

FDOT Contract BDK77 977-21

Report

Union County Site Analysis and Justification - CR229, CR241, CR18

Safety Project Development Capacity for Small Communities in Coordination with Local Technical Assistance Program (LTAP) Center





October 2013

Prepared by:



Florida Department of Transportation FDOT Contract BDK77 977-21

Union County Site Analysis and Justification – CR229, CR241, CR18 **REPORT** Prepared by: University of Florida

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1. INTRODUCTION

1.1 SCOPE AND PURPOSE

The Florida Department of Transportation has recognized that there is an urgent need to assist small communities in Florida in their efforts to improve highway safety. With increased emphasis on safety at the national level, federal funds are available for safety improvements on all public roads, but federal guidance requires the programming of safety funds to be data driven. In many cases the smaller communities in Florida do not have sufficient technical resources to conduct the required analysis.

FDOT has engaged the LTAP Center at University of Florida to help develop a program to assist these small communities. This effort includes developing a template for conducting field studies and preparing the required analysis and documentation. To develop this template, LTAP has worked with Union County to conduct a pilot study as a basis for this template.

This report documents the findings from the pilot study and the associated analysis.

1.2 STUDY SITES

In selecting sites for the study, the team looked for roads where crashes could be mitigated with low cost improvements. Since one of the objectives was to provide a template for future use by others, it was also important to select sites that could provide meaningful examples of how to perform analyses.

The team examined crash information from two sources: the FDOT Safety Portal and Signal Four Analytics. The team also discussed the crash problems with Union County, and visited several locations before selecting the test sites.

From FDOT's All Roads Crash Analysis (ARCA,) on the Safety Portal two potential sites were identified:

<u>CR 796 is shown as a High Risk Rural Road in 2010.</u> Further examination of this road indicated that improvements to this road have been made recently. It did not appear to be a good example for a case study and it was eliminated.

<u>CR 241 at CR 18 is shown as a High Crash Segment in 2010</u>. Field visits confirmed that this site met the criteria for this study.

Signal Four Analytics was used to produce maps showing locations of fatalities, clusters of crashes, and sites where there appeared to be an unusual concentration of night time crashes. Crash data for the period from 2006 through 2011 were used for the analysis. From this information and discussions with Union County representatives, road segments on CR 229 and CR 241/18 were selected for the pilot study. Figure 1 shows the approximate location of these sites. For the purpose of analysis and development of proposed countermeasures, these road segments were divided into five separate study sites:

CR 229 Area

- o CR 229 (south) from Bradford County Line to SR 121
- o CR 229 (north) from SR 121 to Baker County Line

• CR 241/CR 18 Area

- Intersection of CR 18 at CR 241
- CR 241 from Alachua County Line to CR 238
- CR 18 from Columbia County Line to SR 121

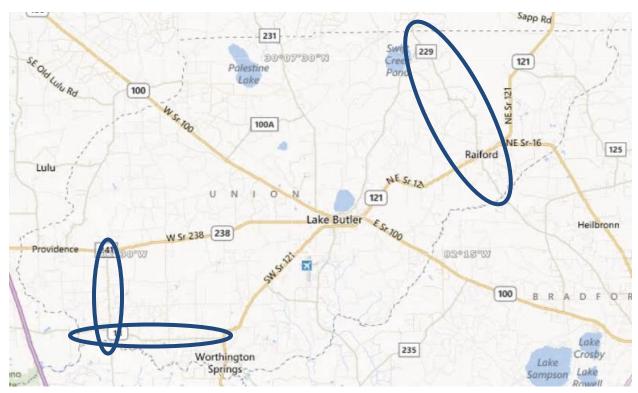


Figure 1. Sites for pilot study in Union County

2. STUDY METHODOLOGY

2.1 STUDY TEAM

The analysis was conducted generally following the principles of the FHWA Road Safety Audit Guidelines. The study team included various members of UF's research team. From the County, the participants were the County Commission Chairman, Road Superintendent, and a representative of the County Emergency Management office. The Road Superintendent represented the County during the field reviews.

