Removing Travel Lanes
Are we Crazy?!?

City of Tempe
PUBLIC WORKS

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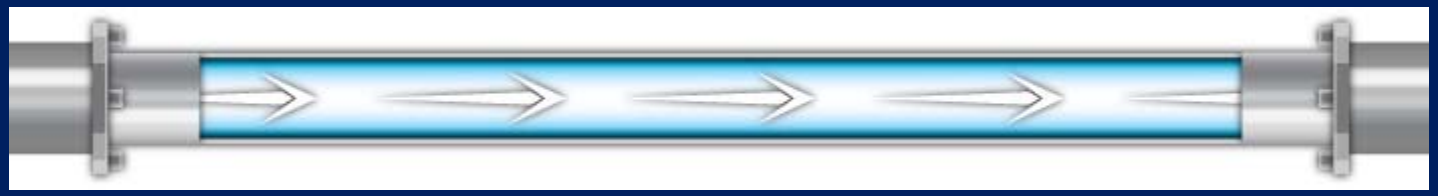
cra·zy/ˈkrāzē/

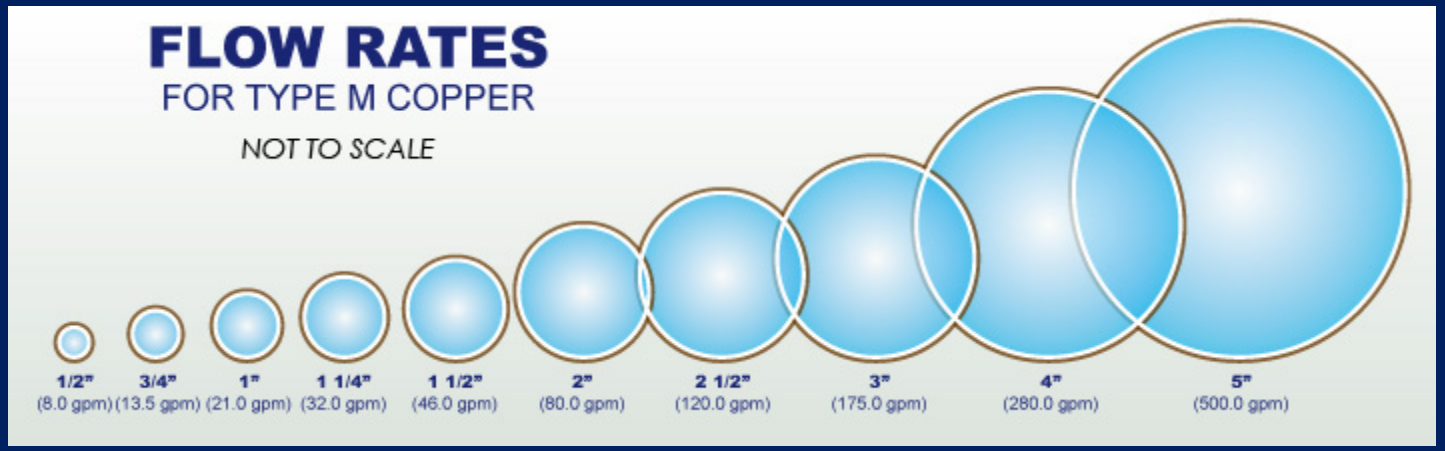
"Reducing vehicular capacity on an arterial street."

Five Basic Principles

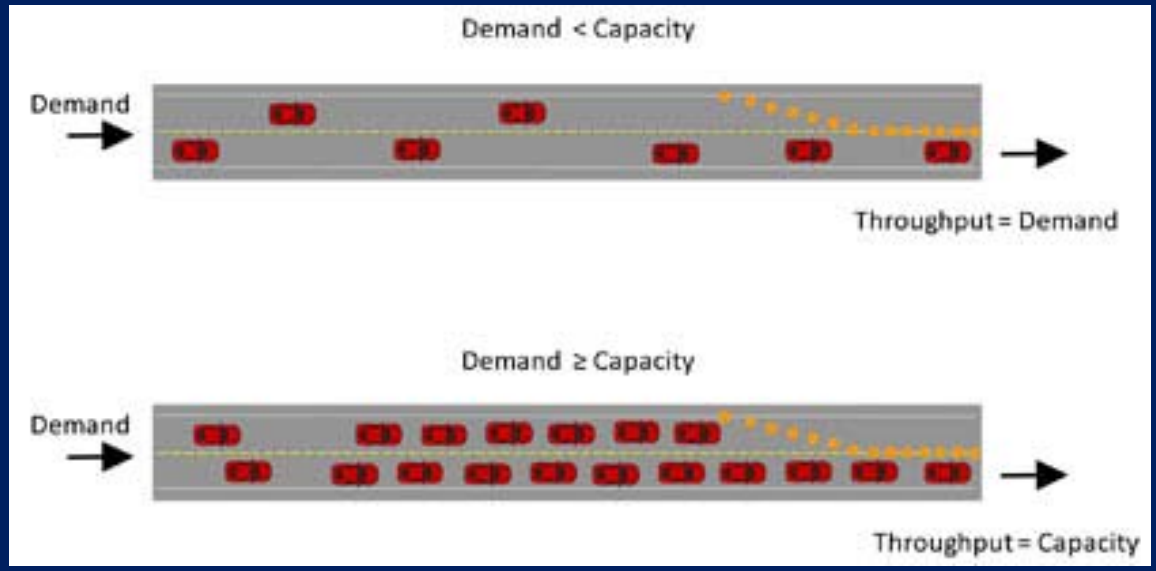
1. Capacity/Demand
2. Level of Service
3. Induced/Latent Demand
4. Disappearing Traffic
5. ROW Redistribution

