

LOCAL ROAD SAFETY PLAN, OCT 2019 PEER EXCHANGE

1 - 15,000 ADT or local nut. 15,000 ADT or local nut. 15,000 ADT no. 10. 25,000 ADT no. 10. 15,000 ADT or local nut.	O ADT non-local	
27,000 ADT or local 27,000 ADT non-local 27,001 - 15,000 ADT 7,001 - 15,000 ADT	1000 ADT or local 15,000 ADT 15,000 AD	
5 9 21 10 ntrol Violation other movements 4 3 3 8 ntrol Violation through movement 1 2 4 3 ntrol Violation turning movement 2 tering from minor facility 1 5 livre to Yield 1 hers 5 sestrian not in dedicated areas 5 safe Speed 5 safe Turning Left 5 safe Turning other 5 safe Turning other 5 safe Turning other	1 3 1 2 8 11 4 1 7 3 2 1 1 2 8 11 4 1 7 3 2 1 1 3 3 4 10 8 4 6 9 2 29 27 25 8 8 8 6 37 18 13 17 11 3 16 23 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2

CITY OF SAN DIEGO SSARP PRESENTED BY CITY TRAFFIC ENGINEERS JULIO FUENTES AND PHIL RUST



3 years – 24,000 total crashes (22/day on average)

