

E. Kenwood Boulevard & N. Lake Drive

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UP 772 - Pedestrian & Bicycle Transportation

Dr. Robert Schneider



Project Brief

- E. Kenwood Boulevard & N. Lake Drive Pedestrian & Bicycle Analysis
- Two Hour traffic count
- Existing Street Conditions
- Proposed Intervention
- Cost Estimates
- Design Guidelines & Resources



Site Aerial

Intersection Analysis

Traffic, Bike, & Pedestrian counts, Crash Data



Count Data

Peak Travel Time
16:40-18:40



Data Collection

Vehicle Counts

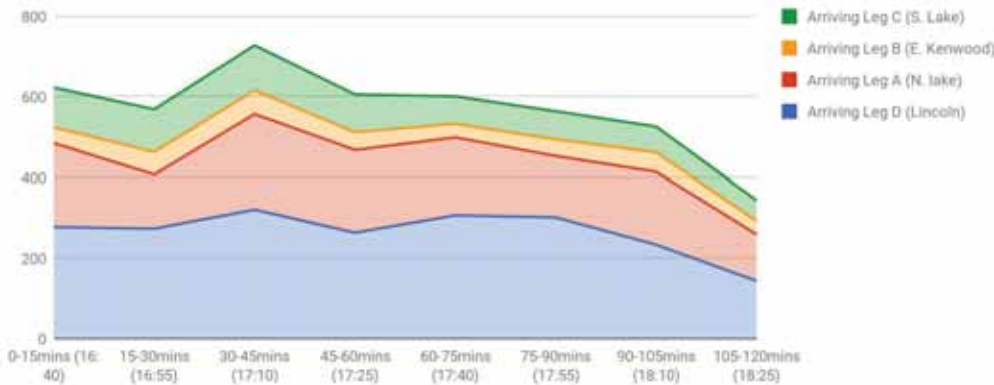
Thursday April 19th, 2018 16:40-18:40 CST (43° - Clear)

2hr Automobile Total : 4561

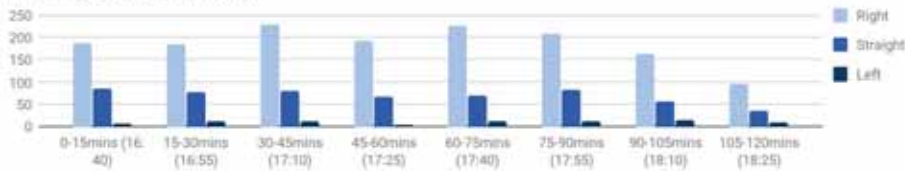
Arriving A: 1419
 Arriving B: 354
 Arriving C: 664
 Arriving D: 2124



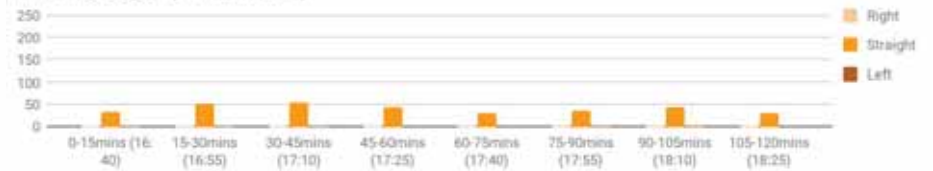
Automobile Crossings - By Leg



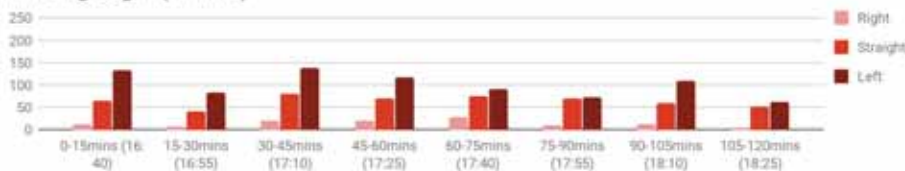
Arriving Leg D (Lincoln)



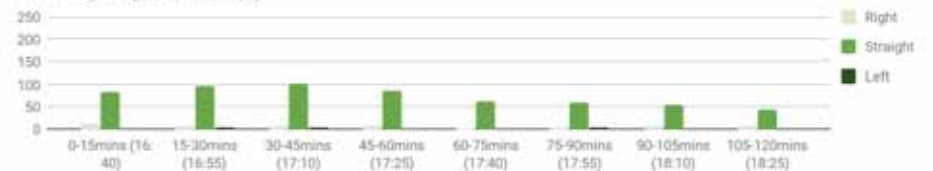
Arriving Leg B (E. Kenwood)



Arriving Leg A (N. lake)



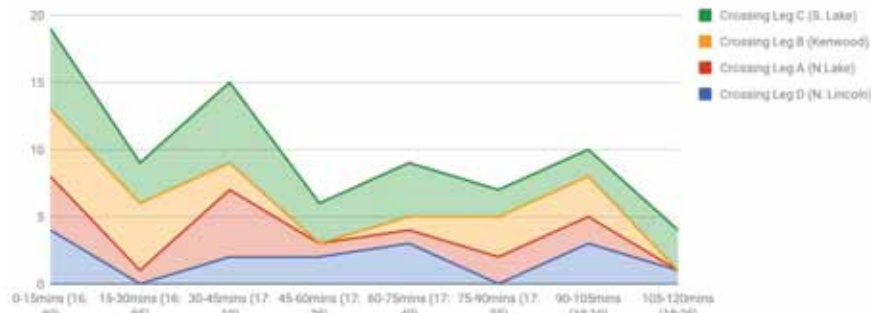
Arriving Leg C (S. Lake)



Pedestrian & Bicycle Counts

Thursday April 19th, 2018 16:40-18:40 CST (43° - Clear)

