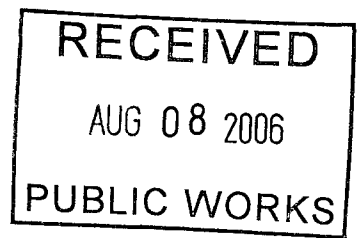


KANSAS



DEPARTMENT OF TRANSPORTATION
DEB MILLER, SECRETARY

KATHLEEN SEBELIUS, GOVERNOR

DAVID A. CHURCH, P.E., CHIEF

August 2, 2006

Federal-aid STP safety projects
City of Lawrence
Douglas County

Church
~~Frank Reeb~~
City Clerk
6th East 6th Street
Lawrence, Kansas 66044-0708

Dear Mr. Reeb:

Enclosed with this letter is a copy of the report that has been sent to the Federal Highway Administration (FHWA). These reports are required by the FHWA when federal funds are used to make safety improvements to intersections. You will find in the report, a copy of the cost to benefit sheet, a summary sheet and a collision diagram for the after crashes at these locations.

Listed below is a short summary of each project and scope for reference.

| LOCATION | CITY | SCOPE | BENEFIT/COST RATIO | % REDUCED CRASHES |
|--|----------|---|--------------------|-------------------|
| 27 th and Iowa (US-59/K-10) | Lawrence | Left turn lane added and upgrade traffic signal | 12.81 | 42.42 % |
| 23 rd (K-10) and Barker | Lawrence | Left turn lane added and upgrade traffic signal | 9.36 | 62.07 % |

If you have any questions or comments regarding this traffic study, please feel free to call our office at (785) 296-3618.

Sincerely,

Adam Pritchard
Traffic Engineering Associate

AMP:kr

STP Project Review Report

Date of Evaluation: 18-Jul-06

INTRODUCTION:

| | | | |
|-----------------|--------------|-----------|--------------------------|
| Evaluation No.: | FY 2001-0075 | Location: | 27th & Iowa (US-59/K-10) |
| Project No.: | U-1846-01 | City: | Lawrence |
| Letting Date: | 7/18/2001 | County: | DOUGLAS |

Background Information: Primary Scope: Geometric Changes with an Upgrade of the Existing Traffic Signals

| | | | |
|---|------------------------------------|---|---------------------|
| The project's signals will be: | Fully Actuated Signals | | |
| Status of Left-Turn Phasing: | Protected Only | | |
| Status on left-turn lanes: | Left-turn lanes added with project | | |
| Was this an upgrade from pedestal-mounted signals ? | Yes | | |
| What was the traffic control before this project ? | Actuated Signals | | |
| What type of pedestrian phasing will be used ? | Pedestrian Push-Button Added | Is there any parking restrictions now ? | Existing No Parking |

Accident Data:

| | | | |
|-------------------------------------|-----------|----------------------------------|-----------|
| PDO accidents prior to project: | 21 | PDO accidents after project: | 17 |
| Fatal accidents prior to project: | 0 | Fatal accidents after project: | 0 |
| Injury accidents prior to project: | 12 | Injury accidents after project: | 2 |
| Total Prior to Construction: | 33 | Total After Construction: | 19 |
| 1996 to 1997 | | 2004 to 2005 | |

| | PDO Before | PDO After | Fatal Before | Fatal After | Injury Before | Injury After |
|---------------------------|------------|-----------|--------------|-------------|---------------|--------------|
| Left Turn Accidents: | 8 | 2 | 0 | 0 | 4 | 0 |
| Rear End Accidents: | 3 | 11 | 0 | 0 | 2 | 0 |
| Right Angle Accidents: | 8 | 1 | 0 | 0 | 6 | 0 |
| All Side Swipe Accidents: | 0 | 0 | 0 | 0 | 0 | 1 |
| Head On Accidents: | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn Accidents: | 2 | 1 | 0 | 0 | 0 | 0 |
| Backed Into Accidents: | 0 | 1 | 0 | 0 | 0 | 0 |
| Fixed Object Accidents: | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Accidents: | N/A | N/A | 0 | 0 | 0 | 1 |
| Other Accidents: | 0 | 1 | 0 | 0 | 0 | 0 |
| Totals: | 21 | 17 | 0 | 0 | 12 | 2 |