Capacity/Demand



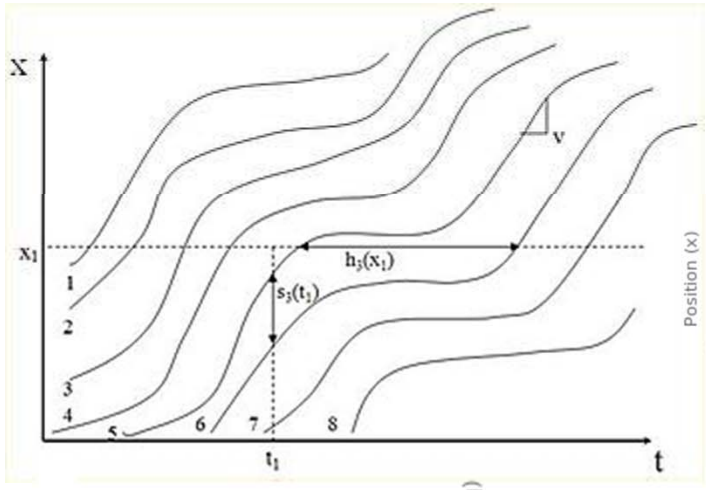


Capacity/Demand



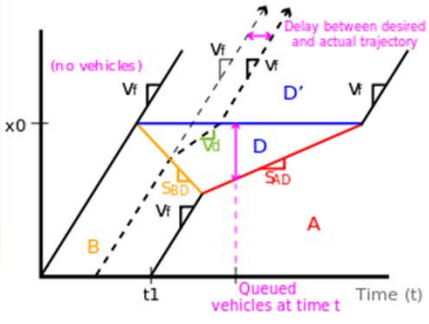
DEMAND > CAPACITY = DELAY

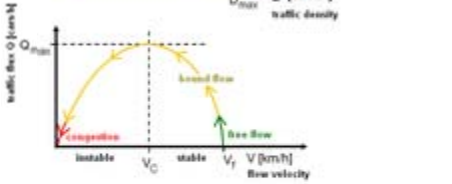
Capacity/Demand

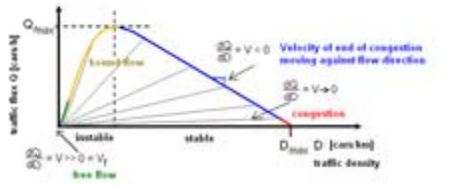


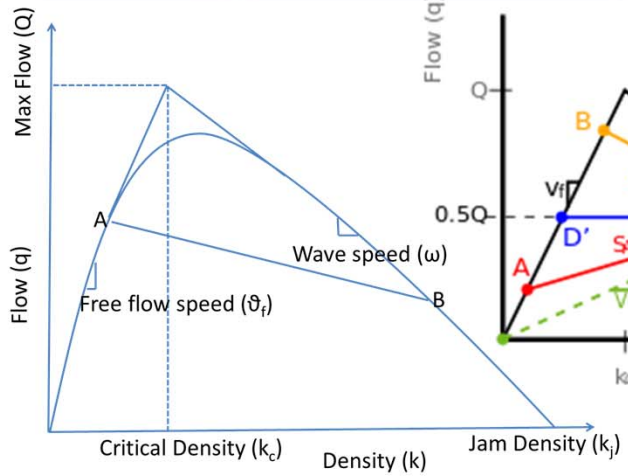
$$v_t = (1/m)\sum_{i=1}^{m} v_i$$

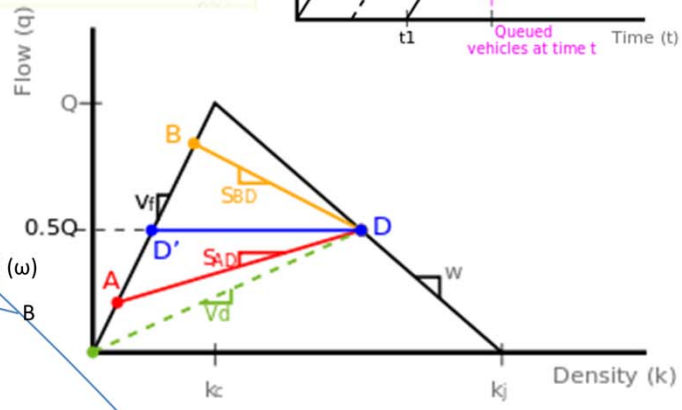
$$K(L,t_1) = \frac{n}{L} = \frac{1}{\bar{s}(t_1)}$$











Flow Density Relationship

Level of Service

LEVELS OF SERVICE
for Multi-Lane Highways

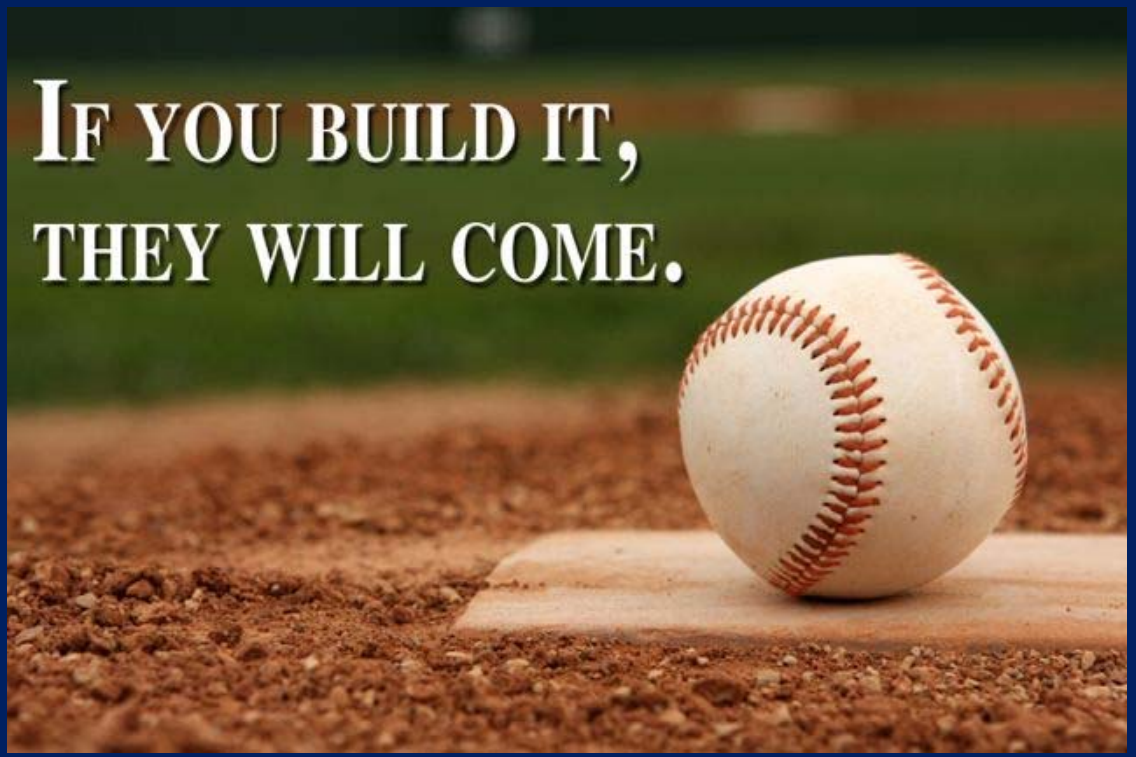
Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		60	Highest level of service. Traffic flows freely with little or no restrictions on maneuverability. **No delays**
B		60	Traffic flows freely, but drivers have slightly less freedom to maneuver. **No delays**
C		60	Density becomes noticeable with ability to maneuver limited by other vehicles. **Minimal delays**
D		57	Speed and ability to maneuver is severely restricted by increasing density of vehicles. **Minimal delays**
E		55	Unstable traffic flow. Speeds vary greatly and are unpredictable. **Minimal delays**
F		<55	Traffic flow is unstable, with brief periods of movement followed by forced stops. **Significant delays**

Source: 2000 HCM, Exhibit 21-3, Speed-Flow Curves with LOS Criteria for Multi-Lane Highways

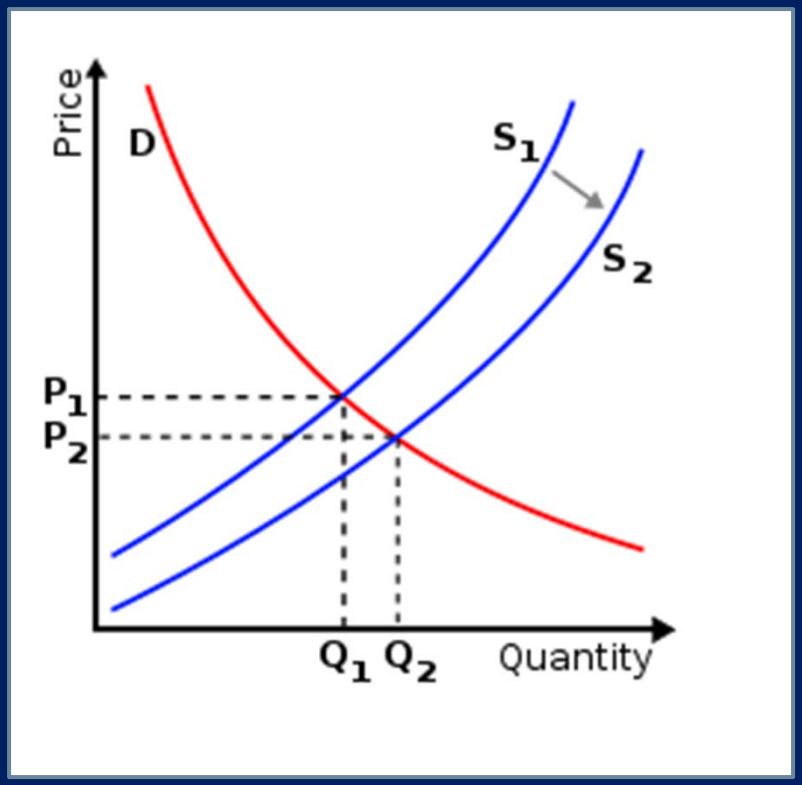
Level of Service

Induced/Latent Demand

After supply increases, more of a good is consumed.



Induced/Latent Demand



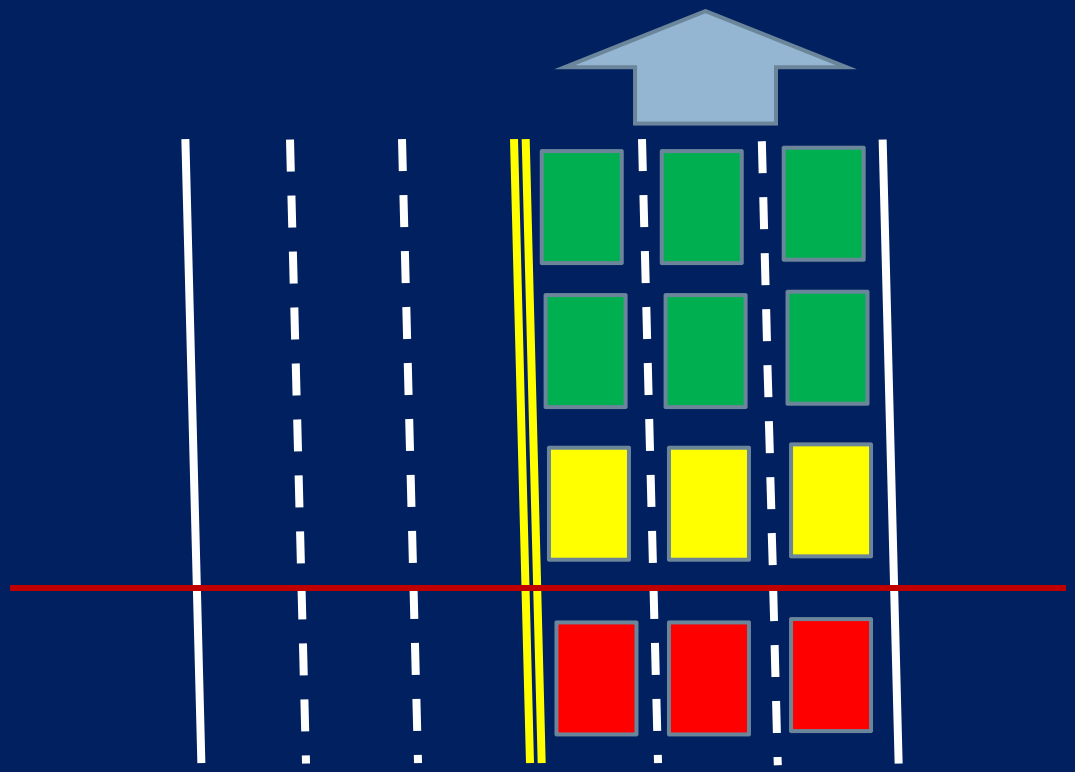
As supply increases, Price decreases and thus the Quantity Consumed increases

