

Old North End Neighborhood Association Street Safety Recommendations



ONEN Street Safety Committee

October 8, 2021

Desired Outcome

A collaborative plan to calm traffic through structural changes that are within conventional traffic engineering practice

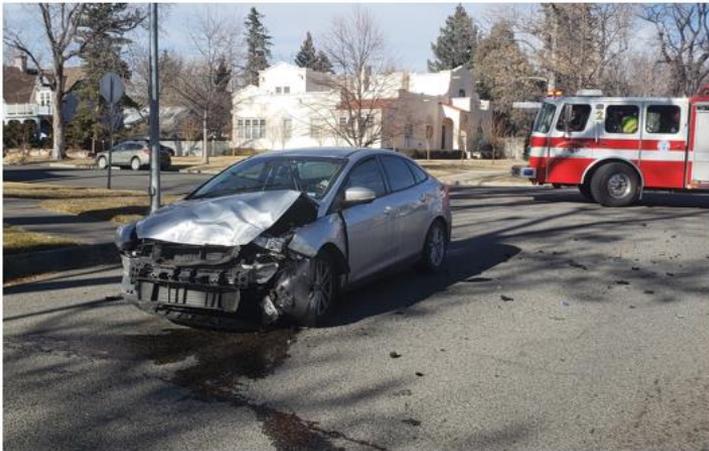


Sign erected on Nevada last week by unknown resident

Problem

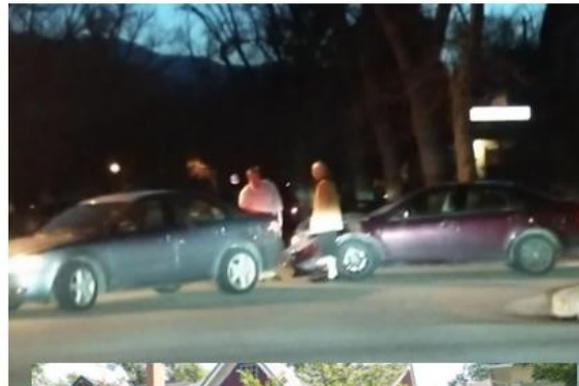
- Traffic safety on residential streets
- **At least seven fatalities in a one-mile residential road since 2002**
 - See *“How Did We Get Here: Life and Death on Nevada Ave”* by Mark Nelson

Sample of photos taken by me less than a block from my house (school zone) (fatalities censored)



Problem

Elsewhere on Nevada in the Old North End (fatalities censored)



