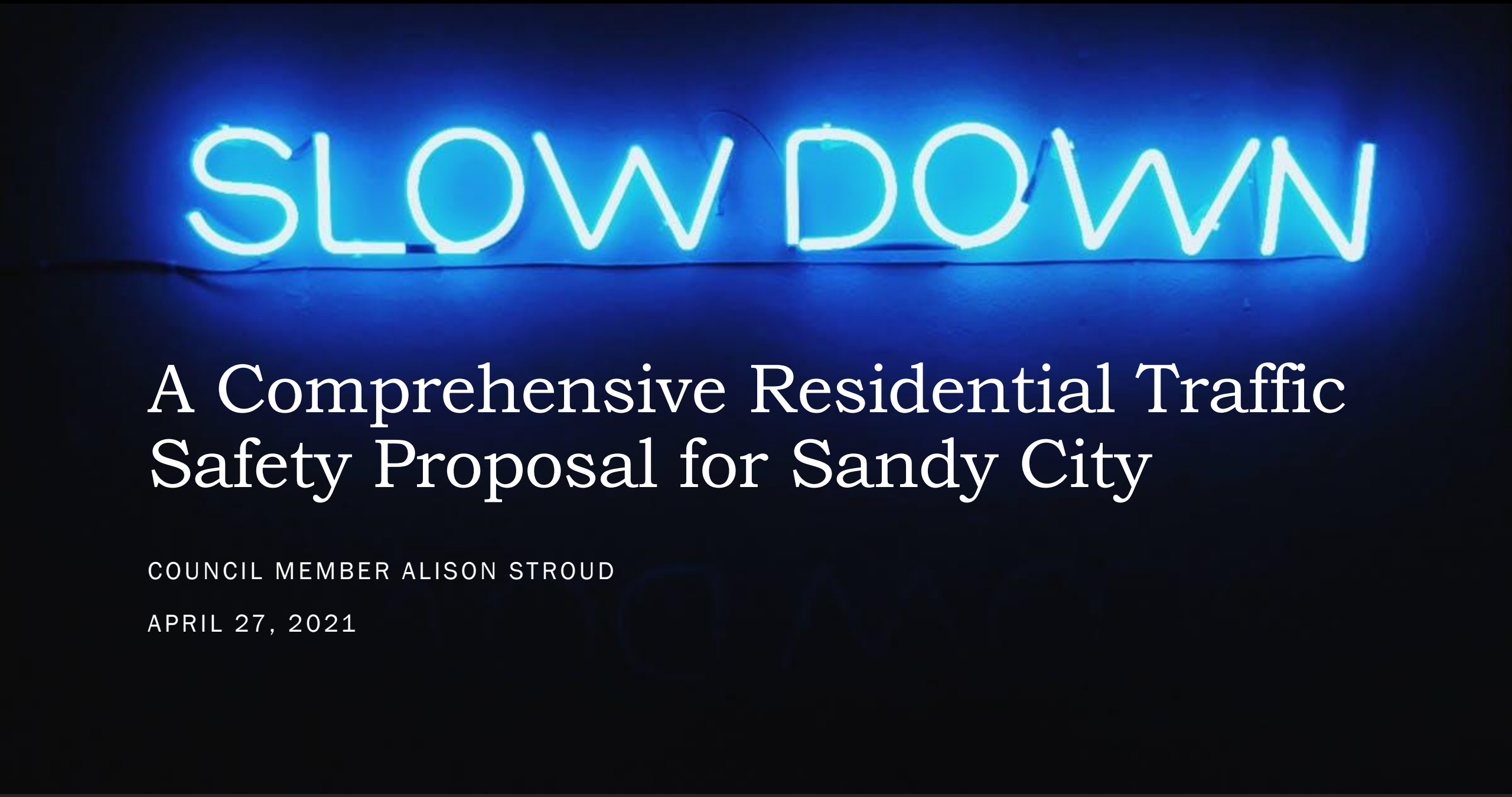


A Comprehensive Residential Traffic Safety Proposal for Sandy City

COUNCIL MEMBER ALISON STROUD

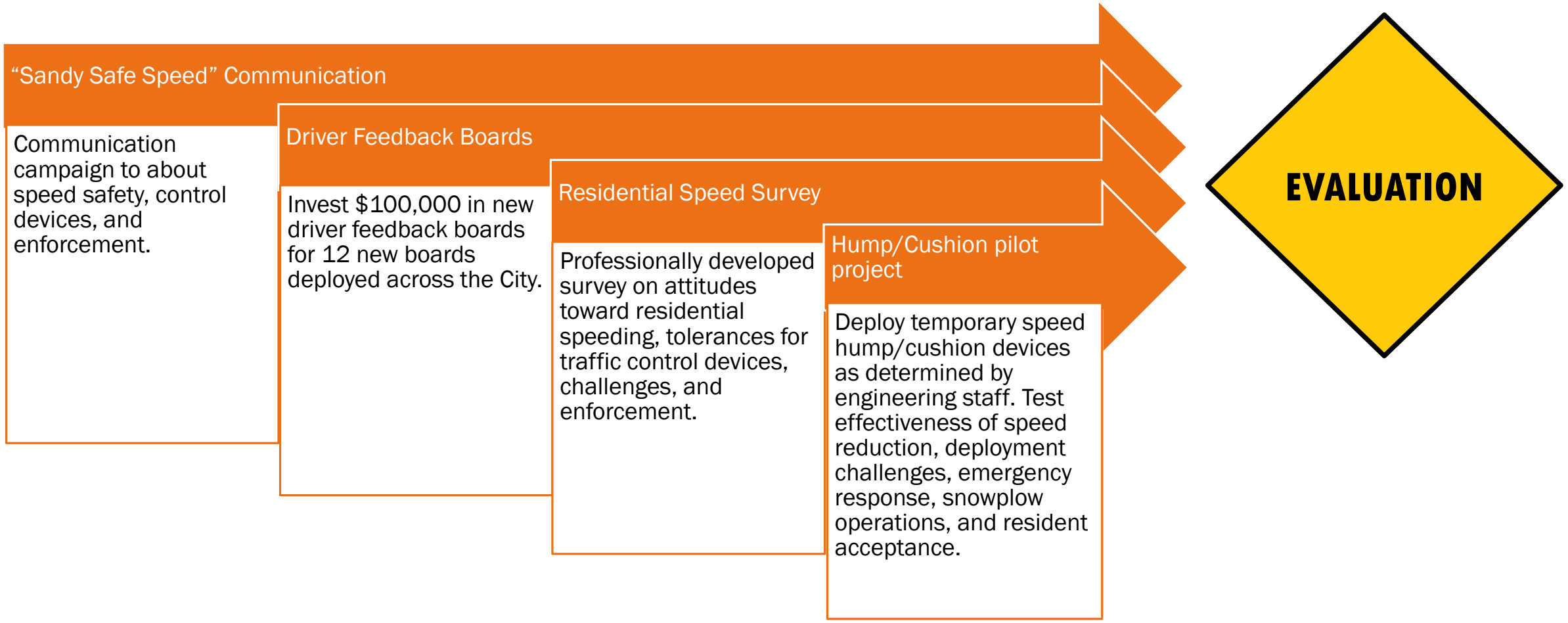
APRIL 27, 2021

Speed Problems

- Discussed concerns with Council on 11/17/20
- Common resident complaint
- Possibilities brought up by council
  - Need for hard data to define where challenges are in residential areas
  - Work group including PD, Transportation, Schools
  - Lower speed limits
  - More driver feedback boards
  - Focused temporary or permanent additional enforcement
  - Parking unused patrol cars on residential streets
  - Tactical urbanism
  - Tap into neighbors to know where to dedicate resources
  - University research and/or Zero Fatalities