12,000 property damage

12,000 injury crashes

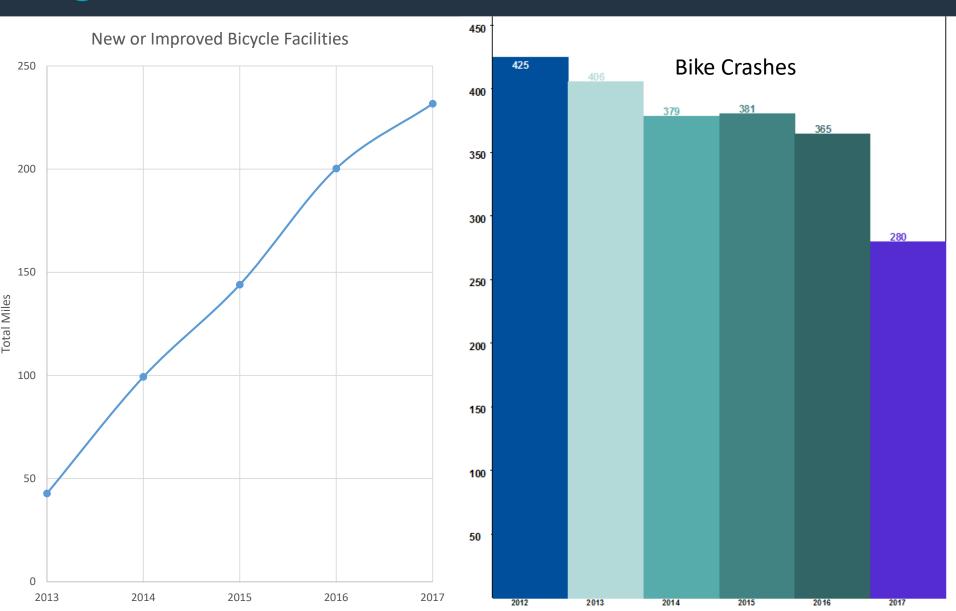
1,700 pedestrian crashes

1,350 bicycle crashes

541 fatal & severe crashes



SUCCESSFUL SYSTEMIC APPROACH



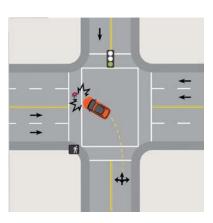


Crash Reports In

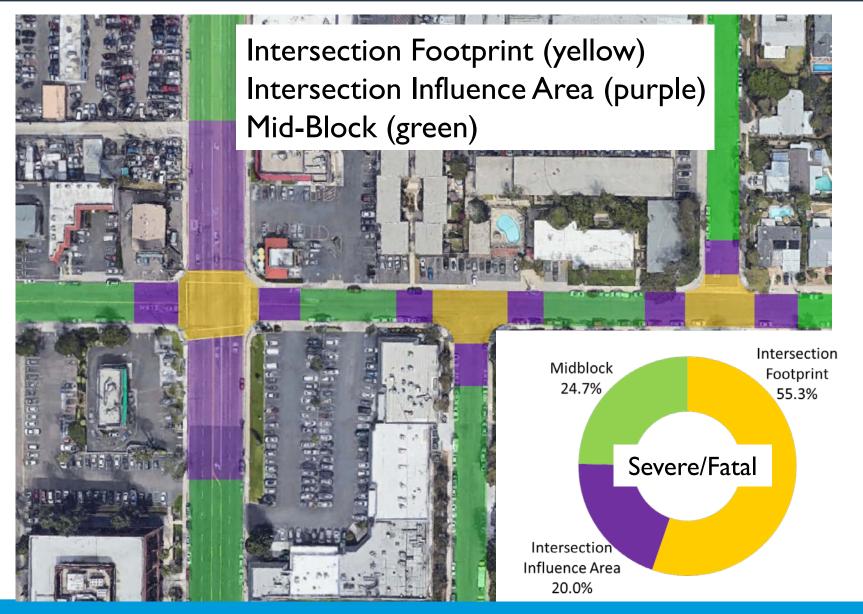


Statistical Analysis Hot Spots

		gnali				_	_			_		_				_	_			
	T		nes	2+2	4-	4+				_	4+	4			_	6+	_			
	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	7,001-15,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	25,000
Control Violation other movements		2	1	1			2	1	4	4	1		9	10	3			1	1	
Control Violation through movement		1	3			1	2	8	11	4		1	7	3	2		2	1	1	
Control Violation turning movement			1					3	3	1			1	2						Ξ
Entering from minor facility							1	1	1				3						1	
Failure to Yield																				
Crossing In Crosswalk At Intersection																				
Making Left Turn	1	5	12	5		6	8	14	29	14	7	3	33	14	1	1	1	1	6	
Proceeding Straight				1			2	3	3	3	1	1	4	1	2			1	3	
Making Right Turn			2			7	2	7	17	4	1	2	8	6	5	1		1	- 1	
Other		1	1				3	4	6	4			4	1	2			1		
Crossing In Crosswalk Not At Intersection	1								2					1						
Crossing Not In Crosswalk	2		2	1		1		3	4	2		1		2	1					
In Road			2			2			1				1							
Not In Road			1				1			2		1	2	1		1	1			
Not Stated	1		1	3			1		2	1			1							Т
Others	4	3	3	8		6	5	12	21	7	6		22	15	3		1		5	
Pedestrian not in dedicated areas	1	2	4	3	1	2	2	6	11	6			7	4	7					
Unsafe Speed				2		1	1	2	4	2			2	1			1		1	
Unsafe Turning Left		1	5			4	2	5	10	1			5	1	3	1		1		Ξ
Unsafe Turning other			1					1	2	1		1		2	3			1		
Unsafe Turning Right							1	2	1	2				1	1					
irand Total	10	18	39	24	1	30	35	75	133	59	16	10	110	66	33	4	7	8	19	1

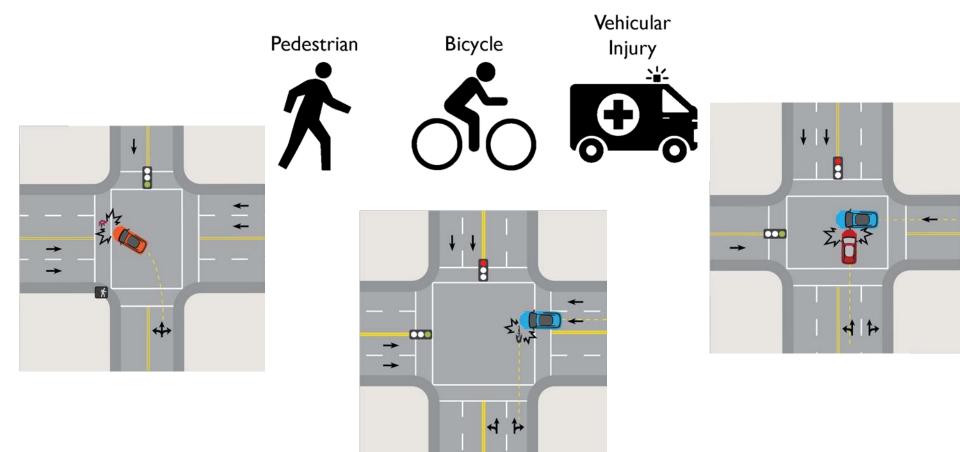








LOCAL ROAD SAFETY PLAN, OCT 2019 PEER EXCHANGE





Sample Matrix: Pedestrian Collisions within intersections

	Sig	nalize	ed In	terse	ctio	n																		Al	II-Way	y Stop						2-w	ay sto	ор									Oth	ers (Grand Tota