Problem

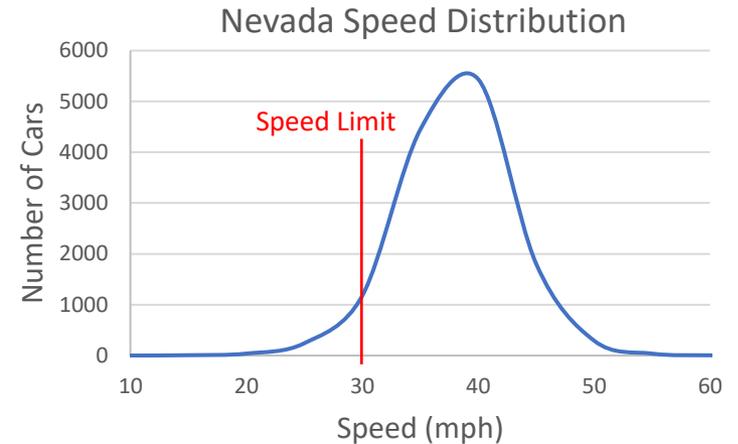


Traffic Count & Speed on Typical Day

Station ID: 4
NEVADA AVE N/O FONTANERO ST

| NB | 1 | 16 | 21 | 26 | 31 | 36 | 41 | 46 | 51 | 56 | 61 | 66 | 71 | 76 | Total |
|-------------|-----|----|----|-----|------|------|------|-----|-----|----|----|----|----|-----|-------|
| Start Time | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 999 | |
| 04/21/16 | 0 | 0 | 1 | 1 | 7 | 11 | 17 | 11 | 0 | 1 | 0 | 0 | 0 | 0 | 49 |
| 01:00 | 0 | 0 | 1 | 3 | 3 | 12 | 13 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 02:00 | 0 | 0 | 0 | 2 | 1 | 5 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 14 |
| 03:00 | 0 | 1 | 0 | 0 | 2 | 3 | 3 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 16 |
| 04:00 | 1 | 0 | 0 | 0 | 1 | 3 | 2 | 4 | 2 | 0 | 0 | 1 | 0 | 0 | 14 |
| 05:00 | 0 | 0 | 2 | 3 | 12 | 26 | 31 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 85 |
| 06:00 | 6 | 0 | 2 | 3 | 26 | 50 | 60 | 52 | 8 | 2 | 2 | 0 | 0 | 0 | 211 |
| 07:00 | 12 | 2 | 6 | 31 | 109 | 180 | 110 | 27 | 5 | 1 | 0 | 0 | 0 | 0 | 483 |
| 08:00 | 7 | 1 | 5 | 13 | 73 | 137 | 162 | 54 | 4 | 2 | 0 | 0 | 0 | 0 | 458 |
| 09:00 | 6 | 1 | 0 | 12 | 88 | 155 | 135 | 42 | 10 | 1 | 2 | 0 | 0 | 0 | 432 |
| 10:00 | 9 | 0 | 1 | 11 | 61 | 192 | 127 | 48 | 12 | 3 | 1 | 0 | 0 | 0 | 465 |
| 11:00 | 16 | 2 | 1 | 17 | 69 | 176 | 165 | 58 | 5 | 3 | 0 | 1 | 0 | 0 | 513 |
| 12 PM | 15 | 2 | 3 | 12 | 82 | 238 | 187 | 48 | 10 | 0 | 1 | 0 | 0 | 0 | 598 |
| 13:00 | 5 | 0 | 2 | 21 | 77 | 208 | 195 | 61 | 24 | 2 | 0 | 0 | 0 | 0 | 595 |
| 14:00 | 11 | 1 | 3 | 27 | 127 | 229 | 139 | 32 | 10 | 1 | 0 | 0 | 0 | 0 | 580 |
| 15:00 | 14 | 0 | 0 | 13 | 92 | 201 | 175 | 61 | 13 | 1 | 0 | 0 | 0 | 0 | 570 |
| 16:00 | 20 | 0 | 1 | 20 | 89 | 258 | 203 | 71 | 19 | 5 | 1 | 0 | 0 | 0 | 687 |
| 17:00 | 14 | 0 | 3 | 12 | 84 | 213 | 249 | 101 | 25 | 4 | 3 | 0 | 0 | 0 | 708 |
| 18:00 | 4 | 1 | 2 | 5 | 49 | 148 | 121 | 46 | 12 | 2 | 1 | 0 | 0 | 0 | 391 |
| 19:00 | 7 | 0 | 3 | 11 | 55 | 115 | 72 | 18 | 10 | 1 | 1 | 0 | 0 | 1 | 294 |
| 20:00 | 2 | 1 | 0 | 8 | 45 | 81 | 48 | 19 | 4 | 0 | 0 | 0 | 0 | 0 | 208 |
| 21:00 | 4 | 0 | 1 | 14 | 44 | 74 | 31 | 13 | 5 | 2 | 0 | 0 | 0 | 0 | 188 |
| 22:00 | 1 | 0 | 1 | 7 | 13 | 46 | 55 | 12 | 6 | 0 | 0 | 0 | 0 | 0 | 141 |
| 23:00 | 1 | 1 | 1 | 2 | 19 | 26 | 23 | 12 | 2 | 2 | 1 | 0 | 0 | 0 | 90 |
| Total | 155 | 13 | 39 | 248 | 1208 | 2787 | 2327 | 810 | 188 | 35 | 13 | 3 | 0 | 1 | 7827 |
| Grand Total | 155 | 13 | 39 | 248 | 1208 | 2787 | 2327 | 810 | 188 | 35 | 13 | 3 | 0 | 1 | 7827 |

15th Percentile : 32 MPH
50th Percentile : 39 MPH
85th Percentile : 44 MPH
95th Percentile : 49 MPH



- Average speed (39 mph) is equal to average measured by CDR Koch (8/21)
- Sensors located one block north of Steel School zone
- In *just the northbound lanes* on a typical day:
 - 210 cars were over 50 mph, 13 over 60 mph
- During 5 PM rush hour (highest “congestion”)
 - 32 cars over 50 mph, 3 over 60 mph
- Wahsatch has the same problems

Does Enforcement Work?