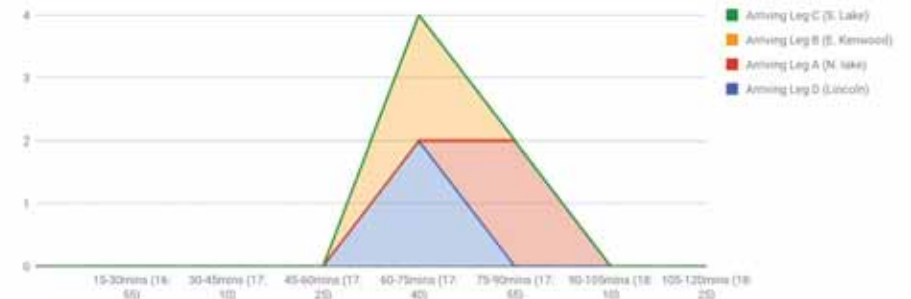
Pedestrian Crossings - By Leg



2hr Pedestrian Total : 79

Male : 41 Female : 38

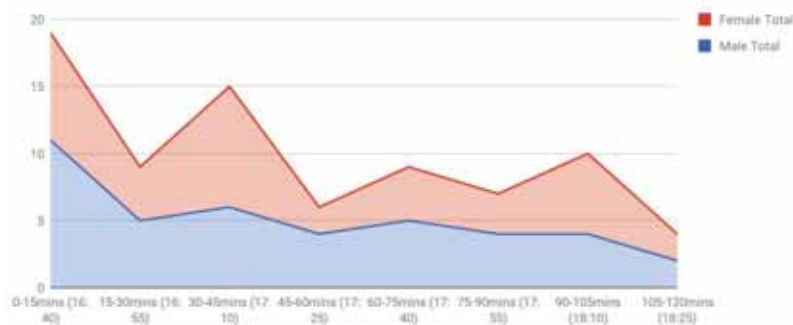
Bicycle Crossings - By Leg



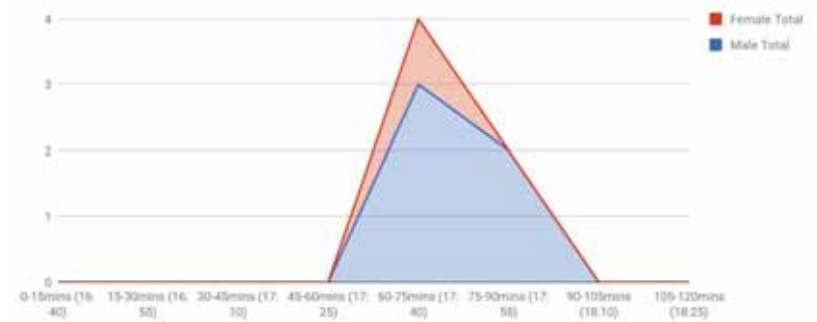
2hr Bicycle Total : 6

Male : 5 Female : 1

Pedestrian Crossings - By Gender



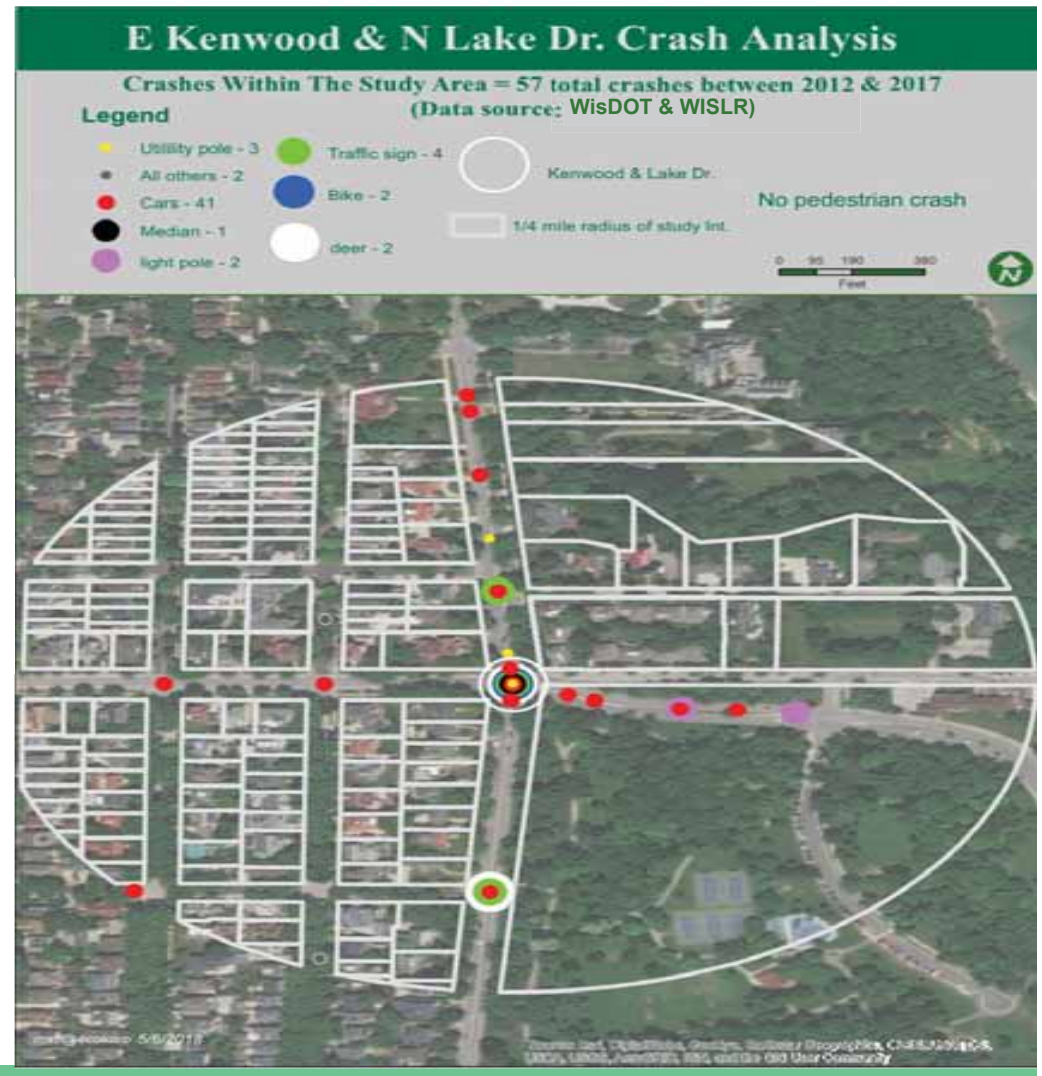
Bicycle Crossings - By Gender



Crash Analysis

Over 50% of the total crashes within a ¼ mile of E Kenwood & N Lake Dr. occurred at its intersection, which is why it needs attention.