	The	u Lar	nes 2	+2	4-	4+2				4-	+4			Т	6+2				6	+4			6+6	Th	nru La	nes 2	-2	4+2		4+	4	Thru	ı Lane	es 2+:	2 4	1+2			\Box	4-	6+2			\neg	
		0 ADT non	15,000 A	1 - 25,000	71	∢ । ⋅	0 ADT non	7,001 - 15,000 ADT	1 - 23,000 00 ADT	1 8	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	>25,000 ADT	۵I.	<7,000 ADT non-local	7,001 - 15,000 ADT	>25,000 ADT	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	>25,000 ADT	>25,000 ADT	1 8	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	<7,000 ADT non-local	7,001 - 15,000 ADT	<7,000 ADT or local	<7,000 ADT non-local	<7,000 ADT or local	<7,000 ADT non-local	15 001 - 25 000 ADT	<7.000 ADT or local	8 8	7,001 - 15,000 ADT	15,001 - 25,000 ADT	>25,000 ADT	<7,000 ADT or local	- 15,000	00 ADT			
Control Violation other movements		_					_					-,	10	3				1				4	1 1	ı	1							1				1									4
Control Violation through movement		1	3			1	2	8 1	1 4	1	1	7	3	2		2	1 :	1 4	1	1	2	3		2	2	3			1			1	1					2							6
Control Violation turning movement			1					3	3 :	l l		1	2											1									1												
Entering from minor facility							1	1	1			3					- 1	1								1						1	1		1			5							1
Failure to Yield	5	9	21	10		16	19	34 6	5 3:	9	8	54	27	11	3	3	4 1	D 8	3	4	6	9	- 2	2 29	27	25		8 8	3 6			37 :	18 1	3 1	7 1	1 3	16	23	10	1		1		5	62
Others	4	3	3	8		6	5	12 2	1 :	6		22	15	3		1		5 3	3	2	5	3	1 3	3 14	6	3		1 1	. 2	1		31	8	9	4 1	8 3	1	9	2			3		3	24
Pedestrian not in dedicated areas	1	2	4	3	1	2	2	6 1	1 (;		7	4	7				- 2	2 1		1	3	1	4	6	2						14	6	3	3	3 1	4	9	3			2 1			12
Unsafe Speed				2		1	1	2	4 :	2		2	1			1		1						1	3	3	1				1	6	6	1				1				1		2	4
Unsafe Turning Left		1	5			4	2	5 1	.0	L		5	1	3	1		1					1		3	1				1			3	3		- 3	1	1		1						
Unsafe Turning other			1					1	2 :	L	1		2	3			1	- 1	1		1	1			2						1	8	2	2	1		2	2			1			1	3
Unsafe Turning Right							1	2	1 :	2			1	1								2			1							3	1	1	- 3	1									1
Grand Total	10	18	39	24	1	30	35	75 13	3 5	16	10	110	66	33	4	7	8 1	9 18	3 1	7	15	26	2 7	54	49	37	1	9 9	10	1	2 1	05	47 2	9 2	6 2	5 7	24	51	16	1	1	3 5		11	129