- The following data taken from survey conducted by CDR Koch over the past 12 months
- Study region from Cascade to Nevada, and Bijou to Espanola (southern half of ONE)
- Nevada in ONE is 10.8% of total lane distance in the study area
- In the past year, on Nevada from Uintah to Espanola (length less than half of the Old North End), there were 133 citations for speeding
- This is slightly less than half of all traffic summons for speeding in the study area (275)
- Traffic engineering data shows that on a typical day on Nevada, over 3,377 vehicles exceed the posted speed limit by 10+ mph (24%)
- **Takeaway: Although Nevada in ONE is only ~11% of the study area, it accounted for nearly 50% of the speeding enforcement. We are grateful for this focused attention of resources. However, the entire year of tickets accounts for only 1.1% of *one day of speeders*. We suspect a substantial redirection of CSPD resources would be necessary to show significant improvement.**
- **Fact: 210 cars over 50 mph in a single day in northbound lane** (see data page 6)
- **Fact: 133 cars ticketed for speeding (north & south) in one full year**
- ***Still, we're grateful for all you can do!!***

Solution: Frisbie/Krager/CC Plan

“Posted speed limits do not affect driver behavior,
but geometry does” K. Krager April 4, 2018

- Complete implementation of the CC Transportation Master Plan
- Safety-size Nevada and Wahsatch
- For Nevada, maintain four traffic lanes south of Uintah and north of Jackson

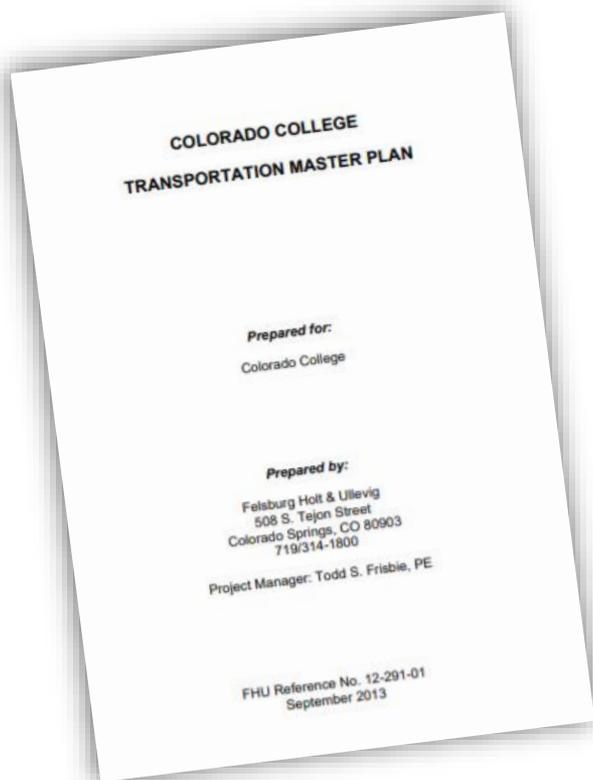
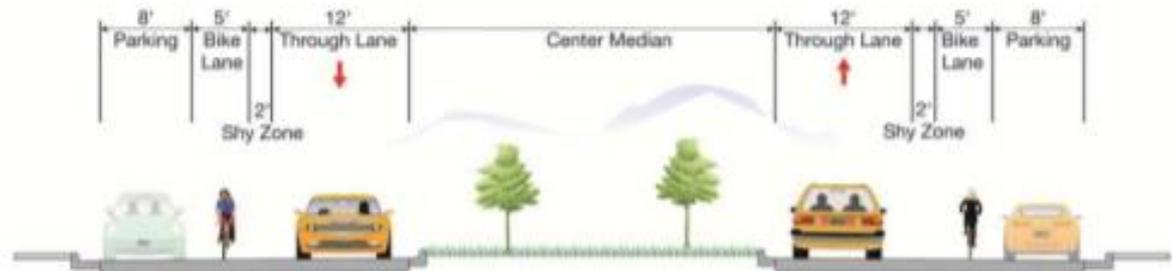
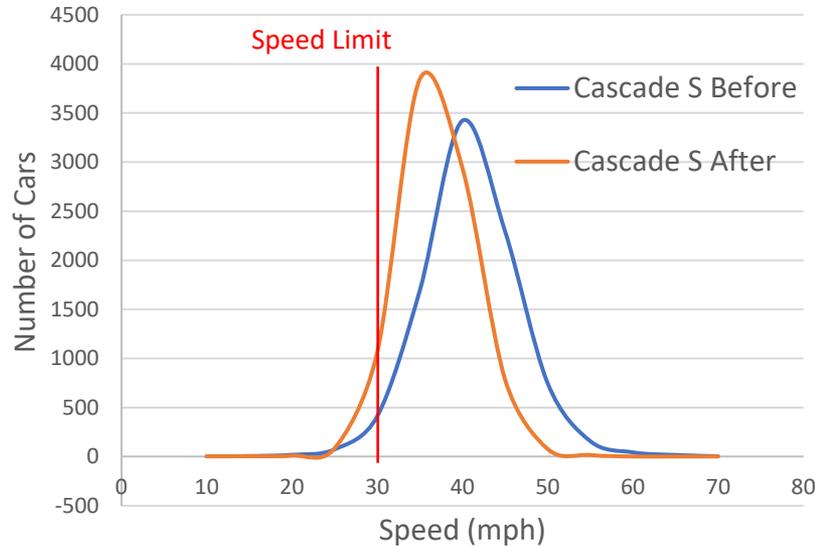