Induced/Latent Demand

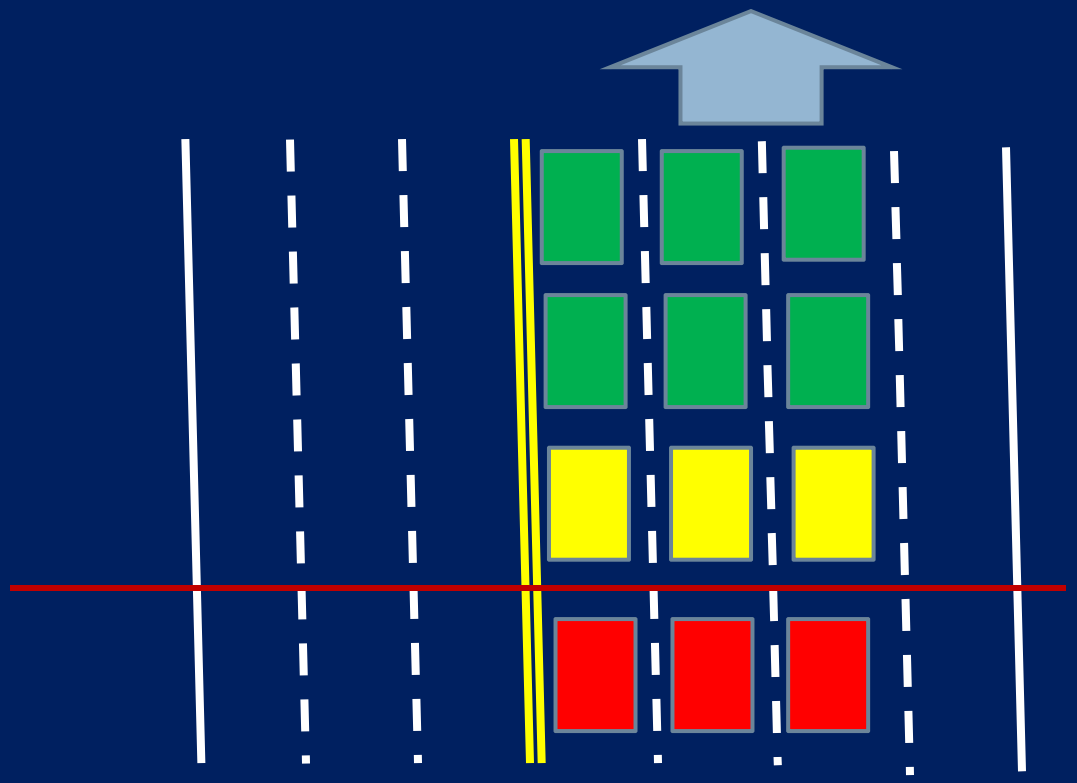
As ~~supply~~ vehicular system capacity increases, ~~price~~ delay to motorists decreases and thus ~~Quantity Consumed~~ the number of motorists increases.

(Note: The magnitude of the increase in the quantity consumed depends on the elasticity of demand.)