Signalized Intersect	Signalized Intersection														
Thru Lanes 2+2	4- 4+2	4+4	6+2												
<7,000 ADT or local <7,000 ADT non-local 7,001 - 15,000 ADT 15,001 - 25,000 ADT 7,001 - 15,000 ADT	7,000 ADT or loc 7,000 ADT non-loc,001 - 15,000 AD 5,001 - 25,000 AD	<7,000 ADT or local <7,000 ADT non-local 7,001 - 15,000 ADT 15,001 - 25,000 ADT >25,000 ADT	<7,000 ADT or local <7,000 ADT non-local 7,001 - 15,000 ADT 15,001 - 25,000 ADT												



Sample Matrix: Pedestrian Collisions within intersections

	Signalized	d Inter	section	ı															All-W	ay Stop	р				2-	way st	ор								Others	Grand To	tal
	Thru Lane	es 2+2	4	4+2			4+	4			6+2				6+4		6-	-6	Thru	Lanes 2	2+2	4+2		4+4	Th	nru Lar	nes 2+	2 4	+2			4-	6+2				
	<7,000 ADT or local <7,000 ADT non-local	1 - 25,000		<7,000 ADT or local	15,000 A	15,001 - 25,000 ADT	ا≯اۃ	<7,000 ADT non-local	01 - 25,000	>25,000 ADT	<7,000 ADT or local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	>25,000 ADT	- 15,000 A	15,001 - 25,000 ADT	7,001 - 15,000 ADT	>25,000 ADT	<7,000 ADT or local	1 41	52,	<7,000 ADT or local	7,001 - 15,000 ADT	<7,000 ADT non-local		Tnon	7,001 - 15,000 ADT	<7,000 ADT or local	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT >25,000 ADT	0 ADT or lo	7,001 - 15,000 ADT 15,001 - 25,000 ADT	>25,000 ADT			
Control Violation other movements	2	1 1		2	1	4	4 1		9 10	3		1	1			-	4 1	1		1					1			1									49
Control Violation through movement	1	3		1 2	8	11	4	1	7 3	2		2 1	. 1	4	1	2 :	3		2 2	2 3			1		1	1					2						69
Control Violation turning movement		1			3	3	1		1 2										1							1											13
Entering from minor facility				1	1	1			3				1							1					1	1		1			5						16
Failure to Yield	5 9 2	1 10		16 19	34	65 3	1 9	8 5	4 27	11	3	3 4	10	8	4	6 9	9	2 :	29 27	7 25		8 8	6		37	18	13 1	7 11	3	16 2	23 10	1		1	5		626
Others	4 3	3 8		6 5	12	21	76	2	2 15	3		1	5	3	2	5 :	31	3 :	14 (5 3		1 1	2	1	31	8	9	4 8	3	1	9 2			3	3		247
Pedestrian not in dedicated areas	1 2	4 3	1	2 2	6	11	6		7 4	7				2	1	1 :	3	1	4 6	5 2					14	6	3	3 3	1	4	9 3		2	1			125
Unsafe Speed		2		1 1	2	4	2		2 1			1	1						1 3	3 3	1				1 6	6	1				1		1		2		43
Unsafe Turning Left	1	5		4 2	5	10	1		5 1	3	1	1					1		3 :	1			1		3	3		1		1	1						54
Unsafe Turning other		1			1	2	1	1	2	3		1		1		1 :	1		- 2	2					1 8	2	2	1		2	2		1		1		37
Unsafe Turning Right				1	2	1	2		1	1							2		- 1	1					3	1	1	1									17
Gran	10 18 3	9 24	1	30 35	75 1	133 5	9 16	10 11	0 66	33	4	7 8	19	18	1 7	15 2	6 2	7 !	54 49	37	1	9 9	10	1	2 105	47	29 2	6 25	7	24 5	51 16	1	1 3	5	11	1	296

Collision Violation Categories (Enhanced by driver movement)

Control Violation other movements
Control Violation through movement
Control Violation turning movement
Entering from minor facility
Failure to Yield
Others
Pedestrian not in dedicated areas
Unsafe Speed
Unsafe Turning Left
Unsafe Turning other
Unsafe Turning Right
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LOCAL ROAD SAFETY PLAN, OCT 2019 PEER EXCHANGE