Figure 3-5b. Proposed Nevada Avenue Typical Section - Jackson Street to Columbia Street

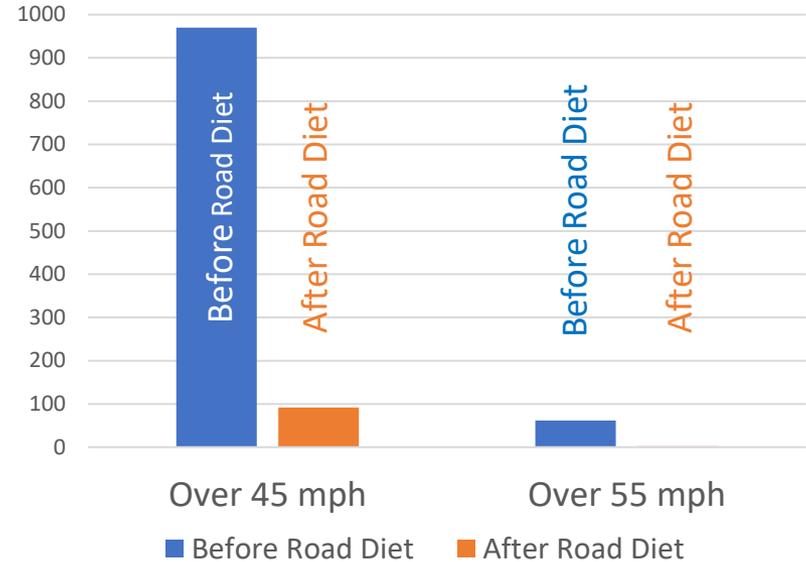


Sound Evidence of Effectiveness

Speed Changes on Cascade after Road Diet



Cascade Road Diet Results



- Safety-sizing Cascade was first intended as a test case for our neighborhood
- Two speed studies were done by the city before, and two after, safety sizing
- **Results :**
 - *Before Road Diet, there were 970 vehicles above 45 mph, and 62 over 55 mph*
 - *After Road Diet, there were 92 over 45 mph and 0 over 55*
 - *No congestion; average speed is still well above speed limit*
 - *No increased traffic on neighboring 2-lane streets*
- **This is an indisputable triumph of traffic engineering and public safety**

Nevada and Wahsatch are Not Too Busy

Here's how we know it will not cause congestion:

1. Rule of thumb for road diet: congestion possible with volume above 18 to 20,000 vehicles per day (many successful examples at 25,000 vpd)
 - **Nevada is generally under 14,000 vpd, Wahsatch is under 6,000 vpd**
 - *There are many two-lane roads in COS with higher traffic volume*
 - *Some cities (e.g., Seattle) permit traffic engineering to conduct road diet without oversight when traffic volume is below 15,000 vpd*
 - *Traffic volume is 17% lower (pre-COVID) than when Frisbie/Krager/CC plan was devised*
2. How can a congested street have 32+ cars over 50 mph *at rush hour*?
3. The light at Uintah (and Fillmore) permits only 24 cars per signal cycle. That's <12 cars per minute. One lane can easily handle this volume.
 - *Uintah carries almost 2.5X as much traffic as Nevada in ONE*
4. Nevada was constricted to two lanes for one year (2012), and it was fine

Are we trying to close Nevada?

- No
- Multiple studies find no reason why this plan would result in degraded operations or fewer cars on Nevada
- Nevada is under assault since 2016:
 - *1091 vehicle per day increase after Cascade road diet*
 - Diversion observed only on four lane streets
 - *Bus line moved from Cascade to Nevada*
 - Buses speed too, and one bus produces as much noise as 32 cars
 - *New left turn arrow from eastbound Uintah permits more vehicles*
 - *Whoop-di-doos and rough pavement removed when repaved*
 - Broken promise made by K. Krager (4/4/18) and C. Farkas (6/20/19)
 - *2018 Old/Near North End Transportation Study resulted in substantial safety improvements to all streets except Nevada and Wahsatch*
 - *August 28, 2021 city data: 50 trucks with at least 5 axles*
 - ***All of these were done in violation of the ONEN Master Plan, city ordinance***

Will local residents support the plan?

