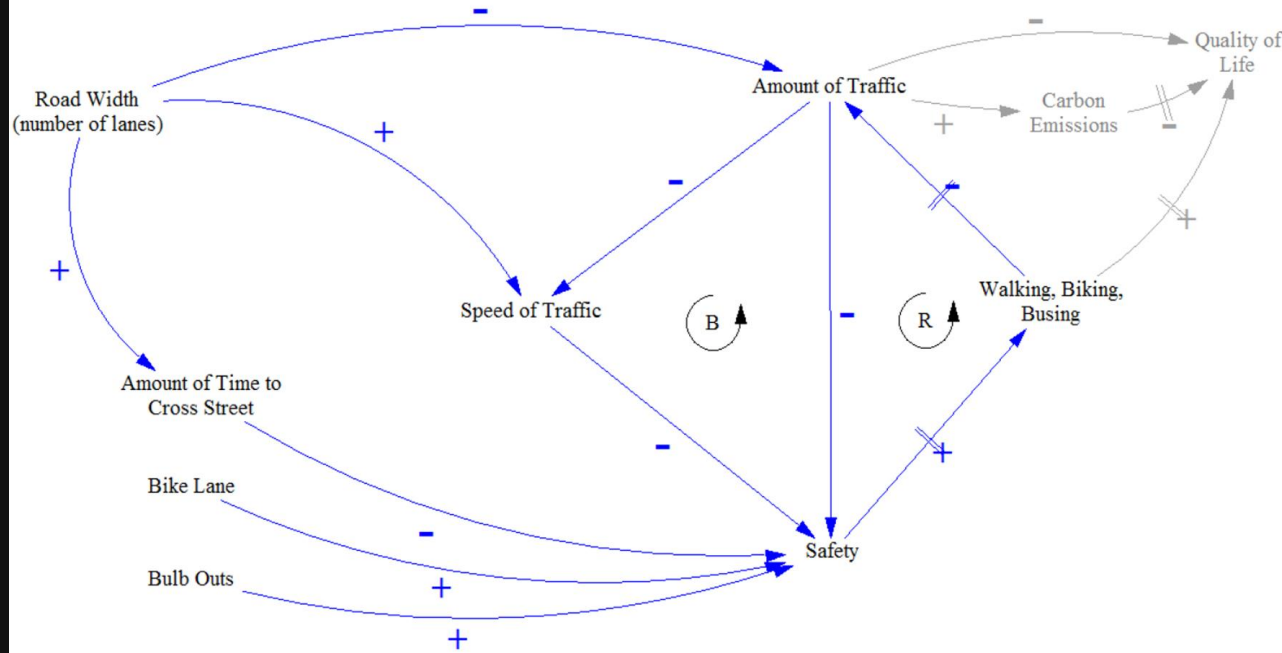
Data Collection

- 09 December 2015
- 10am - 11am
- Intersection at W. Alisal & Homestead



Observation	Count
Pedestrians	138
Bicyclists	7
People at Bus Stop	6
Total	151
Avg. # of Cars Backed up at stoplight	4
Avg. Time to cross W. Alisal (sec)	13.8

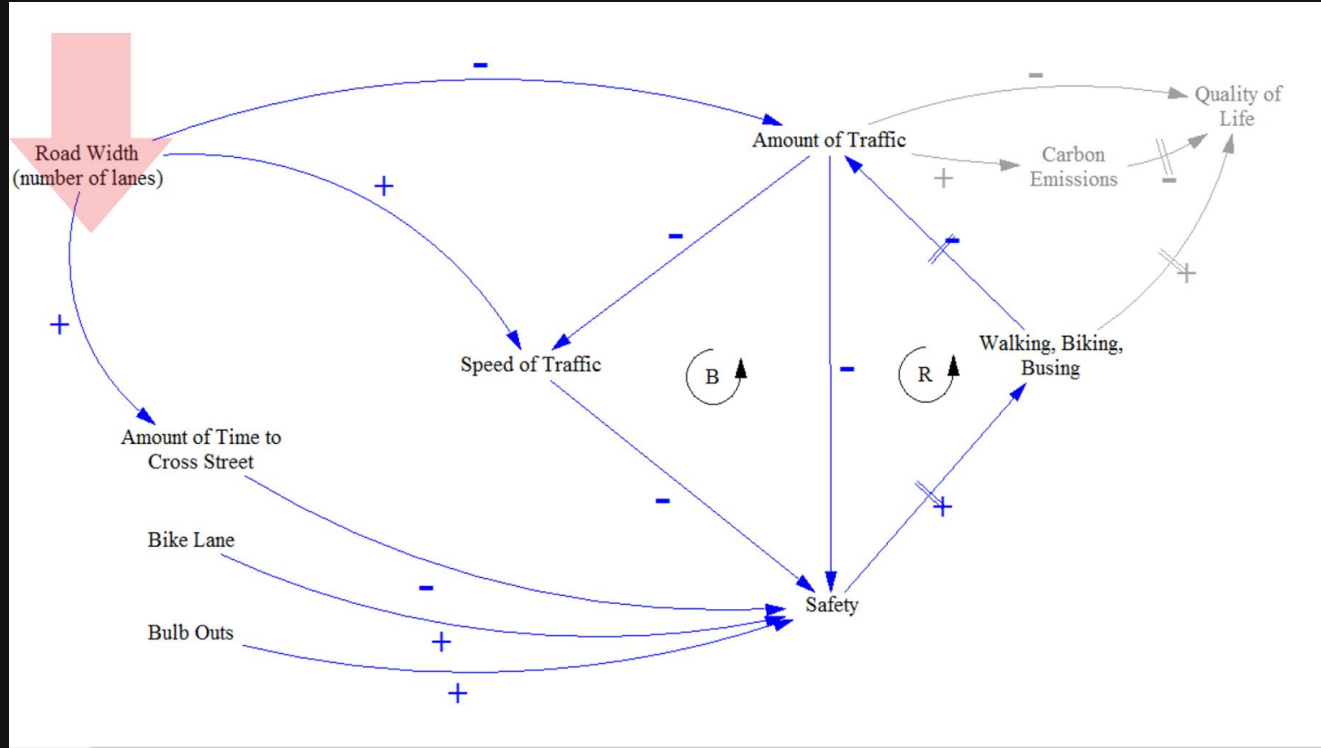
Causal Loop Diagram



Variables of Interest:

1. Road Width
2. Speed of Traffic
3. Safety
4. Walking, Biking, Busing
5. Amount of Traffic

Causal Loop Diagram



Variables of Interest:

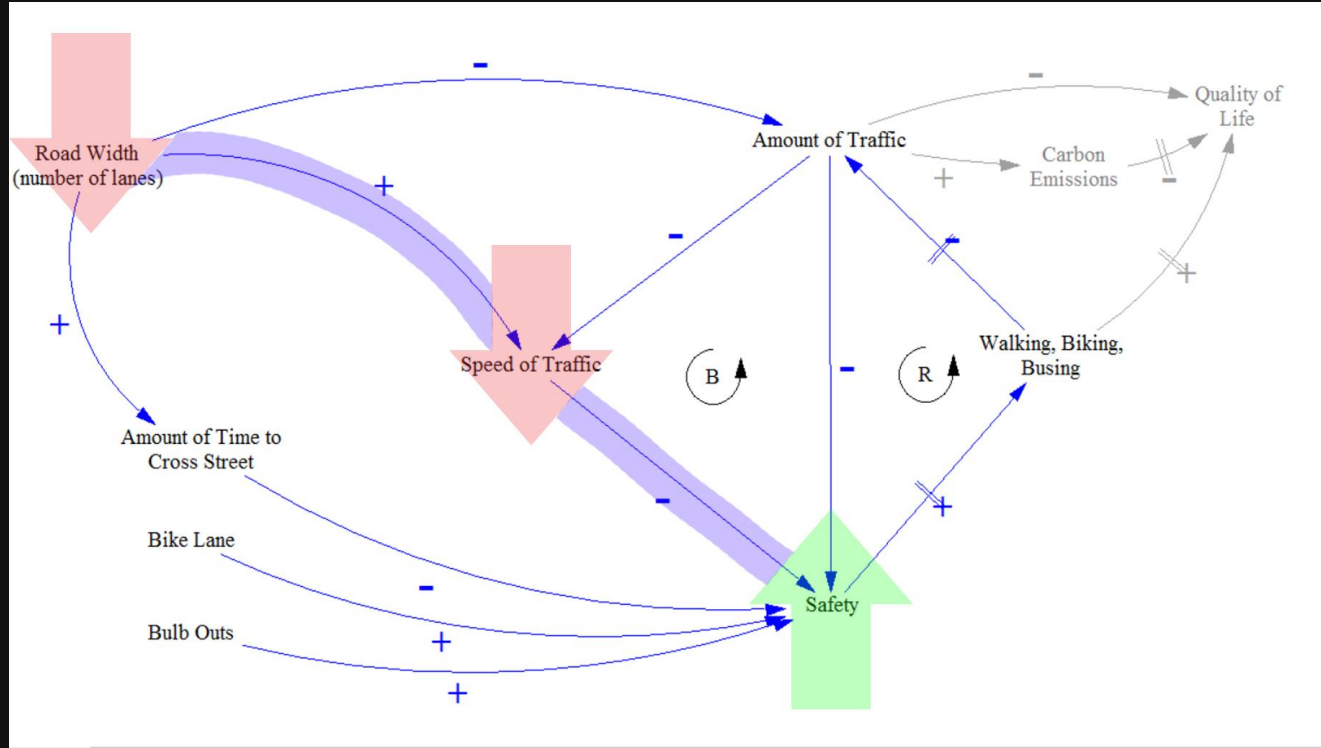
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The diagram illustrates the following causal links and feedback loops:

- Inputs:** Road Width (number of lanes), Speed of Traffic, Bike Lane, Bulb Outs.
- Intermediate Variables:** Amount of Traffic, Amount of Time to Cross Street, Safety, Walking, Biking, Busing.
- Outputs:** Carbon Emissions, Quality of Life.
- Feedback Loops:**
 - Loop B (Balancing):** Road Width (+) → Amount of Time to Cross Street (+) → Safety (+) → Walking, Biking, Busing (+) → Amount of Traffic (-) → Speed of Traffic (-) → Amount of Time to Cross Street (+).
 - Loop R (Reinforcing):** Road Width (+) → Speed of Traffic (+) → Amount of Traffic (+) → Walking, Biking, Busing (+) → Amount of Traffic (+).
- Other Causal Links:**
 - Road Width (+) → Amount of Traffic (-)
 - Speed of Traffic (+) → Amount of Traffic (+)
 - Speed of Traffic (-) → Safety (-)
 - Amount of Traffic (+) → Safety (-)
 - Amount of Traffic (+) → Carbon Emissions (+)
 - Carbon Emissions (-) → Quality of Life (-)
 - Walking, Biking, Busing (+) → Quality of Life (+)
 - Safety (+) → Walking, Biking, Busing (+)

1. Road Width
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3. Safety
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5. Amount of Traffic

