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Vincent Cardone Principal Engineer II, Traffic Monmouth County

- Competitive program administered by MPO
- Uses funds from the Federal Highway Administration's Highway Safety Improvements Program (HSIP).
- Only NJTPA member subregions are eligible to submit applications to the NJTPA for these programs. Municipalities located within the subregions may recommend a project to their respective county



For projects to be advanced in FY 2018 all environmental approvals, local approval, and right-of-way acquisition must be completed and a full set of PS&E documents submitted to the Local Aid office by a set deadline.



- Project sponsors must give consideration to modern roundabouts for all new intersection and intersection upgrade projects.
- The National Environmental Policy Act (NEPA) regulations must be followed. As such, projects must have minimal or no environmental and cultural resource impacts.
- Projects must be completed within 24 months of receiving federal authorization.

- The following types of projects are NOT eligible:
 - improvements involving State, U.S. and Interstate highways including any improvements at intersections with such facilities;
 - routine maintenance/ replacement projects (including general resurfacing projects)
 - congestion management/ roadway capacity enhancements (road widening)
 - Aesthetic improvements along the rights-of-way.

NJTPA High Risk Rural Roads Network Screening List

FY 2017-2018 HIGH RISK RURAL ROADS PROGRAM

NETWORK SCREENING (USING CRASH DATA FROM 2011-2013)

					ALLCOUNT			ALL COUNTIES							
NJTPA RANK	COUNTY RANK	COUNTY	MUNICIPALITY	ROAD NAME	SRI	MILEPOST START	MILEPOST END	LENGTH	TOTAL CRASHES	FATAL INJURY	INCAPACITATING INJURY	MODERATE INJURY	PAIN	PDO	WEIGHTED SCORE/MILE
9	2	Hunterdon	Clinton town	West Main Street	00000173Z_	0.00	0.45	0.45	2	1	0	0	0	1	10.69
11	3	Hunterdon	Tewksbury township	Fairmount Road West	00000512	3.73	4.93	1.20	14	0	2	1	1	10	10.24
13	3	Hunterdon	Delaware township	Stockton-Flemington Road	00000523	3.03	3.95	0.92	10	0	1	1	2	6	9.22
14	3	Hunterdon	Lebanon township	Fairview Avenue	00000513	15.97	20.05	4.08	73	1	3	3	12	54	8.88
19	4	Hunterdon	Tewksbury township	Old Turnpike Road	00000517	1.39	3.29	1.90	36	1	0	3	4	28	7.27
21	4	Hunterdon	Clinton township	PAYNE RD	10061007	0.60	1.33	0.73	2	1	0	0	0	1	6.59
23	5	Hunterdon	Holland township	Milford-Warren Glen Road	00000519	19.46	22.56	3.10	49	0	2	5	2	40	6.44
27	5	Hunterdon	Kingwood township	Kingwood Road	00000519	9.19	10.36	1.17	6	0	1	0	2	3	5.82
41	7	Hunterdon	Union Twp (Hunterdon Co)	Little York Road	10000614	5.11	6.37	1.26	8	1	0	0	1	6	4.61
64	11	Hunterdon	East Amwell township	Rileyville Road	10000607	0.00	2.08	2.08	5	0	1	0	0	4	2.31
3	2	Middlesex	Old Bridge township	Texas Road	00000520	0.00	2.06	2.06	107	0	1	2	26	78	16.58
4	1	Monmouth	Wall township	Belmar Boulevard	130000181	1 41	2.45	1.05	28	0	2	1	3	22	13.61
	1	Monmouth	Freehold township	Jackson Mill Road	120000181	0.00	1.45	1.05	20	1	0	2	9	22	12.01
15	4	Monmouth	Millstone township	Perrineville Road	13000001	1.57	3.23	1.66	40	0	1	1	8	30	8.72
26	8	Monmouth	Howell township	CASINO RD	13191012	2.62	3.60	0.98	6	0	1	0	1	4	5.93
31	8	Monmouth	Roosevelt borough	South Bochdale Avenue	00000571	29.68	30.57	0.89	4	1	0	0	0	3	5.40
31	8	Monmouth	Howell township	ARNOLD BLVD	13191101	0.00	0.89	0.89	4	0	1	0	0	3	5.40
42	9	Monmouth	Upper Freehold township	Stage Coach Road	00000524	7.91	13.36	5.45	29	1	1	5	7	15	4.58
43	9	Monmouth	Freehold township	Ely Harmony Road	13321049	0.00	4.46	4.46	37	0	1	5	7	24	4.52
51	12	Monmouth	Upper Freehold township	Holmes Mill Road	13000027	1.37	4.67	3.30	13	1	0	3	1	8	3.28
56	12	Monmouth	Upper Freehold township	MEIRS RD	13511013	1.79	3.97	2.18	4	1	0	1	0	2	2.97
60	12	Monmouth	Millstone township	Millstone Road	13321017	0.00	5.57	5.57	39	1	0	4	3	31	2.60
			· · · · · ·	·											
1	1	Morris	Washington Twp (Morris Co)	West Mill Road	00000513	25.67	25.85	0.18	11	0	1	0	0	10	26.72
30	2	Morris	Washington Twp (Morris Co)	Fairmont Road	00000517	7.31	9.30	1.99	22	0	1	3	1	17	5.44
36	2	Morris	Washington Twp (Morris Co)	East Mill Road	00000513	26.87	28.39	1.52	31	0	1	0	3	27	5.14
38	3	Morris	Jefferson township	Ridge Road	14141233	1.51	2.49	0.98	2	0	1	0	0	1	4.91
40	3	Morris	Mendham township	Roxciticus Road	14191045	2.18	3.52	1.34	4	1	0	1	0	2	4.84
			· · · · · · · · · · · · · · · · · · ·												
18	1	Ocean	Ocean Twp (Ocean Co)	Warren Grove-Waretown Road	00000532	32.21	33.04	0.83	5	0	1	1	0	3	7.81
20	1	Ocean	Manchester township	Whiting-New Egypt Road	00000539	25.36	28.38	3.02	43	0	1	3	11	28	6.89
24	2	Ocean	Stafford township	North Green Street	00000539	10.58	11.68	1.10	6	0	1	0	2	3	6.19
25	2	Ocean	Plumsted township	Pinehurst Road	00000539	32.23	33.71	1.48	5	1	0	2	1	1	6.18
29	4	Ocean	Little Egg Harbor township	Thomas Avenue	15000602	0.00	1.75	1.75	4	1	1	0	0	2	5.50
33	5	Ocean	Jackson township	West Veterans Highway	00000528	16.41	18.18	1.77	13	0	1	1	3	8	5.36
39	6	Ocean	Little Egg Harbor township	STAGE RD	15161159	0.00	0.99	0.99	3	0	1	0	0	2	4.86
44	7	Ocean	Little Egg Harbor township	North Green Street	00000539	0.73	3.69	2.96	53	1	0	2	5	45	4.44
46	7	Ocean	Lacey township	Lacey Road	15000614	2.71	10.04	7.33	46	0	1	8	8	29	3.57
47	8	Ocean	Lacey township	Cedar Bridge-Whiting Road	00000539	15.91	20.85	4.94	33	1	0	4	6	22	3.54
55	9	Ocean	Berkeley township	Dover Road	15000618	1.90	3.80	1.90	9	0	1	0	1	7	3.06
61	9	Ocean	Lacey township	Dover Road	15000618	0.00	1.90	1.90	1	0	1	0	0	0	2.53
68	9	Ocean	Plumsted township	Long Swamp Road	15230004	0.00	3.85	3.85	2	1	0	0	0	1	1.25
16	1	Somerset	Tewksbury township	Lamington Road	00000523	24.36	24.94	0.58	6	1	0	0	0	5	8.25
58	4	Somerset	Hillsborough township	BEEKMAN LN	18101024	1.22	3.24	2.02	5	0	1	0	1	3	2.88
59	4	Somerset	Bedminster township	Burnt Mills Road	18000620	0.00	3.01	3.01	23	0	1	1	2	19	2.82