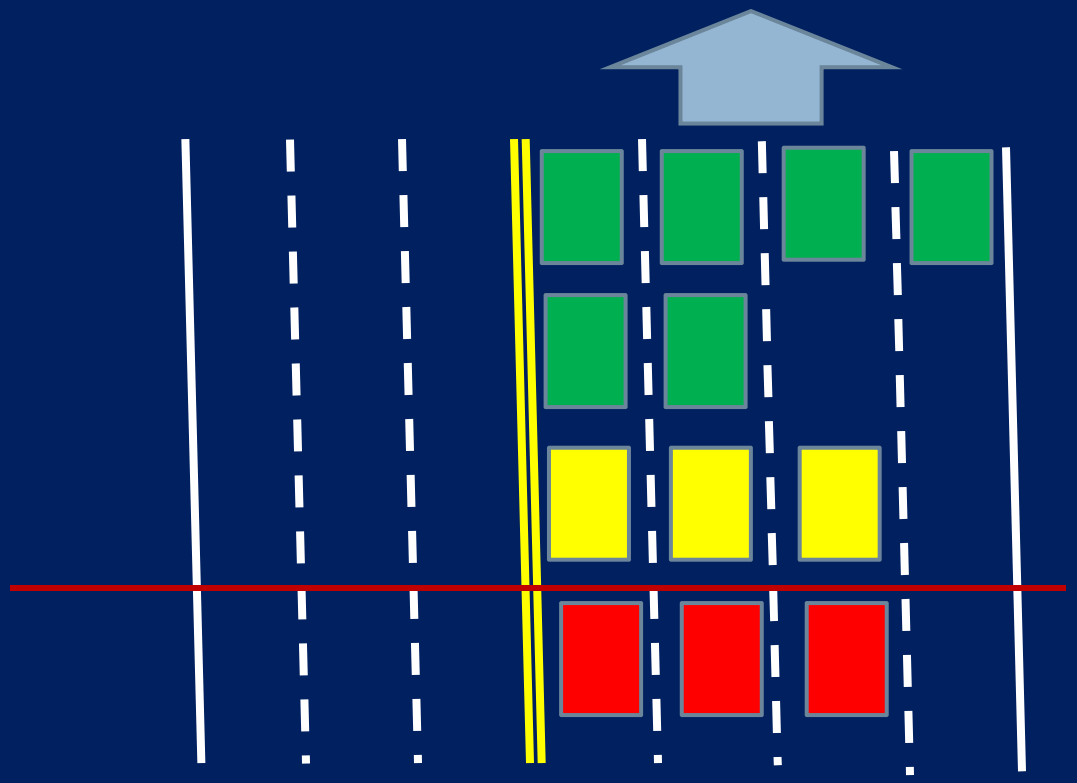
Induced/Latent Demand



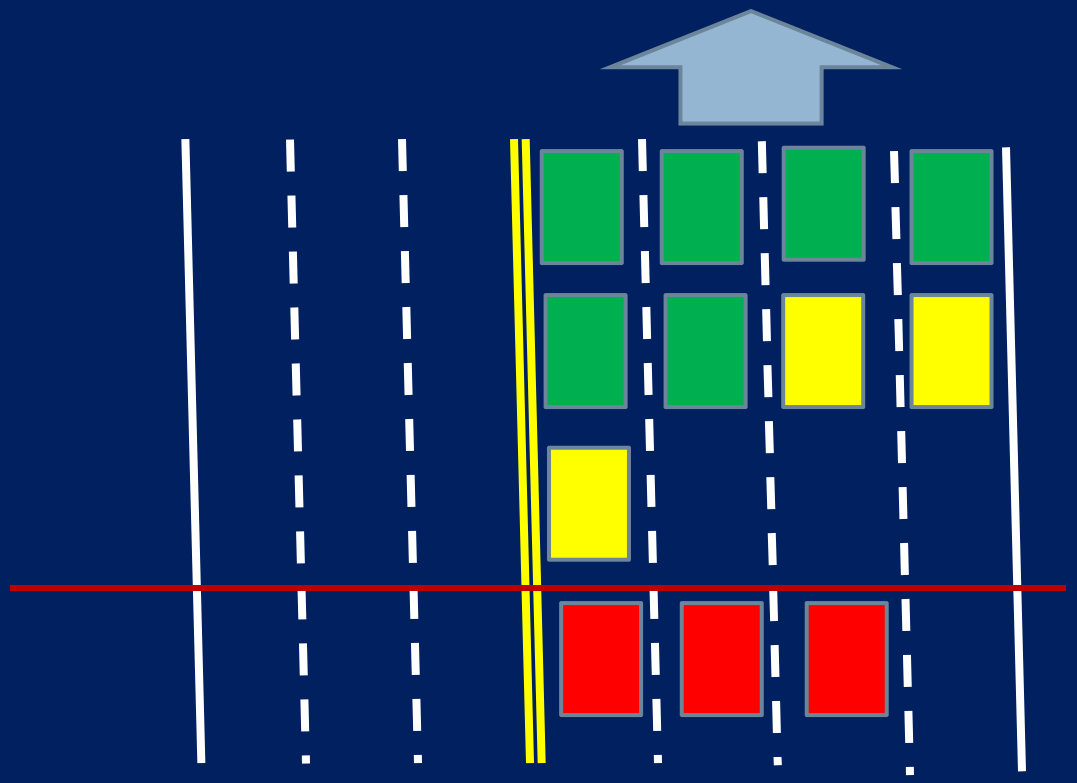
Induced/Latent Demand



Induced/Latent Demand



Induced/Latent Demand



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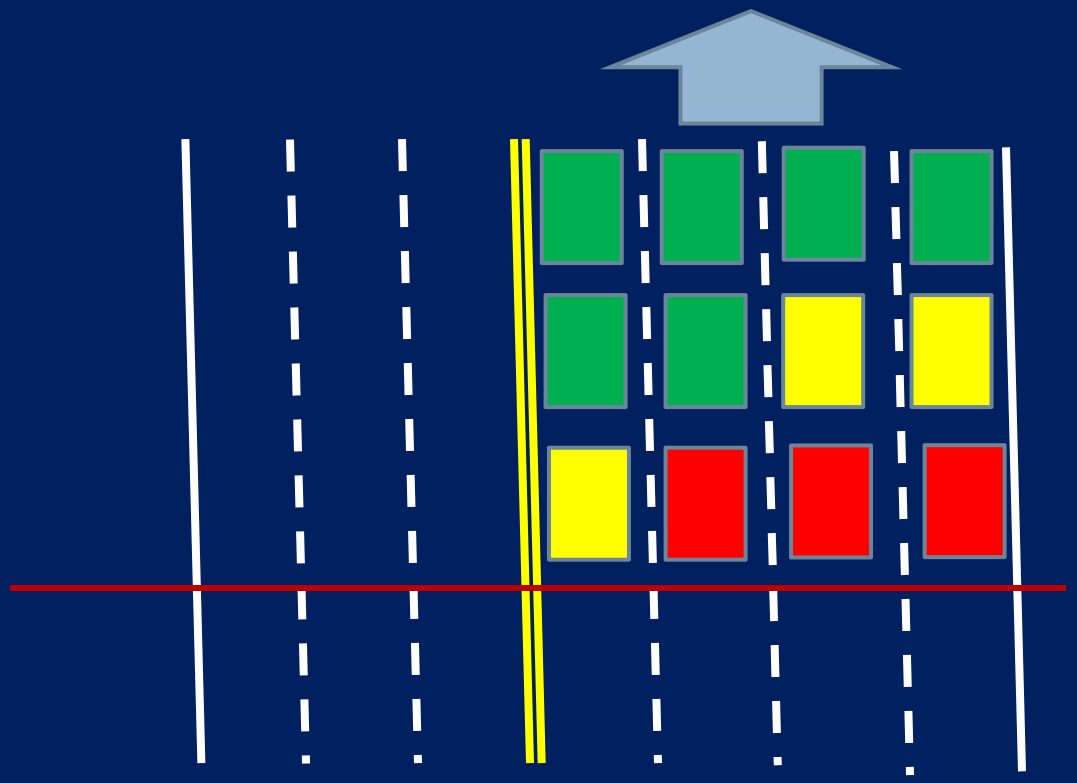

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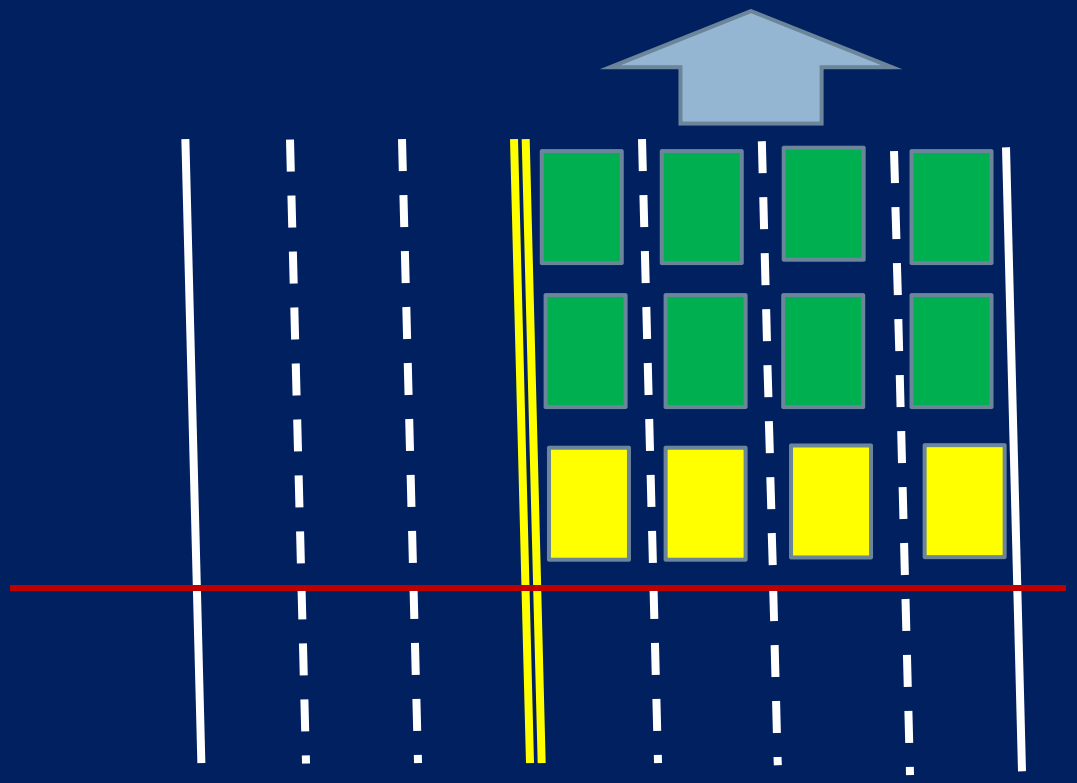
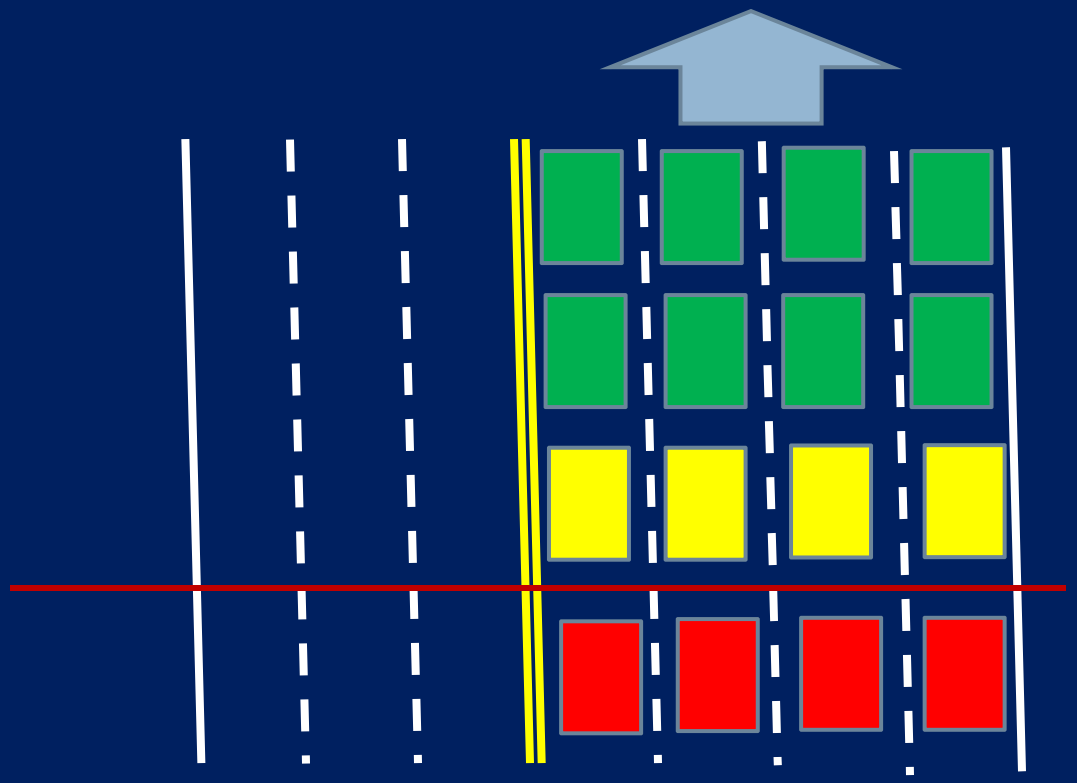
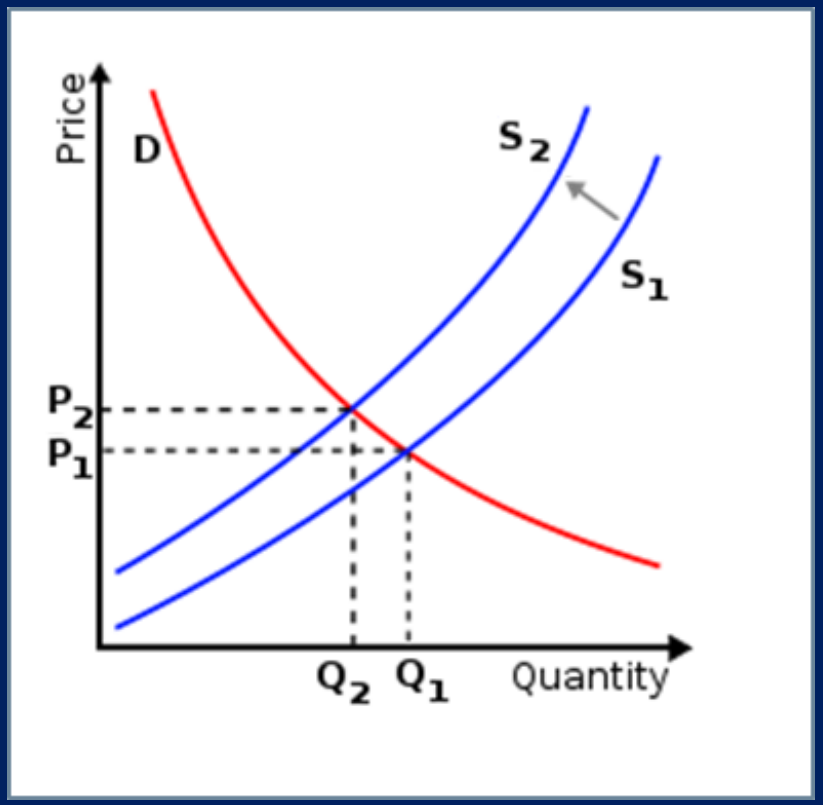


