

IDOT District 6 Uncontrolled Crosswalk Pedestrian Safety Project



Illinois Department of Transportation

Marshall Metcalf, P.E.

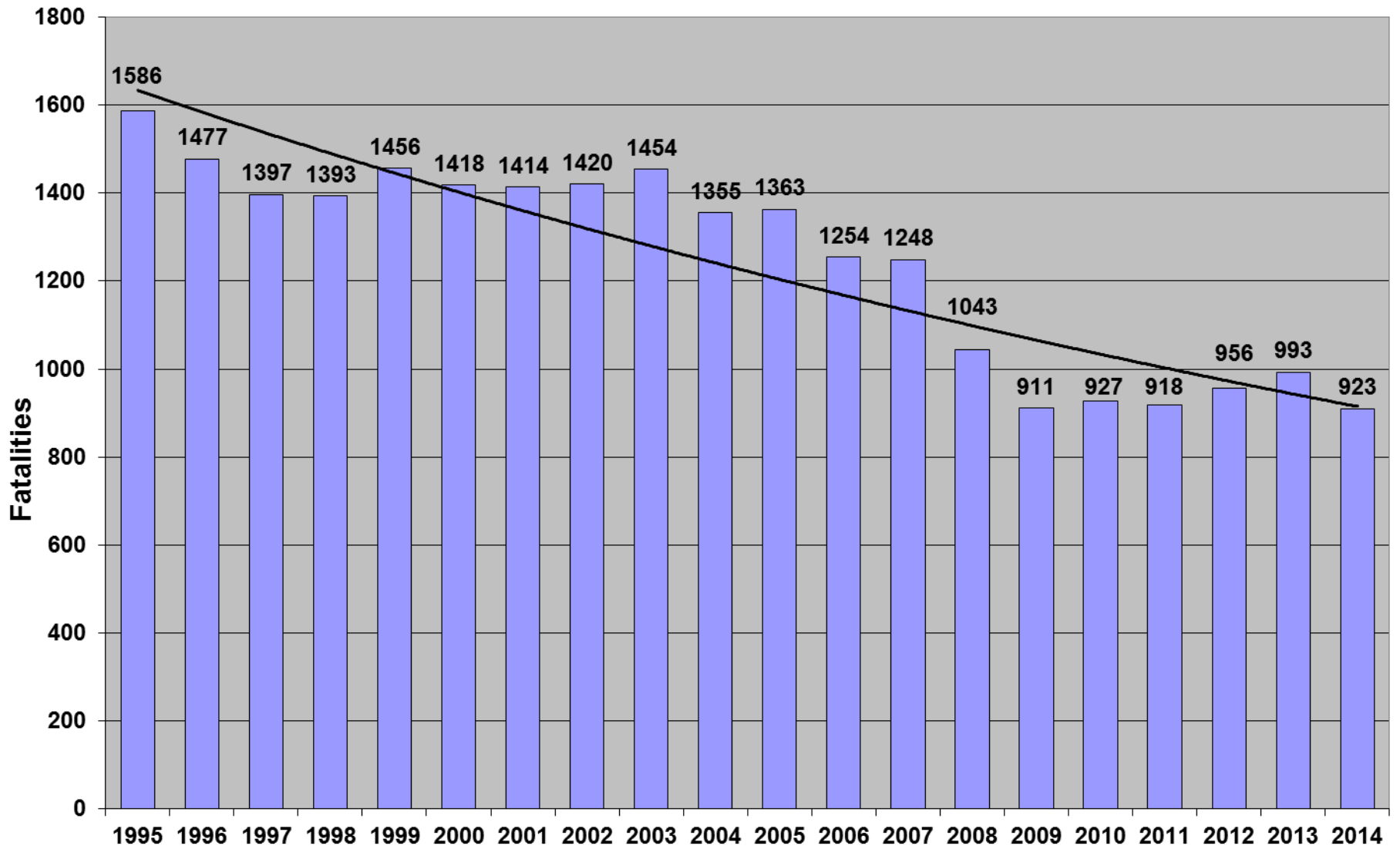
Dan Mlacnik, P.E.