Well over 350 persons, mostly Old North End residents, have signed the following petition in favor of safety sizing all ONE streets:

To The Honorable John Suthers and City Council of Colorado Springs

On January 30, 2018, the City of Colorado Springs announced plans for changes to the transportation configuration of the Old North End. The plan indicates that the number of travel lanes on Cascade, Weber, and Fontanero will be reduced from four to two. We recognize this as a fundamental redistribution of transportation capacity through our neighborhood, and a high risk for reduced safety and livability on Nevada. This will have far-reaching implications for the apportioning of transportation responsibilities, focusing growth and detrimental effects on the families who made their homes on Nevada Avenue. It also violates the historic distribution of capacity that spans more than 5 generations. While this breach of equity may be briefly permitted, we demand that the City provides a road map to returning our streets to historic parity.

We, the undersigned, want the City of Colorado Springs to implement fully all items listed in the ONEN Street Safety Proposal which was adopted by the ONEN Board of Directors on February 21, 2018, so that our entire neighborhood can benefit equally in accordance with the ONEN Master Plan. The City's Transportation Plan does not go far enough to address adequately the immediate safety concerns on our busiest street, Nevada Avenue. The City's Plan is incomplete and was developed with input provided by only a small portion of our neighborhood. Before proceeding with the plan, the City must formally assure our neighborhood that it will endorse, adopt, and fully implement the ONEN Street Safety Proposal which was developed by the residents and leaders of our neighborhood.

Will the Mayor support plan?

At City Council meeting on 12/11/18, Jeff Greene stated that the Mayor bases such roadway decisions on four items:

- 1. advice of professional staff**
- 2. conformation with various city plans**
- 3. advice of City Council**
- 4. recommendations of the Downtown Partnership**

We have met all conditions:

- 1. Plan was authored by his professional staff (Todd Frisbie)*
- 2. Plan is shown in PlanCOS and conforms with Renew North Nevada Plan*
- 3. Our present and former City Council representative gives full support*
- 4. President/CEO of DP has given informal approval (and the plan belongs to CC)
However, DP board has not reviewed plan*

Conclusion

- There is an established problem with true life-or-death consequences
 - *Another person will die soon, but you can reduce the probability*
- There is a demonstrated solution
 - *Tested and validated (three years on Cascade and one year on Nevada)*
 - *Well within conventional traffic engineering practice*
 - *Designed and affirmed by local professional traffic engineers and stakeholders*
 - *Costs very little and creates no traffic delays*
- The solution meets the mayor's criteria for implementation and is supported by residents

Recommendation

- Complete implementation of the plan engineered by Todd Frisbie, Kathleen Krager, and Colorado College

Backup Charts

Didn't residents oppose Krager's plan when proposed in 2016?

- Small proportion opposed to safety-sizing ONEN streets
- There were three factions: Local residents, SaferCC, RestoreOurRoads
 1. *Most local residents were in favor of the plan, but many opposed the sequenced implementation because there was little confidence that other streets would be addressed after Cascade. Nearly all were in support of safety sizing all ONE streets*
 2. *SaferCC was opposed to safety-sizing Cascade because they believe that CC is working to completely close Cascade through their campus.*
 3. *RestoreOurRoads opposes all road diets, and will probably oppose this plan*
- We maintain contact with the leadership of SaferCC and RestoreOurRoads

Our Plan is Shown in PlanCOS



Typology 1: Urban Core Streets

Major Transportation Streets and Parkway Recommendations:

- Redevelop Corridor with Multimodal Facilities
- Maintain and Adapt Landscaped Medians and Tree Lawns
- Accommodate Range of Transportation Options
- Design Street in Relation to Land Uses and Build-to Lines