Induced/Latent Demand



Disappearing Traffic

Interestingly, the INVERSE is also true.

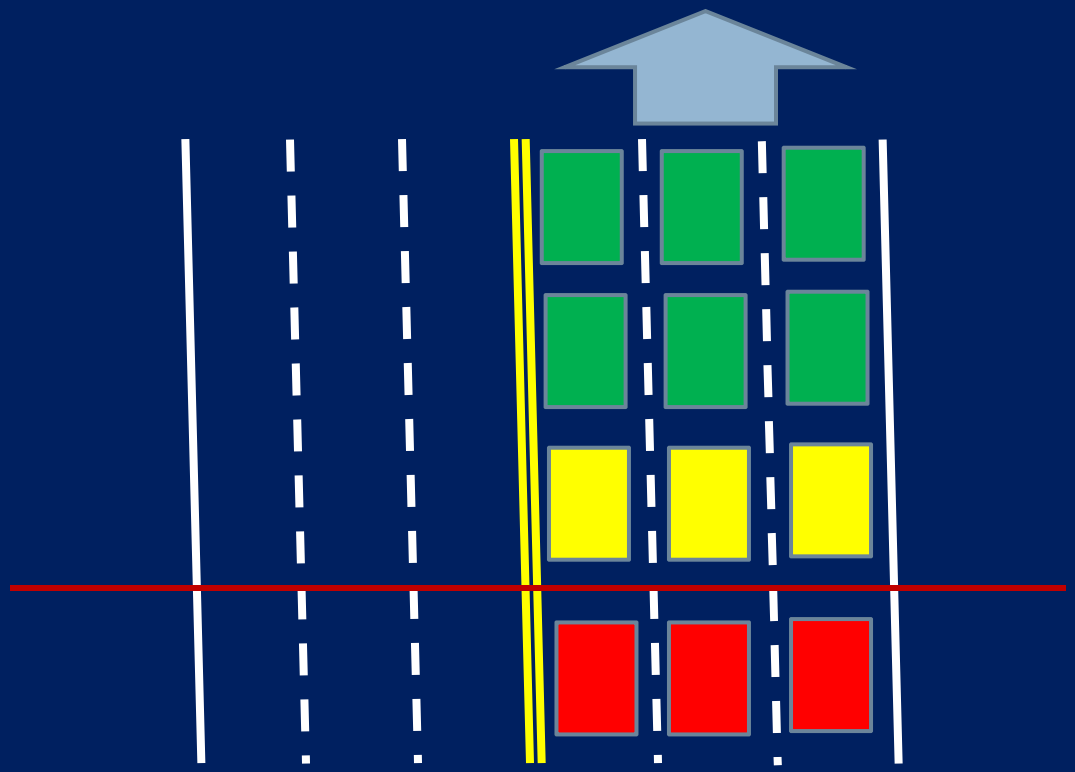


As supply DEcreases, Price INcreases and thus the Quantity Consumed DEcreases

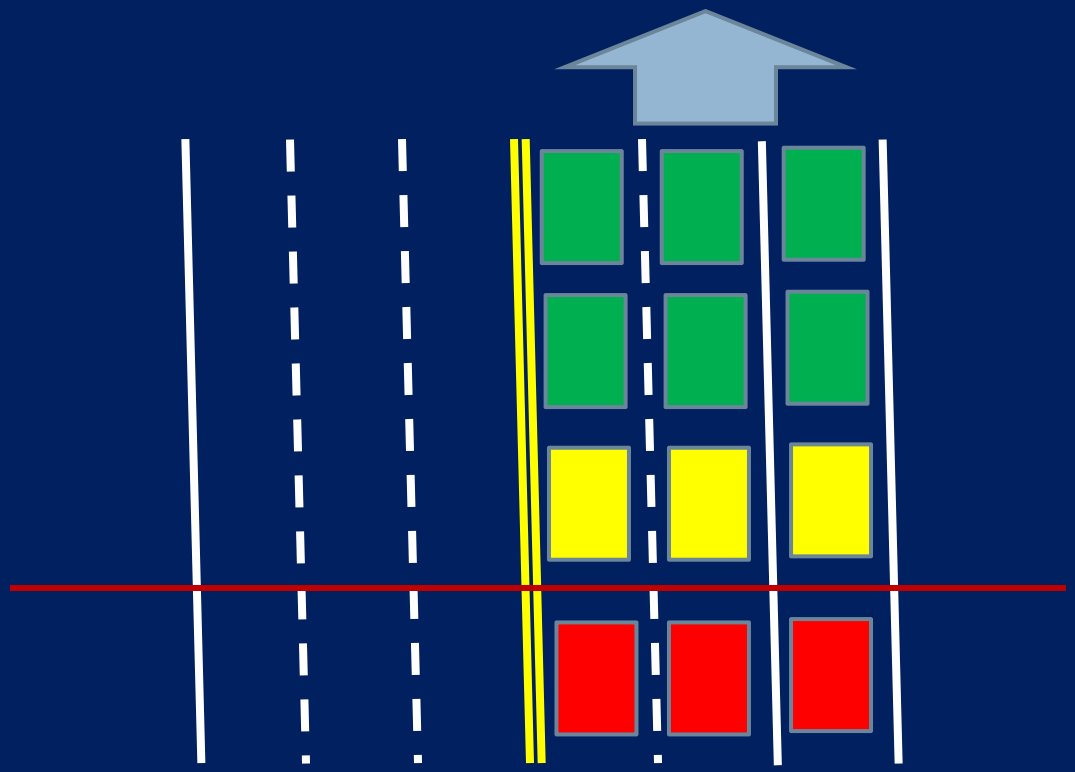
Disappearing Traffic

As ~~supply~~ vehicular system capacity DEcreases, ~~price~~ delay to motorists INcreases and thus ~~Quantity Consumed~~ the number of motorists DEcreases.