- 100% Car & Bike crash
- 100% Car & Median crash
- 51% Car & Car crash
- 50% Car & Deer crash
- 50% Car & Traffic sign crash
- 33% Car & Utility pole crash



Crash Data

OBJECT	ACCDATE	ACCTYPE	ROADCOND	WTHRCOND	LGTCOND	VEHTYPE1	DRVDOO1	AGE1	SEX1	DRVDOO2	AGE2	SEX2	FID_MKTcrash	OBJECTID	DOCSMBR	RTYHOUR	REGION	COUNTY	MUNICIPALI	MUNITYPE	OWHWYR	OWHWYR	OWHWY	OWSTR_1	
1	12/20/16	OTHPX		CLR	LGTT	CAR	GO STR	0	N		0		66162	85802	OPV9AMP	18	5E	MLWAUNKEE	MLWAUNKEE	C				N BARRETTA AVE	
2	3/13/2017		SNOW	SNOW		CAR	BLNK	49	M	BLNK	21	F	3218	17977	JL31F8V9S	18	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	N LAKE DR	
3	6/12/2016	TFSGN		CLDY		CAR	RT TRN	26	F		0		3229	17979	QDPOOXX	14	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E LINWOOD AVE	
4	4/27/2014	DRSR		BLNK		BLNK	BLNK	22	M		0		85299	70953	QDCC98S	8	5E	MLWAUNKEE	MLWAUNKEE	C				LAKE DR N	
5	4/20/2016			CLDY		CAR	GO STR	47	F	GO STR	45	F	49815	64568	OPV259D	16	5E	MLWAUNKEE	MLWAUNKEE	C				E LINWOOD AVE	
6	11/21/2014	LTPOLF		CLR	LGTT	CAR	NEOCR	27	M		0		85958	88716	882DQ6E	3	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR	
7	6/21/2015			CLR		CAR	U TURN	32	M	U TURN	41	M	85969	88727	882DQ7E	17	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR	
8	2/11/2012	LTPOLE	SNOW	CLR		CAR	GO STR	56	M		0		95527	71265	882DQ8E	9	5E	MLWAUNKEE	MLWAUNKEE	C				LINCOLN MEM DR N PARK RD	
9	1/11/2017			WET	CLDY	DUSK	CAR	BLNK	45	M	BLNK	49	M	89968	88728	JL101713G	18	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR
10	11/16/2016			CLR		TRK ST	LT TRN	22	M	LT TRN	51	M	89967	88728	QD089KP	18	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR	
11	6/16/2014			CLR		CAR	GO STR	27	M	STOPED	39	F	95302	70960	QDZ61K	15	5E	MLWAUNKEE	MLWAUNKEE	C				LAKE DR N	
12	10/1/2014			CLR	LGTT	CAR	GO STR	0	N	STOPED	83	F	85946	88754	QD577E	18	5E	MLWAUNKEE	MLWAUNKEE	C				N LAKE DR	
13	5/5/2016			CLR		CAR	BLST	22	M	STOPED	67	M	85966	88724	QDTE2G	9	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR	
14	7/21/2015	BKE		CLR		CAR	RT TRN	73	F	OTHR	19	F	3221	17979	QD289CL	18	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
15	6/14/2016			CLDY		CAR	GO STR	32	M	STOPED	82	M	3222	17980	QD000G	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
16	1/1/2012			WET	CLDY	CAR	GO STR	44	F	GO STR	71	F	3223	17961	880G95N	11	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
17	3/27/2013			CLR		CAR	GO STR	35	F	GO STR	22	M	3224	17962	QD2RQ1	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
18	11/25/2014	SNOW		CLDY		CAR	RT TRN	21	M	GO STR	69	M	3225	17963	QD172GJ	7	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
19	7/19/2012			CLDY		CAR	GO STR	0	N	RT TRN	26	M	3226	17964	QD09V1V	18	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
20	2/14/2012			WET	CLDY	CAR	GO STR	83	F	GO STR	80	F	3227	17965	880B2CK	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
21	3/5/2017			CLR		CAR	BLNK	0	N	BLNK	45	F	3228	17966	JL3L127RT	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 N LAKE DR	
22	3/12/2017			CLR		CAR	GO STR	47	F	GO STR	19	F	3229	17967	JL17LCTL4	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 N LAKE DR	
23	12/8/2017			CLDY		CAR	RT TRN	85	F	NEOCR	79	M	3230	17968	JL16VVD6N	7	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 N LAKE DR	
24	11/24/2015			WET	CLR	TRK SA	RT TRN	44	M	RT TRN	60	M	3231	17969	QDVA98B	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
25	3/9/2017			CLR	DUSK	CAR	BLNK	22	M	BLNK	41	F	3232	17990	JL199F9BJ	19	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
26	6/7/2012			WET	BLNK	BLST	32	F	STOPED	18	F		3233	17991	QD1V8F4	18	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
27	4/19/2013			CLR	LGTT	CAR	GO STR	21	M	GO STR	28	F	3234	17992	QD168FG	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