STP Project Review Report

Date of Evaluation: 18-Jul-06

Cost Analysis:

| | | Before | After |
|-------------------------------|--------------|---------------------------------------|----------------|
| Cost of Right-way: | \$0.00 | | |
| Cost of Utilities: | \$0.00 | | |
| Cost of Consultant: | \$2,000.00 | | |
| Cost of Construction: | \$718,838.48 | | |
| Total Cost of Project: | | | |
| | \$720,838.48 | | |
| | | Cost per PDO Accident: | \$2,200.00 |
| | | Cost per Fatal/Injury: | \$136,300.00 |
| | | Total Cost of Accidents Prior: | \$1,681,800.00 |
| | | Total Cost of Accidents After: | \$343,850.00 |

Summary:

| | | | | | |
|----------------|----------|----------------------|-------|------------------------|----|
| ADT Prior: | 36336 | ADT After: | 42000 | | |
| Interest Rate: | 6 | Accident Rate Prior: | 12.44 | Total Accidents Prior: | 33 |
| Service Life: | 20 Years | Accident Rate After: | 6.20 | Total Accidents After: | 19 |

| | | |
|--|--|----------------|
| | % Reduction in Accident Rate : | 50.19 % |
| | Total Cost of Project to the State: | \$718,838.48 |
| | Total Cost of Accidents Prior to Completion of the Project: | \$1,681,800.00 |
| | Estimated Annual Return Calculation: | \$436,844.00 |
| | Estimated Benefit to Cost Ratio: | 22.91 |
| | Actual Benefit Due to Accident Reduction: | \$769,557.00 |
| | Actual Benefit/Cost Ratio: | 12.81 |

Note: Total Cost of Project is not used in Calculation of Benefit to Cost Ratio. Reason Being Cost of Right-of-Way, Utilities, and Consultant are not State Costs.

Prepared by: Adam Pritchard *AP*

Reviewed by:

Approved by: Brian Gower *BG*

BENEFIT TO COST ANALYSIS PRIOR TO CONSTRUCTION

LOCATION: US-59/K-10 and 27th Street PROJECT NO. U-1846-01
 CITY: Lawrence LETTING DATE: 18-Jul-01
 COUNTY: Douglas

BENEFIT TO COST ANALYSIS AFTER CONSTRUCTION

ADT Prior 36336
 ADT After 42000

| Accident Type | Factor | X | of Type | 2 year total | = | Annual Reduction |
|--|--------|---|---------------|---------------|----------|------------------|
| EW Right Angle | 0.49 | x | PDO | 4 | = | 0.98 |
| EW Right Angle | 0.49 | x | Fatal\ Injury | 3 | = | 0.74 |
| EW Left turn/other | 0.71 | x | PDO | 3 | = | 1.07 |
| EW Left turn/other | 0.71 | x | Fatal\ Injury | 0 | = | 0.00 |
| On Iowa | 0.56 | x | PDO | 14 | = | 3.92 |
| On Iowa | 0.56 | x | Fatal\ Injury | 9 | = | 2.52 |
| Total Estimated Accident Reduction: | | | | PDO | = | 5.97 |
| | | | | Injury | = | 3.26 |

AVERAGE ANNUAL BENEFITS:

1. Estimated reduction of PDO accidents: 5.97
2. Average cost of a PDO accident: \$2,200
3. Benefit from reduction in PDO accidents: \$13,123
4. Estimated reduction of injury accidents: 3.26
5. Average cost of an injury accident: \$136,300
6. Benefit from reduction in injury accidents: \$443,657
7. Average Annual Benefit: \$456,780

AVERAGE ANNUAL COST:

1. Initial cost of improvement: \$200,000
2. Capitol recovery factor for service life: 0.08718
3. Annualized implementation cost: \$17,436
4. Annual maintenance cost: \$2,500
5. Average Annual Cost: \$19,936
6. Average Annual Net Return: \$436,844