Picture of Nevada Ave in Old North End taken from PlanCOS

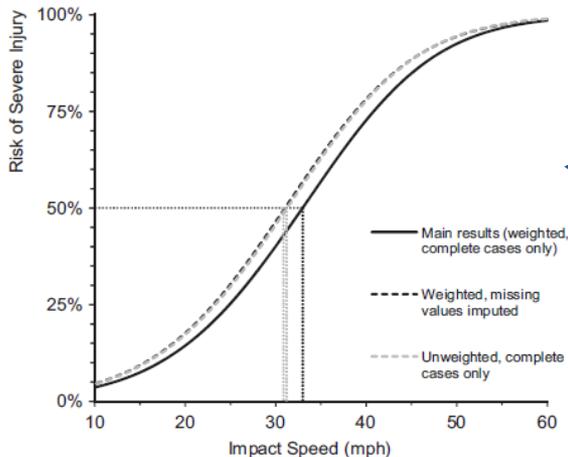
- Uses Nevada Ave as example of safety sizing
 - Shows a picture of Nevada and literally says: “Reduce motor vehicle through lanes while accommodating demand”
- Treats Old North End as “multi-street corridor”
- PlanCOS policies and strategies that would be fulfilled by safety-sizing Nevada are too numerous to list here – ask us for the list!

Is this consistent with conventional engineering practice?

- Three independent professional studies since 2013 have validated effectiveness with worst-case only marginal increase in traffic congestion
 1. *CC Transportation Master Plan (2013, FH&U, et al)*
 2. *Old North End Road Diet Plan (2016, K. Krager)*
 3. *Lane Reduction Feasibility Analysis (2020, Wilson Co.)*

Peer-reviewed Studies Affirm Benefits

- Several studies of hundreds of cases show substantial reductions in frequency and severity of accidents
- We have a library of these
- This one was funded by the FHWA, conducted by transportation scientists at multiple universities, and published in peer-reviewed journals
- It found a 29% decrease in total crashes
- The reduction in high-speed traffic on Cascade is an excellent demonstration



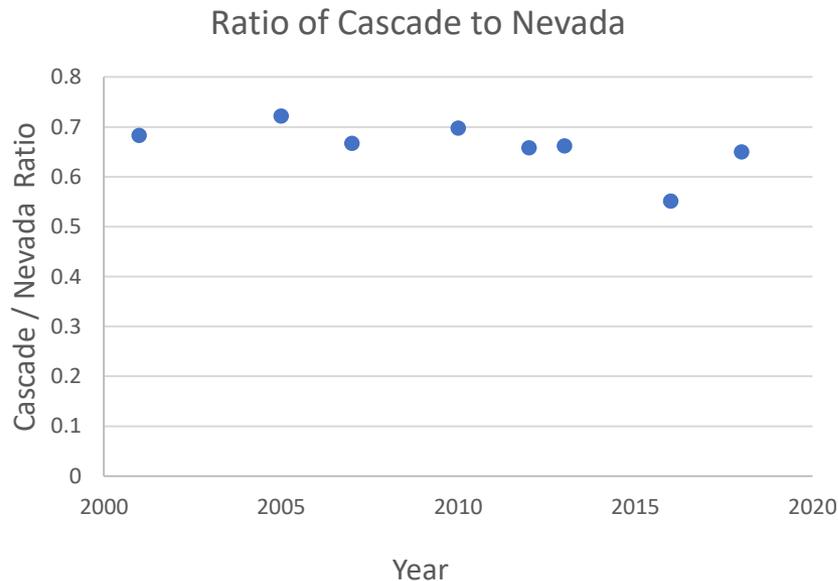
Risk of injury increases rapidly with speed: B.C Teft, Impact Speed and a Pedestrian's Risk of Severe Injury, Accident Analysis and Prevention 50 (2013) 871– 878



Download it here:
<https://www.fhwa.dot.gov/publications/research/safety/10053/10053.pdf>

Is Cascade really a fair comparison?

- Cascade, Nevada, and Wahsatch are built to identical specifications
- Historically, Cascade has 70% as much traffic as Nevada
 - *They are nearly twin sisters*
 - *There is no difference that would result in qualitative differences in performance*



Will cars divert to neighboring streets?

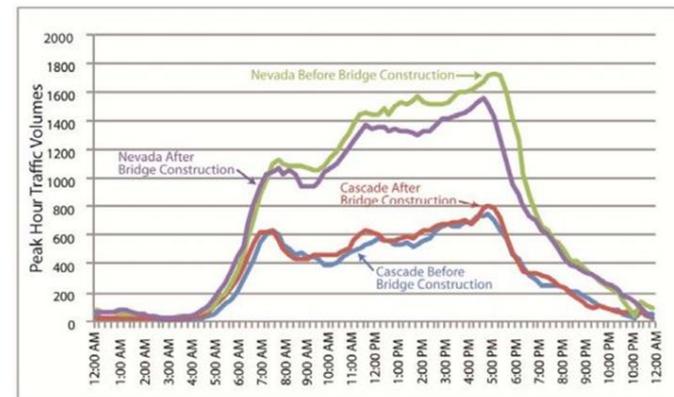
Traffic Volume (Vehicles per Day)

| Location | Before Road Diet | After Road Diet | Change |
|----------|------------------|-----------------|--------|
| Wood | 547 | 554 | +1.2% |
| Tejon | 598 | 552 | -7.6% |
| Nevada | 13,665 | 14,756 | +7.8% |
| Wahsatch | 5,093 | 5,520 | +8.0% |