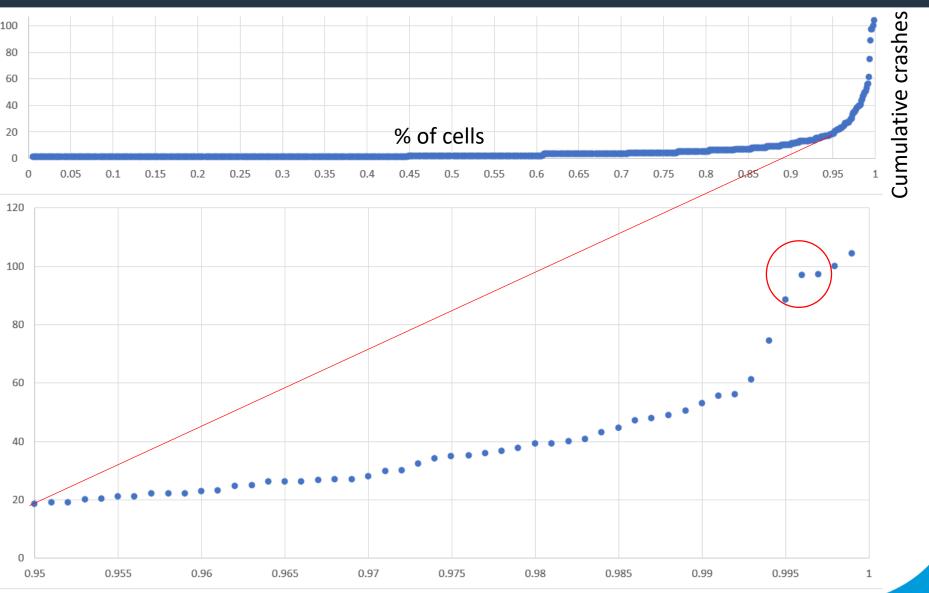
Concentrated under "Failure to Yield" violation

	Signalized Intersection All-	-Way Stop 2-way stop	Others Grand Total
			Others Grand Total
	Thru Lanes 2+2 4 4+2 4+4 6+2 6+4 6+6 Thr	ru Lanes 2+2	
	7-7,000 ADT non-local 7-7,000 - 15,000 ADT 7-7,001 - 15,000 ADT 7-7,001 - 15,000 ADT 7-7,000 ADT non-local	7,000 ADT non-loca 15,001 - 15,000 ADT 7,001 - 15,000 ADT or local 7,000 ADT non-loca 7,000 ADT non-loca 7,001 - 15,000 ADT 7,001 - 15,000 ADT	
Control Violation other movements	2 1 1 2 1 4 4 1 9 10 3 1 1 4 1 1	1 1	49
Control Violation through movement	1 3 1 2 8 11 4 1 7 3 2 2 1 1 4 1 2 3 2	2 3 1 1 1	69
Control Violation turning movement	1 3 3 1 1 2	1	13
Entering non-times recently			20
Failure to Yield	5 9 21 10 16 19 34 65 31 9 8 54 27 11 3 3 4 10 8 4 6 9 2 29	27 25 8 8 6 37 18 13 17 11 3 16 23 10 1	5 626
- Cincia		0 0 1 1 2 1 01 0 7 1 0 0 1 7 2	
Pedestrian not in dedicated areas	1 2 4 3 1 2 2 6 11 6 7 4 7 2 1 1 3 1 4	6 2 14 6 3 3 3 1 4 9 3 2 1	125
Unsafe Speed	2 1 1 2 4 2 2 1 1 1	3 3 1 1 6 6 1 1 1	2 43
Unsafe Turning Left	1 5 4 2 5 10 1 5 1 3 1 1 1 3	1 1 3 3 1 1 1	54
Unsafe Turning other	1 1 2 1 1 2 3 1 1 1 1	2 1 8 2 2 1 2 2 1	1 37
Unsafe Turning Right	1 2 1 2 1 1	1 3 1 1	17
Grand Total	10 18 39 24 1 30 35 75 133 59 16 10 110 66 33 4 7 8 19 18 1 7 15 26 2 7 54	49 37 1 9 9 10 1 2 105 47 29 26 25 7 24 51 16 1 1 3 5	11 1296

	Sig	gnali:	zed												
	Th	ıru La	anes	2+2	44	4+	2				4+	4			
	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	7,001-15,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000
Control Violation other movements		2	1	1			2	1	4	4	1		9	10	3
Control Violation through movement		1	3			1	2	8	11	4		1	7	3	2
Control Violation turning movement			1					3	3	1			1	2	
Entering from minor facility							1	1	1				3		
Failure to Yield															
Crossing In Crosswalk At Intersection															
Making Left Turn	1	5	12	5		6	8	14	29	14	7	3	33	14	1
Proceeding Straight				1			2	3	3	3	1	1	4	1	2
Making Right Turn			2			7	2	7	17	4	1	2	8	6	5
Other		1	1				3	4	6	4			4	1	2