TOTAL BENEFIT: \$456,780
IMPLEMENTATION COST: \$200,000
BENEFIT/COST RATIO: 22.91

| Accident Type | Factor | X | of Type | 2 year total | = | Annual Reduction |
|--------------------------------------|--------|---|---------------|---------------|----------|------------------|
| EW Right Angle | 1.00 | x | PDO | 0 | = | 0.00 |
| EW Right Angle | 1.00 | x | Fatal\ Injury | 0 | = | 0.00 |
| EW Left turn/other | 1.00 | x | PDO | 3 | = | 1.50 |
| EW Left turn/other | 1.00 | x | Fatal\ Injury | 0 | = | 0.00 |
| On Iowa | 1.00 | x | PDO | 15 | = | 7.50 |
| On Iowa | 1.00 | x | Fatal\ Injury | 1 | = | 0.50 |
| Total Average Annual Crashes: | | | | PDO | = | 9.00 |
| | | | | Injury | = | 0.50 |

AVERAGE ANNUAL BENEFITS:

1. Reduction of PDO accidents: 1.50
2. Average cost of a PDO accident: \$2,450
3. Benefit from reduction in PDO accidents: \$3,675
4. Reduction of fatal/ injury accidents: 5.50
5. Average cost of an injury accident: \$151,100
6. Benefit from reduction in injury accidents: \$831,050
7. Average Annual Benefit (after construction): \$834,725

AVERAGE ANNUAL COST:

1. Actual cost of entire project: \$718,838
2. Capitol recovery factor for service life: 0.08718
3. Annualized implementation cost: \$62,668
4. Annual maintenance cost: \$2,500
5. Average Annual Cost (after construction): \$65,168
6. Average Annual Net Return: \$769,557

TOTAL BENEFIT: \$834,725
TOTAL COST: \$65,168
BENEFIT/COST RATIO: 12.81

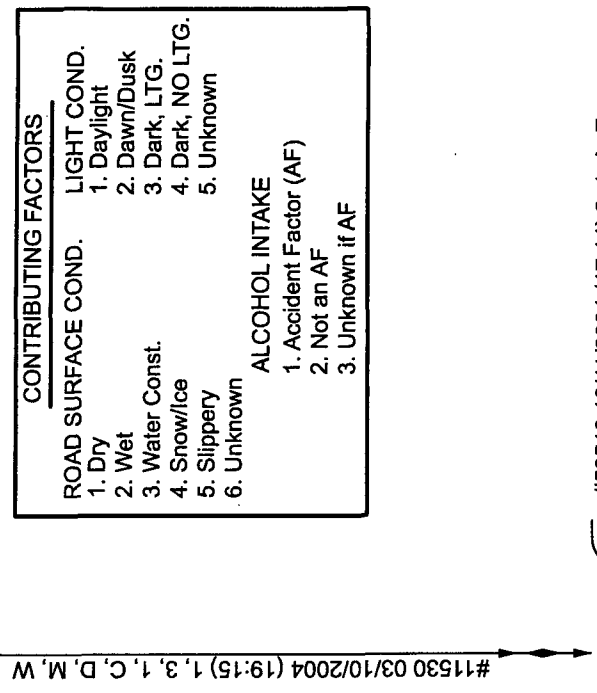
ACCIDENT SUMMARY

No. Of Accidents: 19
 Fatal: 0
 Personal Injury: 2
 Property Damage: 17

2004 - 2005

Injury Record: 2
 Fatalities: 0
 Personal Injuries: 2

US-59 (IOWA ST)



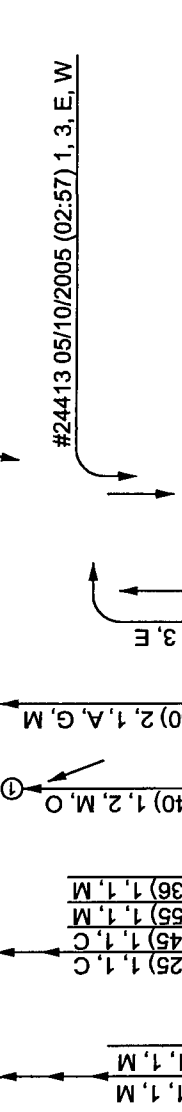
CONTRIBUTING FACTORS

ROAD SURFACE COND.
 1. Dry
 2. Wet
 3. Water Const.
 4. Snow/Ice
 5. Slippery
 6. Unknown

LIGHT COND.
 1. Daylight
 2. Dawn/Dusk
 3. Dark, LTG.
 4. Dark, NO LTG.
 5. Unknown

ALCOHOL INTAKE
 1. Accident Factor (AF)
 2. Not an AF
 3. Unknown if AF

27TH ST



ACCIDENT RATE

(# Acc.)(107)
 (365)(Yrs.)(ADT)
 Critical Rate:

(ENTER NUMBER)
 (ENTER NUMBER)

LEGEND

● Uninvolved Vehicle
 ○ Involved Vehicle
 ↑ Pedestrian
 □ Fixed Object

Case # Date (Time) Road Cond. Light Cond. Action

COLLISION DIAGRAM

KANSAS DEPT. OF TRANSPORTATION
 BUREAU OF TRAFFIC ENGINEERING

US-59 (IOWA STREET)
 & 27TH STREET
 CITY OF LAWRENCE

COUNTY: Douglas DATE: 6/08/06
 COMPLETED BY: Connie Eakes

DRIVER ACTION

A. Illegal or Unsafe Speed
 B. Impeding Traffic
 C. Following Too Close
 D. Improper Backing
 E. Improper Turn
 F. Improper Start, Stop, Park
 G. Traf. Control Viol'n. Lights
 H. Traf. Control Viol'n. Signs
 J. Fail to Yield RW
 K. Drove Left of Center
 L. No or Improper Signal
 M. Careless- Inattention
 N. Avoid Vehicle, Object, Ped.

O. Improper Lane Change
 P. Ill or Med. Condit.
 Q. Slick due to Weather
 R. Distraction in Vehicle
 S. Brake Failure
 T. Bicyclist
 V. Did Not See
 W. Hit & Run
 X. Vision Obstructed by Other Vehicles and/or Sun

(*) Median Related

27TH ST

STP Project Review Report

Date of Evaluation: 13-Jul-04

INTRODUCTION:

| | | | |
|-----------------|--------------|-----------|----------------------|
| Evaluation No.: | FY 2001-0076 | Location: | 23rd (K-10) & Barker |
| Project No.: | U-1847-01 | City: | Lawrence |
| Letting Date: | 7/18/2001 | County: | DOUGLAS |

Background Information: Primary Scope: Geometric Changes with an Upgrade of the Existing Traffic Signals

| | | | |
|---|------------------------------------|---|---------------------|
| The project's signals will be: | Fully Actuated Signals | | |
| Status of Left-Turn Phasing: | Protected Only | | |
| Status on left-turn lanes: | Left-turn lanes added with project | | |
| Was this an upgrade from pedestal-mounted signals ? | No | | |
| What was the traffic control before this project ? | Actuated Signals | | |
| What type of pedestrian phasing will be used ? | Pedestrian Push-Button Added | Is there any parking restrictions now ? | Existing No Parking |

Accident Data:

| | | | |
|-------------------------------------|-----------|----------------------------------|-----------|
| PDO accidents prior to project: | 20 | PDO accidents after project: | 8 |
| Fatal accidents prior to project: | 0 | Fatal accidents after project: | 0 |
| Injury accidents prior to project: | 9 | Injury accidents after project: | 3 |
| Total Prior to Construction: | 29 | Total After Construction: | 11 |

1996 to 1997

| | PDO Before | PDO After | Fatal Before | Fatal After | Injury Before | Injury After |
|---------------------------|------------|-----------|--------------|-------------|---------------|--------------|
| Left Turn Accidents: | 6 | 1 | 0 | 0 | 2 | 0 |
| Rear End Accidents: | 9 | 7 | 0 | 0 | 5 | 3 |
| Right Angle Accidents: | 2 | 0 | 0 | 0 | 2 | 0 |
| All Side Swipe Accidents: | 1 | 0 | 0 | 0 | 0 | 0 |
| Head On Accidents: | 0 | 0 | 0 | 0 | 0 | 0 |
| Right Turn Accidents: | 1 | 0 | 0 | 0 | 0 | 0 |
| Backed Into Accidents: | 0 | 0 | 0 | 0 | 0 | 0 |
| Fixed Object Accidents: | 0 | 0 | 0 | 0 | 0 | 0 |
| Pedestrian Accidents: | N/A | N/A | 0 | 0 | 0 | 0 |
| Other Accidents: | 1 | 0 | 0 | 0 | 0 | 0 |
| Totals: | 20 | 8 | 0 | 0 | 9 | 3 |