Field studies were conducted during both daylight and nighttime conditions.

2.2 DATA SOURCES AND APPROACH TO DATA COLLECTION

Crash records for the period from 2006 through 2012 were used for this analysis. The crash sites were identified and plotted on maps prior to the field study and helped guide the team in investigating the problem areas.

To the extent practical, the team used data obtained from public sources. Although much of the photography contained in this report was obtained from Google's Street View, conditions were verified by field observation. A hand held GPS unit was used to collect some data.

Estimates and approximate locations of features like signs, guardrails, and culverts were considered adequate for estimating costs, but more detailed survey work will be required to obtain the information necessary to develop construction plans and quantities.

2.3 BENEFIT-COST (B/C) ANALYSIS SUMMARY

Benefit/cost analysis was performed in accordance with the specifications described by the Florida Department of Transportation in State Safety Office Bulletin 10-01, regarding "Benefit/Cost Analysis, Roadside Safety Analysis Program, and Discount (Interest) Rate." Crash costs and the interest rate used in analysis also come from this document (http://www.dot.state.fl.us/rddesign/updates/files/RDB10-09.pdf).

Crash modification factors used in analysis primarily originate from the FHWA Crash Modification Factor Clearinghouse (http://www.cmfclearinghouse.org/).

Countermeasure costs are based on statewide averages of 2011 unit costs (http://www.dot.state.fl.us/specificationsoffice/estimates/historicalcostinformation/AnnualSWAve/AnnualStatewideAverage11.xls.

Quantities used in estimating countermeasure costs are shown in Appendix B – Basis of Cost Estimates.

Table 1 provides a summary of potential countermeasures for each site, along with their estimated costs and B/C ratio. In this summary and in the detailed discussions of each site, Level 1 countermeasures generally refer to low cost improvements that can be implemented quickly. These improvements generally have a higher benefit/cost ratio. Level 2 usually refers

to more extensive improvements that will take longer to plan and implement. Level 2 improvements usually include the Level 1 work.

Table 1. Summary of implementation scenarios

Site	Level 1 Countermeasures	Level 1 Estimated Cost	Level 1 B/C Ratio	Level 1 Net Present Value	Additional Level 2 Countermeasures	Level 2 Estimated Cost	Level 2 B/C Ratio	Level 2 Net Present Value
CR 229 (S Curve South of SR 121)	Upgrade signs and markings, enhance waming signs, chevrons, additional stop sign	\$60,653	19.215	\$210,749	Widen pavement with additional markings, move ditch, remove guardrails	\$581,670	6.778	\$229,163
CR 229 (Intersection at NE 125th Way and NE 228th Place)	Upgrade signs and markings, enhance advanced warning signs, additional stop sign, transverse rumble strips, new guardrail and mitered culvert end	\$22,842	37.728	\$116,507	N/A	\$22,842	37.728	\$116,507
CR 229 (SR 121 to Baker County Line)	Upgrade signs and markings, enhance advance warning signs and chevrons at curves, upgrade T-intersection end treatments, upgrade and install guardrail	\$217,366	4.741	\$139,807	Widen pavement	\$2,975,000	1.636	\$121,066
CR 241 - CR 18 Intersection	Advanced warning signs, trim vegetation, additional and larger stop signs, retroreflective sign posts, transverse rumble strips, edge lines, center lines, RPMs, update signs	\$19,144	41.506	\$190,928	Overhead flashing beacon, intersection lighting	\$83,791	20.291	\$208,025
CR 241 (Alachua County Line to CR 241A)	Edge lines, RPMs, warning signs, T- intersection end treatments, update signs, new guardrail	\$182,442	1.885	\$17,563	Widen pavement	\$1,124,186	1.976	\$70,224
CR 18 (CR 241 to Columbia County Line)	Upgrade signs and markings, upgrade T- intersection end treatments, upgrade and install guardrail	\$61,249	7.572	\$54,325	Widen pavement	\$612,500	2.424	\$55,828
CR 18 (CR 241 to SR 121)	Upgrade signs and markings, remove vegetation at intersections, upgrade Tintersection end treatments, upgrade and install guardrail	\$264,101	4.912	\$138,760	Widen pavement	\$3,125,000	2.247	\$249,369