Monmouth County List

NJTPA RANK	COUNTY RANK	COUNTY	MUNICIPALITY	ROAD NAME	SRI	MILEPOST START	MILEPOST END	LENGTH
4	1	Monmouth	Wall township	Belmar Boulevard	130000181_	1.41	2.46	1.05
6	1	Monmouth	Freehold township	Jackson Mill Road	13000023	0.00	1.45	1.45
15	4	Monmouth	Millstone township	Perrineville Road	13000001	1.57	3.23	1.66
26	8	Monmouth	Howell township	CASINO RD	13191012	2.62	3.60	0.98
31	8	Monmouth	Roosevelt borough	South Rochdale Avenue	00000571	29.68	30.57	0.89
31	8	Monmouth	Howell township	ARNOLD BLVD	13191101	0.00	0.89	0.89
42	9	Monmouth	Upper Freehold township	Stage Coach Road	00000524	7.91	13.36	5.45
43	9	Monmouth	Freehold township	Ely Harmony Road	13321049	0.00	4.46	4.46
51	12	Monmouth	Upper Freehold township	Holmes Mill Road	13000027	1.37	4.67	3.30
56	12	Monmouth	Upper Freehold township	MEIRS RD	13511013	1.79	3.97	2.18
60	12	Monmouth	Millstone township	Millstone Road	13321017	0.00	5.57	5.57

ROAD NAME	SRI	TOTAL CRASHES	FATAL INJURY	INCAPACITATING INJURY	MODERATE INJURY	PAIN	PDO	Weighted Score/mile
Belmar Boulevard	130000181_	28	0	2	1	3	22	13.61
Jackson Mill Road	13000023	35	1	0	3	9	22	12.98
Perrineville Road	13000001	40	0	1	1	8	30	8.72
CASINO RD	13191012	6	0	1	0	1	4	5.93
South Rochdale Avenue	00000571	4	1	0	0	0	3	5.40
ARNOLD BLVD	13191101	4	0	1	0	0	3	5.40
Stage Coach Road	00000524	29	1	1	5	7	15	4.58
Ely Harmony Road	13321049	37	0	1	5	7	24	4.52
Holmes Mill Road	13000027	13	1	0	3	1	8	3.28
MEIRS RD	13511013	4	1	0	1	0	2	2.97
Millstone Road	13321017	39	1	0	4	3	31	2.60



Monmouth County List

Lists are ranked assuming the weight of a fatal crash is the same as an incapacitating injury crash and using the value of a Complaint of Pain injury as the base value (K=A, no Property Damage only (PDO)).