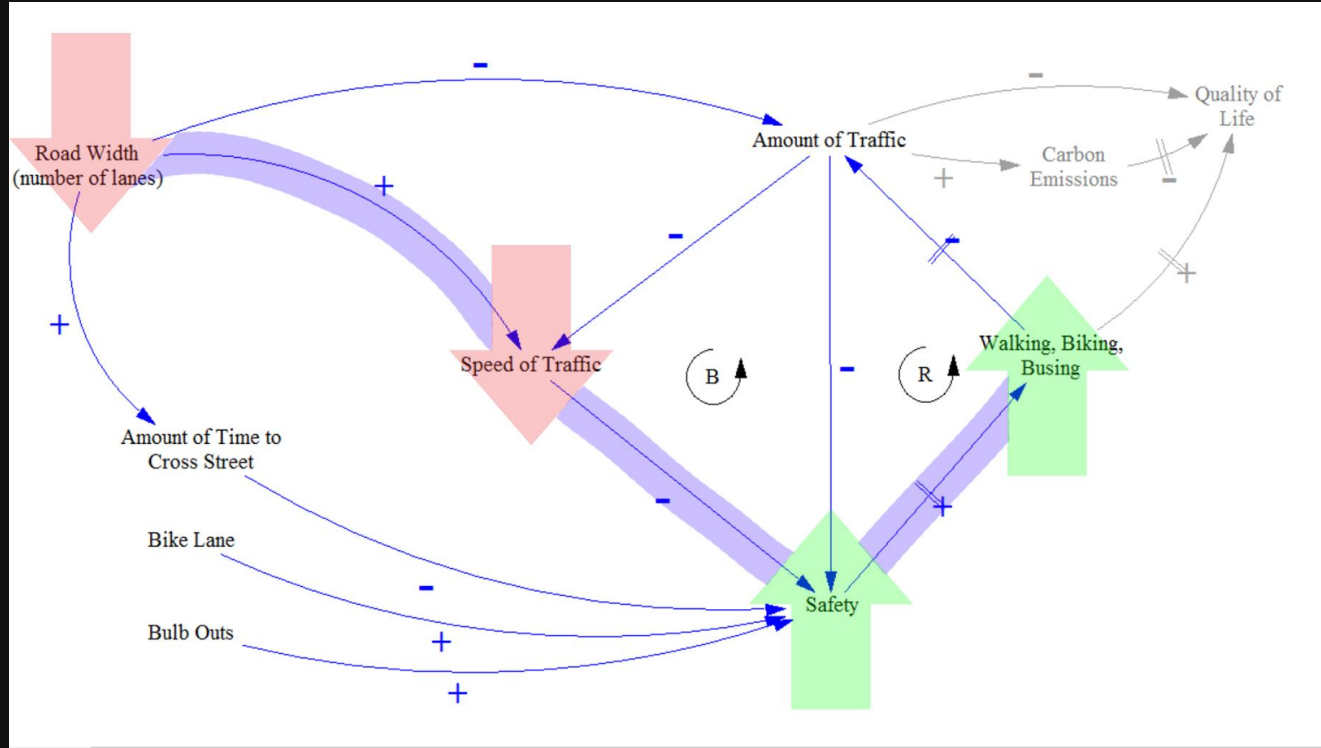
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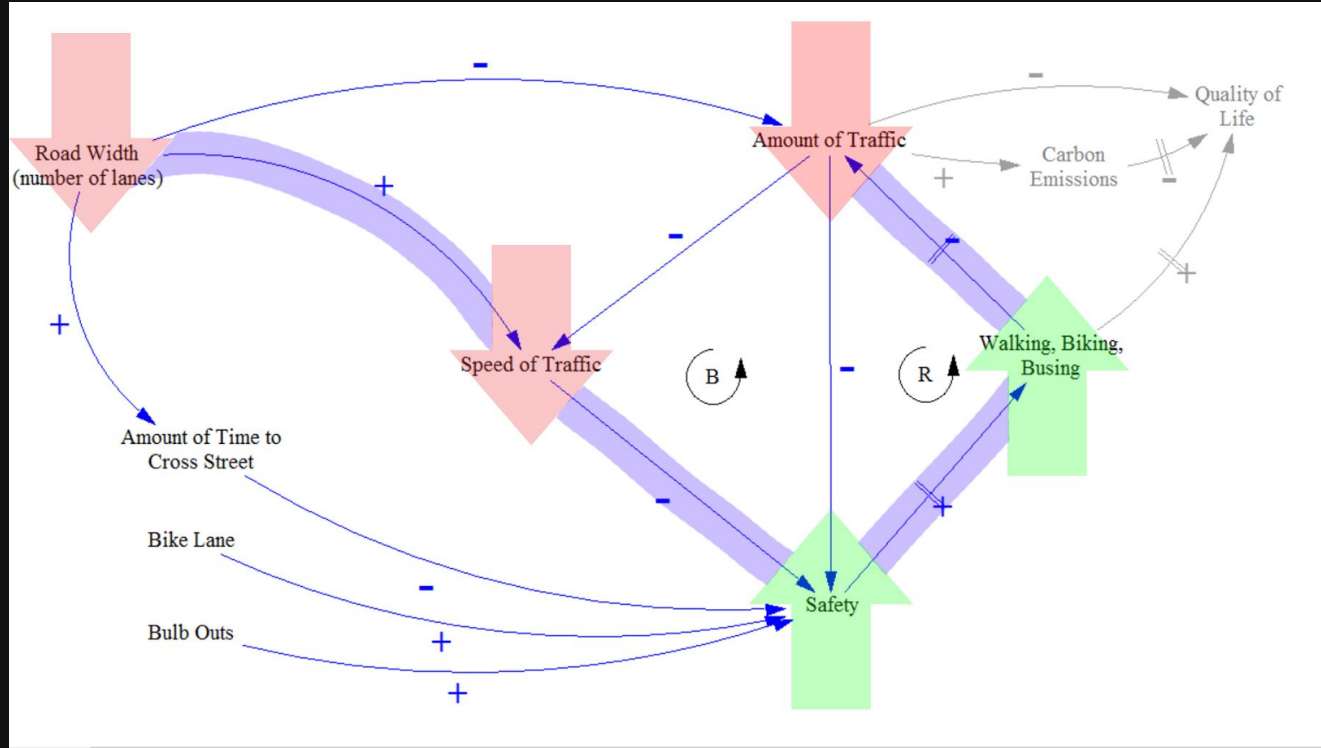
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Causal Loop Diagram



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The diagram illustrates the following causal relationships:

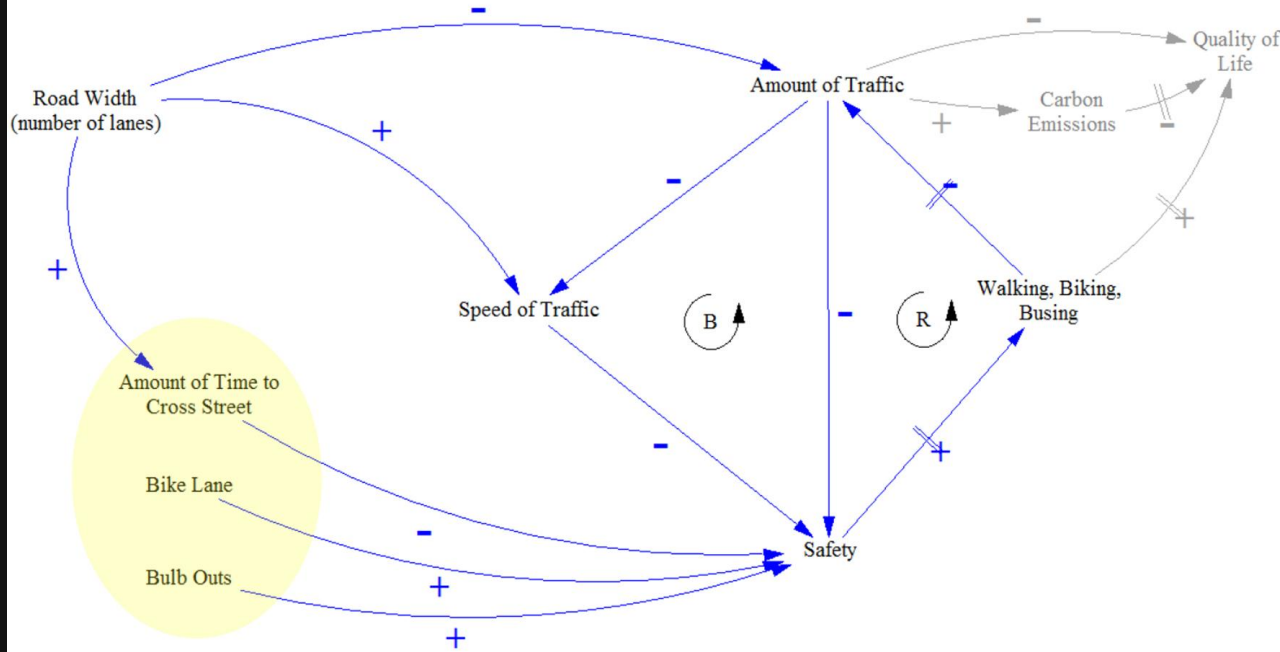
- Road Width (number of lanes)** (red downward arrow) has a positive impact (+) on **Amount of Traffic** and a positive impact (+) on **Amount of Time to Cross Street**.
- Amount of Traffic** (red downward arrow) has a negative impact (-) on **Speed of Traffic** and a negative impact (-) on **Safety**.
- Speed of Traffic** (red downward arrow) has a negative impact (-) on **Amount of Time to Cross Street** and a negative impact (-) on **Safety**.
- Amount of Time to Cross Street** has a positive impact (+) on **Amount of Traffic**.
- Bike Lane** has a negative impact (-) on **Amount of Traffic** and a positive impact (+) on **Safety**.
- Bulb Outs** has a positive impact (+) on **Safety**.
- Safety** (green upward arrow) has a positive impact (+) on **Walking, Biking, Busing**.
- Walking, Biking, Busing** (green upward arrow) has a positive impact (+) on **Amount of Traffic** and a positive impact (+) on **Quality of Life**.
- Carbon Emissions** (green upward arrow) has a positive impact (+) on **Quality of Life**.
- Quality of Life** has a negative impact (-) on **Carbon Emissions**.