28	12/29/2014	TFSGN		CLR	LGTT	CAR	GO STR	49	F		0		3235	17993	QD100GQ	2	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
29	10/20/2012			WET	RAIN	LGTT	CAR	GO STR	0	N	RT TRN	26	M	3236	17994	QDVA9C3	21	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD
30	8/29/2012	TFSGN		CLR		CAR	LT TRN	27	M		0		3237	17995	880G9MK	18	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
31	6/25/2012	BKE		CLR		CAR	GO STR	38	M	GO STR	24	F	3238	17996	QDVA9JC	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	E KENWOOD BLVD	
32	11/22/2014	MCD B	ICE	SLEET	DAWN	CAR	NEOCR	57	F		0		3239	17997	QD172GQ	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	LINCOLN MEMORIAL DR N	
33	9/25/2017			CLR		TRK UT	CHG LM	80	M	GO STR	33	M	49653	84411	JL18B8GKT	18	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
34	11/4/2014			WET	SLEET	CAR	GO STR	24	F	LT TRN	45	F	49654	84412	QD577T3	11	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
35	3/13/2017			CLR		CAR	LT TRN	22	F	GO STR	19	M	49655	84413	JL3023VQD	12	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
36	5/17/2017			CLDY		CAR	BLNK	0	N	BLNK	35	F	49656	84414	JL34V1G0T2	20	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
37	8/16/2018			CLR	DUSK	CAR	LT TRN	24	M	GO STR	28	F	18254	88812	QD190L3	9	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
38	6/6/2014			CLR		CAR	NEOCR	32	M	NEOCR	32	M	55300	70958	QD172ND	15	5E	MLWAUNKEE	MLWAUNKEE	C				LAKE DR N	
39	2/7/2015			WET	CLDY	CAR	LT TRN	50	M	GO STR	29	M	55301	70959	QD1728R	15	5E	MLWAUNKEE	MLWAUNKEE	C				LAKE DR N	
40	2/19/2014			WET	RAIN	CAR	GO STR	20	F	STOPED	61	F	65945	88703	QD100PR	13	5E	MLWAUNKEE	MLWAUNKEE	C				N LAKE DR	
41	1/11/2017	DEER	BLNK	BLNK		TRK UT	BLNK	45	M		0		89971	88726	JL32N0P3C	18	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR	
42	6/24/2015	LTPOLE		CLR	LGTT	CAR	RT TRN	21	F		0		86034	88782	882DQ9E	21	5E	MLWAUNKEE	MLWAUNKEE	C				N LINCOLN MEMORIAL DR	
43	11/8/2013			CLDY		CAR	GO STR	22	M	GO STR	18	F	57751	72589	QDVA98B	12	5E	MLWAUNKEE	MLWAUNKEE	C				BARRETTA AVE N	
44	3/8/2017			CLDY		CAR	LT TRN	57	M	GO STR	25	F	49673	84431	JL351TJQ4	8	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
45	10/23/2015			CLDY		CAR	GO STR	18	F	GO STR	20	F	55056	69914	QD281K2	18	5E	MLWAUNKEE	MLWAUNKEE	C				E KENWOOD BLVD	
46	7/21/2012			CLDY		CAR	GO STR	84	F	GO STR	60	F	3243	17999	QD1V8F4	15	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
47	10/16/2012	LTPOLE		CLR	LGTT	TRK UT	GO STR	43	M		0		3244	17999	QD1V8F4	1	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
48	3/20/17	OWHPX		CLR	LGTT	CAR	BLNK	72	F		0		68101	88858	JL3778HJR	18	5E	MLWAUNKEE	MLWAUNKEE	C				N BARRETTA AVE	
49	6/5/2012			CLR		CAR	LT TRN	20	M	GO STR	26	M	3245	18000	QDVA98B	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
50	3/26/2015			CLDY		CAR	GO STR	45	M	LT TRN	19	F	3243	18001	QD081GQ	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
51	9/23/2014			CLR		TRK UT	GO STR	45	M	GO STR	39	M	3244	18002	QDVA98B	8	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
52	5/13/2016	TFSGN		CLR		CAR	GO STR	0	N		0		3245	18003	QDVA98B	9	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 N LAKE DR	
53	3/18/2016			CLR		CAR	GO STR	17	M	BLST	20	F	3246	18004	QD289MT	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 N LAKE DRIVE	
54	12/16/2014	LTPOLF		CLR	LGTT	CAR	U TURN	16	F		0		3247	18005	QDVA98B	22	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
55	4/9/2017			CLR		CAR	BLNK	43	F	BLNK	18	M	3248	18006	JL31F8E8G	15	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR	
56	1/29/2015			CLR	LGTT	CAR	LT TRN	29	F	GO STR	54	M	3249	18007	QD281K2	17	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	
57	10/27/2014			CLR		CAR	GO STR	70	M	GO STR	29	M	3250	18008	QDZ61K	16	5E	MLWAUNKEE	MLWAUNKEE	C		32	N	32 LAKE DR N	