- Primary factor in most vehicle accidents
  - As speed goes up, time to respond goes down

- Speeding Data Reviewer:
  - https://sandycity.maps.arcgis.com/apps/webappviewer/index.html?id=2650fb58eb8f4df9a91f747f9d0d22ed
  - 81% of Sandy road miles are 30 mph or less
  - 1,627 Speeding violation issued in 25 and 30 mph zones between January 2018 and October 20


“Sandy Safe Speed” Communication
Communication campaign to about speed safety, control devices, and enforcement.
Driver Feedback Boards
Invest $100,000 in new driver feedback boards for 12 new boards deployed across the City.
Residential Speed Survey
Professionally developed survey on attitudes toward residential speeding, tolerances for traffic control devices, challenges, and enforcement.
Hump/Cushion pilot project
Deploy temporary speed hump/cushion devices as determined by engineering staff. Test effectiveness of speed reduction, deployment challenges, emergency response, snowplow operations, and resident acceptance.
EVALUATION

Overview

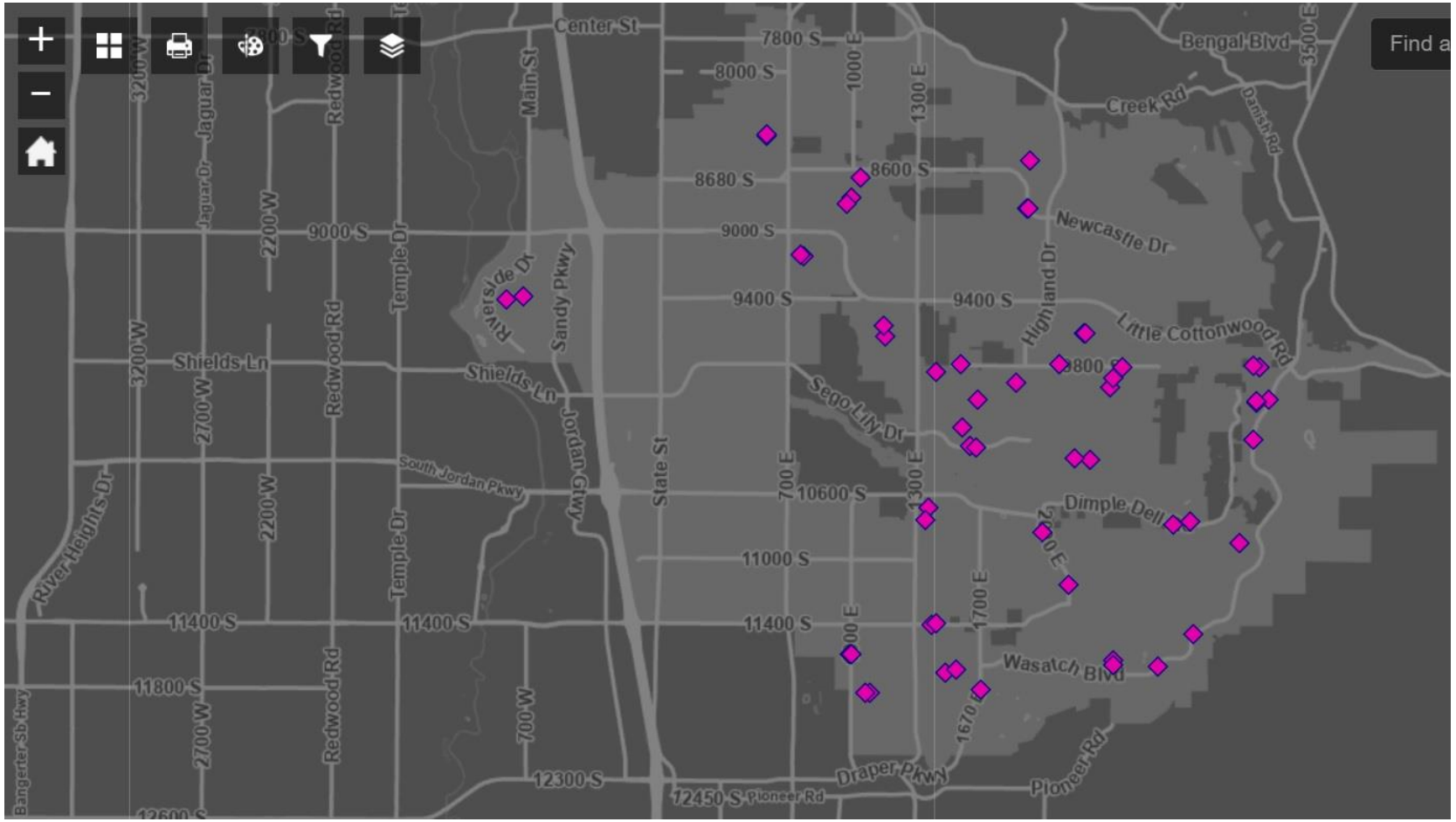
PHASE 1

- “Sandy Safe Speed” focused communication campaign
- Utilize City/Council platforms to remind people to slow down
  - Augment w/ PSAs, videos, crash data, enforcement data
- Announce other phases of campaign
  - Resident survey
  - Investment and installation of driver feedback boards
  - Pilot project on speed humps