Division of Highways/District 6

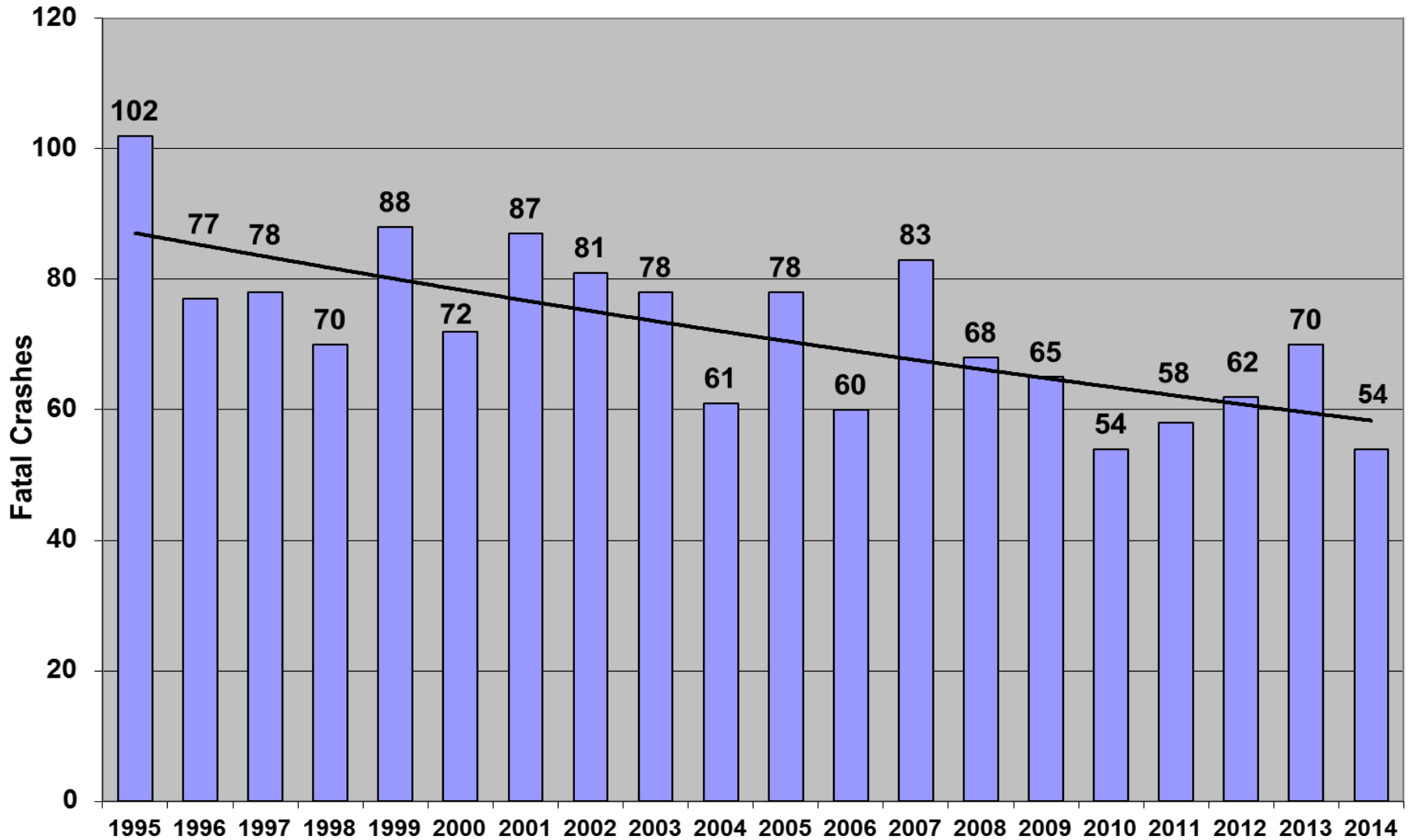
February 24, 2015



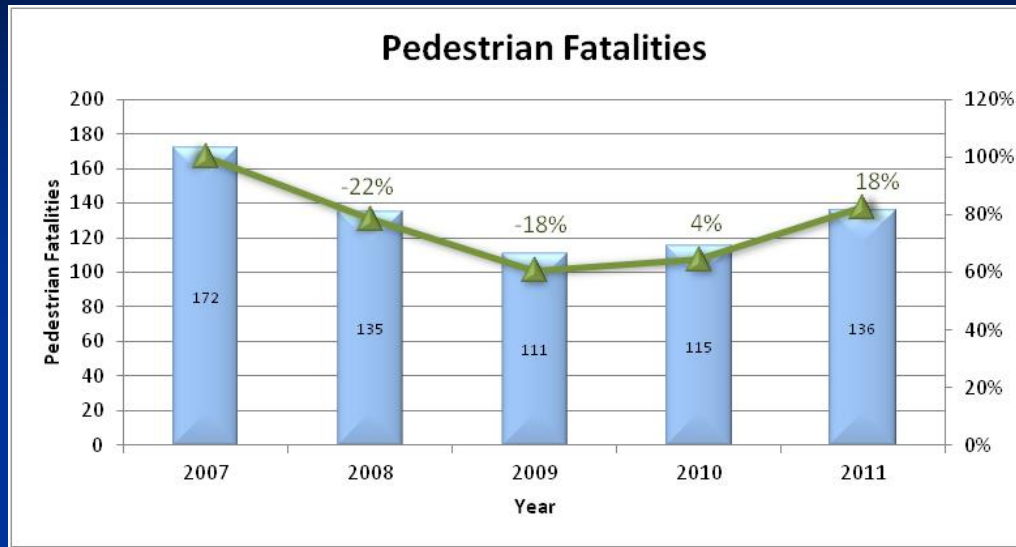
Illinois Roadway Fatalities 1995-2014



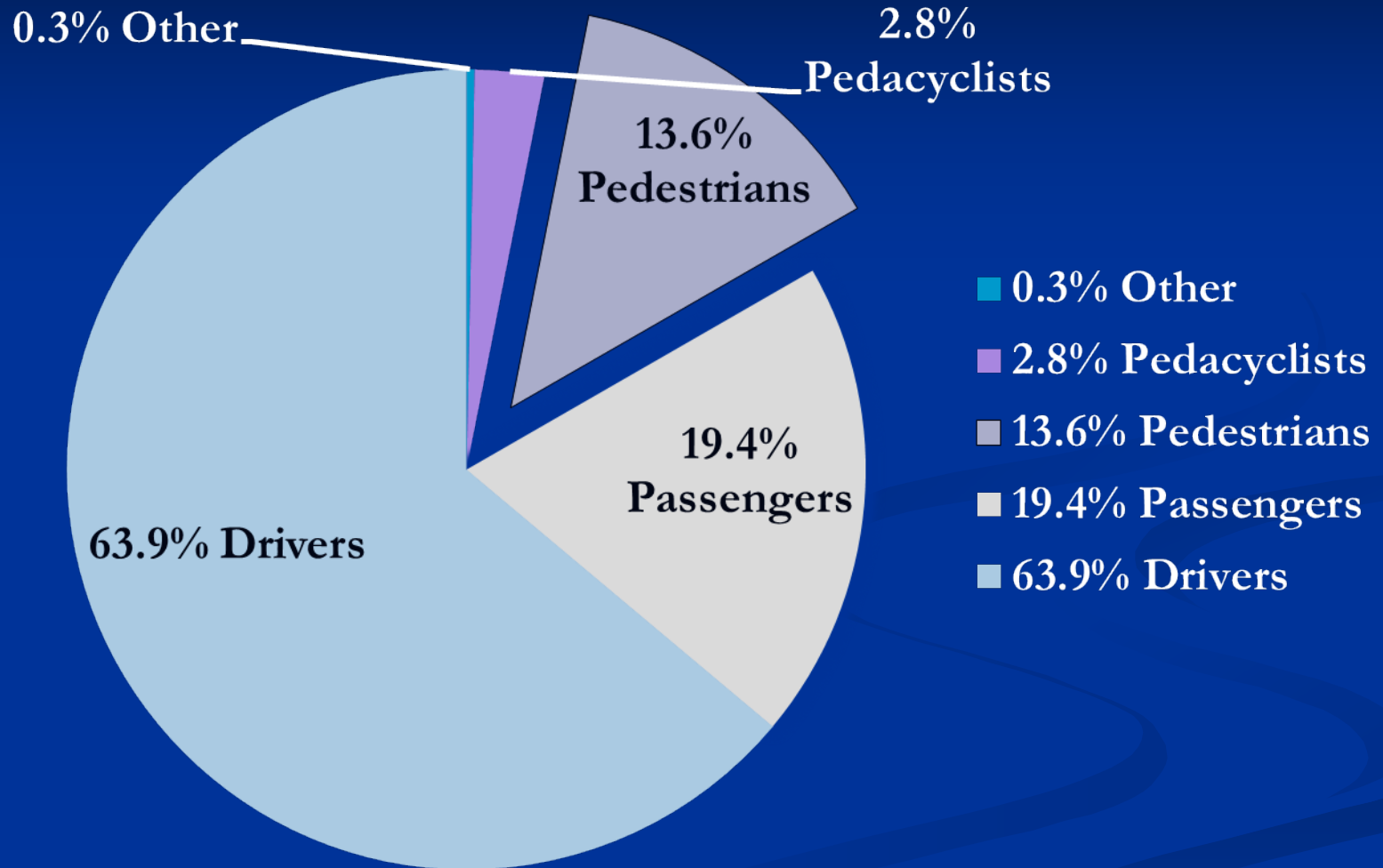
District 6 Roadway Fatal Crashes 1995-2014



Statewide Vulnerable User Fatalities 2007-2011



2014 Illinois Roadway Fatalities By Type



Note: "Other" includes occupants of non-motor vehicles (train passengers, occupant of horse-drawn carriage, person in building struck by motor vehicle, etc.), and equestrians.



District 6 Severe Pedestrian Crashes

2000-2011

Type of Crash	Number of Crashes	Avg. per Year	Nighttime Crashes	% Nighttime
Fatal (K)	36	3.0	22	61%
A-Injury	85	7.1	22	26%
B-Injury	122	10.2	13	11%
Total	243	20.3	57	23%