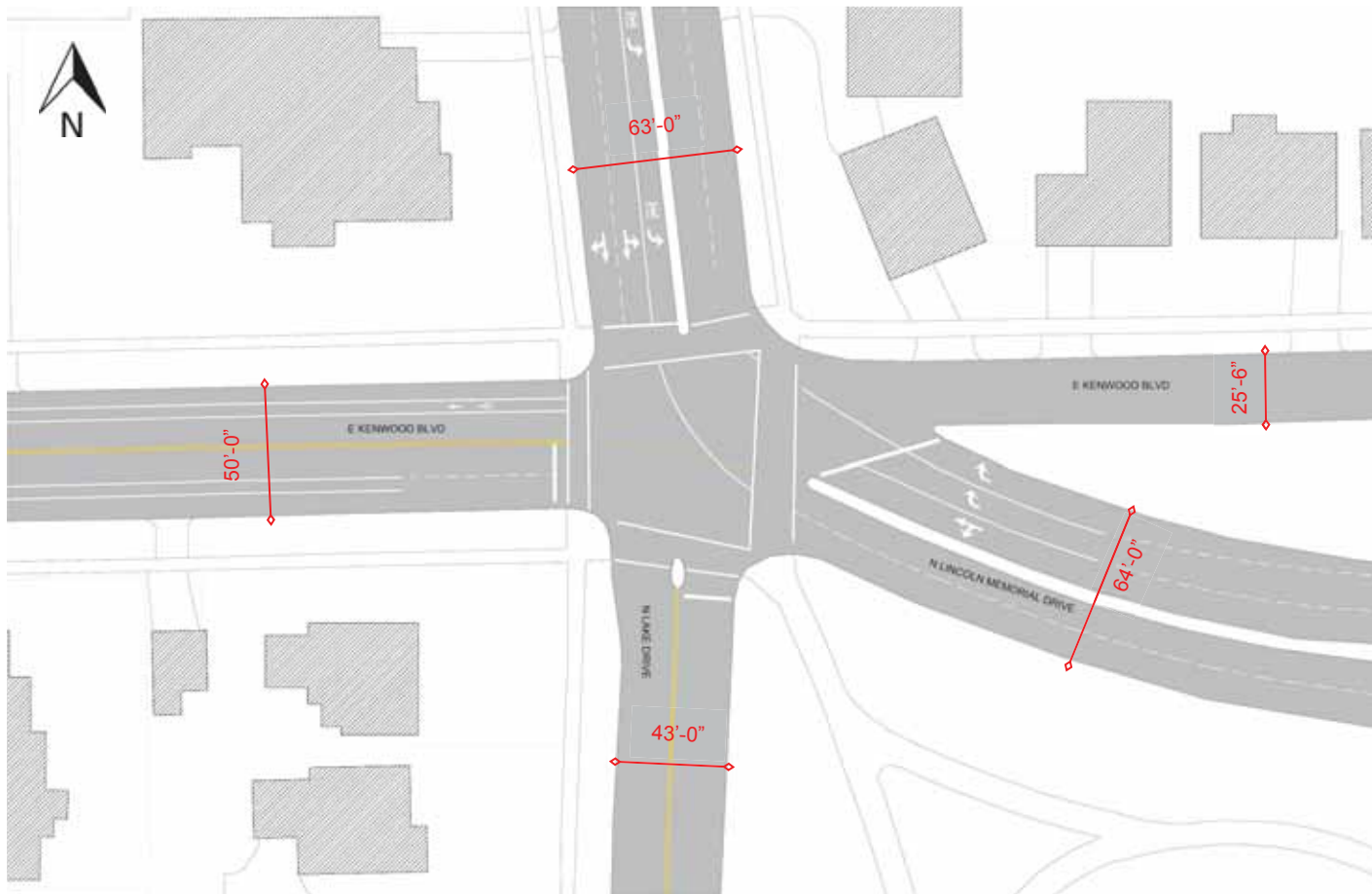


Intersection

Existing Conditions



Existing Condition



Road Widths

- E. Kenwood (west)
 - 50'
- E. Kenwood (east)
 - 25.5'
- N. Lake (north)
 - 63'
- N. Lake (south)
 - 43'
- N. Lincoln
 - 64'

Key Observations

- Kenwood Eastbound - No Access
- Dangerous, Illegal Kenwood Left Turn
- Extremely Faded Line Markings
- Long Pedestrian Waits
- Uncertain Bike Travel

Existing Sections



maps.google.com

streetmix.net

Existing Sections



maps.google.com



streetmix.net

Existing Level of Service (LoS) - Southbound Lake Dr.

Current Pedestrian Level of Service Evaluation

Input Variable Description	Variable	Measurement	(Typical range)
Number of through lanes in the study direction of travel	Nth	2.0	(1-4)
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0	(0-1)
Motorized vehicle running speed (miles/hour)	Sr	33.0	(5-55)
Midsegment automobile flow rate (vehicles/hour)	vm	780.0	(100-3000)
Width of the outside through lane (feet)	Wol	11.0	(9-16)
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0	(0-7)
Width of the paved outside shoulder or parking area (feet)	Wos	0.0	(0-10)
Curb is present (1 = yes; 0 = no)	C	1.0	(0-1)
Adjusted Width of the paved outside shoulder (feet)	Wos*	-1.5	
Proportion of on-street parking occupied (decimal)	ppk	0.00	(0-0.9)
Effective width of combined bicycle lane and shoulder or parking area (feet)	W1	-1.5	
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5	
Effective width of outside through lane, BL & shoulder as function of traffic volume (feet)	Wv	9.5	
Buffer width between roadway and sidewalk (ft) (use 0 if no SW)	Wbuf	5.0	(0-12)
Continuous barrier (1 = Y; 0 = N)	B	0.0	(0-1)
Buffer area coefficient	fb	1.0	
Sidewalk width (not including buffer) (feet) (use 0 if doesn't exist)	Wsw	6.0	(0-16)
Adjusted available sidewalk width	Was	6.0	
Sidewalk width coefficient	fsw	4.2	
Pedestrian LOS score for the roadway link	lp,link	2.87	
Pedestrian LOS grade for the roadway link	Grade	C	

- (2 left turn lane options, 2 straight through lane options, 1 right turn lane option)
- Curb height solid median
- Softscape buffer
- Grade= C

Existing Level of Service (LoS) - Southbound Lake Dr.