2.4 DESCRIPTION OF COUNTERMEASURE SCENARIOS

To simplify discussion of options, some countermeasures have been grouped together. The following descriptions identify more completely the intent of these countermeasure groups.

2.4.1 Upgrade signs and pavement markings

- This item refers to upgrading critical signs to current MUTCD standards for sign type, placement, size, and condition, including object markers, chevrons, advisory speeds and advanced warnings where appropriate. For some sites, additional enhancements are suggested and these are addressed in the descriptions for each site.
- Intersection treatments refer to signs and pavement markings on the intersecting road.

Note: Union County's street naming practice is to designate certain driveways that serve multiple residences as named streets. Additional coordination with Union County is needed to determine the threshold for which the intersection treatments are required.

Pavement marking refers to placement of centerlines and edge lines. This also includes
placement of Raised Pavement Markers (RPMs) on the centerline. Cost estimates used for
the B/C analysis are based on costs and expected life of thermoplastic markings. Painted
lines may be appropriate under low traffic conditions or where emergency or temporary
striping is needed, but arrangements should be made for follow-up applications if paint is
used for lane lines.

Note: Union County has expressed a concern that when RPMS are placed outside double stripes for a centerline on narrow pavement, it encourages drivers to move closer to the edge and effectively reduces lane width. This should be considered when specifying the placement of RPMs on narrow pavements.

2.4.2 Enhanced conspicuity or other special signing or marking treatments

 A variety of additional treatments may be recommended to address certain problems. In some cases, merely upgrading to minimum standards is not enough to solve a problem, and use of retro reflective strips on sign posts or other devices to call attention to signs or roadway features is appropriate. These issues are described in the detailed discussion of each site.

2.4.3 Guardrail

- Guardrail upgrade refers to all work required to meet current standards, including rails, posts, end treatments, delineators, etc. This also includes extension or installation of new guardrail as required along steep slopes or obstacles within the clear zone.
- In some instances, culverts may be extended or slopes flattened as an alternative to installing guardrail. For the purposes of this analysis, B/C calculations are based on the use of guardrail, recognizing that further evaluation may indicate an alternate is preferred.

2.4.4 Widen and pave shoulders

This treatment would involve widening the pavement to a minimum of 26' and striping to
provide lane widths of at least 11' with paved shoulders of 2' with a safety edge. This may
also involve additional grading of the unpaved portion of the shoulder as required to meet
Florida Greenbook standards.

Note: Design exceptions may be required where right of way, environmental issues, or other constraints make it impractical to completely conform to the standards.

This work would also include other improvements such as culvert end treatments, vegetation removal within the clear zone, removal or shielding of other fixed obstacles, and other work as required to meet *Florida Greenbook* standards (unless otherwise approved by design exception).

3. CR 229 AREA

The areas north and south of SR 121 were reviewed separately. The study for the site south of SR 121 included a brief review of the entire road from Bradford County Line to SR 121, but since the reported crashes for the study period were concentrated in the rural area between NE 233rd Court and Norman Lane, the field review concentrated on this section.

CR 229 north of SR 121 was considered a separate site, with special emphasis on the intersection/curve at NE 125th Way and NE 228th Place.