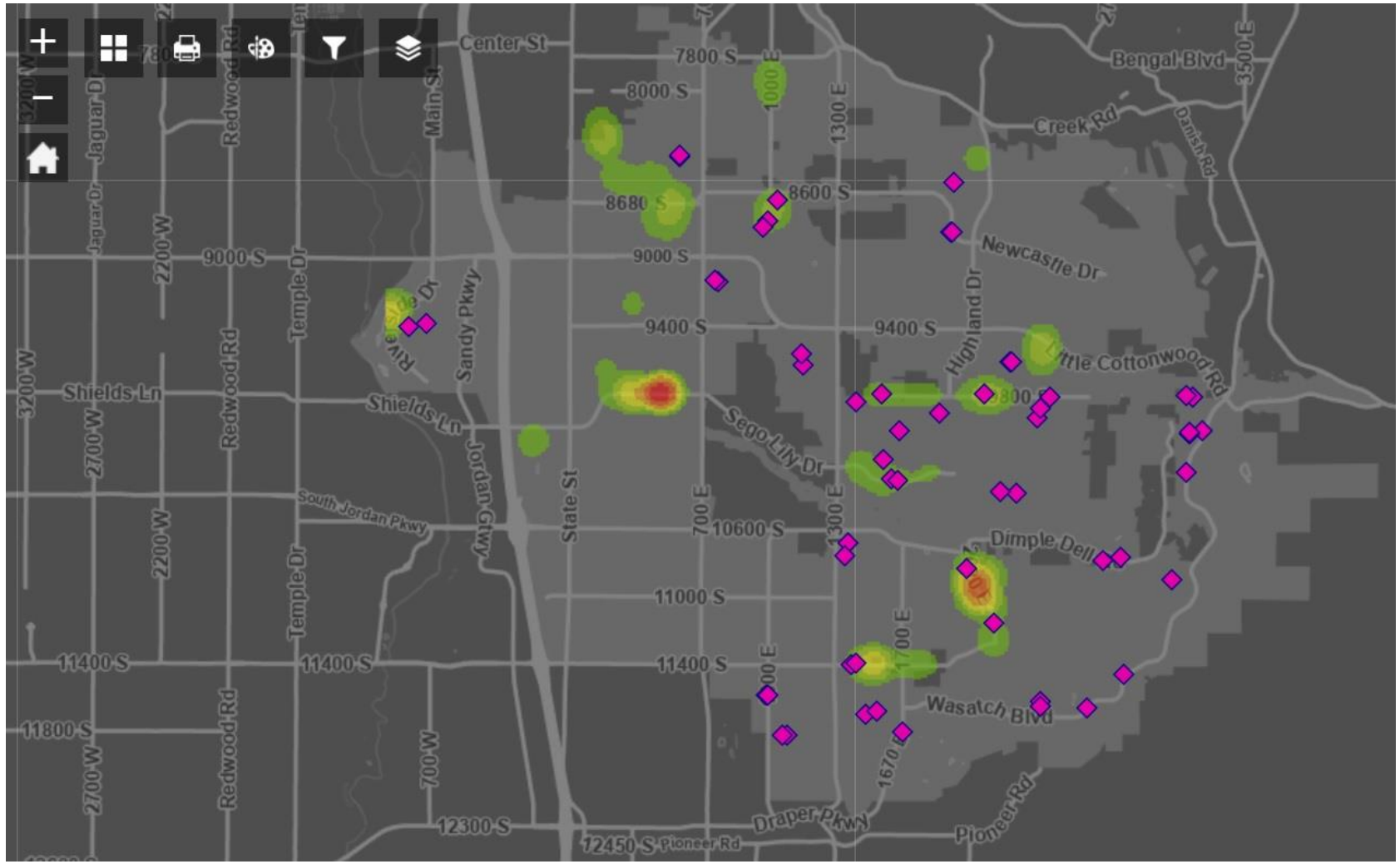
PHASE 2

- Invest in additional Driver Feedback Boards
  - $80,000 buys 10 additional boards (5 pairs)
    - Include in FY 2021-22 Budget
  - Currently $100,000 in FY 2020-21
    - Retain for FY 2021-22
  - Total new Driver Feedback Board investment: $180,000

Location of current driver feedback boards



Driver feedback boards with 25-30 mph hotspots



PHASE 3

- Residential Speed Survey
  - A platform for communicating about safe speeds in residential areas
  - Gauge resident acceptance of traffic control and enforcement mechanisms
  - Highlight geographic areas of concern
  - Possibly reference stats from public safety survey
  - Engage Qualtrics to develop proposal and cost estimate
- What we know…2020 Public Safety Survey
  - 60% of residents satisfied with traffic enforcement
  - 21% no opinion
  - 20% dissatisfied

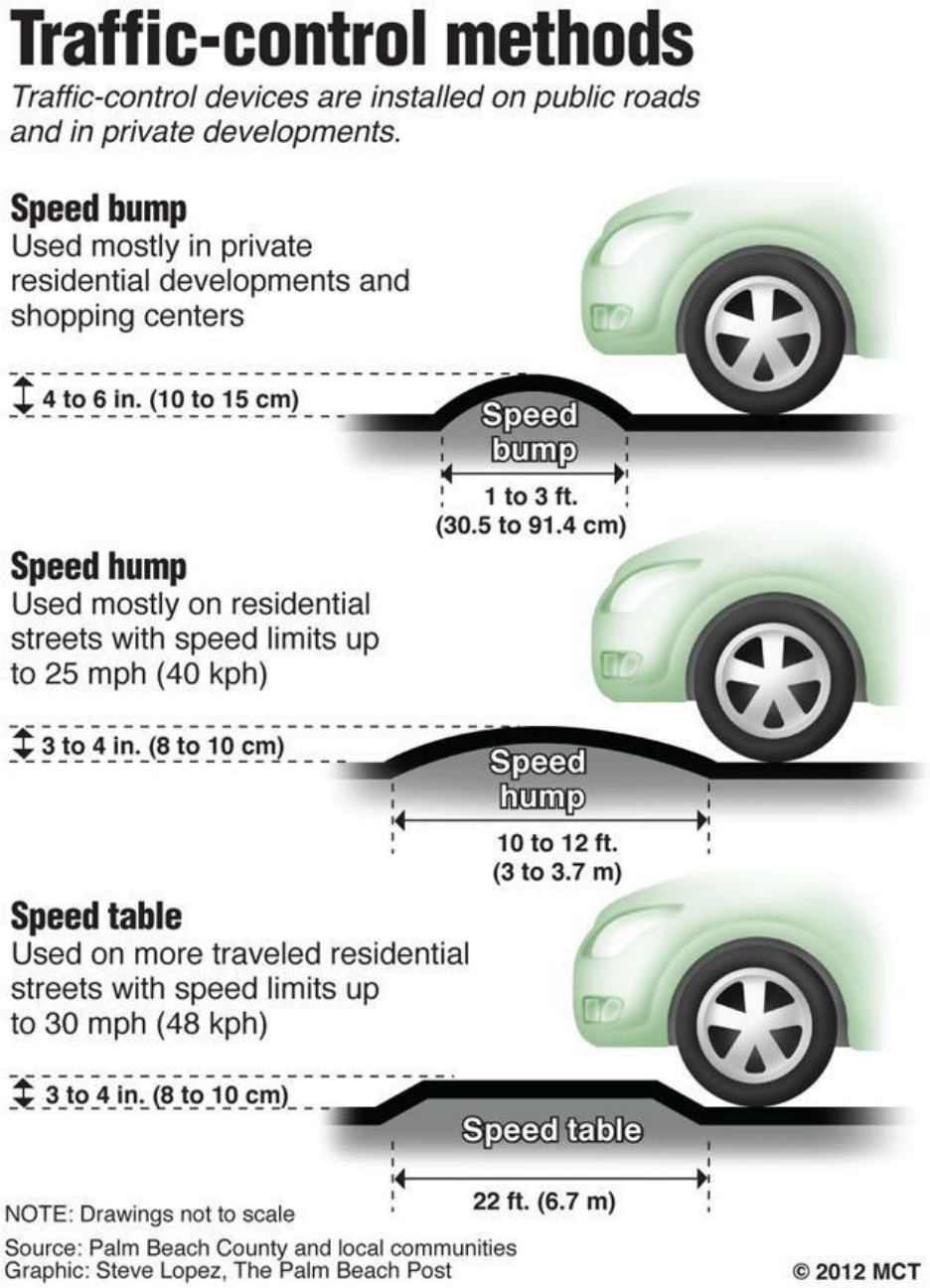
PHASE 4

- Speed hump/cushion pilot project
  - Test effectiveness of temporary speed humps/cushions as a traffic control devices in residential areas
  - Monitor emergency services response times
  - Consider test areas for snowplow operation OR remove devices for winter season
  - Monitor costs of deployment v. effectiveness
  - Options:
    - End pilot project
    - Consider expanding test sites
    - Consider permanent installations (asphalt rather than rubberized devices)

“I thought Sandy doesn’t do speed bumps?”

~~Bumps~~, Humps, Tables, and Cushions

What's the difference?



Speed Hump Description

- Rounded (vertically along travel path) raised areas of pavement typically 12 to 14 feet in length
- Often placed in a series (typically spaced 260 to 500 feet apart)
- Sometimes called road humps, tables, cushions, or undulations

Many residential streets have ample right-of-way for two lanes of travel plus parking, resulting in higher than desired speeds.

