

Curbing Wrong Way Movements onto Michigan's Freeways

Mark Bott, P.E.

Engineer of Traffic & Safety

Michigan DOT

Study Details

Only included crashes caused by

WRONG WAY ENTRY

Onto the freeway system

Not included:

Crashes involving vehicle loss of control

or

Vehicles that crossed the median

110 Crashes

Wrong Way Crash Severity

32% of crashes resulted in K or A-injuries
(35 of 110)

Comparison: 2% of all freeway crashes result in K or A

The 35 KA crashes severely affected 66 people:

30 Fatalities

36 Incapacitating injuries

Severity by Location

Crash on an exit ramp

6% of crashes resulted in a K or A

Crash on freeway mainline

42% of crashes resulted in a K or A

By Location

Crash occurred on:

exit ramp – 31

mainline – 71

- entry ramp unknown – 67

- entry ramp known – 4

freeway-to-freeway ramp – 6

entrance ramp – 2

**35 Known
Entry Points**

Lighting Conditions

78% occurred under conditions of darkness

(86 crashes)



Question: Was there lighting at the ramp??

For 35 crashes with known entry point:

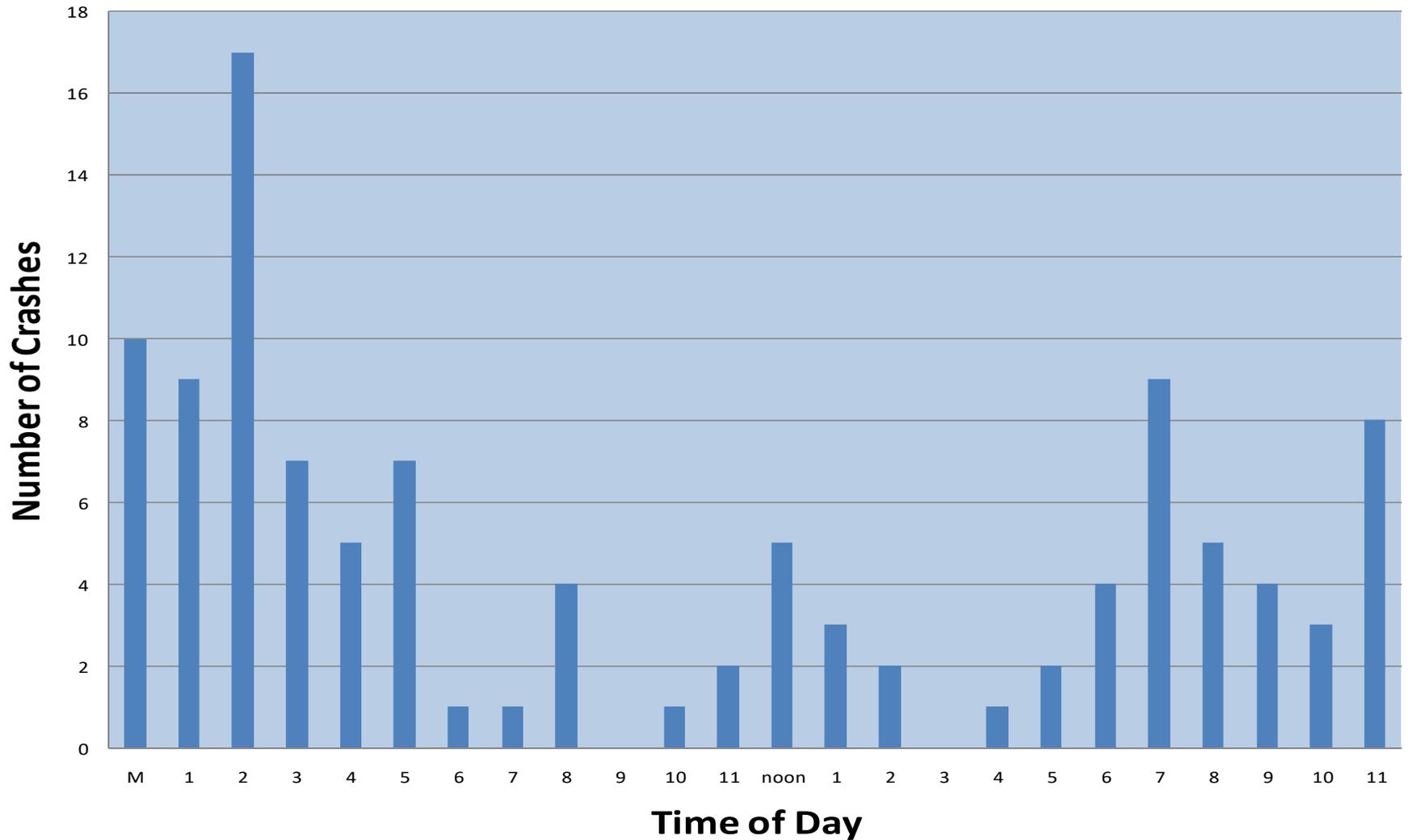