Feedback loops are identified as follows:

- Loop B** (Balancing): Road Width → Amount of Traffic → Speed of Traffic → Amount of Time to Cross Street → Amount of Traffic.
- Loop R** (Reinforcing): Road Width → Amount of Traffic → Walking, Biking, Busing → Amount of Traffic.

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Causal Loop Diagram

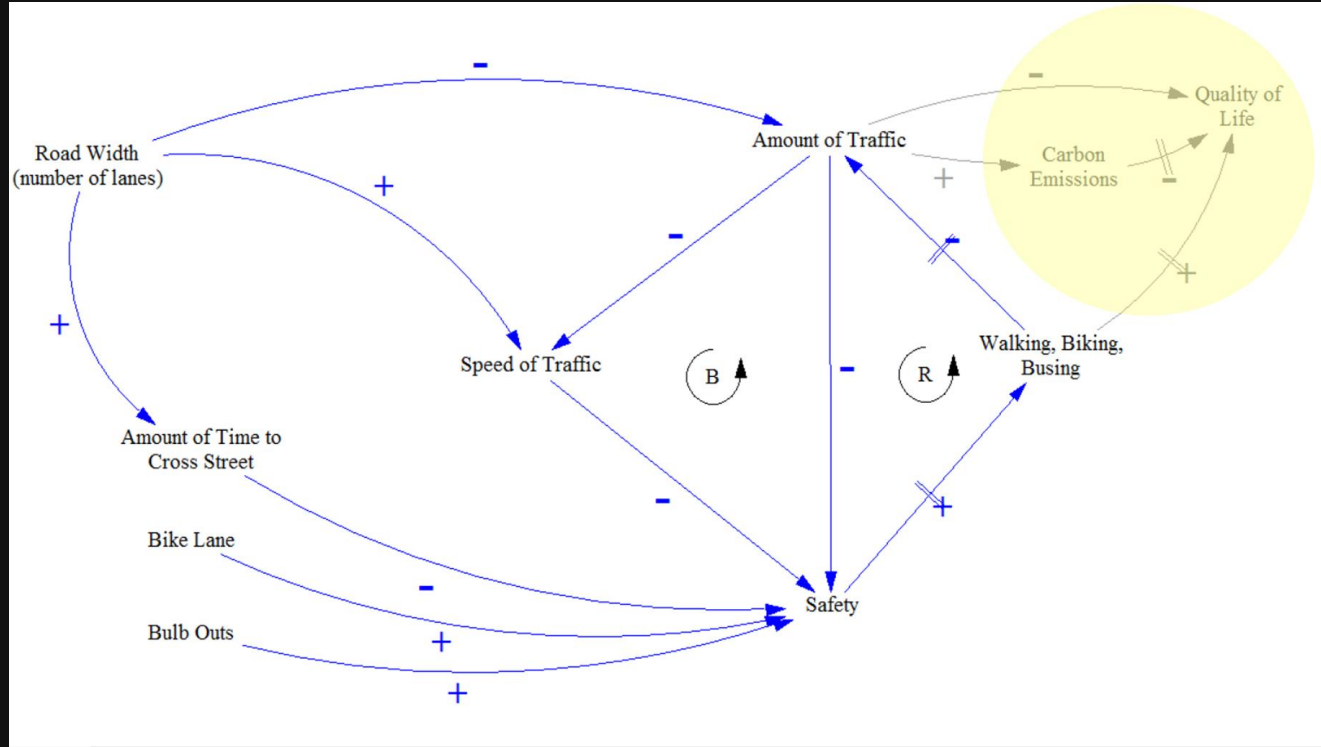


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Safety Variables

Causal Loop Diagram



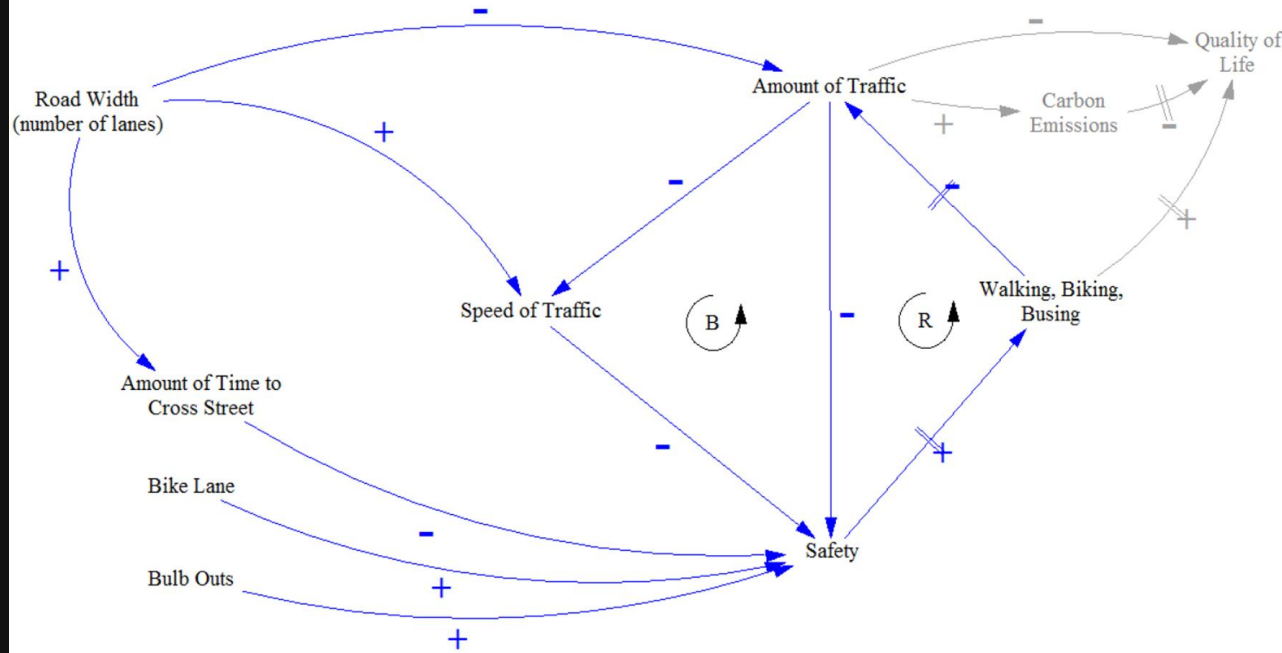
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Safety Variables