ê	RUTGERS	HSM (FHWA-HRT-05-	051)									
A	Genter for Manacel Infortuctore	Link		Publi	shed 2005		Weighting Factors						
NJTPA	and inasponision	21	001 dollars	2012	dollars (KABCO)	KABCO Weight	K=A Weight	K=A No PDO Weight					
	K Fatal	\$	4,008,900	\$	5,197,200	89.30	4.81	2.73					
	ABC ALL INJURY	\$	82,600	\$	107,100								
	A Incapacitating	\$	216,000	\$	280,000	4.81	4.81	2.73					
	B Moderate	\$	79,000	\$	102,400	1.76	1.76	1.00					
	C Complaint of Pain O PDO		44,900	\$	58,200	1.00	1.00	0.57					
			7,400	\$	9,600	0.16	0.16	0.00					

ROAD NAME	SRI	TOTAL CRASHES	FATAL INJURY	INCAPACITATING INJURY	MODERATE INJURY	PAIN	PDO	Weighted Score/mile
Belmar Boulevard	130000181_	28	0	2	1	3	22	13.61
Jackson Mill Road	13000023	35	1	0	3	9	22	12.98
Perrineville Road	13000001	40	0	1	1	8	30	8.72
CASINO RD	13191012	6	0	1	0	1	4	5.93
South Rochdale Avenue	00000571	4	1	0	0	0	3	5.40
ARNOLD BLVD	13191101	4	0	1	0	0	3	5.40
Stage Coach Road	00000524	29	1	1	5	7	15	4.58
Ely Harmony Road	13321049	37	0	1	5	7	24	4.52
Holmes Mill Road	13000027	13	1	0	3	1	8	3.28
MEIRS RD	13511013	4	1	0	1	0	2	2.97
Millstone Road	13321017	39	1	0	4	3	31	2.60









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Plan4Safety Filter

	Preview Your Filter The filter you're building will find crash records where [CRASH.COUNTY = MONMOUTH and CRASH.CRASH YEAR in [2011.2012.2013.2014.2015]	
ect All Unselect All	and [CRASH.MILEPOST <= 2.46 and CRASH.MILEPOST >= 1.41] and CRASH.SRI = 130000181] Alt. Shading On Preview Off Refresh	Network screening List covered 2011- 2013 Query expanded to
Table:	Column: COUNTY AND AND AND AND AND AND AND AND AND AND	recent data
Table:	Column: Operator: Value: CRASH_YEAR VIN Value: 2013 2014 2015 2016	
Table:	Column: Operator: Value: MILEPOST < <= 2.46	
Table: CRASH	Column: Operator: Value: MILEPOST >= 1.41	

Plan4Safety GIS Point View





Use crash tools to create a road histogram (P4S)

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			Comprehensive Crash Analy	rsis Program		-		- market
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			Filter Slot 3 -	Empty				
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		₩ ◀ 1 ►	m					
Total: 0 Mean: 0	0 Median: 0							

Road Histogram reveals crash locations (P4S)



Safety Voyager

Process using Safety Voyager is similar, but results are obtained faster



Crash SRI and Milepost



Filters are easy to find



Review remainder of screening list

- Iterative process
- Need to diagnose the problem before coming up with a solution



Review remainder of screening list

4	1	Monmouth	Wall township	Belmar Boulevard	130000181_	1.41	2.46	1.05
6	1	Monmouth	Freehold township	Jackson Mill Road	13000023	0.00	1.45	1.45
15	4	Monmouth	Millstone township	Perrineville Road	13000001	1.57	3.23	1.66
26	8	Monmouth	Howell township	CASINO RD	13191012	2.62	3.60	0.98
31	8	Monmouth	Roosevelt borough	South Rochdale Avenue	00000571	29.68	30.57	0.89
31	8	Monmouth	Howell township	ARNOLD BLVD	13191101	0.00	0.89	0.89
42	9	Monmouth	Upper Freehold township	Stage Coach Road	00000524	7.91	13.36	5.45
43	9	Monmouth	Freehold township	Ely Harmony Road	13321049	0.00	4.46	4.46
51	12	Monmouth	Upper Freehold township	Holmes Mill Road	13000027	1.37	4.67	3.30
56	12	Monmouth	Upper Freehold township	MEIRS RD	13511013	1.79	3.97	2.18
60	12	Monmouth	Millstone township	Millstone Road	13321017	0.00	5.57	5.57

- Jackson Mills Rd corridor included several Developer-lead projects that were yet to be constructed
- Perrineville Rd-reviewed intersection of CR 1 & Millstone Rd for possible roundabout-Green Acres implications and ROW impacts would not qualify under HRRR
- Casino Rd, South Rochdale Ave, & Arnold Blvd had 3 to 4 crashes per corridor-Cost/Benefit would be low
- CR 524 (Stage Coach Rd)-Several "hot spots"
 - CR 524 & CR 539-Traffic Signal installed by Developer
 - CR 524 & Sharon Station Rd-Discussions with Upper Freehold for largescale project outside funding limits of HRRR
 - Several fixed object crashes in the corridor, especially along easterly portion (connects to segment previously approved by HRRR)



CR 524 Histogram (P4S)



CR 524 Histogram-SafetyVoyager







The Plan4Safety System (P4S) is a crash and analysis database system capable of providing users with a quick way to rank, analyze, and visualize crashes.