Application

- Appropriate for residential local streets and residential/neighborhood collectors
- Not typically used on major roads, bus routes, or primary emergency response routes
- Not appropriate for roads with 85th-percentile speeds of 45 mph or more
- Appropriate for mid-block placement, not at intersections
- Not recommended on grades greater than 8 percent
- Work well in combination with curb extensions
- Can be used on a one-lane one-way or two-lane two-way street

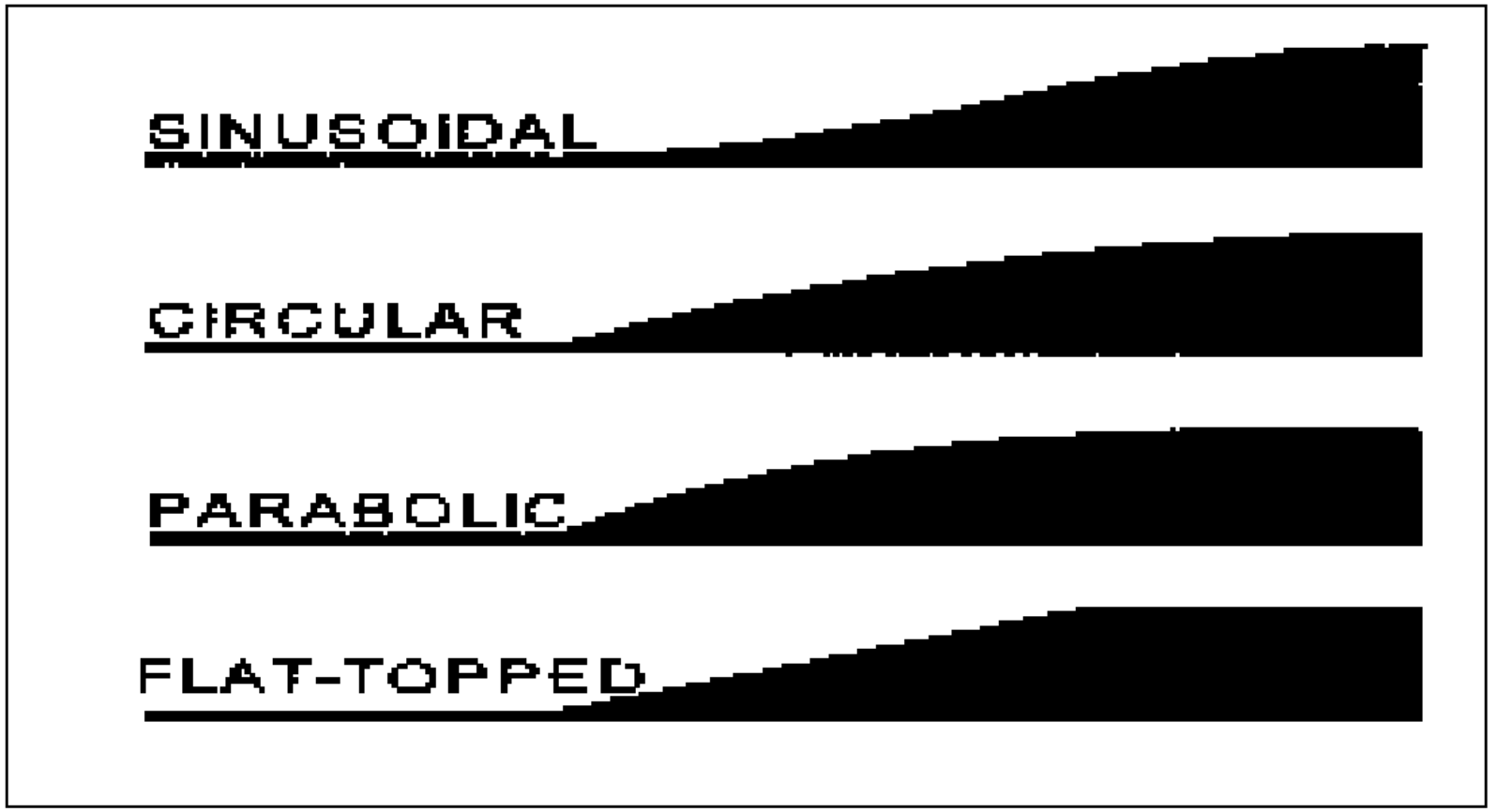
(Source: City of Boulder, Colorado)

(Source: PennDOT Local Technical Assistance Program)

Design & Installation

- ITE recommended practice - “Guidelines for the Design and Application of Speed Humps”
- Typically, 12 to 14 feet in length; other lengths (10, 22, and 30 feet) reported in practice in U.S.
- Speed hump shapes include parabolic, circular, and sinusoidal
- Typically spaced no more than 500 feet apart to achieve an 85th percentile speed between 25 and 35 mph
- Hump heights range between 3 and 4 inches, with trend toward 3 - 3 ½ inches maximum
- Often have associated signing (advance warning sign before first hump in series at each hump)
- Typically have pavement markings (zigzag, shark's tooth, chevron, zebra)
- Taper edge near curb to allow gap for drainage
- Some have speed advisories
- Need to design for drainage, without encouraging means for motorists to go around a hump