Current Bicycle Level of Service Evaluation

Input Variable Description	Variable	Measurement	(Typical range)
Number of through lanes in the study direction of travel	Nth	2.0	(1-4)
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0	(0-1)
Pavement condition rating (5 = excellent to 1 = poor)	Pc	2.5	(1-5)
Motorized vehicle running speed (miles/hour)	Sr	33.0	(5-55)
Adjusted motorized vehicle running speed (miles/hour)	Sra	33.0	
Midsegment automobile flow rate (vehicles/hour)	vm	780.0	(100-3000)
Adjusted midsegment demand flow rate (vehicles/hour)	vma	780.0	
Percent heavy vehicle volume (percentage)	PHV	2.0	(0-100)
Adjusted percent heavy vehicle volume (percentage)	PHVa	2.0	
Width of the outside through lane (feet)	Wol	11.0	(9-16)
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0	(0-7)
Width of the paved outside shoulder or parking area (feet)	Wos	0.0	(0-10)
Curb is present (1 = yes; 0 = no)	C	1.0	(0-1)
Adjusted Width of the paved outside shoulder or parking area (feet)	Wos*	-1.5	
Proportion of on-street parking occupied (decimal)	ppk	0.00	(0-0.9)
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5	
Effective width of outside through lane, BL & shoulder as function of traffic volume (feet)	Wv	9.5	
Effective width of outside through lane (feet)	We	9.5	
Bicycle LOS score for the roadway link	Ib,link	4.83	
Bicycle LOS grade for the roadway link	Grade	E	

- Curb height median
- Long parallel cracking along travel lanes
- When over 50ft back from intersection, on street parking is present.
- Grade= E



Existing Condition



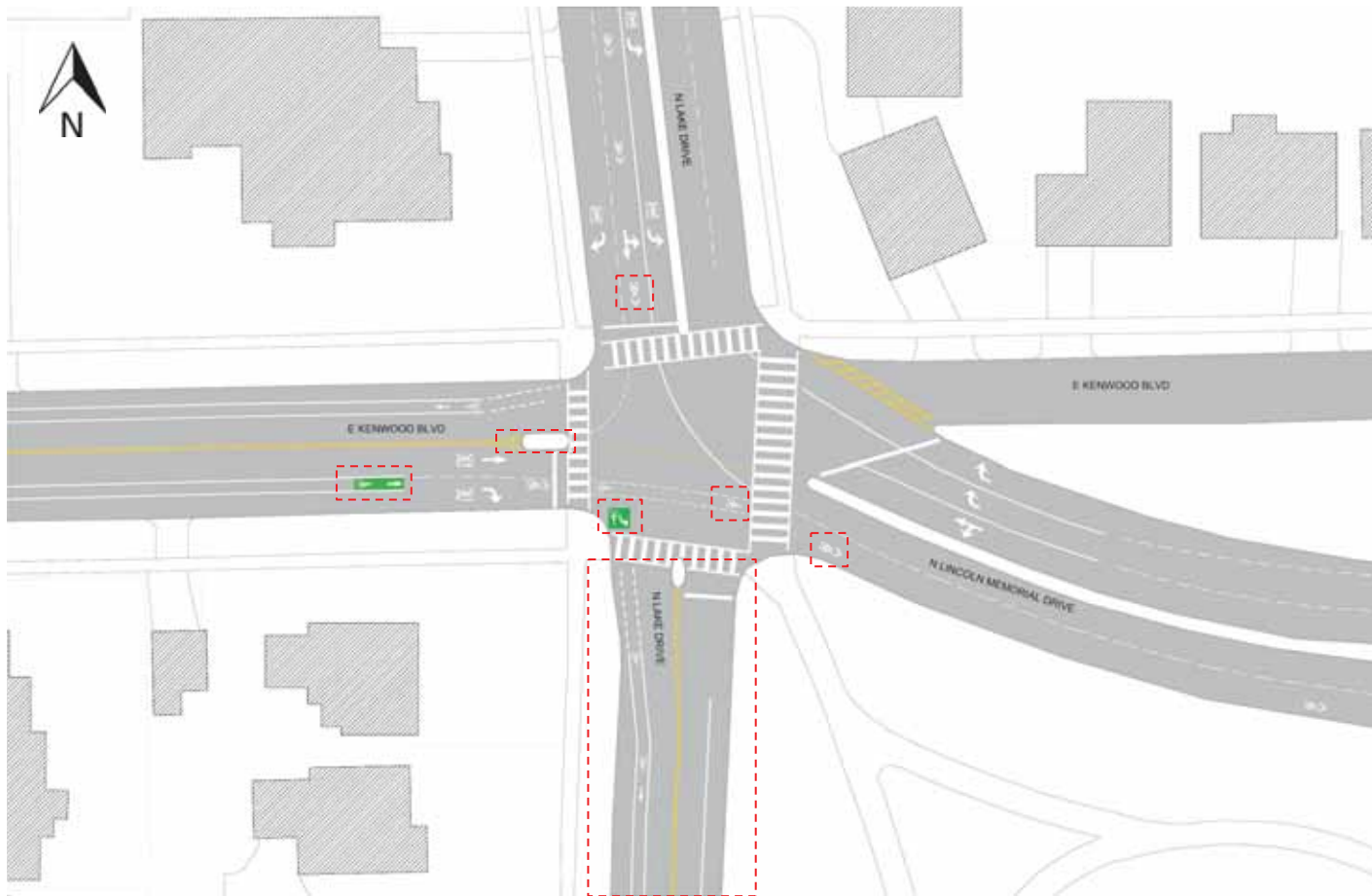
Proposed Intervention



Key Changes

- Continental Crossings
- Green Bike Lane End Warning
- Bike left Turn Box
- Sharrow Markings
- Closing Kenwood - Non rigid bollards
- N. Lake (south) Road Diet & Bike Lane addition
- New Right Turn and Straight Only Markings & E. Kenwood Curb
- Re-Positioned No Left Turn signage

Proposed Intervention



Key Changes

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- New Right Turn and Straight Only Markings & E. Kenwood Curb
- Re-Positioned No Left Turn signage

Proposed Section



maps.google.com



Proposed Section



maps.google.com



streetmix.net

New Level of Service (LoS) - Southbound Lake Dr.