Disappearing Traffic



Disappearing Traffic



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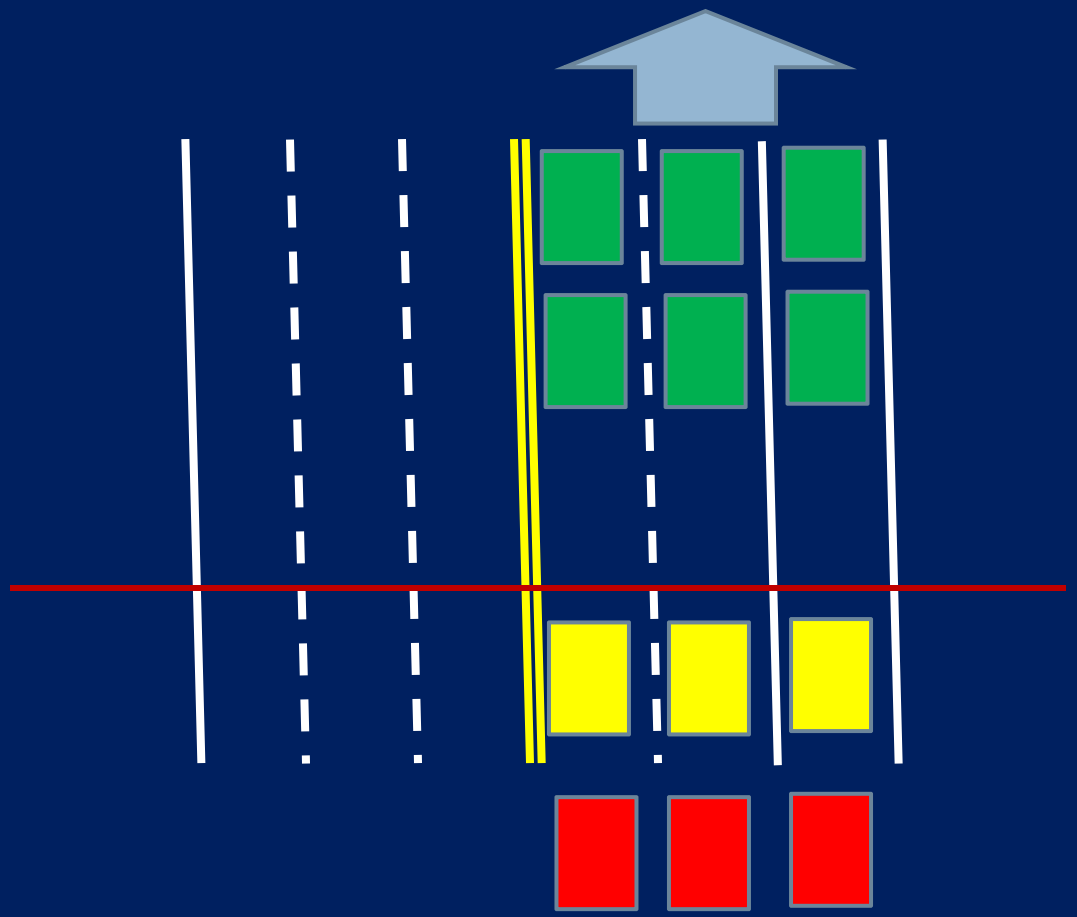
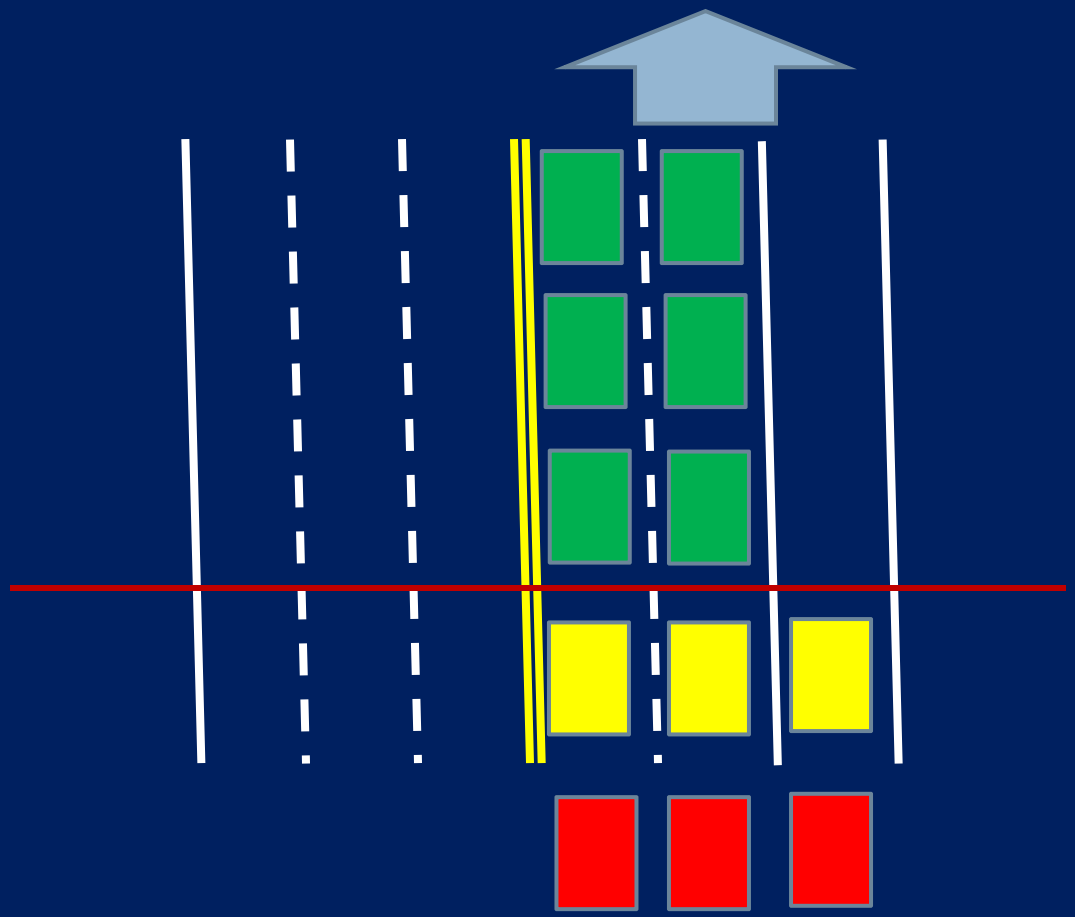


Disappearing Traffic



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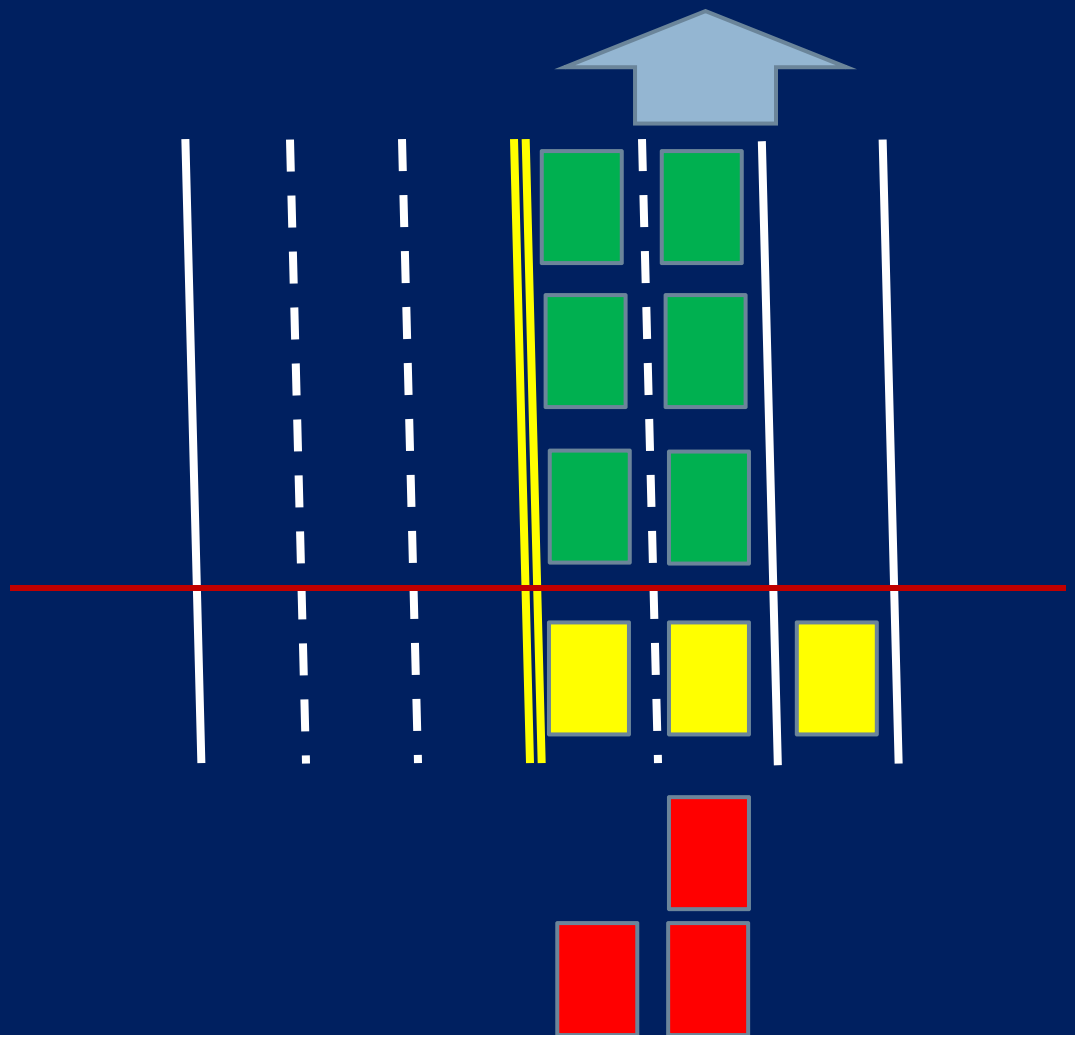