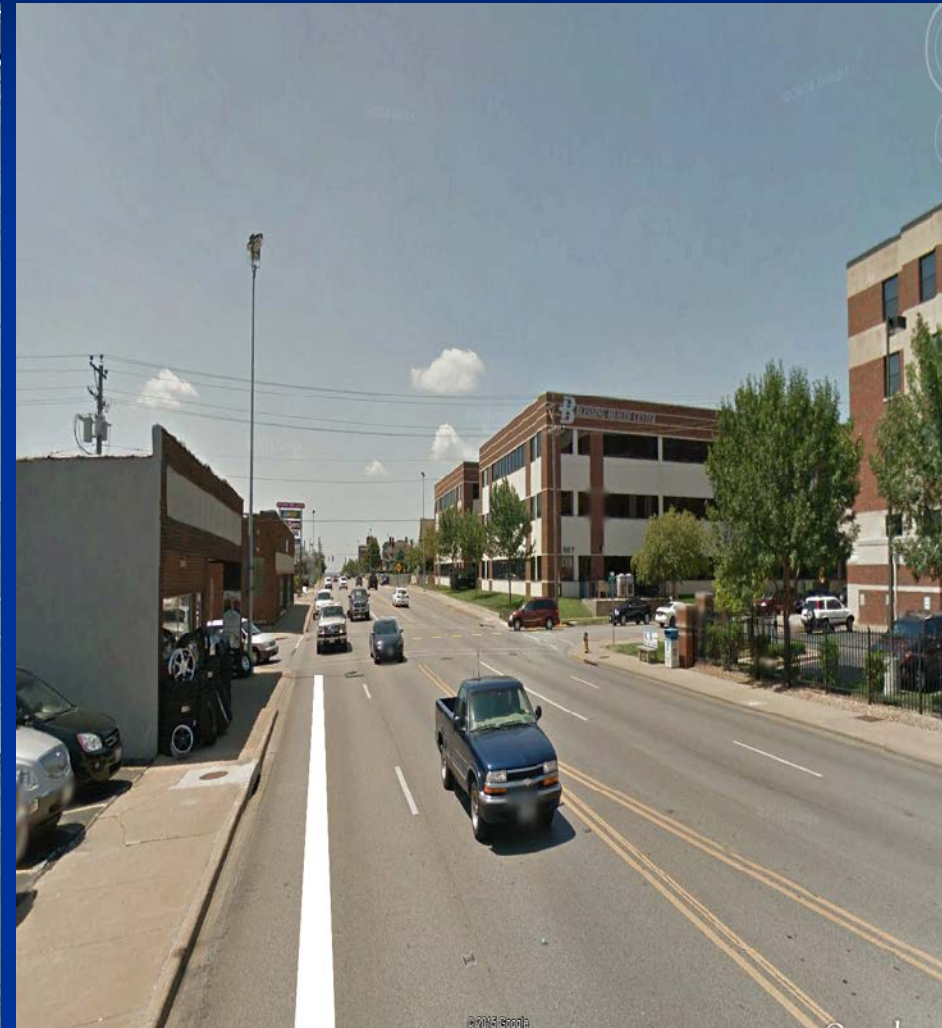
Fatal Pedestrian Crashes represent around 5% of all District Fatal Crashes.