3.1 FIELD REVIEWS

Initial daylight review – conducted afternoon of 11-13-2012

Review team: John Goodknight, team leader; Soowoong Noh, UF; Phillip Haas, UF; Shelton Arnold, Union County Road Superintendent

Follow up nighttime review – conducted after 6 pm 11-13-2012

Review team: John Goodknight, team leader; Soowoong Noh, UF; Phillip Haas, UF; Shelton Arnold, Union County Road Superintendent

3.2 CR 229 - FROM NE 233RD COURT TO NORMAN LANE (UNION CO.)

3.2.1 Site Description

Land along this section of the road (approximately .9 miles) is largely undeveloped and rural in nature. Two residential driveways connect directly to CR 229, and two other roads intersect within this section. Areas to the north and south are developed as low density residential properties.



Figure 2. Location of study site - CR 229 south of SR 121

3.2.2 Analysis of Problems

3.2.2.1 From Crash Records

For the period from 2006 through 2012, crash data show significant patterns:

- Five of six recorded crashes occurred during non-daylight hours, suggesting that visibility of roadway is a significant factor.
- Three crashes occurred at the CR 793 intersection. All crashes at this location occurred at night and involved southbound vehicles that failed to negotiate the curve and exited the road to the right.
- Crashes in the tangent sections involved lane departures. All three of these crashes resulted in rollovers with injuries or a fatality.

3.2.2.2 Field Observations

Pavement:

Pavement of this two-lane road is narrow (approximately 19.5'). Pavement surface is somewhat irregular, but does not exhibit significant distress.

Shoulders and Pavement edge drop-offs:

Shoulders are generally narrow and provide limited recovery area. Pavement edge drop-offs are prevalent throughout the area. Figure 3 shows the extent of these drop-offs.

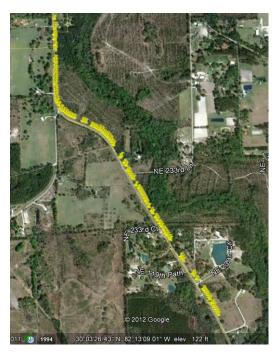


Figure 3. Pavement edge drop-offs on CR 229 (south)

This aerial photograph shows the locations of pavement edge drop-offs as marked using a hand held gps device. The drop-offs were recorded while driving along the road in each direction of travel. Marks were recorded for each 25' of shoulder where the surface of the shoulder was estimated to be 3" or more below the pavement surface.



Figure 4. Typical shoulder conditions on CR 229 (south)

Signage:

Signs are minimal and some do not meet current MUTCD requirements. Curves are not delineated with chevrons or other markers. The curve at the CR 793 intersection is especially difficult to detect at night for southbound drivers. Speed limit through this area is 40 mph, but a preliminary check with the ball-bank indicator showed that the speed at the CR 793 curve/intersection should be lowered, either by reducing the speed limit or by posting a lower advisory speed. A speed study will be needed if the speed limit is lowered. The stop sign at the CR 793 intersection with CR 229 (northbound approach from CR 793) was partially obscured by the vegetation at the intersection at the time of the study.

Pavement markings:

Centerline markings on CR 229 and the intersecting roads are deteriorated. None of the roads in the study area have edge line markings or raised pavement markers.

Clear zone encroachments:

Culverts: One culvert crosses CR 229 within the study area. Ends of this culvert are
within the limits of the clear zone, and should be extended. The culvert at the
intersection with CR 793 is within the clear zone for CR 793 (NE 227th Avenue).
Culverts at NE 233rd Lane and at the various driveways all have blunt ends, but are
small in diameter.



Figure 5. Culvert crossing (CR 229 south)



Figure 6. Culvert at CR 793 Intersection



Figure 7. Culvert at NE 233rd Lane Intersection

- Guardrail: A guardrail along the west side of CR 793 (NE 227th Avenue) at the
 intersection with CR 229 shows evidence of a crash (Figure 6. Culvert at CR 793
 Intersection). This guardrail could be eliminated by extending a culvert and flattening the
 slope of the shoulder; however, the guardrail now supports delineators that mark the
 outside of the curve of CR793. Removing the guardrail would require placement of
 alternate markings delineating the curve for northbound vehicles as they approach the
 intersection.
- OTHER: Right of way throughout the corridor is approximately 50 feet. Much of this right of way is clear, but trees encroach into the clear zone at some locations, especially on the east side of the road in the vicinity of NE 233rd Lane.