Plan4Safety

Filtered Data > Basic Table Summary



The **Basic Table Summary** page allows you to view data in the main crash tables defined by your filter.

?

Basic T	isic Table Summary ** Notice, you have a maximum row return of 50,000 rows for viewing data. Use the Bulk Export Tool to download larger data sets. **													
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	SQL XLS CSV TAB DOC PDF Filter: CR 524 HRRR 2017-2018 Table: CRASH													
	Table DraClick here to download an Excel version (XLS) of this report.													
	Table: 84	Item	s (Showing 1 to 25)											
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	3747	837	20111112I-2011-007864	I-2011-007864	2011	MERCER	Washington Twp (Mercer Co)	2011-05-04	Wednesday	Мау	16:27:00			
	4037	262	20121112I-2012-019209	I-2012-019209	2012	MERCER	Washington Twp (Mercer Co)	2012-10-26	Friday	October	13:45:00			
	4320	565	20131112I-2013-023242	I-2013-023242	2013	MERCER	Washington Twp (Mercer Co)	2013-11-05	Tuesday	November	14:43:00			
	4369	597	20131351C060-2013- 00129A	C060-2013-00129A	2013	MONMOUTH	Upper Freehold township	2013-01-31	Thursday	January	07:21:00			
OF	8489	422	20141351C060-2014-	C060-2014-01628A	2014	MONMOUTH	Upper Freehold	2014-11-01	Saturday	November	09:47:00			



Safety Voyager

Crash Count: 278 SRI: 00000524 [07.91-13.36], Date: 2015,2014,2013,2012,201



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	State Route Identifier	Mile Post	Crashes at Mile Post	KABCO Weighted Score	KA Weighted Score	Ű
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Safety Voyager