12 – daytime

15 – darkness, lighted

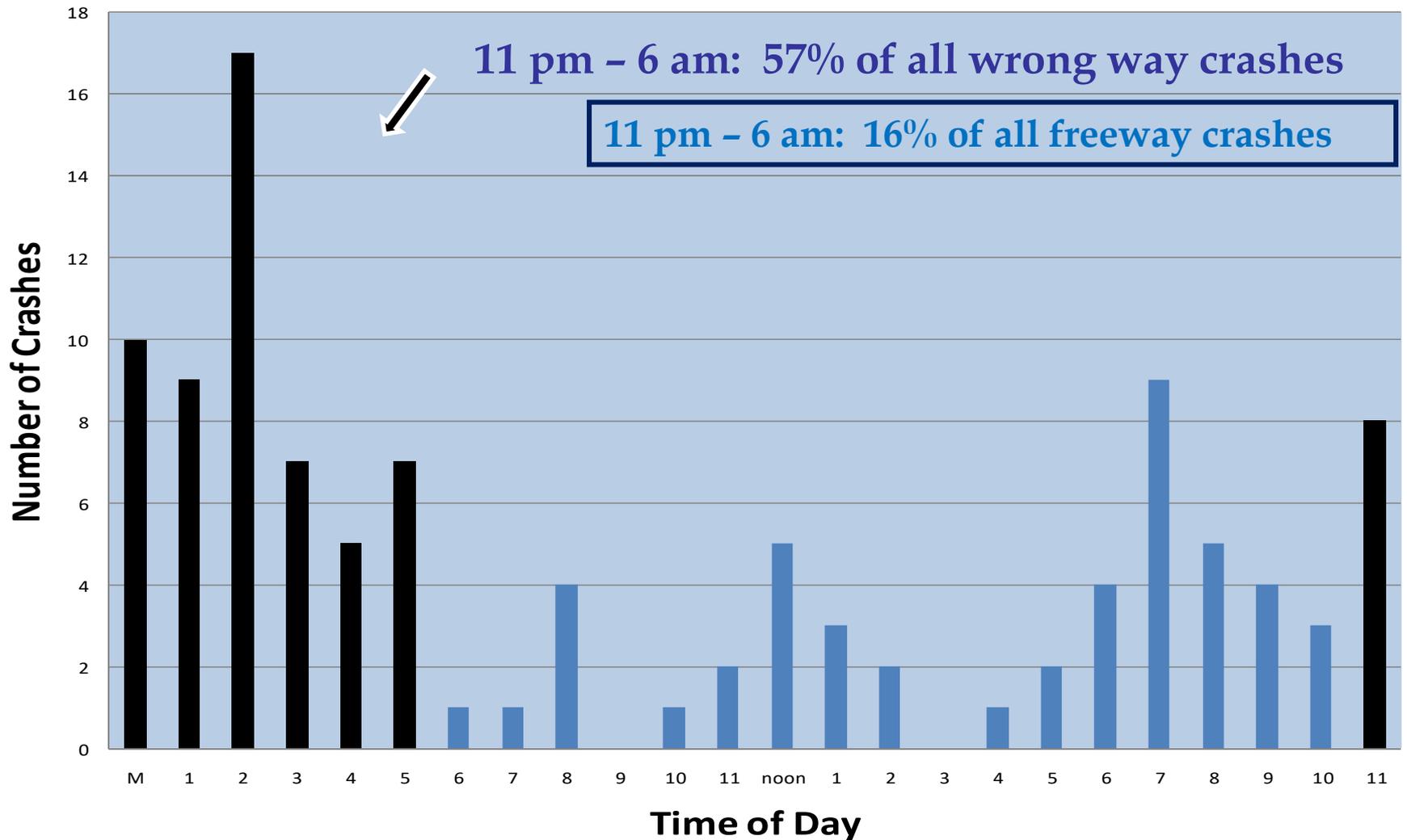
7 – darkness, unlighted

1 – dusk

By Time of Day



By Time of Day



Impaired Driving

(9 Crashes were drive-away – Impairment unknown)



60 Crashes, drivers were impaired:

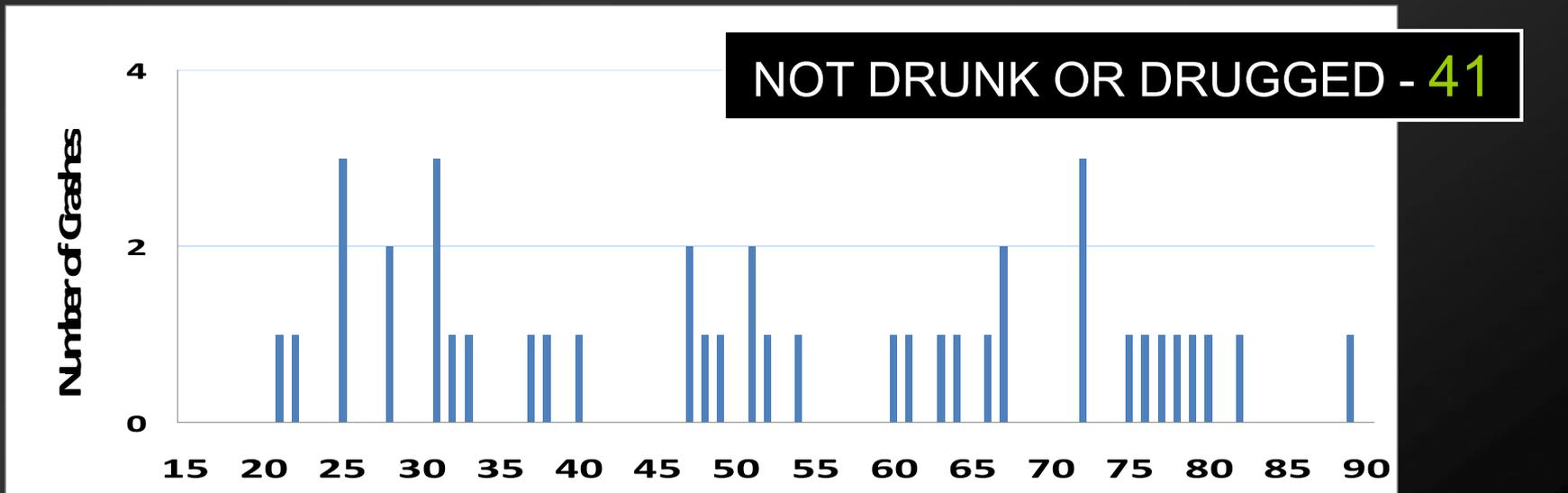
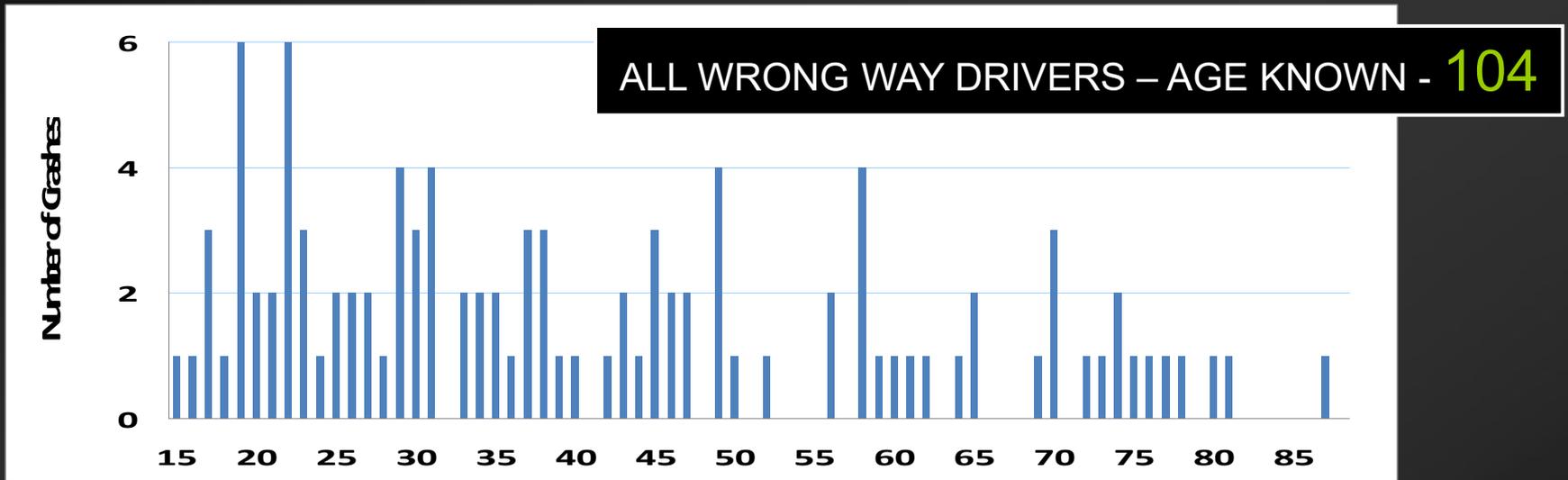
(54 of 60 at night)