Intersection of 10th & Broadway (IL 104) in Quincy

On BSE's 2012 5% Report

IL 104 ADT = 19,000



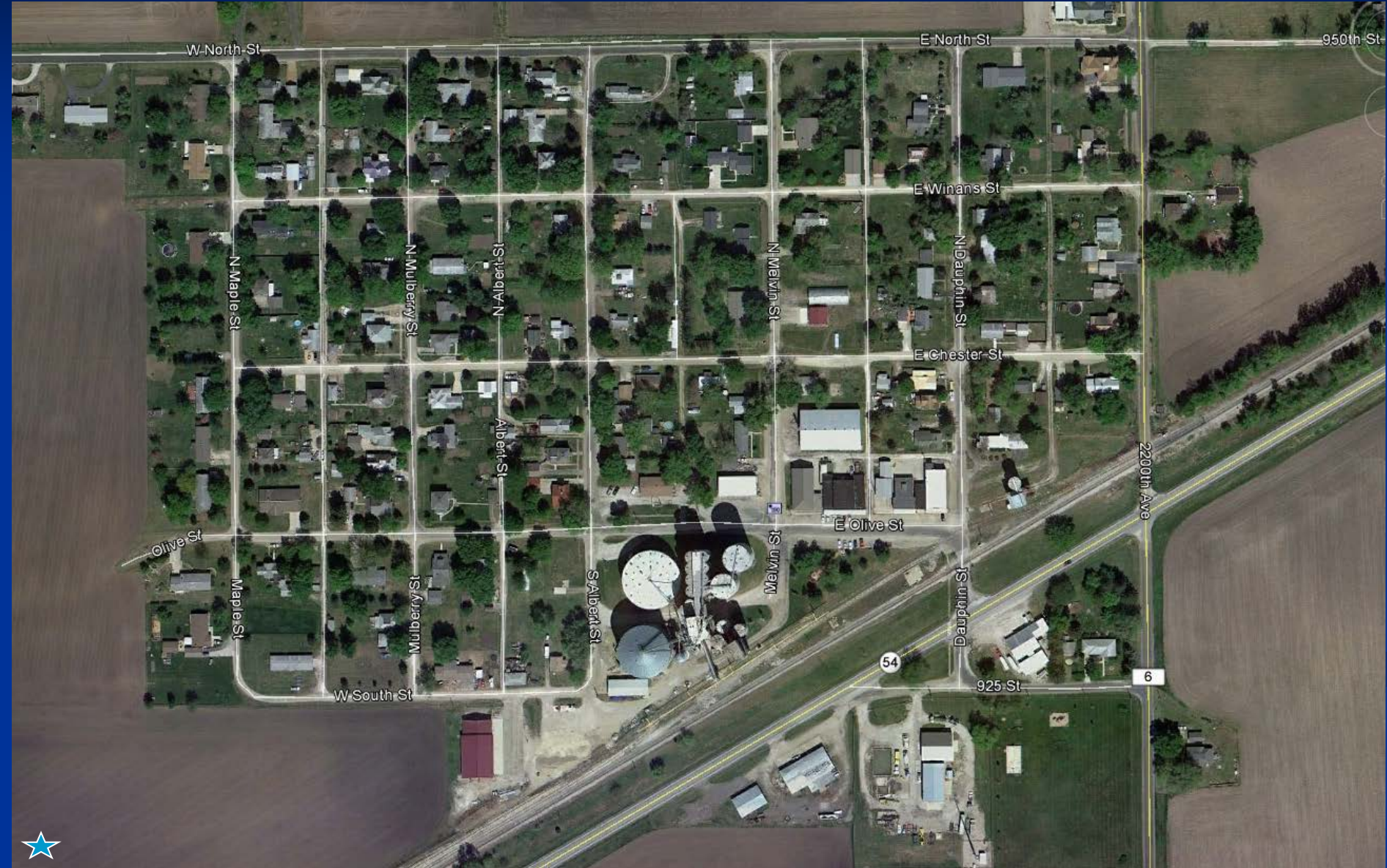
Policy Development

- Reviewed pedestrian plans from Chicago, New York, San Francisco
- How to adapt to rural, high speed?



Chestnut, IL

Population: 246



Policy Development

- Comments from peer review
 - Resistance to a written policy
 - “Don’t mark crossings, people get hit in crossings”



What Did We Initially Do?

- Reviewed Historical Pedestrian Crash Data
- Reviewed Bureau of Safety Engineering Priority Pedestrian Corridors
- Field Checked Existing & Potential Crossing Locations
- Created GIS Inventory of Uncontrolled Crosswalks



Policy Development

- Took draft policy on the road to test effectiveness
- Policy did not always match reality...



What Did We Find?

- It's Hard to Guide Pedestrians to Set Crossing Locations
- Inconsistent Applications
 - Lack of Advanced Warning Signs
 - Lack of Crosswalk Visibility
 - Underuse/Overuse of Crosswalk Striping
- Visual “Clutter”
- Antiquated Traffic Control Devices
- Non-Permitted Treatments



What Did We Find?

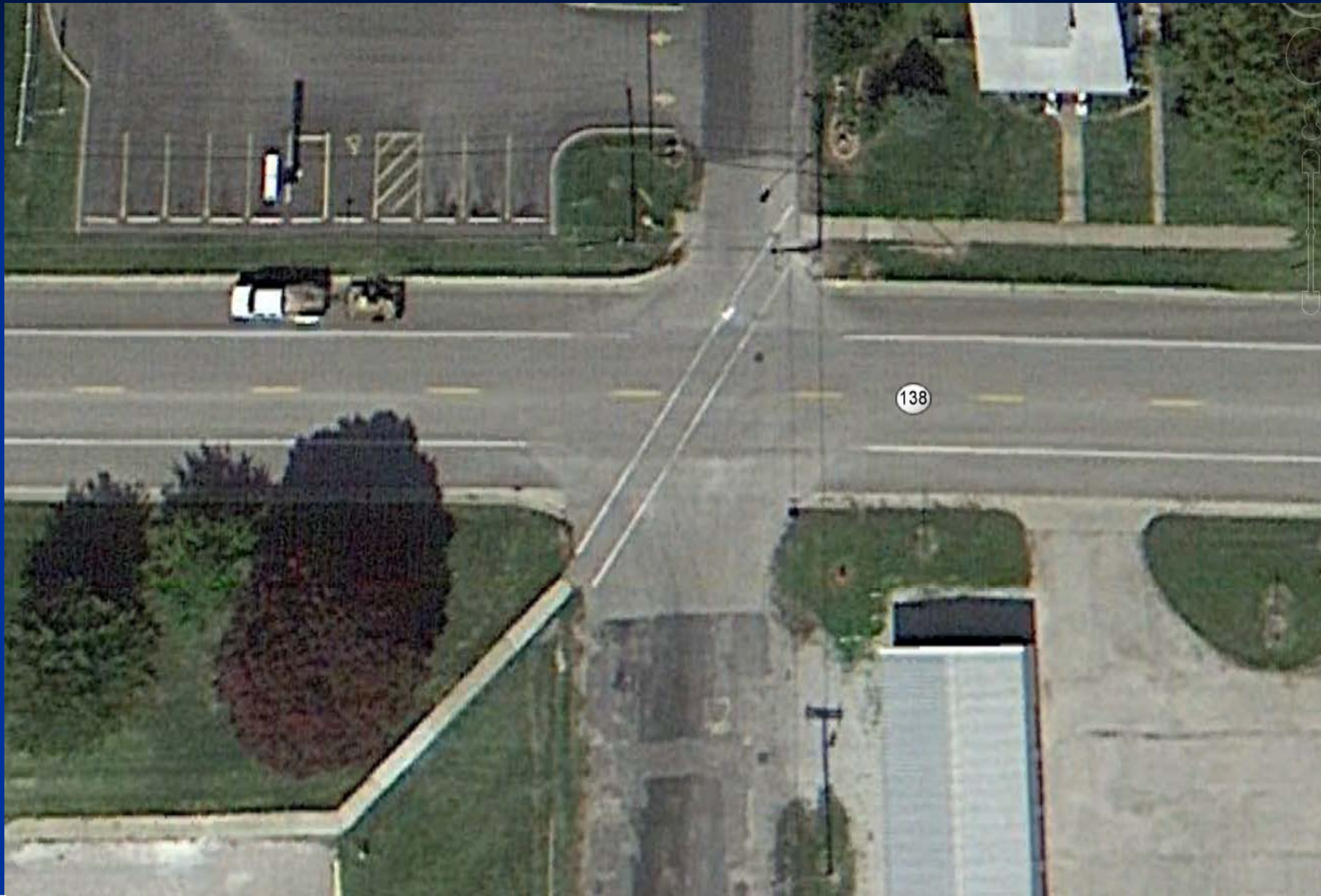




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What Did We Find?