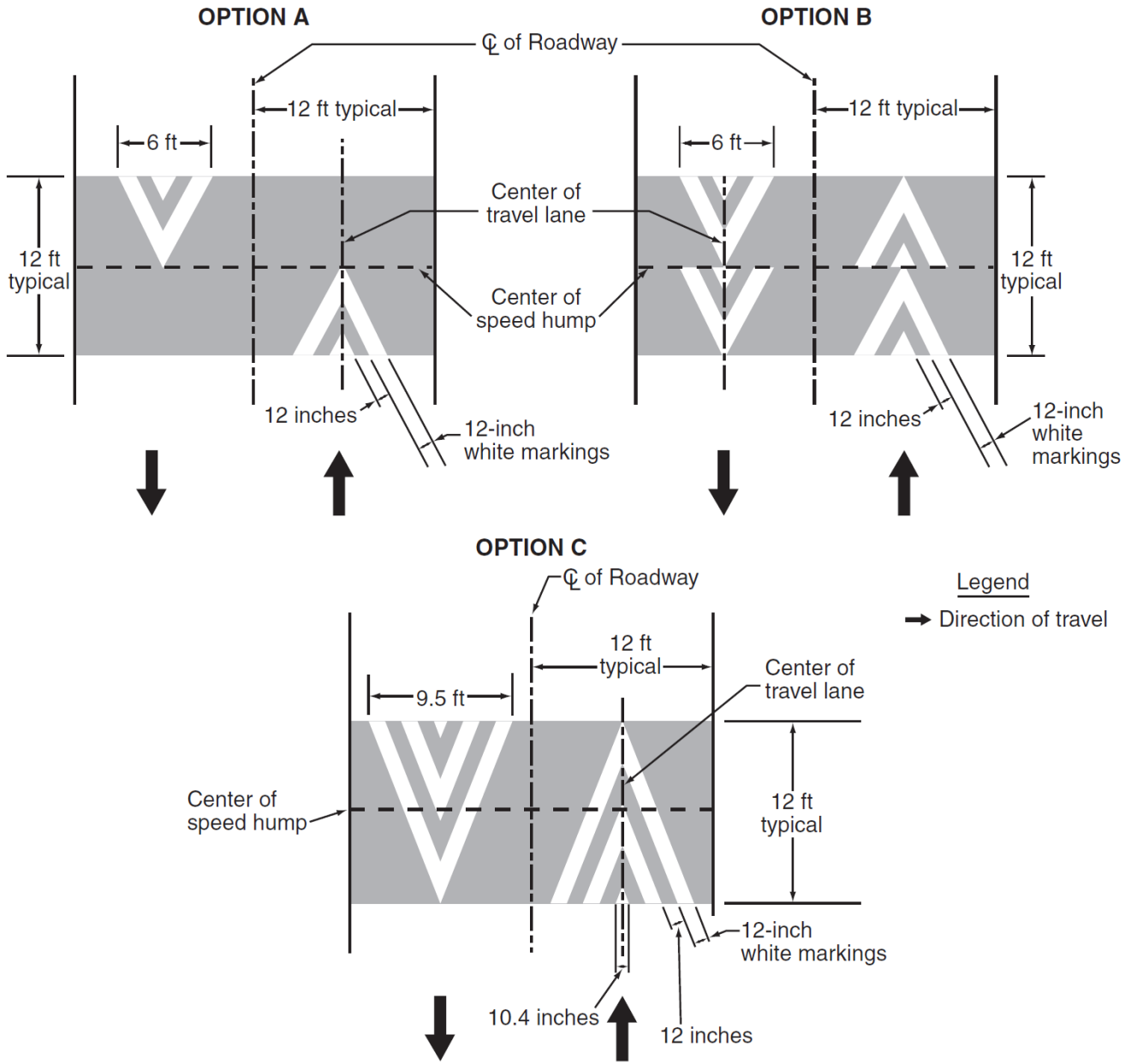
Design



Signage & Pavement Markings

U.S.Department of Transportation
Federal Highway Administration

Manual of Uniform Traffic Control Devices



Potential Impacts Summary

- No impact on non-emergency access
- Average speeds between humps reduced between 20 and 25 percent
- Speeds typically increase approximately 0.5 to 1 mph midway between humps for each 100 feet Beyond the 200-foot approach and exit of consecutive humps
- Traffic volumes diversion estimated around 20 percent; average crash rates reduced by 13 percent
- Impacts to ease of emergency-vehicle throughput
- Approximate delay between 3 and 5 seconds per hump for fire trucks and up to 10 seconds for ambulances with patients
- $2,500 to $4,500

Speed Reduction

Changes in 85th percentile speed

Jurisdiction	Design	Before (mph)	After (mph)	Difference (mph)	Change (%)
Austin, Texas**	12' humps	36 to 40	26 to 31	-5 to -12	-14 to -32
	22' tables	35 to 40	28 to 31	-6 to -9	-17 to -24
Bellevue, Washington**	12' humps	33 to 39	25 to 27	-6 to -12	-18 to -31
	22' tables	34 to 35	29 to 31	-3 to -6	-9 to -17
Berkeley, California**	12' humps	25 to 36	20 to 28	-3 to -11	-12 to -34
	22' tables	31	25	-6	-19
Boulder, Colorado**	12' humps	28 to 31	25	-3 to -8	-11 to -24
Charlotte, North Carolina**	22' tables	31 to 40	27 to 37	0 to -9	0 to -23
Dayton, Ohio**	12' humps	32 to 34	25 to 32	0 to -9	0 to -26
Eugene, Oregon**	14' humps	32 to 34	27	-5 to -7	-16 to -21
Ft. Lauderdale, Florida**	12' humps	35	25	-10	-29
	22' tables	36 to 38	29 to 33	-4 to -9	-11 to -24
Gwinnett County, Georgia**	22' tables	35 to 47	26 to 34	-6 to -14	-15 to -32
Howard County, Maryland**	12' humps	38 to 40	28	-10 to -12	-26 to -30
	22' tables	35 to 43	28 to 36	0 to -14	0 to -33
Montgomery County, Maryland**	12' humps	32 to 43	25 to 34	-3 to -12	-9 to -30
	22' tables	33 to 40	29 to 34	-1 to -8	-3 to -22
Omaha, Nebraska**	12' humps	34 to 45	27 to 37	0 to -11	0 to -27
San Diego, California* *	12' humps	34 to 38	25 to 30	-6 to -13	-17 to -34
San Jose, California**	12' humps	32 to 36	20 to 26	-10 to -13	-28 to -39
Sarasota, Florida**	12' humps	29 to 35	21 to 28	-5 to -9	-17 to -27
	22' tables	42	25	-17	-41
Tucson, Arizona**	12' humps	26 to 45	19 to 33	+1 to -7	+4 to -42
Boca Raton, Florida**	12' humps	34 to 39	31 to 35	-3 to -4	-9 to -10
Kirkland, Washington**	12' humps	32 to 35	24 to 27	-7 to -10	-22 to -30
	14' humps	34 to 35	25 to 28	-7 to -9	-20 to -26
	22' tables	35	27	-8	-23
Las Vegas, Nevada**	12' humps	29 to 38	22 to 27	-6 to -16	-21 to -42
Minneapolis, Minnesota**	32' tables	31 to 33	29 to 31	0 to -4	0 to -12
Tampa, Florida**	12' humps	38 to 42	28 to 34	-6 to -12	-15 to -30
Thousand Oaks, Calififfornia**	12' humps	27 to 43	23 to 32	-4 to -11	-15 to -29
Sherbrooke, Quebec	—	47	37	-10	-21
Toronto, Ontario**	—	27 to 29	24	-4 to -6	-11 to -17
Ottawa, Ontario**	—	27 to 28	21	-6 to -7	-22 to -25
Victoria, British Columbia	—	35	23	-12	-34
Seattle, Washington**	12' humps	35 to 38	29 to 31	-4 to -7	-11 to -18
	22' tables	40	36	-4	-10
Cobb County, Georgia	22' tables	43	34	-9	-21
San Antonio, Texas**	12' humps	35 to 40	26 to 37	-3 to -12	-7 to -31
Manatee County, Florida**	—	27 to 45	19 to 32	-1 to -11	-2 to -40
Portland, Oregon**	14' humps	29 to 37	23 to 28	-3 to -10	-9 to -30
Phoenix, Arizona**	12' humps	26 to 29	20	-6 to -9	-23 to -31
Iowa City, Iowa**	—	32 to 33	27 to 34	+1 to -5	+3 to -16
Bloomington, Ilinois**	—	21 to 40	18 to 26	-3 to -14	-14 to -35
Virginia DOT	—	33	21	-12	-35
	—	36	23	-13	-37

* Sources: Ewing, 2000; Clement, 1983; Urban et al., 1999; Marek and Walgren, 1998; Ballard, 1998; Knapp, 2000; Transportation Association of Canada, 1998; Ripley and Klingaman, 1998; City of Charlotte, 2001; Dittberner, 1999; Aburahmah and Al Assar, 1998; City of Bloomington, 2001; Arnold and Cottrell, 1999.

** Values were summarized from a table of projects within that jurisdiction.

Traveling 35 mph in a 25 mph zone is a **40%** increase in speed…

This would be equivalent to traveling 98 mph in a 70 mph zone.

Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Speed
July 2014

This chart summarizes studies about engineering countermeasures used to manage speeds. Studies where an increase in speed were reported are also shown since this information is also relevant in selection of countermeasures.