STP Project Review Report

Date of Evaluation: 13-Jul-04

Cost Analysis:

| | | Before | After |
|-------------------------------|---------------------|---------------------------------------|-----------------------|
| Cost of Right-way: | \$0.00 | | |
| Cost of Utilities: | \$0.00 | | |
| Cost of Consultant: | \$4,000.00 | | |
| Cost of Construction: | \$456,930.00 | | |
| | | Cost per PDO Accident: | \$2,200.00 |
| | | Cost per Fatal/Injury: | \$136,300.00 |
| | | | \$2,450.00 |
| | | | \$151,100.00 |
| Total Cost of Project: | \$460,930.00 | Total Cost of Accidents Prior: | \$1,270,700.00 |
| | | Total Cost of Accidents After: | \$472,900.00 |

Summary:

| | | | | | |
|----------------|----------|----------------------|-------|------------------------|----|
| ADT Prior: | 34241 | ADT After: | 36000 | | |
| Interest Rate: | 6 | Accident Rate Prior: | 11.60 | Total Accidents Prior: | 29 |
| Service Life: | 20 Years | Accident Rate After: | 4.19 | Total Accidents After: | 11 |

% Reduction in Accident Rate : 63.92 %

Total Cost of Project to the State: \$456,930.00

Total Cost of Accidents Prior to Completion of the Project: \$1,270,700.00

Estimated Annual Return Calculation: \$282,108.00

Estimated Benefit to Cost Ratio: 8.55

Actual Benefit Due to Accident Reduction: \$353,790.00

Actual Benefit/Cost Ratio: 9.36

Note: Total Cost of Project is not used in Calculation of Benefit to Cost Ratio. Reason Being Cost of Right-of-Way, Utilities, and Consultant are not State Costs.

BENEFIT TO COST ANALYSIS PRIOR TO CONSTRUCTION

LOCATION: K-10 and Barker PROJECT NO. U-1847-01
 CITY: Lawrence LETTING DATE: 18-Jul-01
 COUNTY: Douglas

| Accident Type | Factor | X | of Type | 2 year total | = | Annual Reduction |
|--|--------|---|--------------|---------------|----------|------------------|
| All | 0.56 | x | PDO | 23 | = | 6.44 |
| All | 0.56 | x | Fatal Injury | 8 | = | 2.24 |
| Type B | | x | PDO | 0 | = | 0.00 |
| Type B | | x | Fatal Injury | 0 | = | 0.00 |
| Type C | | x | PDO | 0 | = | 0.00 |
| Type C | | x | Fatal Injury | 0 | = | 0.00 |
| Total Estimated Accident Reduction: | | | | PDO | = | 6.44 |
| | | | | Injury | = | 2.24 |

AVERAGE ANNUAL BENEFITS:

1. Estimated reduction of PDO accidents: 6.44
2. Average cost of a PDO accident: \$2,200
3. Benefit from reduction in PDO accidents: \$14,168
4. Estimated reduction of injury accidents: 2.24
5. Average cost of an injury accident: \$136,300
6. Benefit from reduction in injury accidents: \$305,312
7. **Average Annual Benefit: \$319,480**

AVERAGE ANNUAL COST:

20 yr. Service life

1. Initial cost of improvement: \$400,000
2. Capitol recovery factor for service life: 0.08718
3. Annualized implementation cost: \$34,872
4. Annual maintenance cost: \$2,500
5. **Average Annual Cost: \$37,372**
6. **Average Annual Net Return: \$282,108**

TOTAL BENEFIT: \$319,480
IMPLEMENTATION COST: \$400,000
BENEFIT/COST RATIO: 8.55

BENEFIT TO COST ANALYSIS AFTER CONSTRUCTION

ADT Prior: 34241
 ADT After: 36000

| Accident Type | Factor | X | of Type | 2 year total | = | Annual Reduction |
|--------------------------------------|--------|---|--------------|---------------|----------|------------------|
| ALL | 1.00 | x | PDO | 8 | = | 4.00 |
| ALL | 1.00 | x | Fatal Injury | 3 | = | 1.50 |
| Type B | | x | PDO | | = | 0.00 |
| Type B | | x | Fatal Injury | | = | 0.00 |
| Type C | | x | PDO | | = | 0.00 |
| Type C | | x | Fatal Injury | | = | 0.00 |
| Total Average Annual Crashes: | | | | PDO | = | 4.00 |
| | | | | Injury | = | 1.50 |

AVERAGE ANNUAL BENEFITS:

1. Reduction of PDO accidents: 7.50
2. Average cost of a PDO accident: \$2,450
3. Benefit from reduction in PDO accidents: \$18,375
4. Reduction of fatal injury accidents: 2.50
5. Average cost of an injury accident: \$151,100
6. Benefit from reduction in injury accidents: \$377,750
7. **Average Annual Benefit (after construction): \$396,125**

AVERAGE ANNUAL COST:

1. Actual cost of entire project: \$456,930
2. Capitol recovery factor for service life: 0.08718
3. Annualized implementation cost: \$39,835
4. Annual maintenance cost: \$2,500
5. **Average Annual Cost (after construction): \$42,335**
6. **Average Annual Net Return: \$353,790**

TOTAL BENEFIT: \$396,125
TOTAL COST: \$42,335
BENEFIT/COST RATIO: 9.36

BARKER AVE

| ACCIDENT SUMMARY | |
|----------------------|--------------|
| No. Of Accidents: 11 | STUDY PERIOD |
| Fatal: 0 | 2004 - 2005 |
| Personal Injury: 3 | |
| Property Damage: 8 | |
| Injury Record: 5 | |
| Fatalities: 0 | |
| Personal Injuries: 5 | |



#58421 11/09/2005 (17:50) 1, 3, J

#62931 09/30/2005 (09:45) 6, 1, M

#72017 12/18/2004 (22:20) 1, 3, C

#51524 10/07/2004 (07:42) 2, 2, A, M

#23551 05/21/2004 (17:15) 1, 1, M

K-10 (23RD ST)

| ACCIDENT RATE | |
|------------------|----------------|
| (# Acc.)(107) | (ENTER NUMBER) |
| (365)(Yrs.)(ADT) | (ENTER NUMBER) |
| Critical Rate: | |
| LEGEND | |
| Fatality | Uninvolved |
| Personal Injury | Vehicle |
| Property Damage | Pedestrian |
| Fixed Object | |
| Case # | Date (Time) |
| Road Cond. | Light Cond. |
| Action | |

BARKER AVE

| COLLISION DIAGRAM | |
|---|---------------|
| KANSAS DEPT. OF TRANSPORTATION BUREAU OF TRAFFIC ENGINEERING | |
| K-10 (23RD STREET) & BARKER AVENUE CITY OF LAWRENCE | |
| COUNTY: Douglas | DATE: 6/08/06 |
| COMPLETED BY: Connie Eakes | |

| CONTRIBUTING FACTORS | |
|-------------------------|------------------|
| ROAD SURFACE COND. | LIGHT COND. |
| 1. Dry | 1. Daylight |
| 2. Wet | 2. Dawn/Dusk |
| 3. Water Const. | 3. Dark, LTG. |
| 4. Snow/Ice | 4. Dark, NO LTG. |
| 5. Slippery | 5. Unknown |
| 6. Unknown | |
| ALCOHOL INTAKE | |
| 1. Accident Factor (AF) | |
| 2. Not an AF | |
| 3. Unknown if AF | |

#12533 03/29/2004 (15:40) 1, 1, C

#47873 10/01/2005 (14:05) 2, 1, M

#52925 10/31/2005 (07:38) 2, 1, A, M, Q

#45416 09/16/2005 (07:30) 1, 1, M

#66513 12/08/2004 (21:40) 1, 3, C

#12530 03/30/2004 (16:48) 1, 1, M, W

K-10 (23RD ST)

| DRIVER ACTION | |
|---------------------------------|---------------------------|
| A. Illegal or Unsafe Speed | O. Improper Lane Change |
| B. Impeding Traffic | P. Ill or Med. Condit. |
| C. Following Too Close | Q. Slick due to Weather |
| D. Improper Backing | R. Distraction in Vehicle |
| E. Improper Turn | S. Brake Failure |
| F. Improper Start, Stop, Park | T. Bicyclist |
| G. Traf. Control Viol'n. Lights | V. Did Not See |
| H. Traf. Control Viol'n. Signs | W. Hit & Run |
| J. Fail to Yield RW | X. Vision Obstructed |
| K. Drove Left of Center | by Other Vehicles |
| L. No or Improper Signal | and/or Sun |
| M. Careless- Inattention | (*) Median Related |
| N. Avoid Vehicle, Object, Ped. | |