What Did We Find?



What Did We Do Next?

- Refined District Policy
- Created Standard Detail
- Developed Proposed Districtwide Construction Project
- Submitted Project for HSIP Funding
- Coordinated with Local Agencies
 - Municipalities
 - School Districts



Plan Details

- Why we chose continental markings
- Pavement Marking Type selection
- Beacons



Continental Markings







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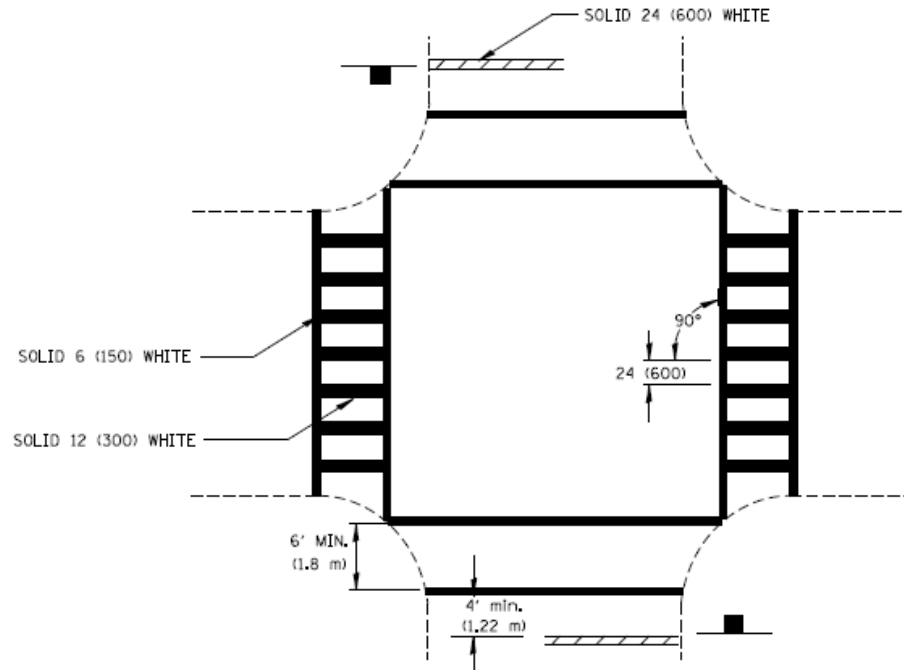




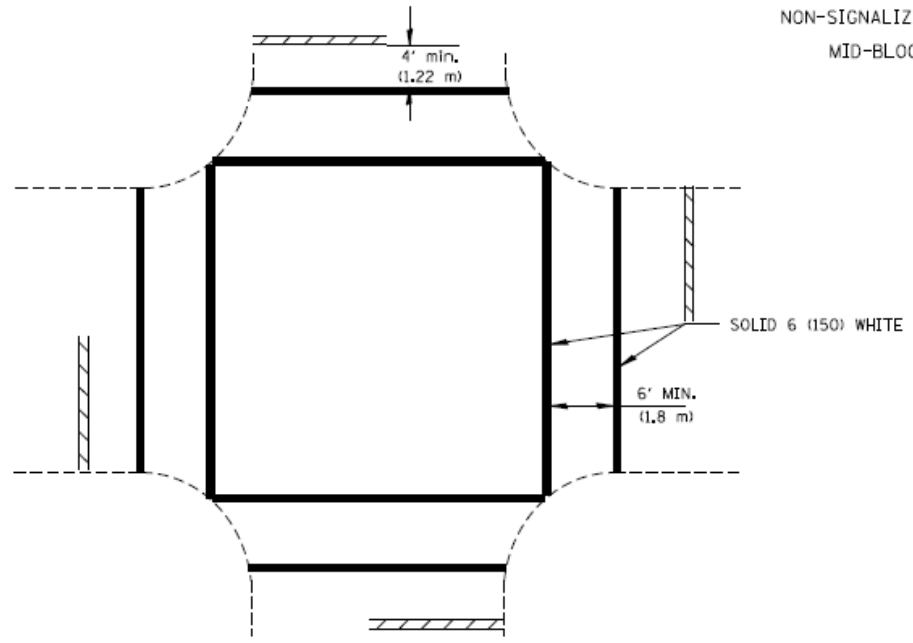
Continental Markings

- “Ladder” style continental marking uses 3 times the material as a “two lines” marking.
- Additional conspicuity worth the extra cost.