Proposed Pedestrian Level of Service Evaluation

Input Variable Description	Variable	Measurement	(Typical range)
Number of through lanes in the study direction of travel	Nth	1.0	(1-4)
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0	(0-1)
Motorized vehicle running speed (miles/hour)	Sr	33.0	(5-55)
Midsegment automobile flow rate (vehicles/hour)	vm	780.0	(100-3000)
Width of the outside through lane (feet)	Wol	11.0	(9-16)
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0	(0-7)
Width of the paved outside shoulder or parking area (feet)	Wos	0.0	(0-10)
Curb is present (1 = yes; 0 = no)	C	1.0	(0-1)
Adjusted Width of the paved outside shoulder (feet)	Wos*	-1.5	
Proportion of on-street parking occupied (decimal)	ppk	0.00	(0-0.9)
Effective width of combined bicycle lane and shoulder or parking area (feet)	W1	-1.5	
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5	
Effective width of outside through lane, BL & shoulder as function of C (feet)	Wv	9.5	
Buffer width between roadway and sidewalk (ft) (use 0 if no buffer)	Wbuf	5.0	(0-12)
Continuous barrier (1 = Y; 0 = N)	B	0.0	(0-1)
Buffer area coefficient	fb	1.0	
Sidewalk width (not including buffer) (feet) (use 0 if doesn't exist)	Wsw	5.0	(0-16)
Adjusted available sidewalk width (feet)	Was	5.0	
Sidewalk width coefficient	fsw	4.2	
Pedestrian LOS score for the roadway link	lp,link	3.76	
Pedestrian LOS grade for the roadway link	Grade	D	

- Reduction to only 1 lane option for straight through travel.
- Far right lane becomes right turn only for vehicles
- Grade= D* (notes on next page)

New Level of Service (LoS) - Southbound Lake Dr.

Proposed Bicycle Level of Service Evaluation

Input Variable Description	Variable	Measurement
Number of through lanes in the study direction of travel	Nth	1.0
Character of cross-section (1 = divided by median; 0 = undivided)	D	1.0
Pavement condition rating (5 = excellent to 1 = poor)	Pc	2.5
Motorized vehicle running speed (miles/hour)	Sr	33.0
Adjusted motorized vehicle running speed (miles/hour)	Sra	33.0
Midsegment automobile flow rate (vehicles/hour)	vm	780.0
Adjusted midsegment demand flow rate (vehicles/hour)	vma	780.0
Percent heavy vehicle volume (percentage)	PHV	2.0
Adjusted percent heavy vehicle volume (percentage)	PHVa	2.0
Width of the outside through lane (feet)	Wol	11.0
Width of the bicycle lane (feet) (use 0 if doesn't exist)	Wbl	0.0
Width of the paved outside shoulder or parking area (feet)	Wos	0.0
Curb is present (1 = yes; 0 = no)	C	1.0
Adjusted Width of the paved outside shoulder or parking area (feet)	Wos*	-1.5
Proportion of on-street parking occupied (decimal)	ppk	0.00
Total width of outside through lane, bicycle lane, & paved shoulder (feet)	Wt	9.5
Effective width of outside through lane, BL & shoulder as function of C (feet)	Wv	9.5
Effective width of outside through lane (feet)	We	9.5
Bicycle LOS score for the roadway link	Ib,link	5.13
Bicycle LOS grade for the roadway link	Grade	F

(Measure to the closest 0.5 feet)

(Typical range)

(1-4)

(0-1)

(1-5)

(5-55)

(100-3000)

(0-100)

(9-16)

(0-7)

(0-10)

(0-1)

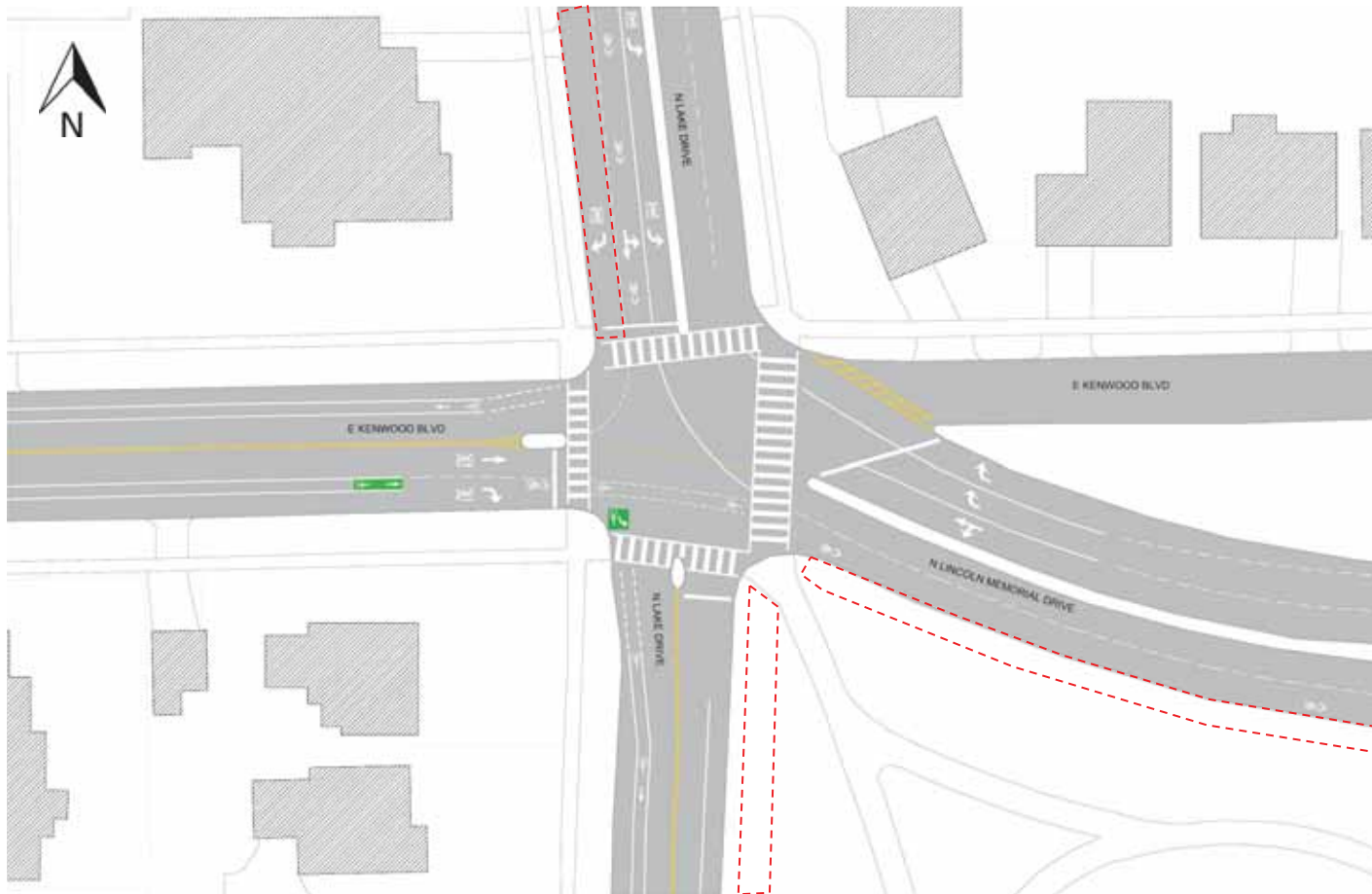
(0-0.9)