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Vertical Deflections Within the Roadway																	
Speed Hump—rounded, raised area placed across the roadway, typically 12 to 14 feet long	pedestrian	urban	local	1 (1999)	178	—	48 to 11544	46 to 110443	—	—	—	35	27	-8	—	various	
	pedestrian	urban	local	2 (2005)	7	—	400 to 4362	401 to 3384	—	—	—	32	26	-6	—	VA	
	pedestrian	urban	local	3 (2000)	4	—	475 to 1506	433 to 1343	—	—	—	36	31	-5	—	WA	
	pedestrian	urban	local	4 (2005)	1	25	1300	—	22	23	1	37	29	-8	1-mon	FL	
	pedestrian	rural/urban	local	5 (2002)	3	25	218 to 746	—	24	18	-6	28	22	-6	1-mon	IA	
	pedestrian	urban	—	1 (1999)	4	—	—	—	—	—	—	36	29	-7	—	—	with speed table
	pedestrian	urban	—	1 (1999)	2	—	2456 to 3685	2593 to 2931	—	—	—	38	25	-13	—	—	with choker

U.S. Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
Investment in roadway safety saves lives
http://safety.fhwa.dot.gov

Countermeasure	Safety Focus	Area	Roadway	Reference	Sites	Speed Limit (mph)	Volume (vpd)		Mean Speed (mph)			85th %tile Speed (mph)			Period	Location	Notes
							Before	After	Before	After	Change	Before	After	Change			
Speed Cushion—raised area typically 6 to 7 feet wide that allows most emergency vehicles to straddle the hump	pedestrian	urban	—	1 (1999)	1	—	3323	2321	—	—	—	35	28	-7	—	various	
	pedestrian	—	—	2 (2005)	2	—	1042 to 1556	693 to 1563	—	—	—	31 to 37	26 to 30	-5 to -7	—	VA	
Speed Table—a long speed hump typically 22 feet in length with a flat section in the middle and ramps on the ends	pedestrian	urban	—	1 (1999)	72	—	198 to 14500	242 to 14400	—	—	—	37	31	-6	—	various	
	pedestrian	urban	residential	6 (2003)	19	—	198 to 2102	364 to 2061	—	—	—	38	29	-9	—	GA	
	pedestrian	rural community	2-lane	7 (2007)	1	—	1200	—	27	24	-3	33	29	-4	1-mon	IA	
	pedestrian	rural community	local	5 (2002)	3	25	218 to 746	—	24	18	-6	28	22	-6	1-mon	IA	removable speed table
	pedestrian	urban	—	1 (1999)	2	—	6500 to 8440	6400 to 6780	—	—	—	37	29	-8	—	—	with center island
	pedestrian	urban	residential	8 (2001)	1	30	1600	—	34	23	-11	38	27	-11	within 12-mon	MN	raised crosswalk
Raised Intersection—a raised plateau, with ramps on all approaches, where roads intersect	pedestrian	urban	—	1 (1999)	2	—	—	—	—	—	—	37	38	1	—	various	
	pedestrian	urban	local	9 (2004)	1	—	—	—	—	—	—	30	30	0	12-mon	NY	

Case Studies

Salt Lake City

Problem

The effectiveness of speed humps, 14 ft (4.3 m) wide by 3.5 in (8.9 cm) high, and tables, 22 ft (6.7 m) wide, on 12 streets in Salt Lake City, Utah was investigated. Mean and 85th percentile spot speeds, speed limit compliance, motor-vehicle crashes, and resident opinions were considered.

Method

Spot speeds were collected at 18 “between-hump” locations. Motor-vehicle crash data were obtained for “before” and “after” periods of equal duration. A total of 436 residents were surveyed; 184 responded.

Results

The mean and 85th percentile speeds decreased at 14 and 15 locations, respectively. The average reduction in the 85th percentile speed (3.4 mph or 5.4 km/h) was significant in flat and rolling terrain, but not on uphill or downhill segments. The number of sites with 50% speed limit compliance increased from 4 to 12. The number of motor-vehicle crashes decreased from 10 to 9; the change was not significant, but injury crashes decreased from five to one. Regarding the residents, 30% were positive, 25% were negative, and 45% offered suggestions, some of which were conflicting.

Iowa

- Iowa Department of Transportation
- Results for two rural Iowa cities: Atlantic and LeClaire

“Both the speed hump and the speed table were effective in reducing mean speeds at the device and immediately downstream.”

“The results of the peak speed analysis indicated that the temporary speed hump and temporary speed table both effectively reduced vehicles traveling at higher speeds.”

“An evaluation of the 85th percentile speeds indicated that both the temporary speed hump and temporary speed table effectively reduce 85th percentile speeds at the location of the device and for at least the length of data collection downstream (about 400 feet).”

Emergency Services

Speed Cushion

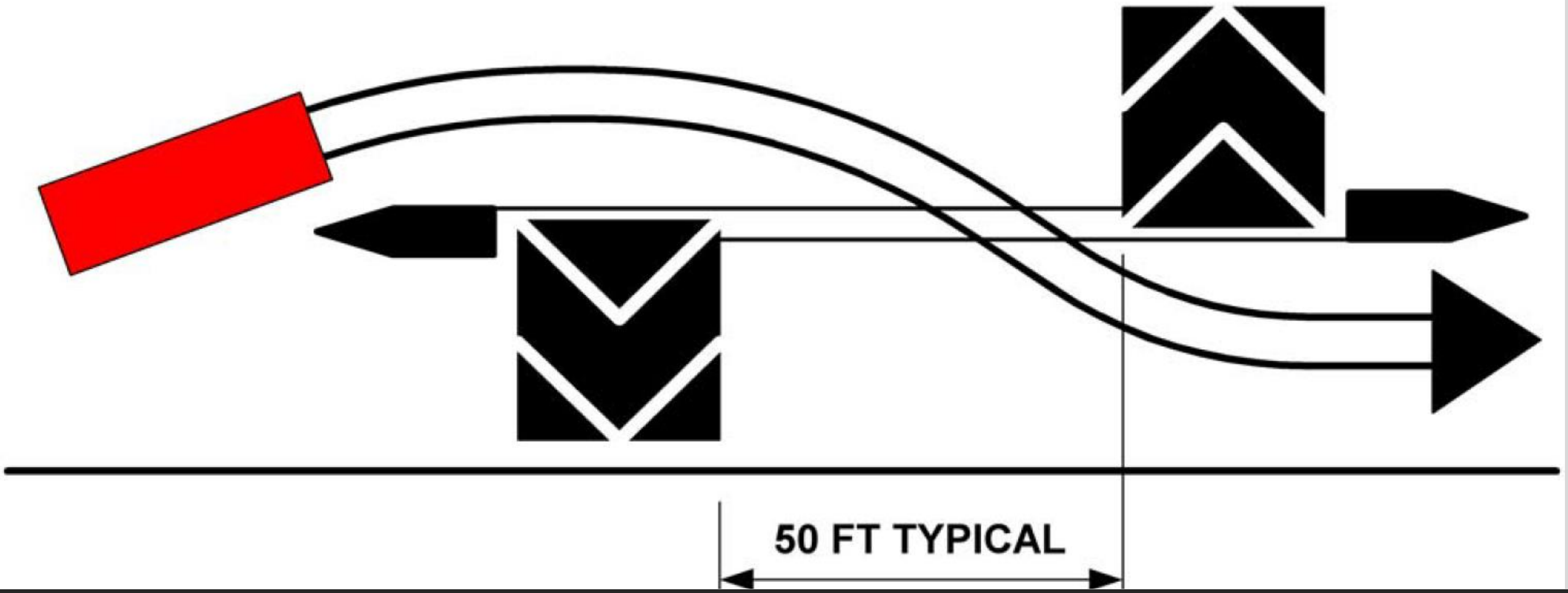
Speed cushions are either speed humps or speed tables that include wheel cutouts to allow large vehicles to pass unaffected, while reducing passenger car speeds. They can be offset to allow unimpeded passage by emergency vehicles and are typically used on key emergency response routes.

Speed cushions extend across one direction of travel from the centerline, with longitudinal gap provided to allow wide wheel base vehicles to avoid going over the hump.