NON-SIGNALIZED INTERSECTION
OR
MID-BLOCK CROSSING



ALL WAY STOP CONTROLLED
OR
SIGNALIZED INTERSECTION

CROSSWALK MARKINGS SHOULD NOT BE USED INDISCRIMINATELY. AN ENGINEERING STUDY IS REQUIRED BEFORE THEY ARE INSTALLED AT LOCATIONS AWAY FROM TRAFFIC SIGNALS OR STOP SIGNS.
CROSSWALK SHALL CONNECT TO CURB CUTS OR SIDEWALKS. CROSSWALKS MAY BE INSTALLED AT A SKEW TO PERMIT THIS CONNECTION.

HMA SURFACES USE: URBAN THERMOPLASTIC
RURAL - CALL OPERATIONS
CONCRETE SURFACES USE: EPOXY

CROSSWALKS

All dimensions are in inches (millimeters) unless otherwise noted.



Pavement Marking Type

- Thermoplastic for HMA
 - Research by IDOT
 - Poor paint and urethane crosswalk performance
 - Observation of thermoplastic use by others



Pavement Marking Type

- Drawbacks with thermoplastic
 - Snow operations
 - Friction for motorcycles



Thermoplastic – How Much?

- Contract price 72G76
 - Mobilization - lump sum
 - \$2.40 per foot, 12 inch line
 - A 50 ft wide crossing = 150 sq ft = \$360





Pavement Marking Type

- Why not preformed?
 - Retrofit application



Pavement Marking Type

- Epoxy for PCC
 - Research by IDOT



Epoxy Markings

- Contract 72G76
 - \$6.85 per foot, 12 inch line
 - 50 ft wide crossing - \$1,027.50



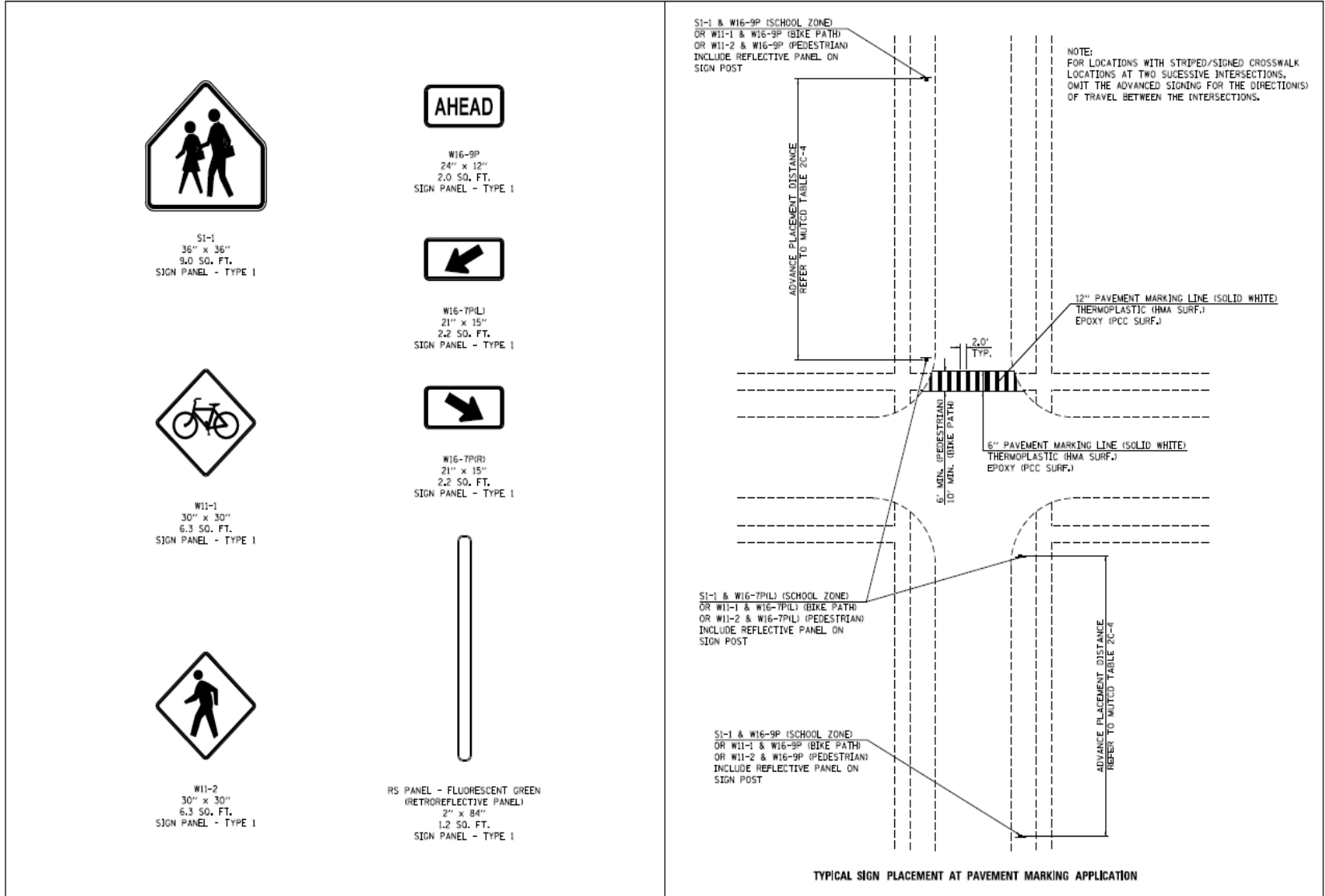
Beacons

- Removed old “Pelican” style beacons
- Installed new solar beacons
- Contract 72G76
 - Removal of existing beacons and time switch equipment - \$630 each
 - Beacons –
 - \$4480 to furnish and install beacons
 - \$950 for digital time switch
 - \$5430 total per beacon