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Safety Voyager

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2 13-02-2013-MV-	13-19		MONMOUTH	ALLENTOWN	BORO	2013 MV-	13-19	W	ednesday	Fixed Object		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
3 13-02-2013-MV-	13-18		MONMOUTH	ALLENTOWN	BORO	2013 MV-	13-18	Tu	iesday	Same Direction - S	ideswipe	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
13-02-2005-MV0	5-67		MONMOUTH	ALLENTOWN	BORO	2005 MV0)5-67	Tł	nursday	Right Angle		NOT RECORD	ED Curve and Level	Black	top	Dry	Dark (stree	et lights on	Clear
13-02-2004-04-4	8		MONMOUTH	ALLENTOWN	BORO	2004	Ap	or-48 Tu	lesday	Struck Parked Veh	licle	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
5 13-02-2004-MV0	4-13		MONMOUTH	ALLENTOWN	BORO	2004 MV0	04-13	Sa	iturday	Right Angle		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
13-02-2015-MV1	5-34		MONMOUTH	ALLENTOWN	BORO	2015 MV1	15-34	Sa	iturday	Same Direction - R	Rear End	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
3 13-02-2014-MV-	14-46		MONMOUTH	ALLENTOWN	BORO	2014 MV-	14-46	10	iesday	Same Direction - H	ear End	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
13-02-2015-2015	-41		MONMOUTH	ALLENTOWN	BORO	2015 2015	o-41	Fr	iday	Struck Parked Ven	licle	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight Davis (steel		Clear
1 12 02 2012 14	3		MONMOUTH	ALLENTOWN	BORO	2015 15-4	10.00	5L Tk	inday	Fixed Object	ida	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Dark (stree	et lights on	Clear
2 12 02 2010 MV1	0.24		MONMOUTH	ALLENTOWN	BORO	2012 WIV-	12-20		idov	Bight Anglo	licie	NOT RECORD	ED Straight and Cra	do Black	top	Dry	Daylight		Clear
3 13-02-2010-MV-	10-24		MONMOUTH	ALLENTOWN	BORO	2010 MV-	10-24	Th	ursdav	Right Angle		NOT RECORD	ED Straight and Lev	ol Black	ton	Wet	Daylight		Clear
4 13-02-2003-MV0	3-30		MONMOUTH	ALLENTOWN	BORO	2010 MV/	13-30	W	ladnesdav	Same Direction - R	ear End	NOT RECORD	ED Straight and Lev	ol Black	ton	Dry	Daylight		Clear
5 13-02-2003-0030	12003-269A		MONMOUTH	ALLENTOWN	BORO	2003 0030	12003-269A	SI	inday	Fixed Object	Con End	NOT RECORD	ED Straight and Lev	el Conc	rete	Dry	Dark (no st	treet lights)	Clear
6 13-02-2016-16AT	0036816-18		MONMOUTH	ALLENTOWN	BORO	2016 16AT	T0036816-1	8 SI	inday	Fixed Object		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Davlight		Clear
7 13-02-2006-MV0	6-14		MONMOUTH	ALLENTOWN	BORO	2006 MV0)6-14	Tł	nursdav	Same Direction - R	Rear End	NOT RECORD	ED Straight and Gra	de Black	top	Drv	Davlight		Clear
8 13-02-2015-MV1	5-13		MONMOUTH	ALLENTOWN	BORO	2015 MV1	15-13	Tu	uesdav	Same Direction - R	Rear End	NOT RECORD	ED Straight and Lev	el Black	top	Snowy	Davlight		Snow
9 13-02-2006-MV0	6-30		MONMOUTH	ALLENTOWN	BORO	2006 MV0	06-30	Sa	, iturday	Same Direction - R	Rear End	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Dark (no st	treet lights)	Clear
0 13-02-2003-MV0	3-26		MONMOUTH	ALLENTOWN	BORO	2003 MV0	03-26	Su	unday	Right Angle		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
1 13-02-2009-09-1	1		MONMOUTH	ALLENTOWN	BORO	2009	11	-Sep Tł	nursday	Fixed Object		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
2 13-02-2005-05-04	4		MONMOUTH	ALLENTOWN	BORO	2005	4-	May W	/ednesday	Left Turn/U Turn		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
3 13-02-2003-03-3	8		MONMOUTH	ALLENTOWN	BORO	2003	Ma	ar-38 M	onday	Right Angle		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
4 13-02-2003-03-22	2		MONMOUTH	ALLENTOWN	BORO	2003	22	-Mar Fr	iday	Same Direction - S	ideswipe	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
5 13-02-2003-03-54	4		MONMOUTH	ALLENTOWN	BORO	2003	Ma	ar-54 W	/ednesday	Same Direction - S	ideswipe	NOT RECORD	ED Straight and Lev	el Black	top	Wet	Daylight		Rain
6 13-02-2003-MV0	3-07		MONMOUTH	ALLENTOWN	BORO	2003 MV0	03-07	Th	nursday	Struck Parked Veh	icle	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Dark (stree	et lights on	Clear
7 13-02-2004-04-2	8		MONMOUTH	ALLENTOWN	BORO	2004	28	8-Apr Sa	iturday	Struck Parked Veh	icle	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
8 13-02-2004-MV0	4-23		MONMOUTH	ALLENTOWN	BORO	2004 MV0	04-23	Sa	iturday	Same Direction - S	ideswipe	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
9 13-02-2005-05-64	4		MONMOUTH	ALLENTOWN	BORO	2005	Ma	ay-64 Tu	iesday	Backing		NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
0 13-02-2005-MV0	5-21		MONMOUTH	ALLENTOWN	BORO	2005 MV0	05-21	W	ednesday	Non-fixed Object		NOT RECORD	ED Curve and Level	Black	top	Dry	Daylight		Clear
1 13-02-2005-MV0	5-22		MONMOUTH	ALLENTOWN	BORO	2005 MV0	05-22	Fr	iday	Struck Parked Veh	licle	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Daylight		Clear
2 13-02-2005-MV0	5-2C		MONMOUTH	ALLENTOWN	BORO	2005 MV0	15-2C	W	ednesday	Right Angle		NOT RECORD	ED Straight and Gra	de Black	top	Dry	Dark (stree	et lights on	Clear
3 13-02-2005-MV0	5-36		MONMOUTH	ALLENTOWN	BORO	2005 MV0	JS-36	SL	inday	Pedestrian		NOT RECORD	ED Curve and Level	Black	top	Dry	Daylight		Clear
4 13-02-2005-MV0	5-52		MONMOUTH	ALLENTOWN	BORO	2005 MV0	J5-52	Fr	iday	Same Direction - R	lear End	NOT RECORD	ED Curve and Level	Black	top	Dry	Daylight Davis (steel		Clear
6 12 02 2000 MIVO	0.00		MONMOUTH	ALLENTOWN	PORO	2003 10/00	00-00	58	lodnosdav	Pight Anglo	lear chu	NOT RECORD	ED Straight and Lev	ei Diack	top	Dry	Dark (stree	et rights on	Clear
7 13-02-2006-10100	0-06		MONMOUTH	ALLENTOWN	BORO	2010 MV	10-06	VV T.	euriesuay losday	Opposite Direction	n (Sideswine)	NOT RECORD	ED Straight and Gra	de Black	top	Dry	Daylight		Overcast
8 13-02-2010-MV1	0-08		MONMOUTH		BORO	2010 MV1	10-08	M	onday	Same Direction - R	Rear End	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Dark (po st	treet lights)	Clear
9 13-02-2010-MV1	0-09		MONMOUTH	ALLENTOWN	BORO	2010 MV1	10-09	T	uesdav.	Right Angle	icai chu	NOT RECORD	ED Straight and Lev	el Black	ton	Dry	Dark (stree	et lights on	Clear
0 13-02-2010-MV1	0-26		MONMOUTH	ALLENTOWN	BORO	2010 MV1	10-26	Fr	iday	Backing		NOT RECORD	ED Straight and Lev	el Conc	rete	Dry	Davlight		Clear
1 13-02-2009-MV0	9-16		MONMOUTH	ALLENTOWN	BORO	2009 MV0	09-16	Ti	iesdav	Struck Parked Veh	icle	NOT RECORD	ED Straight and Lev	el Black	top	Dry	Davlight		Overcast 🗸
♦ ► ► VoyagerEx	port 🖄] 4								