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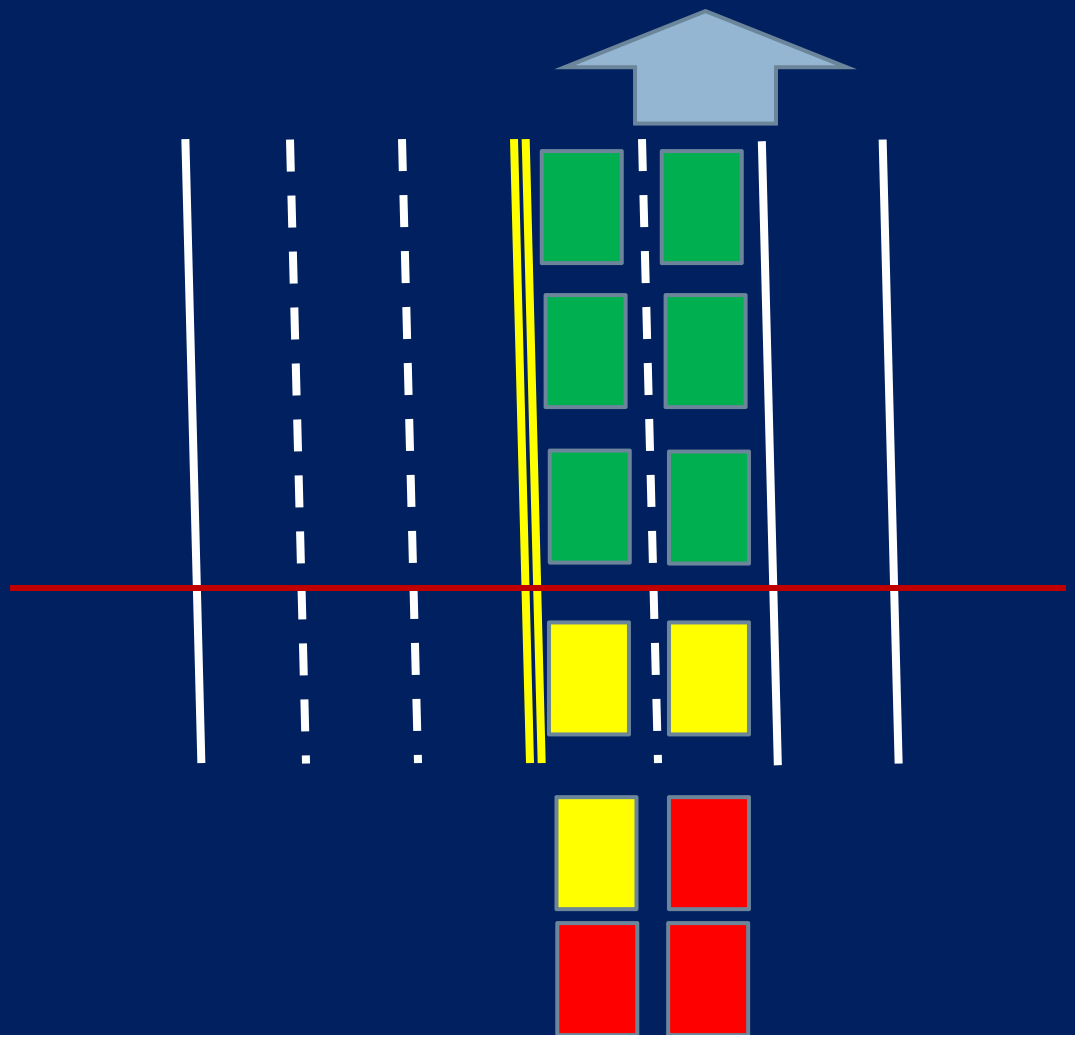

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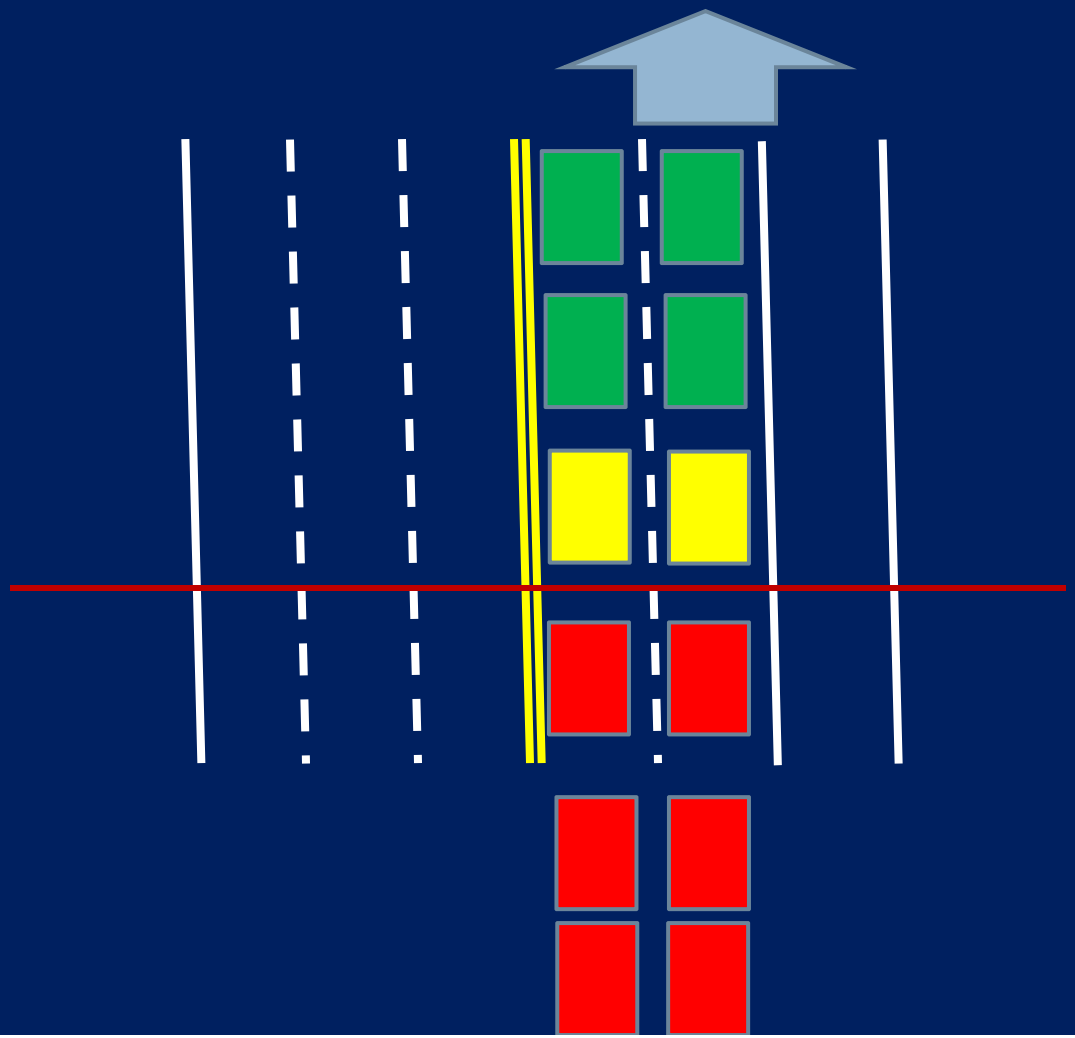