STATISTICAL SIGNIFICANCE



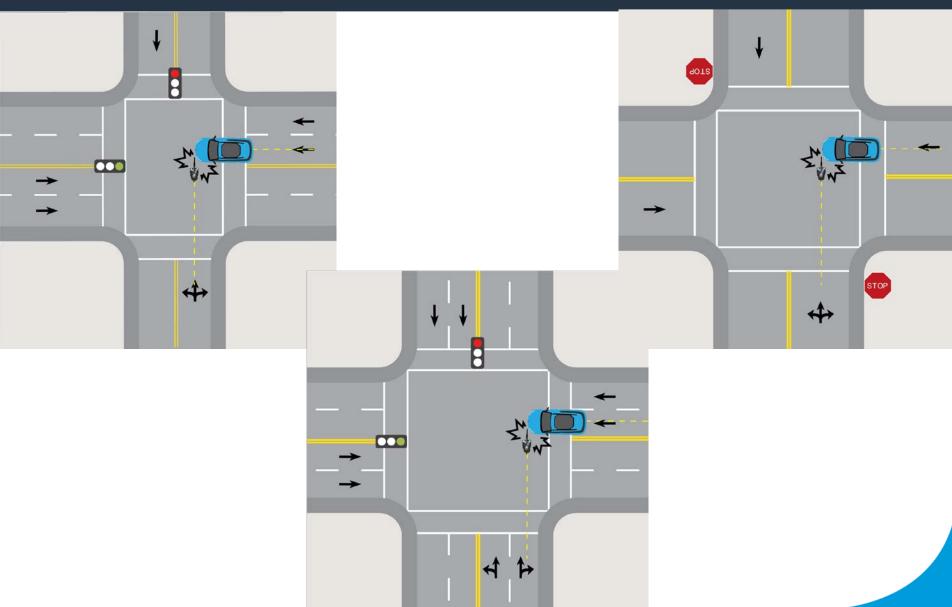


LINK TO VISION ZERO

Accidno 💌	ReportNo 💌	Date 🔻 Ti	ime 💌	Day 🔻	Street	CrossSt	Distance 🔻	Direction 💌	X 🔻	Υ 🔻	Injury 🔻	Nolnjured 💌	NoKilled ▼	PtyAtFault 💌
4176497459		4/17/2014 18	8:09:00	Thursday	06TH AV	EL PRADO	12	West	6281999.9	1847103.0	Other Visi	1	0	1
7591357827	603670	4/28/2016 20	0:40:00	Thursday	54TH ST	LEA ST	0	Not Stated	6306619	1852180	Other Visi	1	0	1
1303020070	507489	9/4/2015 20	0:07:00	Friday	CAM RUIZ	CAPRICORN WY	8	North	6287338	1917533	Complaint	1	o	o
7611947059	410124	12/29/201 08	8:20:00	Monday	CARROLL CANYON RD	MAYA LINDA RD	0	Not Stated	6295264	1909599	Complaint	1	0	1
9458657503	407426	9/29/2014 20	0:20:00	Monday	CLAIREMONT MESA BL	ROLFE RD	o	Not Stated	6269087	1882501	Complaint	1	0	o
6518446207	401358	2/22/2014 20	0:09:00	Saturday	EL CAJON BL	63RD ST (W)	0	Not Stated	6311667	1858591	Complaint	1	0	0
4082967042	605147	6/16/2016 20	0:40:00	Thursday	EL CAJON BL	52ND ST	17	West	6305370.1	1856315.4	Other Visi	2	o	1
1480478048	610267	12/9/2016 18	8:56:00	Friday	EL CAJON BL	WINONA AV	o	Not Stated	6304059	1856116	Complaint	1	0	1
1290917450	503805	5/6/2015 17	7:45:00	Wednesda	EL CAJON BL	52ND ST	o	East	6305387	1856318	Other Visi	1	0	o
9333419799	603742	4/30/2016 14	4:33:00	Saturday	EUCLID AV	NARANJA ST	o	West	6304814	1838637	Complaint	1	0	0
9914898872	601731	2/19/2016 04	4:43:00	Friday	FRONT ST	BEECH ST	o	South	6280318	1843318	Complaint	1	0	1
1244514050	400936	1/27/2014 14	4:05:00	Monday	INGRAHAM ST	PACIFIC BEACH DR	o	Not Stated	6257708	1870101	Complaint	1	0	1
7892547249	506494	8/5/2015 07	7:22:00	Wednesda	MISSION BL	LAW ST	o	Not Stated	6252173	1873136	Other Visi	1	0	1
6267178058	603360	4/9/2016 15	5:13:00	Saturday	MISSION BL	GARNET AV	3	South	6252680.7	1871092.0	Other Visi	1	0	1
3462480306		10/7/2016 08	8:10:00	Friday	PARADISE VALLEY RD	DEEP DELL RD	o	Not Stated	6321901	1833701	Other Visi	2	o	1
3626857399	607060	8/16/2016 08	8:55:00	Tuesday	PARADISE VALLEY RD	DEEP DELL RD	25	North	6321921.5	1833715.2	Other Visi	1	0	1
6299322843	402005	3/12/2014 08	8:40:00	Wednesda	PARADISE VALLEY RD	DEEP DELL RD	o	Not Stated	6321901	1833701	Other Visi	1	0	1
4097843170	401634	3/3/2014 06	6:54:00	Monday	PARADISE VALLEY RD	DEEP DELL RD	o	Not Stated	6321901	1833701	Complaint	1	0	0
7190797328	406305	8/19/2014 15	5:15:00	Tuesday	SATURN BL	ELM AV	5	North			Complaint		0	1
5266163349	509913	11/24/201 08	8:43:00	Tuesday	UNIVERSITY AV	SWIFT AV	9	East	6294401.9	1853693.8	Severe Inj	1	0	1
2475071549	500972	2/3/2015 09	9:24:00	Tuesday	UNIVERSITY AV	SWIFT AV	o	Not Stated	6294393	1853694	Complaint	1	0	1
2193335890	405283	7/15/2014 05	5:57:00	Tuesday	UNIVERSITY AV	SWIFT AV	15	South	6294407.9	1853693.7	Other Visi	1	0	1
1250206200	402204	3/25/2014 06	6:20:00	Tuesday	UNIVERSITY AV	SWIFT AV	o	Not Stated	6294393	1853694	Other Visi	1	0	1
3397881388	602112	3/7/2016 21	1:12:00	Monday	UNIVERSITY AV	07TH AV	o	Not Stated	6282368	1853292	Complaint	1	0	0
4062901139	600140	1/2/2016 09	9:15:00	Saturday	UNIVERSITY AV	WILSON AV	o	Not Stated	6295152	1853681	Complaint	1	0	1
8929052352	510269	12/8/2015 08	8:16:00	Tuesday	UNIVERSITY AV	52ND ST	9	East	6305372.9	1853355.8	Other Visi	1	0	1
3791749477	504106	5/12/2015 13	3:31:00	Tuesday	UNIVERSITY AV	52ND ST	o	Not Stated	6305364	1853356	Other Visi	1	0	1
4815627336	400591	1/23/2014 07	7:50:00	Thursday	UNIVERSITY AV	39TH ST	0	Not Stated	6297053	1853646	Complaint	1	0	1
8494752645	500626	1/22/2015 0	7:35:00	Thursday	WASHINGTON ST	FRONT ST	0	Not Stated	6280328	1853862	Complaint	1	o	0