· JEN

Crash Diagram/Crash table



# 2	ATE	TIME	ROUTE	HILEPOST INTERSECT CRASH TYPE	CONCITION	LIGHT CONDITION	CONDITION	DISTANCE	UNET OF	DIRECTIO	CROSS STREET NAME	x	Y	EPDO	of travel	Crash description
1	1/20/2010	1/:15	2	1 13.01 Not At Inters Serve Direction Rear End	JCV	Jark (No Street Lights)	Sket/Hal/Procane Kain	1361	Fact	West	CHAMBERS RD / KOOSEVELT RD	199181.1/	12:51	001 100	Westbound	Same Direction - Rear End
2	2/27/2011	20:30	2 (4 12.7 At Intersects Fixed Object	Dy	Dark (No Street Lights)	Clear		h:	South	DAST BRANCH RD	490504.63	493658	9.55 PD0	Westbound	ran off road right, struck utility pole
3	4/26/2011	12:51	52	4 13.24 Not At Inters Fixed Object	Dry	Daylight	Clep:	525	Fact	West	CHAMBERS RD / ROOSEVELT RD	495221.59	493650	3.02 Poin	Endbound	ran off road left, struck utility pole & mailton
-1	8/7/2011	18:14	5	12.91 Mil A. MersFiestOlipel	Well	Caylight	Rain	25/0	Fool	First	ROUTE 530	497556.03	10368	1.13 Moderate Injury	Westbound	ran off road right, struck embankment
5	92,72012	0.10	5	 12.66 Not A: Teles Fired Object 	Dy	Cark (Sheet Lights On	Clean	200	Fool	West	EAST BRANCIED	495-05.07	49377	9.56 Moderate Injury	Westhound	ran off road right, struck tree
0	1/14/2013	1.0	5 30	4 12.9 Not At Interstrated Object	Dry	Jark (No Street Lights)	Cien:		NULL	MUL		49/014.24	491	VII Moderate amary	Westhound	ran off rood left, struck tree
7	2/22/2014	7:1:	52	1 13.01 Not As Inters Fixed Object	lov	Davight	Cicar	1581	Feet	East	CHAMBERS RD / ROOSEVELT RD	198181.17	19351	5.51 Moderate Injury	Eastbound	ran off road right, struck utility pole
5	7/8/2014	21:28	52	4 12.34 Not At Inters Other	Wet	Dark (No Street Lights)	Rah	2840	Fact	West	CHIMMERS RD / ROOSEVELT RD	497204.01	49389	5.48 PDO	Eastbound	"thrown/falling object"
9	9/2//2014	8.48	5 54	4 12.8 Not At interviewed Object	Diy	3wight	Ciebr		NULL	MULL		49,7380.2	49.999	1.12 1900	Eastbound	ran olf road right, struck traffic sign
10	10/11/2014	\$7:03	5	4 12.8 Not A: Sters Fixed Object	Wel.	Carylight.	Orei		NUL	MARK.		497080.2	49799	9.12 PDO	Lastbound	ran off road right, struck tree
11	10/13/2014	9:25	52	4 12.76 Mid & MerryOlher	Dry	Caylight	Ownersal	100	fool	Desi	FAST BRANCI RD	495854.46	494075	5.56 PDO	Westbound	ran off road right, crossed centerline, ran off road left, struck post
12	10/24/2014	1.35	54	4 13.2 Not At arters Annual	by	L'oy kght	Clear		NULL	MUL	A	495008.40	49,365	1.44 1/20	Fastbound	deer strike
13	11/12/2014	1611	30	4 12.7 Not At Intern Annual	Dry	Javicht	Clear:		NUL	NULL		490584.63	49.385	0.55 PD0	Westbound	deer strike
14	3/1/2015	10:11	52	4 12.9 Not At Inters Fixed Object	Snowry	Caylight	Snow		NULL	NULL		497514.24	493	71: Pein	bastbound	ran off road right, struck tree
15	3/1/2019	13:34	52	4 13.09 Not At Inters Fixed Object	Snovry	Doy light	Snow	1156	Fact	East	HARMONY HELL RD	498433.68	49360	0.71 Poin	Westbound	ran off road left, struck mailbox
16	12/16/2019	6.10	2	12.7 At Intersecti Animal	Dry	Carli (Street Lights Off	Citer		8:	NULL	EAST BRANCH RD	196581.63	19386	0.55 PD0	Westbound	deer strike
17	3/14/2010	16:10	5 2	4 12.8 Not A. 3 Lens Fixed Object	Wei	Devight	Relt	8	NULL	HUU.		497000.2	490996	9.12 Pein	Eastbound	ran off road left, struck post

no.	revisiona	dota
DEPA	COUNTY OF MONMOUTH	ERING
	JOSEPH M. ETTORE, COUNTY ENGINEER	
CR	CORRIDOR IMPROVEMENTS ON 524 (NEW CANTON-STONE TAVERN MP 12.65 TO 13.25 UPPER FREEHOLD TOWNSHIP	IRD)
MONMOUT	H COUNTY N	EW JERSEY
	CRASH DIAGRAM	
NOT TO SC	ALE drawn by <u>VJC</u> checked by <u>DAJ</u> date G	7-27-2016
	date	1
JOSE	PH M. ETTORE, P.E.	1