Broad Scale Variables

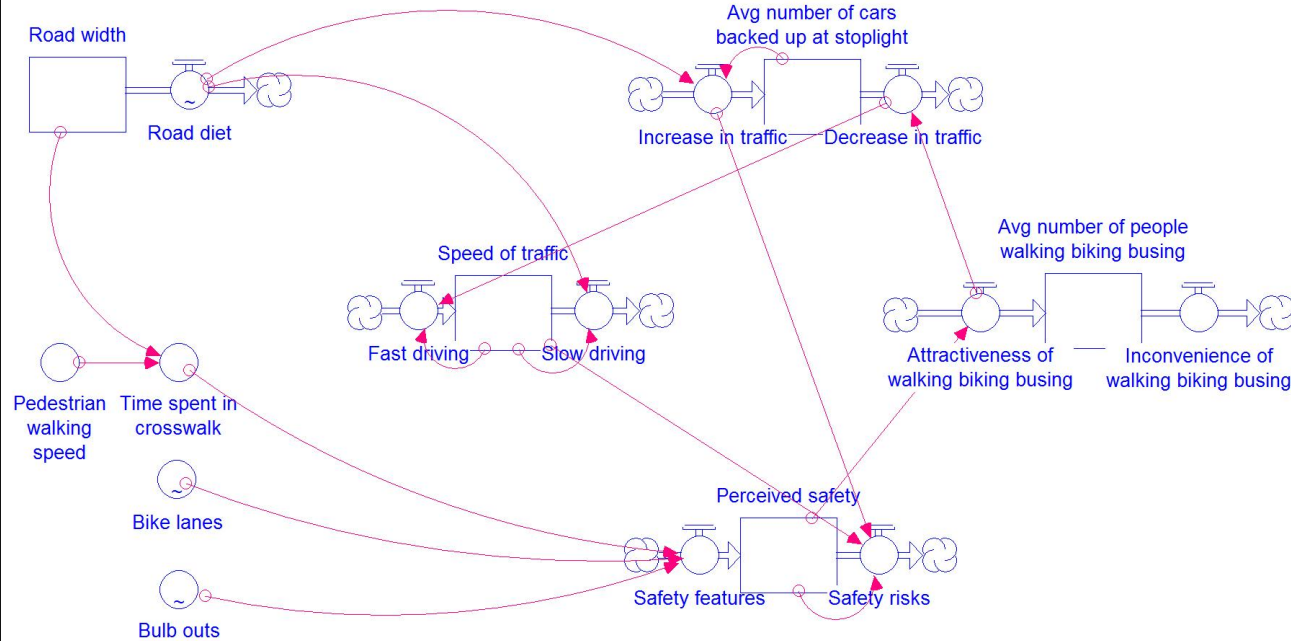
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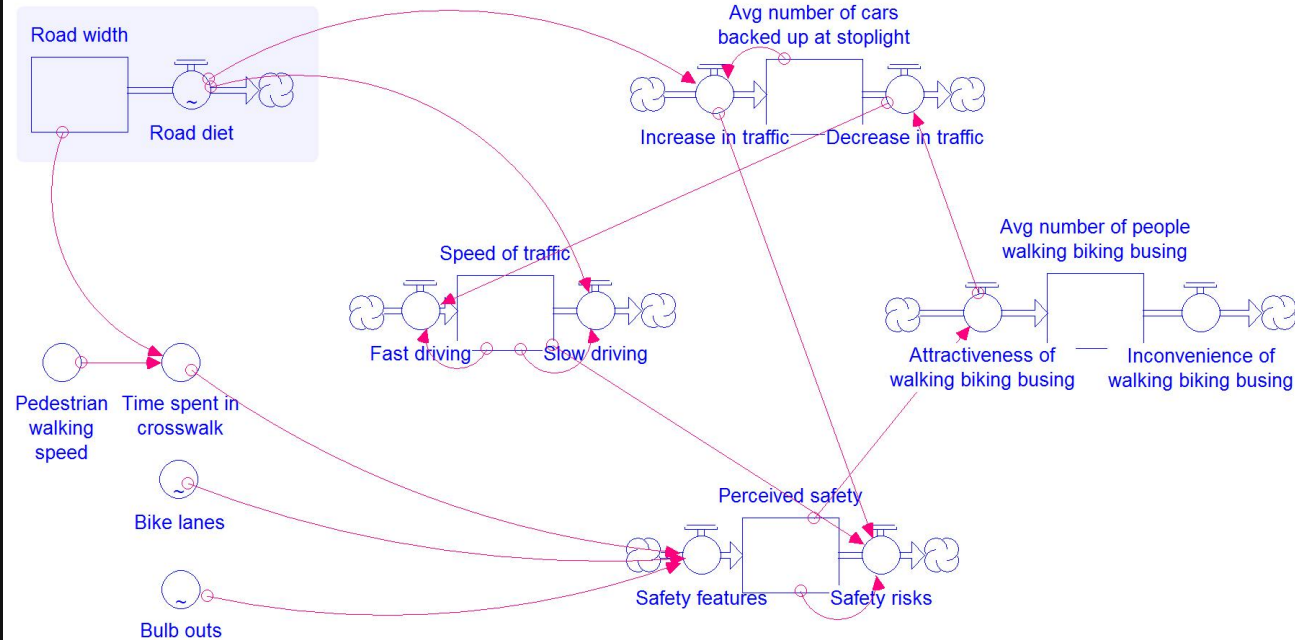
Stock and Flow Model



Stocks:

1. Road Width
2. Speed of Traffic
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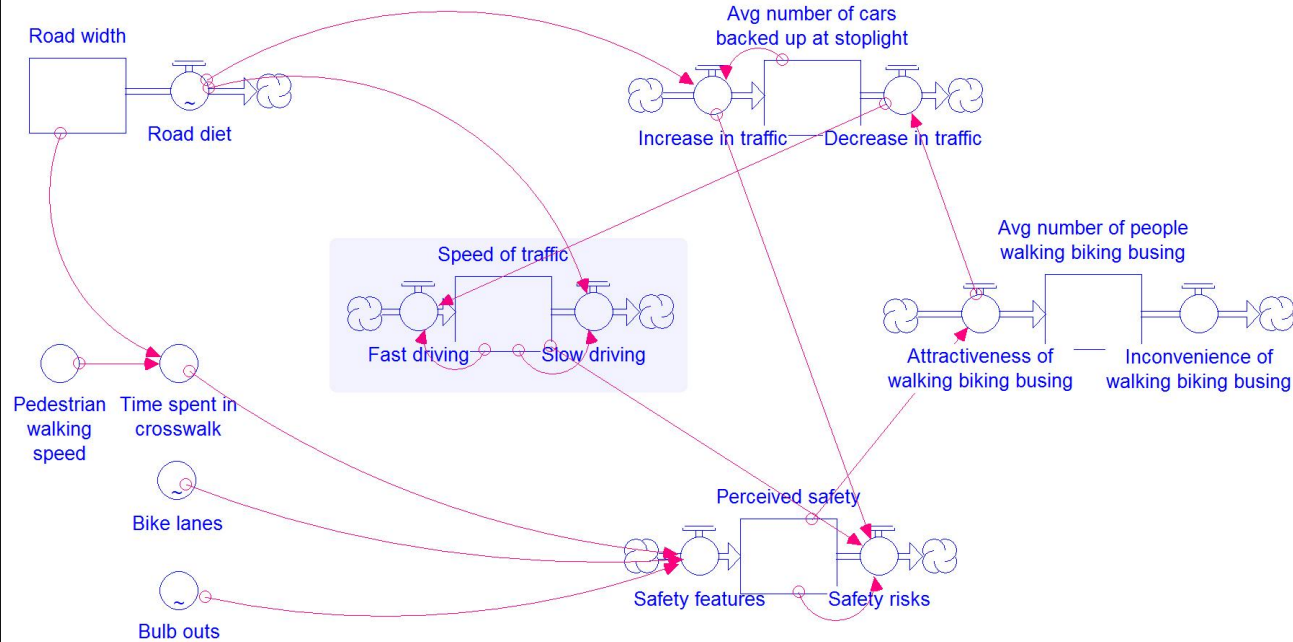
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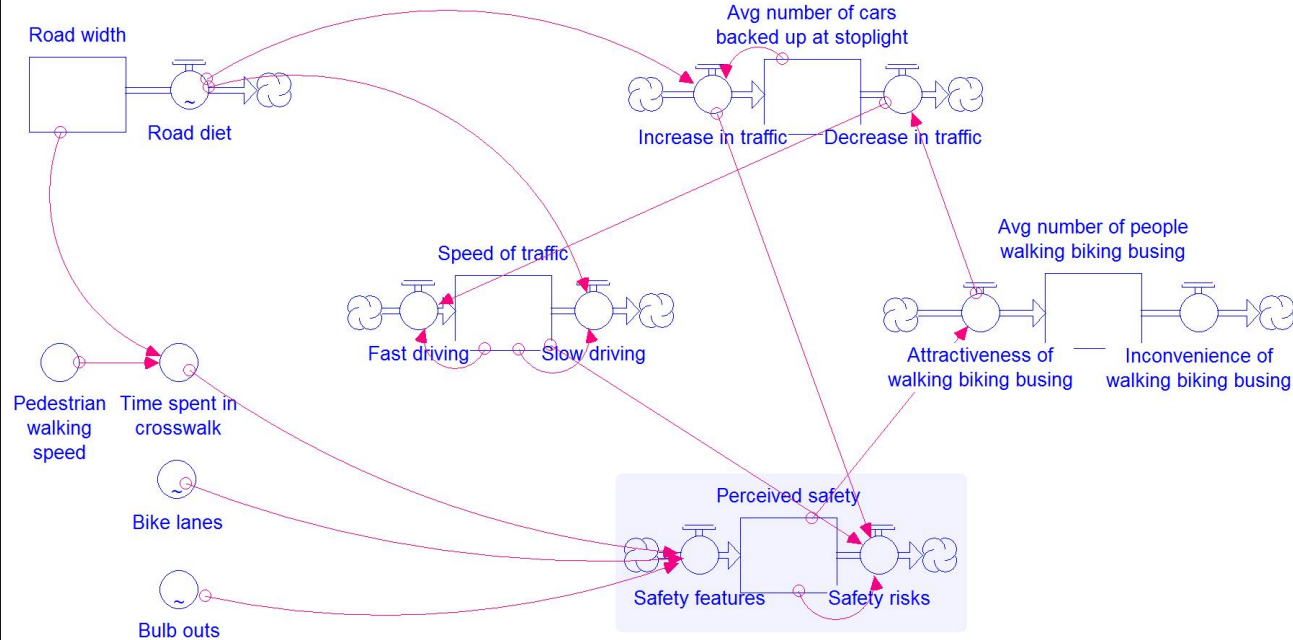
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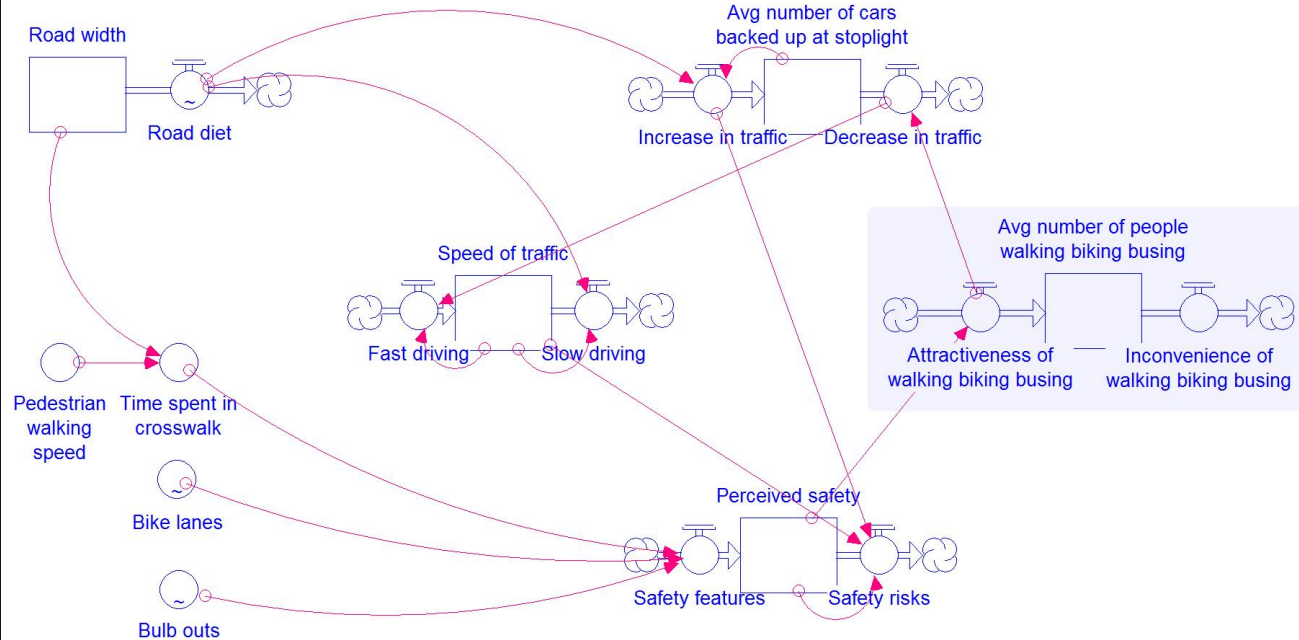
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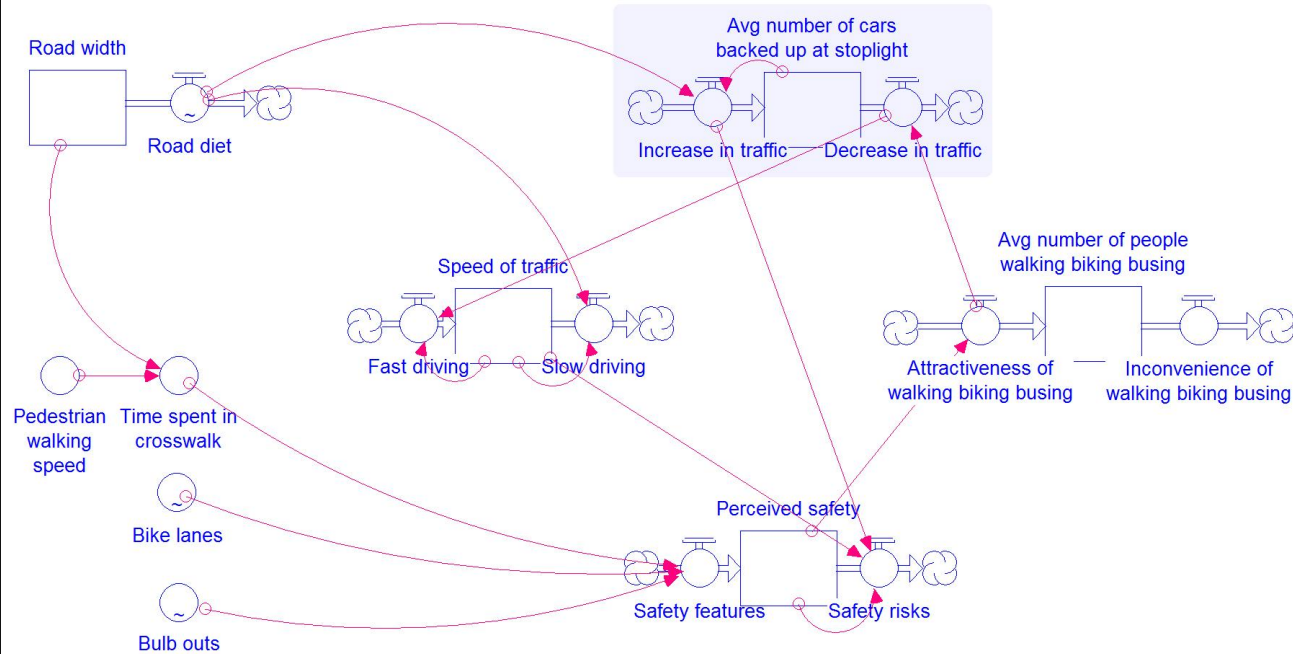
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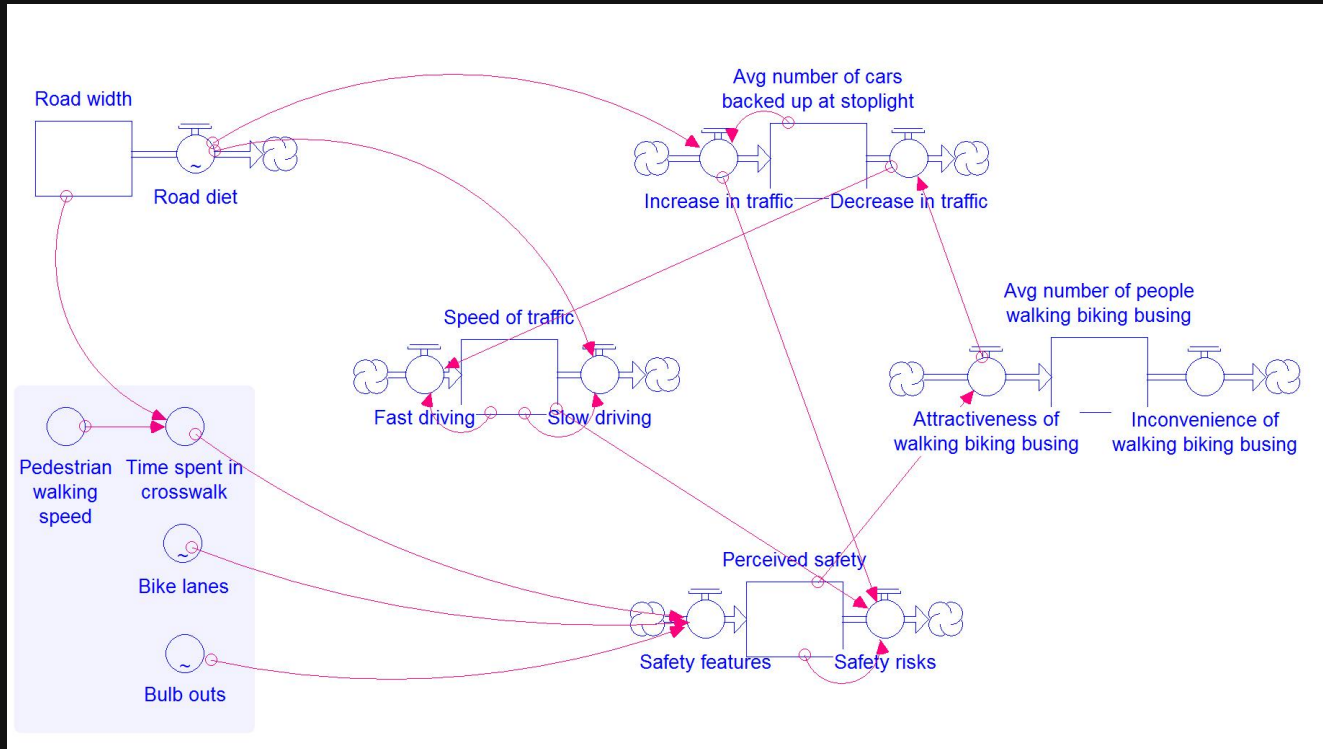
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Stock and Flow Model