Alternative designs mitigate emergency services delays

In a 2000 study by Bunte investigated the effects of the speed cushion on the response times in Austin Texas. Results showed that speed cushions had very little impact, if any, on increasing response times of emergency response vehicles. Average delay times were less than a second, except for the vehicle that was transporting a critically ill/injured patient which had an average delay of 4.84 seconds on total travel time. Overall, the study found that speed cushions are less detrimental to negatively impacting emergency response times than speed humps.

- From A Comparative Study of Speed Humps, Speed Slots and Speed Cushions by LaToya Johnson and A.J. Nedzesky



SUMMARY from the Portland Oregon Department of Transportation study on Offset Speed Tables:
From the outset PDOT has had concerns that efforts to nullify the effect of speed humps for emergency response, as with speed cushions, would also render them ineffectual at reducing speeding. Testing conducted by PDOT and the Portland Fire Bureau successfully showed the ability of the offset speed table design to reduce emergency vehicle delay, especially the largest trucks that normally suffer the greatest delay. A reduction in maximum delay from 4.8 seconds at standard speed tables where the target response speed is 30 mph to the typical 2 second delay at offset speed tables represents a better than 50% reduction in emergency vehicle delay. PDOT is confident that the offset speed table will continue to reduce speeding as effectively as standard speed tables.

Snowplow Operations

Presentation to the Transportation Association of Canada:

A consultation with municipalities that had speed humps installed for many years reported that winter conditions and winter maintenance generally do not cause major problems for the majority of municipalities studied: speed humps maintain their ability to control speed, exhibit little deterioration and cause few problems for snow removal operations. This has also been reported by a variety of Canadian provinces and U.S. states. Certain precautions must be taken, however.

The design of the speed hump plays a significant role. A progressive slope with a sinusoidal shape is easier for snow removal vehicles to negotiate. Operators must adapt their methods, properly positioning the blade of their equipment and taking the time to remove snow from the areas on and around the speed hump where it tends to accumulate. The blade must be raised slightly in order to avoid damaging speed humps, but care must also be taken to remove all of the snow and ice that has built up. Removing snow from speed humps therefore requires adjusted methods and possibly additional time.

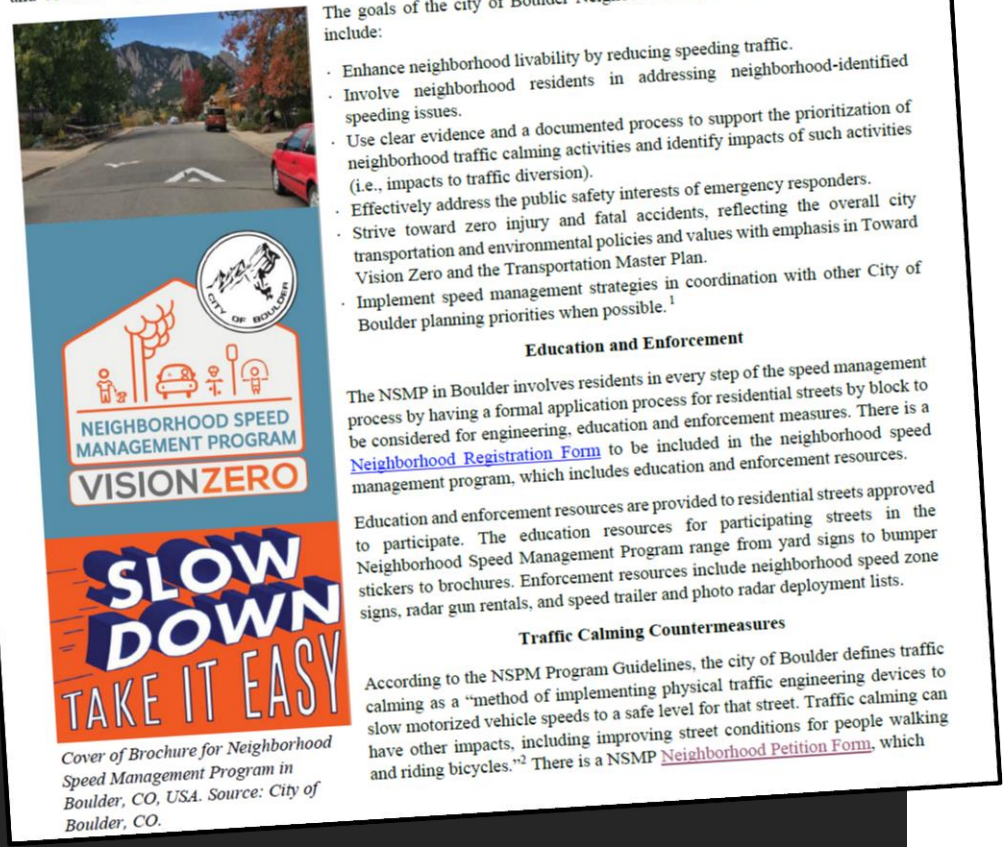
Snow removal for speed cushions is more difficult because of the space between the cushions and the possibility that snow can accumulate.

Boulder, CO

City of Boulder, CO, USA creates Neighborhood Traffic Calming Program

Background

The city of Boulder, Colorado Transportation Division launched a Neighborhood Speed Management Program (NSMP) geared toward slowing speeds on residential streets in 2018. The city continues to implement the program, which also includes education, enforcement and evaluation to calming traffic on any road classified as a local or collector street in Boulder city limits. The Neighborhood Speed Management Program is incorporated in both the Transportation Master Plan and Vision Zero goals in the city of Boulder, to ensure the program is recognized and achievable.



Cover of Brochure for Neighborhood Speed Management Program in Boulder, CO, USA. Source: City of Boulder, CO.

The goals of the city of Boulder Neighborhood Speed Management Program include:

- Enhance neighborhood livability by reducing speeding traffic.
- Involve neighborhood residents in addressing neighborhood-identified speeding issues.
- Use clear evidence and a documented process to support the prioritization of neighborhood traffic calming activities and identify impacts of such activities (i.e., impacts to traffic diversion).
- Effectively address the public safety interests of emergency responders.
- Strive toward zero injury and fatal accidents, reflecting the overall city transportation and environmental policies and values with emphasis in Toward Vision Zero and the Transportation Master Plan.
- Implement speed management strategies in coordination with other City of Boulder planning priorities when possible.[1]

Education and Enforcement

The NSMP in Boulder involves residents in every step of the speed management process by having a formal application process for residential streets by block to be considered for engineering, education and enforcement measures. There is a Neighborhood Registration Form to be included in the neighborhood speed management program, which includes education and enforcement resources.

Education and enforcement resources are provided to residential streets approved to participate. The education resources for participating streets in the Neighborhood Speed Management Program range from yard signs to bumper stickers to brochures. Enforcement resources include neighborhood speed zone signs, radar gun rentals, and speed trailer and photo radar deployment lists.