48 under the influence of alcohol

7 under the influence of drugs

5 under the influence of both

By Age of Wrong Way Driver



Interchange Design

Can it affect wrong way
crashes??

MDOT Interchange Types

791 Interchanges

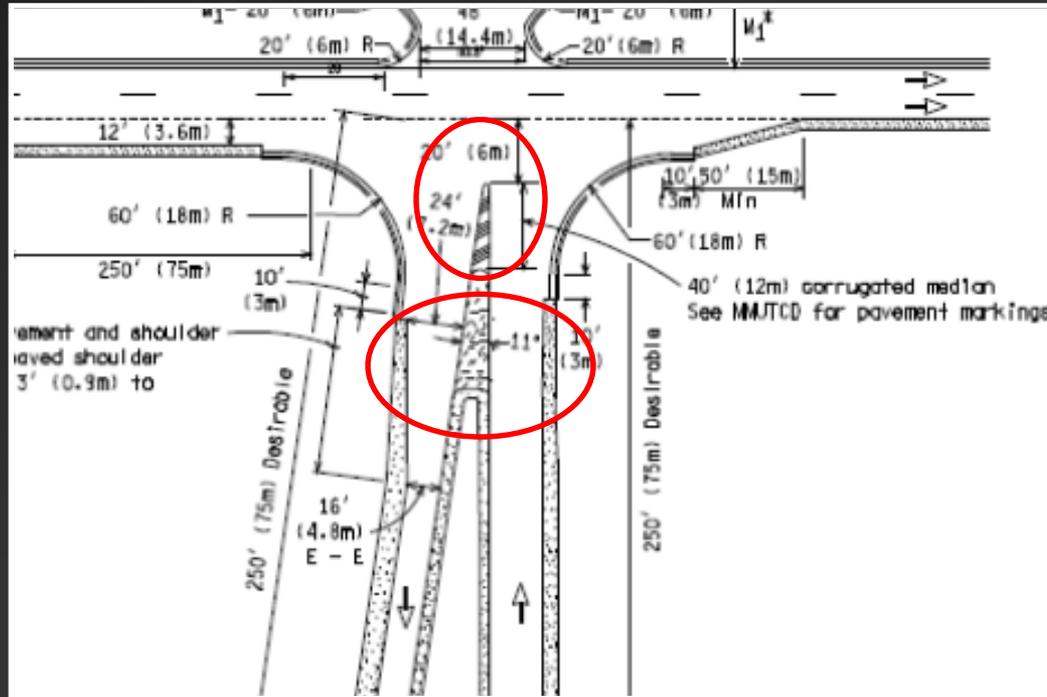
35 Known Wrong Way
Entries

Diamond – 340	6	
Partial Cloverleaf – 163	21	60% / 21%
Directional – 206	2	
Full Cloverleaf – 20	1	
Trumpet – 23	4	11% / 3%
Other – 39	1	

Partial Cloverleaf Interchanges



What do we already do?



From 8° angle between ramps to 11° angle.

From 30' setback to 20' setback for the corrugated island.

What else can we do?

LOW COST COUNTERMEASURES!