Figure 8. Trees within right of way

3.2.2.3 Emphasis Areas for Countermeasures

- Enhance the visibility of roadway through the curves with a combination of signs and pavement markings.
- Reduce speeds to be consistent with the curvature of the road.
- Reduce the frequency and severity of lane departures by providing wider pavement (lanes and shoulders) and delineation of pavement edge.
- Remove obstacles within clear zone.

Table 2. Potential Countermeasures for CR 229 (south)

Level	Countermeasure	Estimated Cost	Benefit /Cost
1.	 Upgrade signs and pavement markings for the entire road segment between Bradford County Line and SR 121. Enhance signing and marking for two curves between NE 233rd Ln and NE 231st CT: Lower speeds through the area of "s" curves using either advisory speeds or lower speed limit (will require engineering study). Install chevrons and other signs to delineate "s" curves consistent with MUTCD 2C-2. Add "bright sticks" for enhanced conspicuity for chevron posts. Place additional stop sign on left side of CR 793 at intersection (vegetation on right side of road may restrict visibility of sign at times). 	\$60,653	19.21
2.	Widen lanes and add paved shoulders through "s" curves- (south of NE 233rd Ln to north of NE 231st CT), including: Overlay existing pavement Extend culverts and add mitered end sections as appropriate	\$581,670	6.78

- Place additional RPMs on outside southbound shoulder of curve at intersection with CR 793. These RPMs should be placed in a chevron pattern consistent with MUTCD Section 3B.24. (Because CR 793 intersects CR 229 in the curve, chevrons alone may not be adequate to delineate the curve. The additional markings will significantly enhance communication to the driver).
- o Remove guardrail at intersection with CR 793:
 - Extend culvert, relocate ditch and regrade shoulder.
 - Replace delineators installed on guardrail with post mounted delineators.
 - Add paved shoulder on west side of CR 793 at intersection.
 - Add RPMs on shoulder of CR 793 to enhance night time delineation at intersection.
 - Remove trees within clear zone.

> Factors affecting implementation

Right of way	Right of way in this corridor is nominally 50'. It appears that all improvements can be implemented within existing right of way.
Environmental impacts	Potential permit issues involving culvert crossings and shoulder widening. These appear minimal but will require further investigation.
Utilities	No significant conflicts are apparent, but will require standard utility coordination.
Community impacts	None anticipated. Rumble strips are not included in these scenarios. If these are considered, the impact on residences should be evaluated.



Figure 9. Suggested improvements at CR 229 intersection with CR 793

3.3 CR 229 - SR 121 TO BAKER COUNTY LINE

3.3.1 Site Description

The review covered the entire section between SR 121 and CR 229 (approximately 6 ½ miles). The intersection/curve at NE 228th Place is addressed separately. The area between SR 121 and NE 228th Place is largely residential and speeds on the road are relatively low. North of this intersection there is a short transition (approximately 1 ½ miles) from residential to rural, and the remainder of the road is rural with occasional intersections or driveways.



Figure 10. CR 229 north of SR 121 showing crash locations

3.3.2 Analysis of Problems

3.3.2.1 From Crash Records

Most crashes in this corridor occurred during non-daylight hours. Most involved lane departures. Five of the eight lane departures north of NE 125th Way resulted in overturning vehicles.

One crash with a serious injury occurred when a vehicle approaching from an intersecting road failed to stop at the intersection. Three of the crashes occurred at the curve in the vicinity of NE 215th Road.

A crash involving a pedestrian just north of SR 121 was not included in this analysis. In this crash, it appeared that the causes were improper actions by the pedestrian and /or driver, and road conditions did not appear to be a contributing factor.