- Instead of allowing for straight traffic in right lane, make right turn only
- Mark center lane as shared bicycle and vehicle traffic lane

- Grade= F*

This Level of Service analysis method does not account for road diets, although NACTO guidelines outline design treatment as a road improvement for bicycle and pedestrian traffic. This analysis assumes all traffic volume will now be condensed closer to bicycle and pedestrian travel. Qualitative elements (such as markings) are also not represented in this model.

Further Proposals



Future Suggestions

- Improved Oak Leaf trail signage with Maps and wayfinding
- Removal of travel lane on N. Lake Dr (north) for protected bicycle lane
- Addition of raised bicycle track along N. Lincoln Memorial
- Re-asses Pedestrian Walk phases
- Full Green Bike Lanes
- Improved Sidewalk / Curb conditions
- New sidewalk along Lake Park

Cost Estimates

Milwaukee by Bike
City of Milwaukee
2010 Bicycle Master Plan
Plan & Maps
September 7, 2010

\$5,337,638 for 138.55 miles of bike path

$5,337,638 / 138.55 = \$38,524.99$ per mile of bike path

$\frac{1}{4}$ mile of bike path = \$9,631.25

\$54,250 per 100 ft of median

10ft of median = \$5,425

Bikeway Wayfinding Signage Design Summary Costing about \$250 each, wayfinding signs are a relatively cost-effective means for improving the walking and bicycling environment.

Total Project Cost= \$15,306.25



Compliance with City of Milwaukee 2010 Bicycle Master Plan

Milwaukee by Bike calls for an increase in the city's bicycle network **from 116 miles to 356 miles**. This increase will include 153 new miles of bike lanes **and shared lanes**, an expanded bike route system and over 70 miles of bicycle boulevards and paved trails.

Facility Recommendations To The On-Street Bicycle Network

Objective 1

Evaluate the bicycle network for new opportunities, **missing links**, and additional needs on an annual basis and add these to the Proposed Bicycle Network Map.

Objective 2

Sign bicycle routes with "Bicycles May Use Full Lane" R4-11 sign and/or add shared lane pavement markings (MUTCD figure 9C-9) on streets needed to connect bicycle lanes or **key destinations** where **bicycle lanes will not fit** due to right-of-way constraints.

Objective 3

Test **bicycle boxes** throughout the city, and install **shared lane** markings throughout the city.

Compliance with City of Milwaukee 2010 Bicycle Master Plan

Support Infrastructure Goal

Provide the support infrastructure necessary to encourage and support bicycling throughout the City of Milwaukee.

Objective 1

Ensure that the bicycle network is **clearly identified** and easy to use.

Provide ample bike lane and route signage.

Provide ample directional and location signage throughout the bicycle network.



Compliance with City of Milwaukee 2010 Bicycle Master Plan

Enforcement Programs Goal

Increase bicyclist safety by better enforcing the rules of the road for all street users.

Objective 2

- Better enforce existing traffic laws for both motorists and bicyclists.
- Work with MPD to better enforce all **traffic violations**
 - Drivers' failure to yield for pedestrians
 - over speeding and
 - safe passing distance violations.
 - Ignoring traffic signs



<https://thumbs.dreamstime.com/z/traffic-violation-icons-set-driving-flat-isolated-vector-illustration-61062171.jpg>

Compliance with City of Milwaukee 2010 Bicycle Master Plan

Bike Facility Design Options

Shared Use Paths In the absence of city-wide design guidelines for shared use pathways, Milwaukee should adopt Wisconsin State guidelines.

Intersection design (e.g., path-roadway crossings)



Colored Bicycle Lanes In Conflict Areas Colored bicycle lanes alert motorists to approaching conflict areas and help guide bicyclists through difficult transitions.

Sources

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<https://www.sandiego.gov/sites/default/files/sdm116.pdf>

http://www.ocpcrpa.org/docs/projects/bikeped/NACTO_Urban_Bikeway_Design_Guide.pdf

WisDOT crash shapefile (*Wisconsin Pedestrian and Bicycle Crashes - WisDOT: 2012-2018*)

Streets and street intersections shapefiles (*Wisconsin Information System for Local Roads - Dr. Schneider: 2018*)

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Dr. Schneider, Guests, & Fellow Classmates.

Any Questions?