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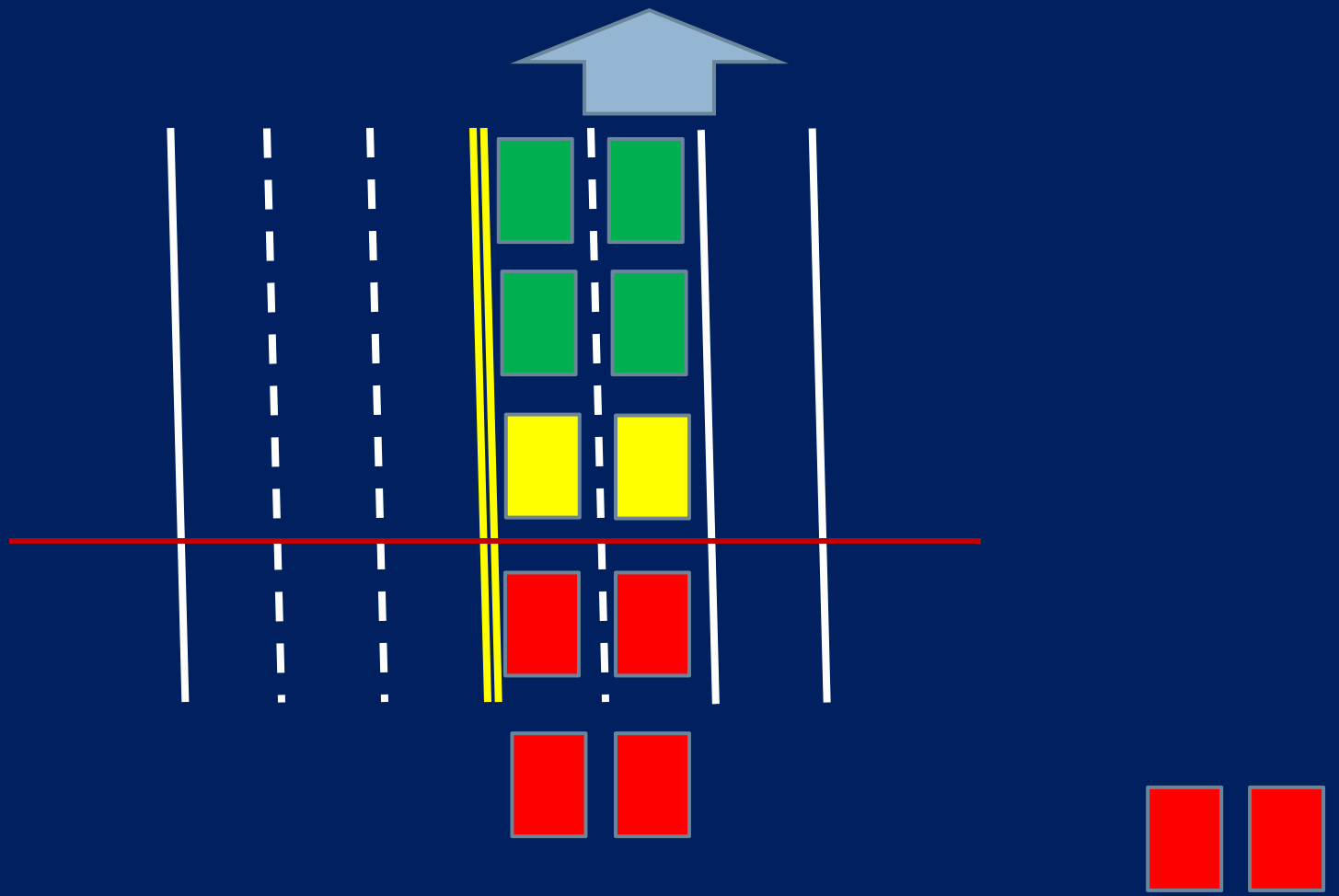


Disappearing Traffic

IF YOU REDUCE IT,
SOME WILL LEAVE.

BUT WHERE WILL THE GO?...

Broadway Road

Broadway Road

They said:

"Widen the sidewalks and add bicycle lanes…but don't acquire any new right-of-way."

Broadway Road

They said:

"Widen the sidewalks and add bicycle lanes…but don't acquire any new right-of-way."

ARE YOU CRAZY?

Broadway Road

Somebody said:

"JUST GET RID OF ONE OF THE THROUGH LANES."

Broadway Road

Somebody said:

"JUST GET RID OF ONE OF THE THROUGH LANES."

ARE YOU CRAZY?

Broadway Road

Convert it into a “two-lane comfort cruise”?

Broadway Road

So, we decided to test it.

- Collected BEFORE & AFTER data:
  - Maximum Queue Length
    - AM and PM Peak Hours
    - EB at Mill and at Rural
  - Volume (25 locations)
    - Surrounding Arterial Streets
    - Neighborhood Streets

Broadway Road

What did we find out?

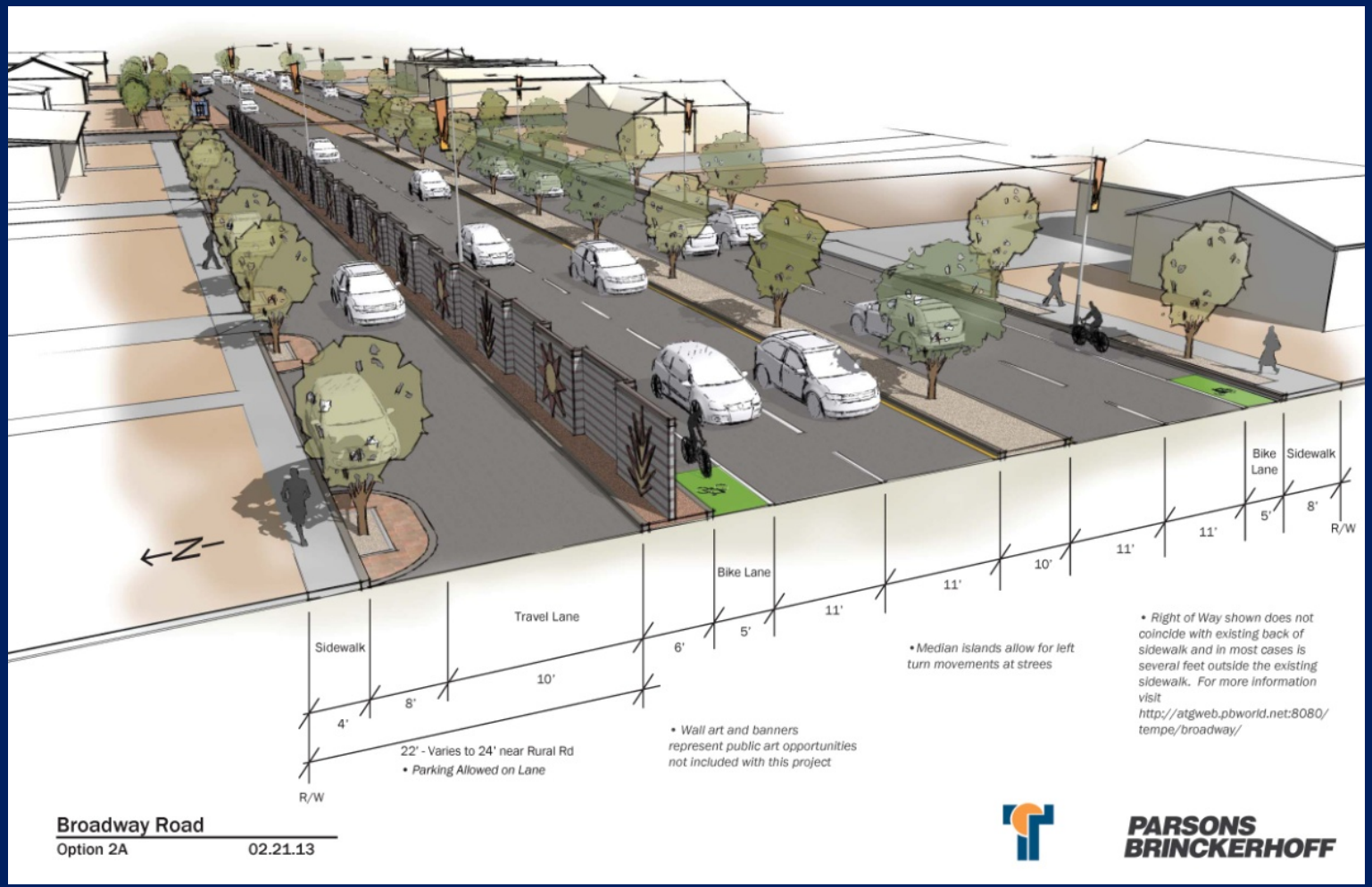
- Restriction had no significant effect on the Maximum Queue Length during the AM peak hour.
- Restriction resulted in a minimal increase in Maximum Queue Length during the PM peak hour.

Broadway Road

What did we find out?

- Restriction had no significant effect on traffic volumes on surrounding arterial streets (+/- 5%).
- Restriction had no significant effect on neighborhood streets (+/- 10%).
- Traffic volumes on Broadway Road dropped 4-11%.

Broadway Road



Right-of-Way Redistribution

When you have limited right-of-way, limited funding, and a goal of improving multi-modalism, you have no choice but to redistribute the right-of-way.

cra·zy/ˈkrāzē/

"Reducing vehicular capacity on an arterial street."