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Converters:

Safety Variables

Results - 5 year Simulation

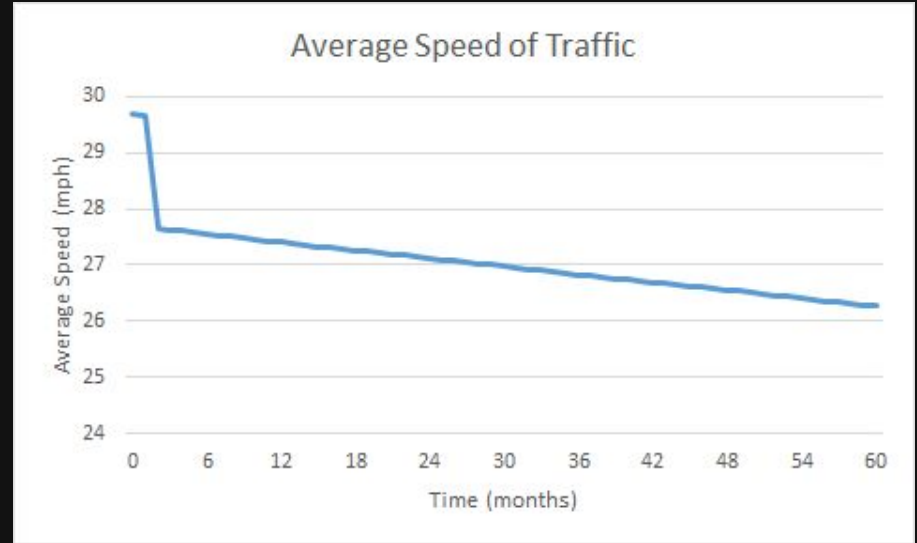
	Initial	Final
Road Width	62 ft	52 ft
Avg. Speed of Traffic	29.7 mph	26.3 mph
Perceived Safety	53.0	70.4
Avg. Number of People Walking, Biking, Busing	151 people	154 people
Avg. Number of Cars Backed Up at Stoplight	3.1 cars	5.3 cars