3.3.2.2 Field Observations

Pavement and shoulders:

The pavement is narrow, but it does not show significant signs of distress. Pavement edge dropoffs are extensive (See Figure 11). Shoulders are generally flat and clear through most of the corridor, but there are a few locations where the presence of a roadside ditch would make recovery difficult. Since the lane departure crashes occur mostly at night, it would appear that the problem is associated more with lack of lane delineation than with condition of the shoulder; however, improving the recovery area could be expected to reduce the severity of the lane departure crashes.

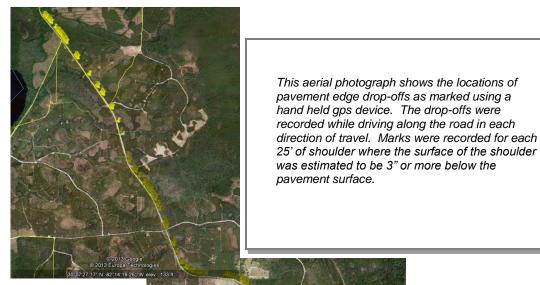


Figure 11. Pavement edge drop-offs (CR 229 north of SR 121)

Signage

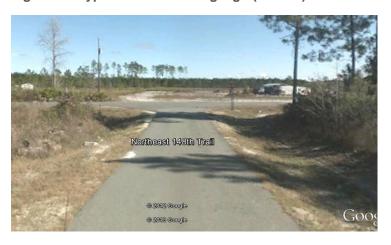
Warning signs designating curves are generally visible, but are small and placed well in advance of the curves. At one location, shadows from overhanging vegetation made daytime visibility of a curve warning sign difficult. One serious injury crash occurred at a "T" intersection (NE 148th Trail) where the only warning is a small stop sign.



This sign is posted well in advance of the curve (approximately 600'). There are no chevrons, edge lines, or other markers to delineate the curve.

Moving the sign closer to the curve, delineating with chevrons and edge markings, and adding an advanced warning sign would help drivers identify the curve, especially at night.

Figure 12. Typical curve warning sign (CR 229)



The intersection at NE 148th Trail was the site of a serious injury crash involving a vehicle that failed to stop.

Increasing the size of the stop sign, adding a double arrow and stop bar would improve communication to the driver about the stop condition.

Figure 13. End of road signage (NE 148th Trail and CR 229)

> Pavement markings

Pavement markings are worn, but the centerline is still visible at night. Absence of an edge line makes it difficult to see the pavement edge.

Clear zone issues (guardrail and culverts)

Guardrail installations are obsolete, although no involvement was reported with any of the crashes reviewed.



Figure 14. Typical guardrail installation (CR 229)

3.3.2.3 Emphasis Areas for Countermeasures

- Improve night time visibility of the pavement edge, especially through the curves.
- Upgrade end of road signage and markings at intersections.
- Improve recovery area:
 - o Replace obsolete guardrail and extend guardrail to cover unprotected areas.
 - Widen pavement and add paved shoulders to correct drop-offs, especially through curve.

Table 3. Potential Countermeasures for CR 229 (North of SR 121)

Level	Countermeasure	Estimated Cost	Benefit/Cost
1.	 Upgrade signs and pavement markings (especially important to improve delineation of curves). Add supplemental warning signs and chevrons at each curve – (MUTCD Figure 2C-2). Use enhanced conspicuity treatments for curve at NE 215th Rd. Add/upgrade end of road treatment at "T" intersections. Upgrade guardrail installations and/or extend culverts to eliminate clear zone conflicts. 	\$217,366	4.74
2.	All Level 1 improvements.Widen pavement and add paved shoulders.	\$2,975,000	1.64

Factors affecting implementation

Right of way	Right of way in this corridor is nominally 50'. It appears that all improvements can be implemented within existing right of way.
Environmental impacts	Extending culverts and widening pavement may involve some minor wetland impacts. These appear minimal but will require further investigation.
Utilities	No significant conflicts are apparent, but will require standard coordination with utility companies.
Community impacts	None anticipated. Rumble strips are not included in these scenarios. If these are considered, the impact on residences should be evaluated.