1. Lower Sign Height

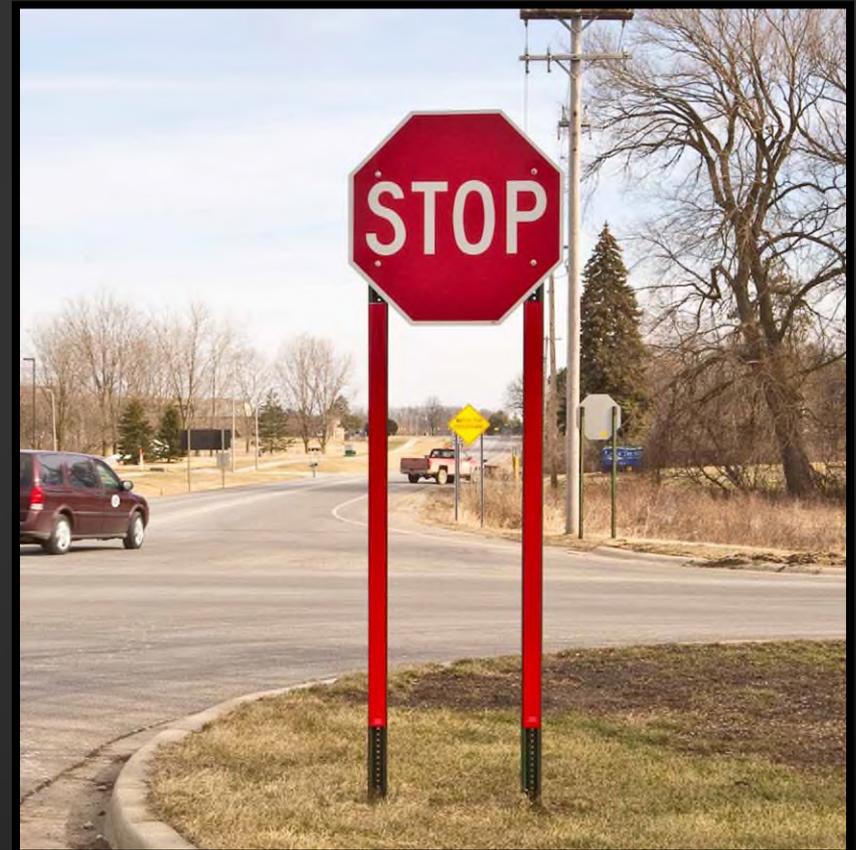


California



Idaho

2. Lollipops



4. Off Ramp Wrong Way Arrow



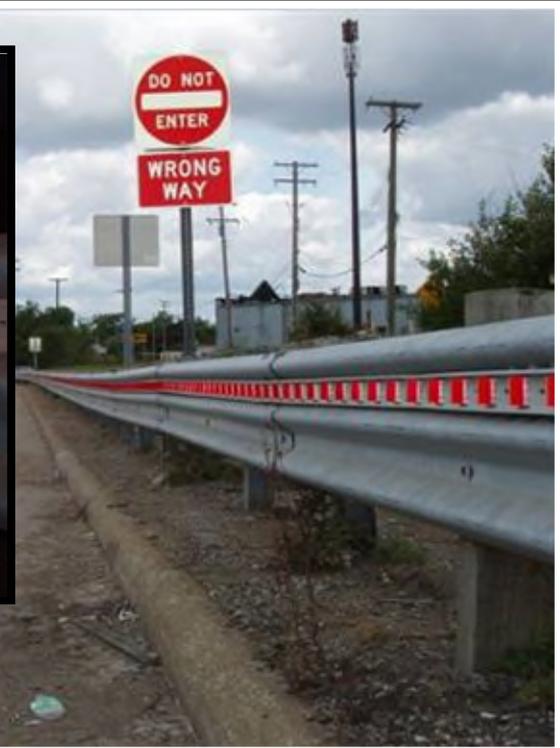
5. Pavement Marking Extensions



6. Painted Island



7. Wrong Way Delineation

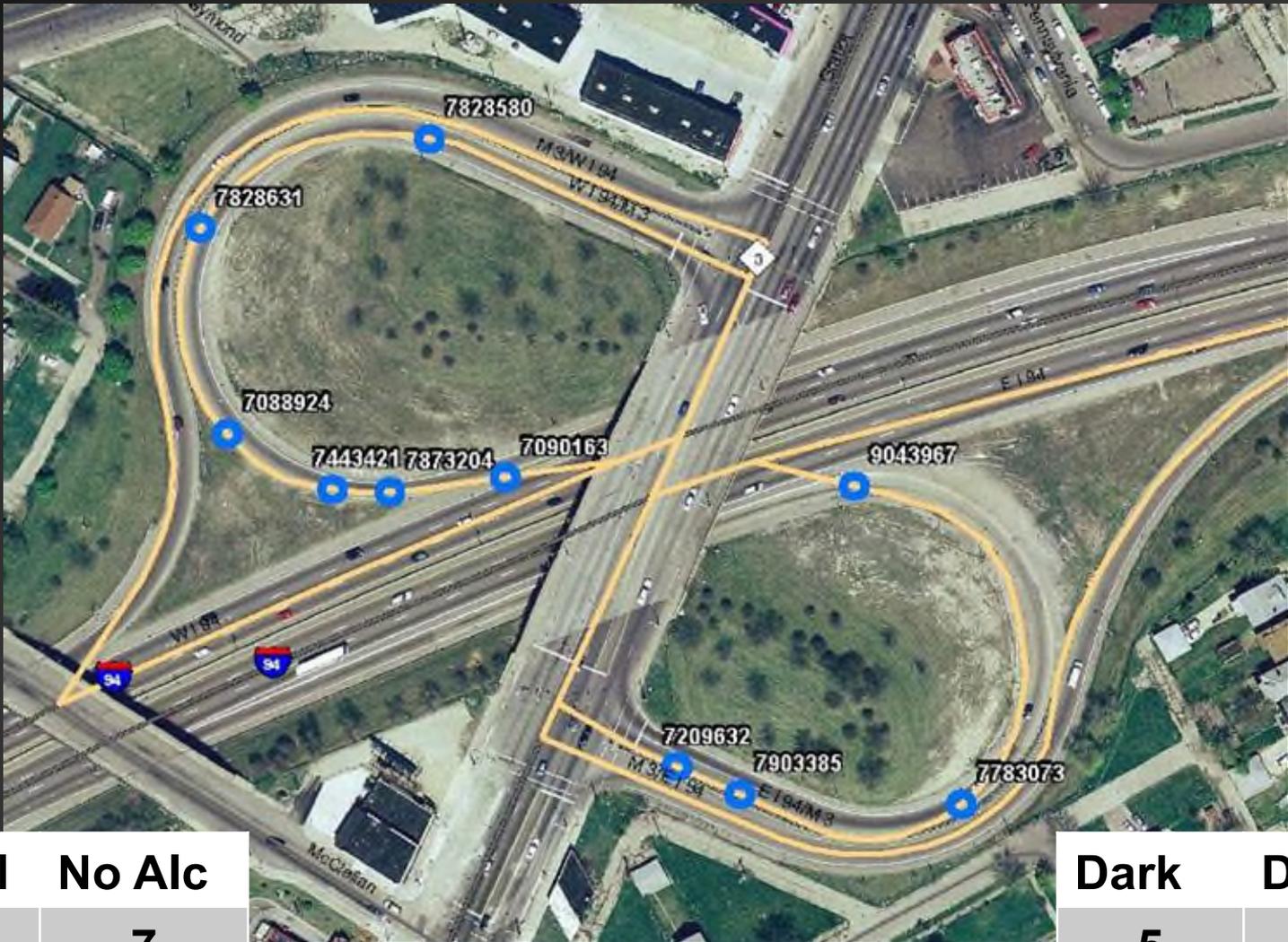


Potential Countermeasures:

- Lowering Signs to 4' Bottom Height
- Reflective Sheeting on Sign Posts
- Stop Bars
- Wrong Way Pavement Markings
- Turning Guidelines
- Painted Island
- Wrong Way Delineation on Ramp



Gratiot Ave @ I-94 (Detroit)



Alcohol	No Alc
3	7

Dark	Daylight
5	5

Gratiot Ave @ I-94



“Video taken at the interchange indicates that drivers may be staying to the left of the barrier because they cannot see the on-ramp on the barrier’s other side.”

Wash DOT, 2001

Public Roads, Sep/Oct 2002

Gratiot Ave @ I-94 Improvements



- Qwick Kurb
- Lower Signs
- Pavement Markings

Gratiot Ave @ I-94 Results

- ZERO wrong way crashes since June 2012
- No winter maintenance issues with Qwick Kurb

Wrong Way Detection I-94 at Sargent Road



I-94 at Sargent Road

Pavement marking and signing changes completed in Fall 2017 to reduce driver confusion



I-94 at Sargent Road

TRAFFICALM™
SYSTEMS
Wrong Way Alert™

TrafficCalm's spear-head of Innovation and Technology has now increased the level of **Wrong Way Driver Detection.**

- Red LED Flush-Mounted Flashers
- Scalable for Expansion
- Multi-Level Wrong Way Driver Detection, Confirmation and Photo-Capture
- First Responder Notification
- Various Notification Triggers
- Data Collection:
 - Wrong Way Drivers
 - Right Way Drivers
- System Status / Health Monitoring:
 - Vandal Detection
 - Charging & Battery Health

We've Eliminated Paise Calls.
SOON!
Through System Collaboration

Where Seconds Count:
Our Systems Detect...
Our Systems Talk...
Our Systems Listen...
Reaction is Immediate

Wrong Way Alert currently being used in:
ARIZONA
TEXAS
UTAH
COLORADO

TZD

- Location 1 & 2: 36" Wrong Way Sign w/red flasher ring
- Locations 3, 5, 6: 48" Wrong Way Sign w/red flasher ring
- Location 4: 48" Wrong Way Sign w/red flasher ring and controller



I-94 at Sargent Road