Traffic Calming Countermeasures

According to the NSPM Program Guidelines, the city of Boulder defines traffic calming as a "method of implementing physical traffic engineering devices to slow motorized vehicle speeds to a safe level for that street. Traffic calming can have other impacts, including improving street conditions for people walking and riding bicycles."[2] There is a NSMP Neighborhood Petition Form, which

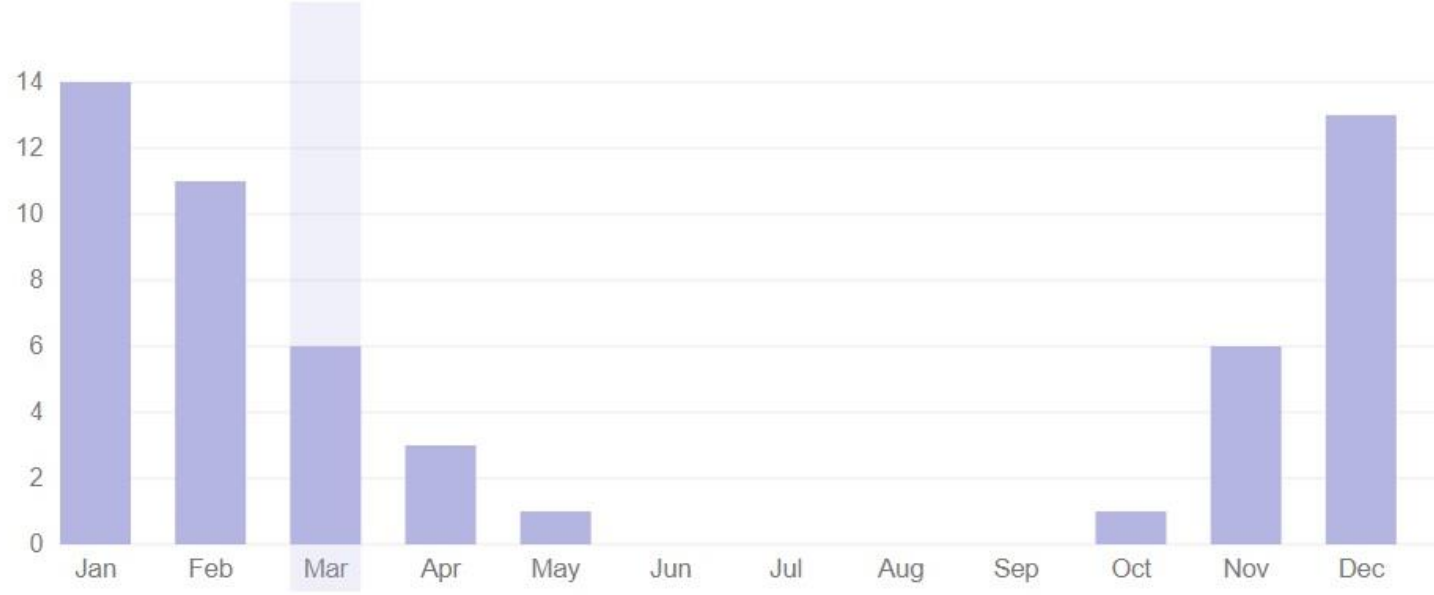
Weather history for Boulder, Colorado

Average snowfall

March

6 days

Avg snowfall	5.61 in
Avg rainfall	1.46 in
Avg temps	56° / 29° F



Temperature | Rain | **Snow**

Current forecast · Radar map · Data from Weather Trends

Rubberized Speed Cushion

https://youtu.be/3l6S5rcdYhY

- Temporary/Removable
- Costs estimated from hundreds to a few thousand per device + installation
  - Small investment can result in sufficient test sites
- Installation is quick
  - Rosehill Speed Cushion Fitting In Less than 30 Minutes - Bing video
- Suggesting initial investment for test humps of $20,000
  - (in addition to the new $80k for driver feedback boards)

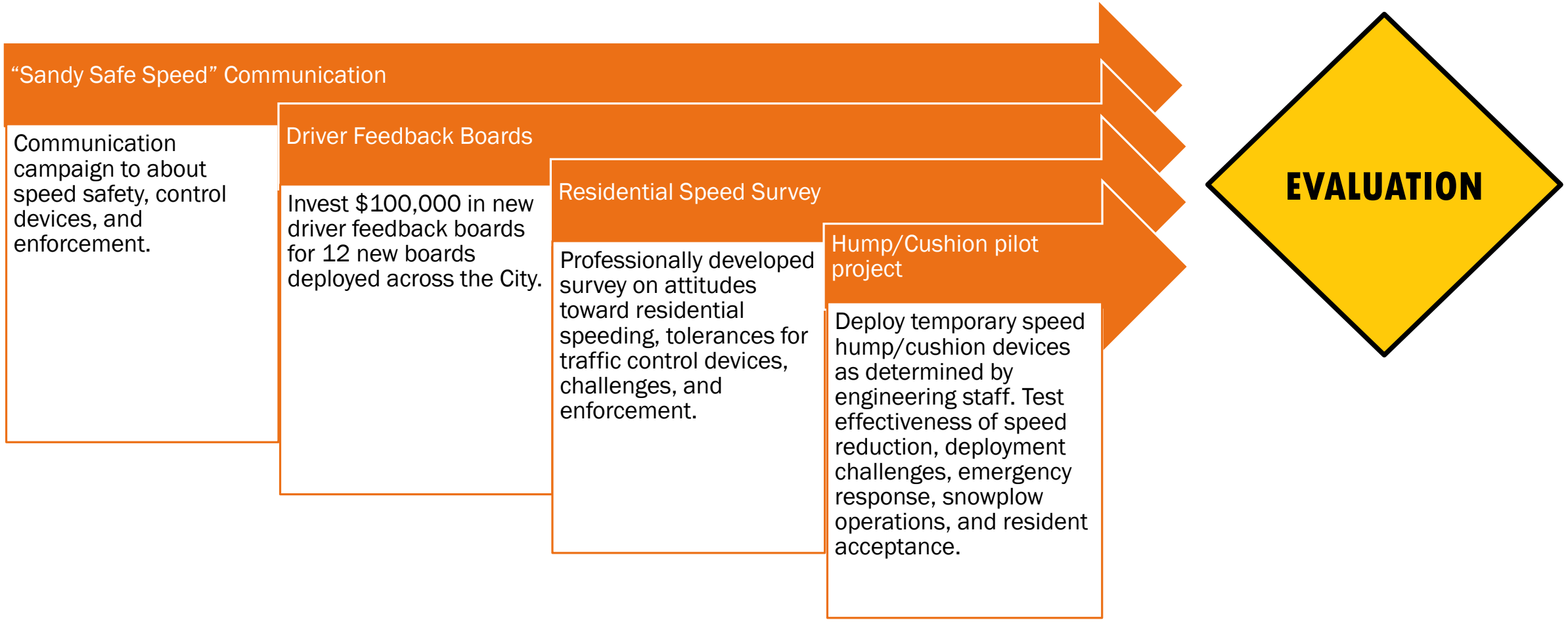
Speed Hump/Cushions Summary

ADVANTAGES

- Speed reduction
- Volume reduction
- Accident frequency reduction
- Accident severity reduction
- Crime reduction
- Cushions (versus humps) mitigate emergency response delays

DISADVANTAGES

- Potential emergency response delays
- Traffic diversion if alternate routes not considered
- Snow removal/maintenance adjustments
- Noise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EVALUATION

Discussion

The ASK/proposal

Policy Questions

1. Is residential speeding a problem?
2. Is this plan a comprehensive solution worth exploring?

If so,

- City Council and Administration Communications staff work to develop a communications/outreach/survey plan & costs.
- City Council to include appropriation for new driver feedback boards
- Council request the Administration form a work group with Transportation Engineering, Streets Maintenance/Plow Operators, Police Department, Fire Department, to evaluate potential devices, configuration, location, costs.

Possible Motions for 2nd reading

A. Motion to work with Administration to create an education and outreach program to educate residents on safe speeds.

B. Motion to approve $80k to be used for additional driver feedback boards.

- Council contingency as a possible funding source
- Include as FY 2021-22 budget amendment

C. Motion to approve $20K for temporary speed humps/tables.

- Council contingency as a possible funding source
- Include as FY 2021-22 budget amendment

Remember:
THIS IS A TEST

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