Crash Diagram/Crash table





Crash Diagram/Crash Table

#	CRASH DATE	CRASH TIME	ROUTE	MILEPOST	INTERSECT	CRASH_TYPE	SURFACE CONDITION	LIGHT_CONDITION	ENVIRONMENTAL CONDITION	DISTANCE_	UNIT_OF_M	DIRECTION	CROSS_STREET_NAME	x	Y	EPDO	Direction of travel	Crash description
1	1/26/2011	17:19	524	13.04	Not At Inter	Same Direction - Rear End	Icy	Dark (No Street Lights)	Sleet/Hail/Freezing Rain	1584	Foot	West	CHAMBERS RD / ROOSEVELT RD	498181.47	493515.81	PDO	Westbound	Same Direction - Rear End
2	2/27/2011	20:30	524	12.7	At Intersect	Fixed Object	Dry	Dark (No Street Lights)	Clear		At	South	EAST BRANCH RD	496584.63	493889.55	PDO	Westbound	ran off road right, struck utility pole
3	4/26/2011	12:51	524	13.24	Not At Inter	Fixed Object	Dry	Daylight	Clear	528	Foot	West	CHAMBERS RD / ROOSEVELT RD	499221.59	493693.02	Pain	Eastbound	ran off road left, struck utility pole & mailbox
4	8/7/2011	18:44	524	12.91	Not At Inter	Fixed Object	Wet	Daylight	Rain	2640	Foot	East	ROUTE 539	497556.03	493668.03	Moderate Injury	Westbound	ran off road right, struck embankment
5	9/23/2012	0:36	524	12.66	Not At Inter	Fixed Object	Dry	Dark (Street Lights On/	Clear	200	Foot	West	EAST BRANCH RD	496405.07	493779.66	Moderate Injury	Westbound	ran off road right, struck tree
6	12/24/2013	1:28	524	12.9	Not At Inter	Fixed Object	Dry	Dark (No Street Lights)	Clear		NULL	NULL		497514.24	493701	Moderate Injury	Westbound	ran off road left, struck tree
7	2/22/2014	7:41	524	13.04	Not At Inter	Fixed Object	Icy	Daylight	Clear	1584	Foot	East	CHAMBERS RD / ROOSEVELT RD	498181.47	493515.81	Moderate Injury	Eastbound	ran off road right, struck utility pole
8	7/8/2014	21:28	524	12.84	Not At Inter	Other	Wet	Dark (No Street Lights)	Rain	2640	Foot	West	CHAMBERS RD / ROOSEVELT RD	497264.01	493895.48	PDO	Eastbound	"thrown/falling object"
9	9/27/2014	8:48	524	12.8	Not At Inter	Fixed Object	Dry	Daylight	Clear		NULL	NULL		497080.2	493999.32	PDO	Eastbound	ran off road right, struck traffic sign
10	10/11/2014	17:03	524	12.8	Not At Inter	Fixed Object	Wet	Daylight	Clear		NULL	NULL		497080.2	493999.32	PDO	Eastbound	ran off road right, struck tree
11	10/13/2014	9:05	524	12.76	Not At Inter	Other	Dry	Daylight	Overcast	300	Foot	East	EAST BRANCH RD	496864.46	494025.66	PDO	Westbound	ran off road right, crossed centerline, ran off road left, struck post
12	10/24/2014	7:33	524	13.2	Not At Inter	Animal	Dry	Daylight	Clear		NULL	NULL		499008.49	493683.44	PDO	Eastbound	deer strike
13	11/12/2014	14:11	524	12.7	Not At Inter	Animal	Dry	Daylight	Clear		NULL	NULL		496584.63	493889.55	PDO	Westbound	deer strike
14	3/1/2015	14:11	524	12.9	Not At Inter	Fixed Object	Snowy	Daylight	Snow		NULL	NULL		497514.24	493701	Pain	Eastbound	ran off road right, struck tree
15	3/1/2015	13:34	524	13.09	Not At Inter	Fixed Object	Snowy	Daylight	Snow	1056	Foot	East	HARMONY HILL RD	498433.68	493600.71	Pain	Westbound	ran off road left, struck mailbox
16	12/16/2015	6:10	524	12.7	At Intersect	Animal	Dry	Dark (Street Lights Off)	Clear		At	NULL	EAST BRANCH RD	496584.63	493889.55	PDO	Westbound	deer strike
17	3/14/2016	16:06	524	12.8	Not At Inter	Fixed Object	Wet	Daylight	Rain		NULL	NULL		497080.2	493999.32	Pain	Eastbound	ran off road left, struck post