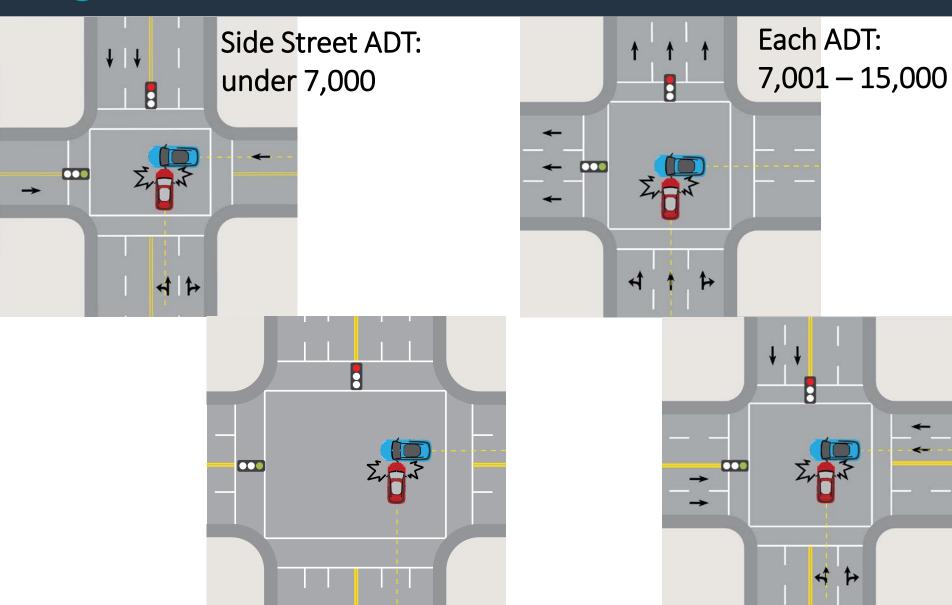


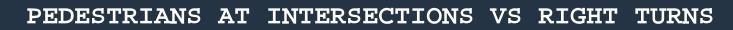
BICYCLES AT INTERSECTIONS



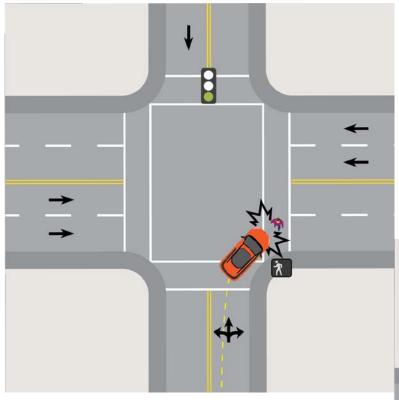


VEHICLES AT INTERSECTIONS

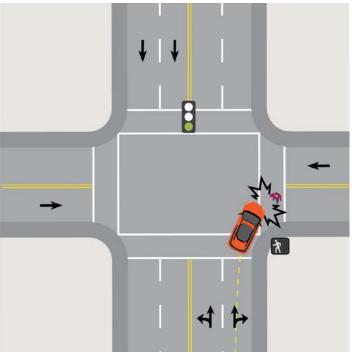








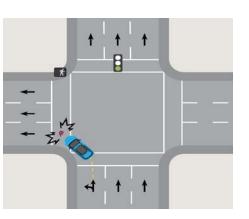
Major Street ADT: 15,001 – 25,000

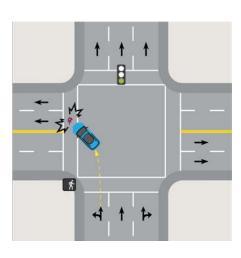


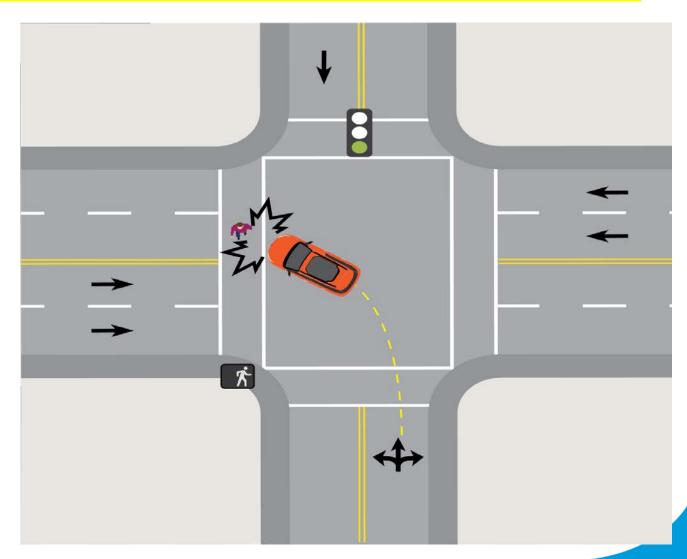


PEDESTRIANS AT INTERSECTIONS VS LEFT TURNS

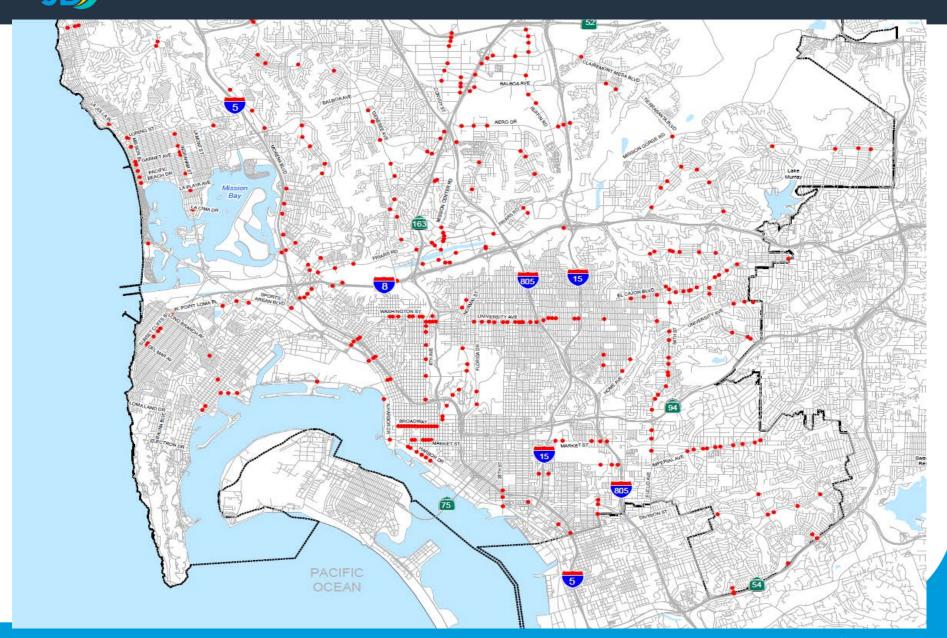
Signalized, No Turn Arrow, Driver at fault, Major Street ADT: 7,001 – 25,000