No. Here's how we know:

- Results from Cascade road diet
 - Changes on Wood & Tejon (adjacent to Cascade) are statistically insignificant
 - **This conclusively demonstrates that Cascade road diet did not divert cars to two-lane roads**
 - There was significant diversion to four lane streets (Nevada & Wahsatch), as expected

- Nevada bridge closure in 2012
 - Single lane for nearly one year
 - Almost no detectable diversion



This plot, taken from CC Transportation Master Plan shows there was very little effect of closing two lanes on Nevada for nearly a year in 2012

This is a Common Solution for Our Situation



- Many historical neighborhoods solved the same problems
- There are tried and true methods for solving these problems without impeding or diverting traffic

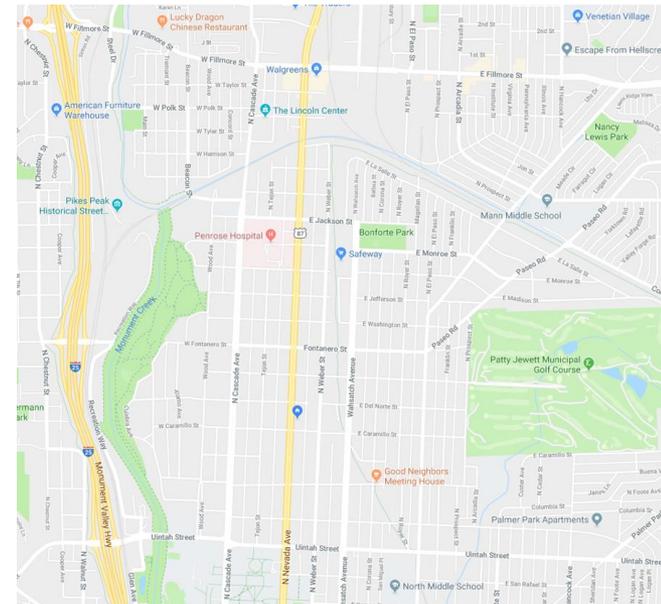
This particular example is from the National Association of City Transportation Officials, [Urban Street Design Guide](#).

“Broad historic boulevards and parkways often function as high-speed thoroughfares, even though their adjacent land uses may be primarily residential in nature. In many cases, these streets have excess width, underutilized on-street parking, and too many travel lanes.”
“Retrofit residential boulevards by expanding or activating the median, adding curbside or [left-side bike lanes](#), and [curb extensions](#) that provide direct access from homes to the center median.”

Example: Monaco Parkway, Denver (16,000+ ADT)

What About Future Growth?

- Traffic on Nevada must grow by 46% to reach the upper limit threshold for road diet (20,000 ADT)
- During rush hour, number of cars is controlled by the lights at Uintah and Fillmore
- How can we even get more cars on Nevada?
 - In every 2-minute light cycle, the light on Nevada to cross Uintah lasts for only 30 seconds
 - This is enough time for about 24 cars to get through (measured hourly maximum – 655 – confirms this)
 - Actually, the *measured* value during maximum rush hour (peak hourly max) is 22 cars every 2 minutes
 - The only way to get more cars is to have longer green lights at Uintah and Fillmore
 - However, this would be problematic, because Uintah has 31,829 cars per day and would be adversely affected by longer red light
 - Why do we need two lanes, when there are only 24 cars every 2 minutes? FHWA advises up to 63 per lane
- See, we're boxed in by major east/west thoroughfares on north and south
- Substantial growth on Nevada can happen only after major changes to these intersections
 - If this happens, restriping back to four lanes would be trivial in comparison



Alternatives: Do “Bump-outs” Reduce Speeds?