Crash Diagram/Crash Table

DATE:	-26-Ji	ıl-15		BY:	VC							
A NALYSIS PERIOD:			Jan 2011 t	o Dec 2013								
	12	1	2	3	4	5	6	7	8	9	10	11
AM	1	1					1	2	1.	1		
PM	1	1	2		1	2	1		1	1		
Crash Year	No. of		Liç	ght conditio	on	No. of C	rashes					
2011	Crasnes			Doulight		30	n (*					
2011			Dert		inter)							
2012	 21		Dark (S	troot Lights Or	nics)							
2015	7		Dark	(Street Lights	Off)	1						
2015	3		Dark	(Street lights)			•					
2016	<u></u>			Surf	ace	No. of C	rashes					
				Dr	y {	9)					
Type of Crash	No. of	% of		We	et.	4	ł					
	Crashes	Total		Sno	wy	2	2					
Backing	0	0%		Ic	7	2						
Fixed object	13	7.6%										
Left turn/U turn	0	.0%		Seve	rity	No. of C	crashes					
Opp. direction	0	0%		PD	0	9)					
Headon/Angular	0	0%		Pa	in	4	ŧ					
Petalcyclist	0	0%		Moderat	e Injury	4	1					
Pedestrian	0	0%		Incapacitat	ting Injury	0)					
Right Angle	0	0%		Fatal I	njury	C)					
Rear end	1	6%										
Side swipe	0	0%										
Animal	3	18%							r			

Countermeasures selected based on crash type

- High friction surface treatment (FHWA proven Safety Countermeasure)
- Centerline rumble strips (FHWA proven Safety Countermeasure)
- Safety Edge pavement edge treatment (FHWA proven Safety Countermeasure)
- 8" edge line marking
- Raised pavement markers on center line
- Additional signage for advanced guidance on roadway
- Sign upgrades based on advisory speed limits determined by ball banking
- Improve sign visibility by installation of retroreflective post covers
- Chevrons and/or other traffic control devices to provide further guidance through curves
- Brush clearing to improve line of sight
- Installation of breakaway roadside fixtures within clear zone

Crash Modification Factors



http://www.cmfclearinghouse.org/

CMF / CRF Details

CMF ID: 7900

Improve pavement friction (HFS-High Friction Surfacing)

Description: The safety benefit of High Friction Surfacing Treatment (HFS)

Prior Condition: Individual curve with perceived friction-related crash problem

Category: Roadway

Study: Evaluation of Pavement Safety Performance, Merritt et al., 2015



Crash Modification Factor (CMF)							
Value:	0.759						
Adjusted Standard Error:							
Unadjusted Standard Error:	0.067						



Crash Reduction Factor (CRF)

Value: 24.1 (This value indicates a decrease in crashes)

Crash Modification factors

		Crash modifca	tion factor	
Treatment		Total	Fatal/	′Injury
	CMF #	CMF	CMF #	CMF
High Friction Surface Treatment	7900	0.759	N/A	1
Safety Edge	4303	0.923	4323	0.835
Centerline Rumble Strip	3364	0.83	3368	0.63
Combined CMF		0.581		0.526
Predicted Crash Rate-Existing Conditions		2.343		0.846
Predicted Crash Rate-Post-construction		1.362		0.445

Cost/Benefit Analysis can be performed by comparing KABCO costs with and without modification factors vs estimated project cost (over the service life of the improvement)

KABCO Costs

			ovority	Estimated Cost			
		injury S	eventy	2001*	2016/17		
		Fatal	(K)	\$4,008,900	\$5,447,373.00		
	Fata	l and/or Injury	(K/A/B/C)	\$158,200	\$214,965.30		
		Injury	(A/B/C)	\$82,600	\$112,238.52		
"Incapacitating	"> D	isability Injury	(A)	\$216,000	\$293,505.09		
"Moderate"	>	Evident Injury	(B)	\$79,000	\$107,346.77		
"Complaint of	Pain" >	Possible Injury	(C)	\$44,900	\$61,011.01		
	Property	/ Damage Only	(0)	\$7,400	\$10,055.27		

* Societal Crash Costs by Severity, FHWA-HRT-05-051, October 2005



KABCO Costs

https://www.fhwa.dot.gov/publications/research/safety/05051/05051.pdf

Crash Cost Estimates by Maximum Police-Reported Injury Severity Within Selected Crash Geometries

OCTOBER 2005

PUBLICATION NO. FHWA-HRT-05-051



Research, Development, and Technolo Turner-Fairbank Highway Research Ce 6300 Georgetown Pike

VA 22101-22

Concept Plan







Concept Plan



Summary

- Follow the guidelines for the funding solicitations
- Develop a process for selecting potential projects
 - Start with "high level" data (i.e. network screening lists)
 - Narrow down to a specific corridor or location
 - Identify crash patterns & develop a problem statement
 - Identify potential countermeasures
 - Evaluate the potential effect of countermeasures (i.e. use CMF)
- Effective understanding and presentation of data will help the people that make the decisions.



Thank You vince.cardone@co.monmouth.nj.us



Vincent Cardone Principal Engineer II, Traffic Monmouth County