- 10-ft wide lane removed

Results - 5 year Simulation

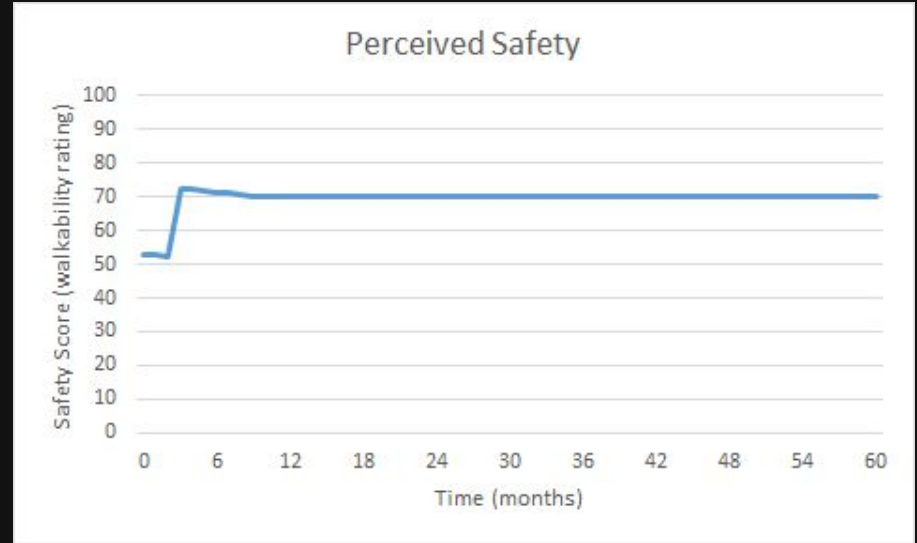
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- Most drivers travel above speed limit
- Slower speeds during adjustment period

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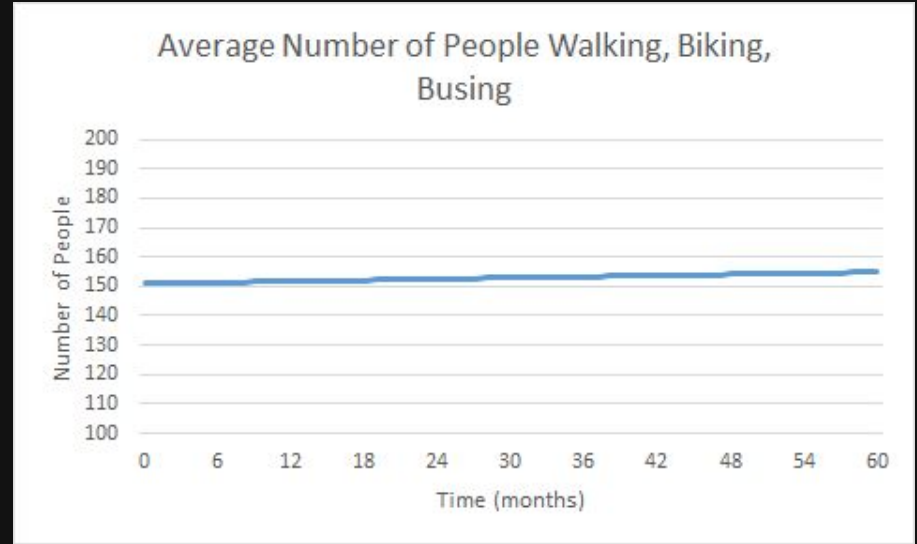
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- Based on Salinas Walkability Rating out of 100 points

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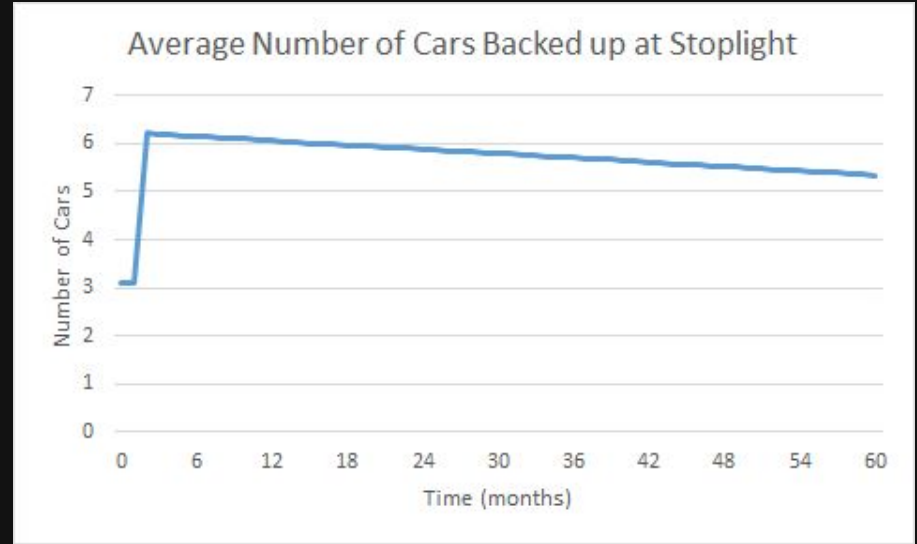
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- Assumes Hartnell students will primarily respond to road diet effects

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- Average doubles when number of through lanes reduced by 1/2

Limitations

Data Collection:

- Road dimensions estimated
- Small sample size
- Bus passengers likely double count as pedestrians
- Data collected during off-peak traffic hours

Model:

- Research on road width and vehicle speed inconclusive
- Omits other safety related variables
- Perceived Safety values subjective and assigned arbitrarily

Conclusions

The Road Diet could:

- Decrease traffic speed
- Increase safety
- Increase walking, biking, busing
- Increase traffic density

We recommend:

- Strengthening our model
- Use community surveys to gather more qualitative data
- Perceived Safety & Walking, biking, busing behavior



References

- <http://www.hartnell.edu/about-hartnell>
- <http://destinationsalinas.com/maps.htm>
- <http://www.mchsmuseum.com/salinasbrief.html>
- <http://www.carodeo.com/>
- <http://www.wehoville.com/wp-content/uploads/2014/09/Screen-Shot-2014-08-28-at-7.39.45-AM.png>
- <http://www.thecalifornian.com/story/news/local/2015/05/29/multimodal-project-put-salinas-road-diet/28180361/>