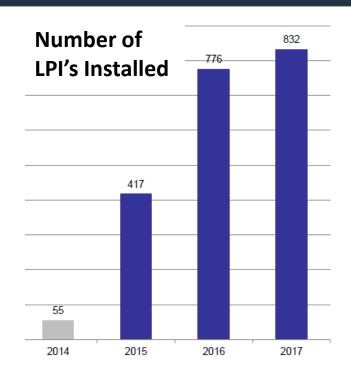


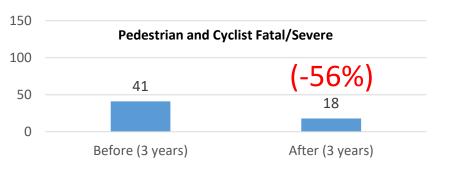






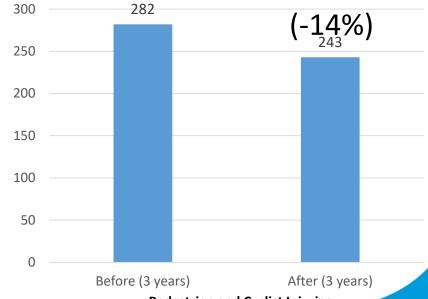
Effectiveness of LPIs: New York City







Leading Pedestrian Interval

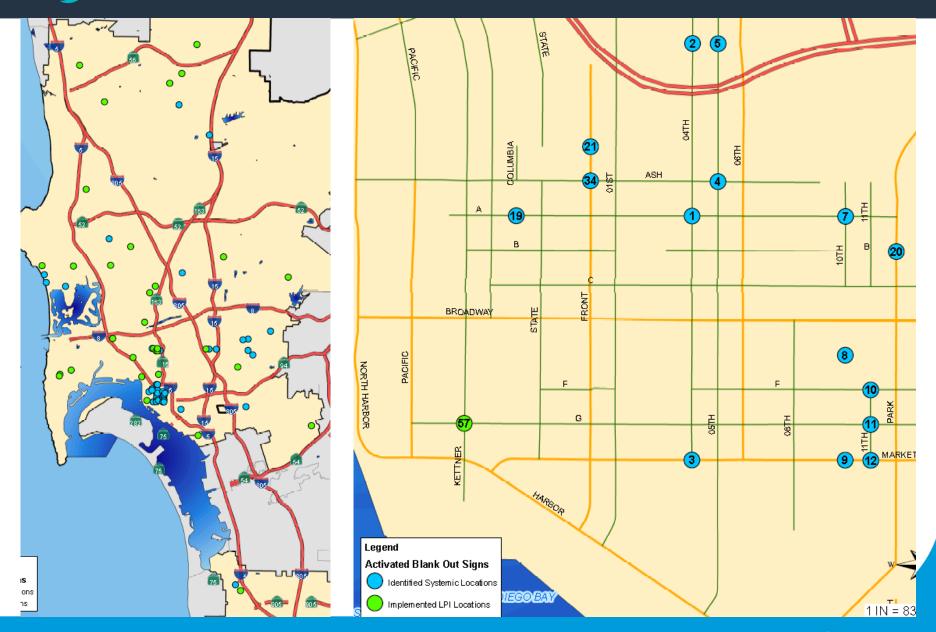




COUNTERMEASURE: LEAD PEDESTRIAN INTERVAL



INITIAL LPI DEPLOYEMENT 66 INTERSECTIONS



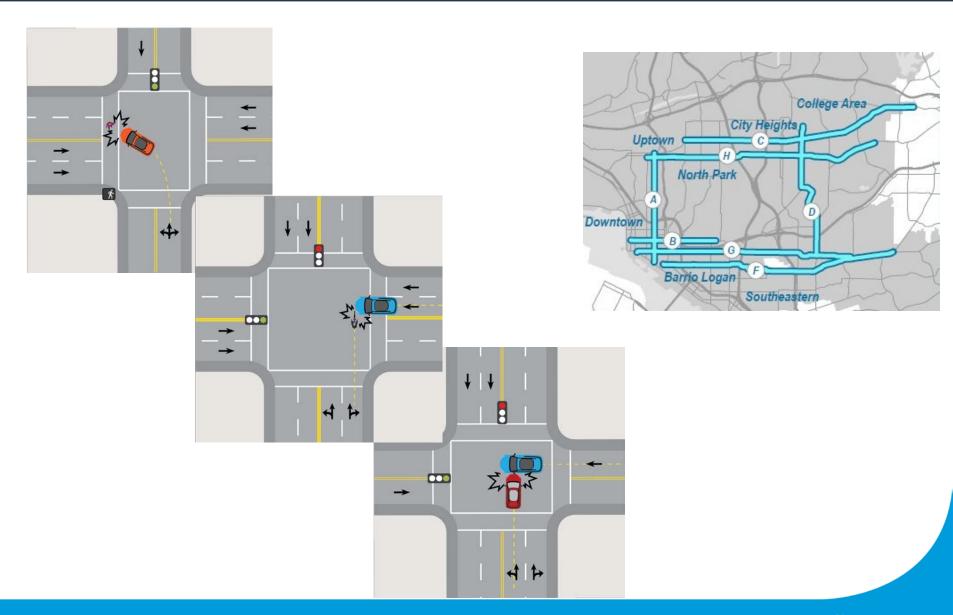


Narrow Focus -> Progress

- Focus maximizes return on a fixed income
- Vision Zero focus is eliminating Fatal & Severe crashes
- Systemic Analysis strategically narrows focus but stays proactive
 - Intersections
 - Traffic signals
 - 4 lane streets
 - Permitted left turns
- Just like traffic signals aren't needed at every intersection
- LPI's aren't needed at every traffic signal
- Prioritize locations where multiple hot spots overlap



Focus on Systemic Spots instead of Network





Countermeasure Shortcut – FHWA



Roadside Design Improvement at Curves



Reduced Left-Turn Conflict Intersections



Systemic Application of Multiple Low Cost Countermeasures at Stop-Controlled Intersections



Leading Pedestrian Interval



Local Road Safety Plan



USLIMITS2



Enhanced Delineation and Friction for Horizontal Curves



Longitudinal Rumble Strips and Stripes on Two-Lane Roads



Median Barrier



Safety EdgesM



Backplates with Retroreflective Borders



Corridor Access Management



Dedicated Left- and Right-Turn Lanes at Intersections



Roundabouts



Yellow Change Intervals



Medians and Pedestrian Crossing Islands in Urban and Suburban Areas



Pedestrian Hybrid Beacon



Road Diet



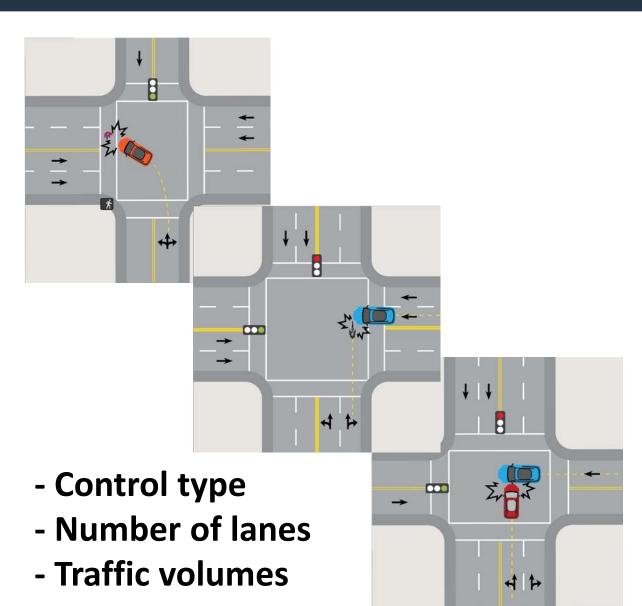
Walkways



Road Safety Audit



Hot Spot Shortcut – San Diego







Retroreflective Borders



Dedicated Left- and Right-Turn Lanes at Intersections



Roundabouts



QUESTIONS?

City of San Diego/Vision Zero/Safety Initiatives

https://www.sandiego.gov/sites/default/files/systemic-safety-the-data-driven-path-to-vision-zero.pdf

Special thanks to

Safe Transportation Research and Education Center



and Chen-Ryan Associates