■ Signing & Striping Upgrades at 140 Locations



FILE NAME =	USER NAME =	DESIGNED -	REVISED -
...	...	DRAWN -	REVISED -
...	...	CHECKED -	REVISED -
...	...	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SIGN AND PAVEMENT MARKING DETAILS

SCALE: SHEET OF SHEETS STA. TO STA.

F.A. DATE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
VAR	*			
CONTRACT NO. 72676			PROJECT	

Proposed Countermeasures:

Upgrade Signs to Conform with MUTCD (CMF= 0.85)
 Install High Visibility Crosswalks (CMF = 0.60)

Proposed Benefit to Cost Ratio:
13.50

PROJECT DESCRIPTION - PROJECT DATA INPUT (INTERSECTIONS)

Project:	Striping and Signing Improvements at Crosswalks					Prepared by:	S. Price	
District:	6	County:	Var.	City:	Var.	Date:	1/14/2014	
Key Route:	Var.	Market Route:	Var.	Map Post:		Current ADT:	Major Street:	Var.
Location Description:	Unprotected Crosswalks at Various Locations						Minor Street:	Var.
Crash data:	6	Years			Traffic Growth Factor:	1.3%		
	From	2007	to	2012	Interest rate:	4.0%		
Peer Group:	Peer Group 5 - Urban Minor Leg Stop Control Intersection							

Messages (See Manual for Details)
 The combined effect of multiple countermeasures is limited to 0.60 or the smallest CMF.

INTERSECTION CRASH SEVERITY DISTRIBUTION BY CRASH TYPE FOR ANALYSIS PERIOD

Crash Type	All Crashes	Angle	Animal	Fixed Object	Head On	Left Turn	Other Noncollision	Other Object	Overturned	Pedestrian	Pedicyclist	Parked Vehicle	Rear End	Right Turn	Sidewalk Same Direction	Sidewalk Opposite Direction	Turning	Train	Night Time	Wet Pavement	Total	
Crash Severity	ALL	AG	AN	FO	HO	LT	OtherNC	OtherO	OVT	PD	PDC	PKV	RE	RT	SSD	SOD	T	TR	NGT	WP	TOT	
Fatal Crashes	2									2												2
Minor Injury Crashes	2									2												2
Major Injury Crashes	5									5												5
Property Damage Only Crashes	0									0												0
PDO Crashes	0									0												0

INTERSECTION BENEFIT COST ANALYSIS

BENEFIT CALCULATIONS				COUNTERMEASURE COST CALCULATIONS						
COUNTERMEASURE	CMF *	Crash Type affected by this improvement	Unit Cost	Quantity	Units	Total Cost	Service Life	Present Worth	EUAC **	
1.3.1.IU.1 - Striping - Upgrade Signs to conform with MUTCD	0.85	All	\$328,000	1	Unit Qty	\$328,000	6	\$587,223	\$52,915	
1.4.14.AL.1 Install High-Visibility Crosswalk	0.60	PD	\$192,000	1	Unit Qty	\$192,000	15	\$192,000	\$17,269	
		All								
		All								
TOTAL BENEFIT			\$952,000							
						TOTAL COST			\$70,084	
BENEFIT COST			13.59							
		ANNUAL NUMBER OF FATALITIES POTENTIALLY PREVENTED							0.13	

**NOTE: IF THE NUMBER OF LEGS AFFECTED VARIES BY COUNTERMEASURES SELECTED, THEN CALCULATE THE BENEFIT-COST RATIO FOR EACH COUNTERMEASURE SEPARATELY (Use separate spreadsheets for each countermeasure applied).

* CMF = Crash Modification Factor

** EUAC = Estimated Uniform Annual Cost



Implementation of Contract

- Coordination with Resident Engineer & Contractor
- Digital Time Switch Pay Item
- Placement Issues



Problems on 24th Street in Quincy

- Existing pedestrian crosswalks on three blocks in a row
 - Middle crossing was signalized
- Separated neighborhood from school and park
- Decided to keep them all



Problems on 24th Street in Quincy

- Installed new signs, with markings to follow
- City police called – did not want south uncontrolled location.





Beacon Problems

- Digital Time Switch Specification Interpretation
- Bad Aim
- Communication Breakdown
- Does anybody know what time it is?





Beacon Problems

- Draft Specification



Implementation Problems

- Construction Inspector misunderstood intent of crosswalk/District typical





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Future Improvements

- Higher level treatments
 - (High-Intensity Activated crossWalk beacon (HAWK))
 - Rapid Rectangular Flashing Beacon (RRFB)
- ADA
- Lighting







2200N PEORIA RD

WIDE SANGAMON AVE

55 29

PEORIA RD





Questions?



Thank you!