Fun Fact: Bump-outs, aka curb extensions, are raised constrictions of the roadway at intersections, like we have at Fontanero/Wahsatch and Nevada/Del Norte

Table 8
COMPARISON OF ALTERNATIVE TRAFFIC CONTROL MEASURES

| Control measure | Effectiveness | | Costs | | Access | | Safety | | Air quality |
|--|---------------|--------|--------|--------|--------|--------------|--------|--------|-------------|
| | Speed | Volume | Const. | Maint. | Emerg. | Resid. Comm. | Walk. | Pedes. | |
| Measures applicable to arterial or residential streets | | | | | | | | | |
| Double strip | 0/+ | 0 | + | - | 0 | 0 | 0 | +/- | 0/- |
| Forced turn channelization | 0 | + | - | - | - | - | - | + | 0/0 |
| Median barrier | 0/+ | + | 0/+ | - | - | - | - | + | 0/0 |
| Choker (bump-out) | 0 | 0 | - | 0 | 0 | 0 | 0 | + | 0/0 |
| Measures applicable to only residential streets | | | | | | | | | |
| Access control sign | 0/+ | 0/+ | + | + | 0 | 0 | 0 | + | 0/0 |
| Advisory sign | 0/+ | 0 | + | + | 0 | 0 | 0 | + | 0/0 |
| Turn prohibition sign | 0 | + | + | + | 0 | 0 | 0 | 0 | 0/0 |
| Speed limit sign | 0 | 0 | + | + | 0 | 0 | 0 | 0 | 0/0 |
| Measures applicable to only residential streets | | | | | | | | | |
| Speed bump (new design) | + | 0/+ | + | - | - | 0 | - | 0/- | 0/- |
| Raised intersection | + | + | - | - | - | 0 | - | 0/- | + |
| Diagonal diverter | 0/+ | + | - | - | - | - | - | 0 | 0/+ |
| Intersection cul-de-sac | 0/+ | + | - | - | - | - | - | 0 | 0/+ |
| Mid-block cul-de-sac | 0/+ | + | - | - | - | - | - | 0 | 0/+ |
| Sand-diverter | 0 | + | - | - | - | - | - | 0 | 0/+ |
| Stop sign | 0/+ | 0/+ | + | + | + | 0/- | - | +/- | +/- |
| Yield sign | 0/+ | 0/+ | + | + | + | 0/- | - | +/- | +/- |
| One-way street | - | + | + | + | - | - | - | + | 0/0 |

+ indicates measure is relatively advantageous for corresponding criterion
 - indicates measure is relatively disadvantageous for corresponding criterion
 0 indicates measure is neutral for corresponding criterion

Forced turn channelization is the use of curbed islands to mark vehicles turn left or right at an intersection. They can be used to eliminate short-cuts along non-arterial streets by forcing indirect routings, or to prevent motorists on an arterial from entering a residential street from particular directions.

Median barriers refer to the use of curbed medians along the center of a street (usually along arterials), to prevent crossings of the street. In the North End area, selected intersections along Cascade Avenue, Nevada Avenue or Wahsatch Avenue could be closed to cross-street movements across the median by extending existing medians through the intersection. This is a means of limiting access to residential streets from particular directions of approach along the arterial, or a means of preventing pass through trips along the residential street.

T-17

- Bump-outs are good for improving pedestrian safety, and we'd love to have them for that reason
- However, we found no indication in literature that they reduce traffic speeds
- We read numerous references – none claimed speed reduction, except for turning traffic in some cases:
 - We found only one systematic, quantitative FHWA study¹ – it does not claim any speed reduction, only improved safety at crosswalks
 - Elsewhere², the FHWA claims that bump-outs reduce speed of turning vehicles, but makes no inference about through traffic
 - Bicycling resources³ say: “Curb extensions are primarily a pedestrian safety measure rather than a speed deterrent measure.”
 - They were studied for the ONEN Master Plan, and transportation engineers concluded they had no advantages for speed or noise (see left)
- We have data on Nevada showing they are ineffective. See next chart.
- Even if it worked, why would we spend \$350,000+ per intersection to slow traffic, when it can be done with paint (by re-striping Nevada)?

1. “PEDESTRIAN SAFETY IMPACTS OF CURB EXTENSIONS: A CASE STUDY” Final Report SPR 304-321 by Randal S. Johnson Department of Civil, Construction & Environmental Engineering Oregon State University Corvallis, Oregon, For FHWA, July 2005
 2. <https://safety.fhwa.dot.gov/saferjourney1/Library/countermeasures/23.htm>
 3. http://www.pedbikeinfo.org/data/faq_details.cfm?id=3453

Alternatives: Do “Bump-outs” Reduce Speeds?

- We already have bump-outs on Nevada at Del Norte (Steele Elementary)
- They are evidently **not** effective at slowing traffic
- Speed distribution is marginally **higher** at bump-out
- Still, they improve pedestrian safety for crossing Nevada, so we welcome them across the entire neighborhood!