3.4 CR 229 - INTERSECTION AT NE 125TH WAY AND NE 228TH PLACE

3.4.1 Site Description

CR 229 makes a 90 degree turn at this intersection. The CR 229 movements (north and east legs) are through movements. The west and south legs are controlled by stop signs.



Figure 15. CR 229 at intersection of NE 228th Place and NE 125th Way

3.4.2 Analysis of Problems

3.4.2.1 From Crash Records

Crashes involved southbound to eastbound vehicles that failed to negotiate the turn. All recorded crashes occurred in non-daylight hours, and resulted in minor injuries.

Vehicles that failed to negotiate the curve struck guardrail, ditch, or other fixed object on south side of CR 229.

3.4.2.2 Field Observations

Pavement and shoulder conditions

The conditions at this location do not appear to be a serious concern, although there is erosion of the shoulder on the inside of the curve. Roadside ditches on the west and south sides of CR 229 pose potential problems. A guardrail along the south edge of CR 229 does not completely shield a ditch and power pole. The end of the culvert under the west leg of the intersection has a vertical end exposed to southbound traffic.

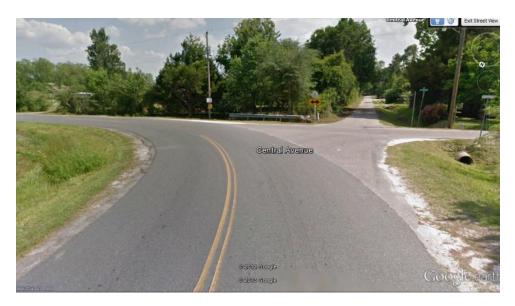


Figure 16. Southbound view of guardrail and exposed culvert end at NE 228th PL/NE 125th Way

Southbound vehicles approach the intersection/curve from a long rural section of the road where speeds are higher. Although advanced warnings are in place, inattention by the driver could easily result in a driver's failure to slow down adequately to make the left turn. Speed appears to be a major factor contributing to the crashes at this location.

> Signs and markings

Generally, upgrading signs and markings could improve delineation of the intersection (Figure 16 and Figure 17). There is no turn sign delineating the west to north movement. A stop sign on northbound leg of intersection is partially obstructed by vegetation. An advanced warning sign ("Dangerous Intersection") is in place on the southbound approach to the intersection.

The centerline pavement markings are worn, and there are no pavement edge markings.



Figure 17. Westbound view showing lack of signage delineating turn at NE 228th Place/NE 125th Way

3.4.2.3 Emphasis Areas for Countermeasures

- Improve delineation of changes in road alignment especially for southbound nighttime traffic. Upgrade signs on other approaches.
- Increase protection provided by guardrail along the south side of the road.

Table 4. Potential Countermeasures for CR 229 at NE 125th Way and NE 228th Place

Level	Countermeasure	Estimated Cost	Benefit/Cost
1.	 Upgrade signs delineating turn for SB/EB traffic – including upgrade of advanced warning signs. Add chevrons for southbound and westbound approaches. Install sign delineating turn for WB/NB traffic – including advanced warning signs Replace "Dangerous Intersection " sign with alternate treatment for enhanced conspicuity. Add left side stop sign for north bound 228th Place where vegetation obscures signs during growing season. Refresh pavement markings and add RPMs and edge lines. (Since approach speed for southbound vehicles is an apparent problem, add speed reduction markings as described in MUTCD Section 3B.22.) Upgrade and extend guardrail on south side of CR 229 to shield fixed objects and ditch. Add mitered end sections to culvert under west leg of intersection. 	\$22,842	37.73

Factors affecting implementation

Right of way	It appears that all improvements can be implemented within existing right of way.
Environmental impacts	These appear minimal.
Utilities	No significant conflicts are apparent, but will require standard coordination with utility companies.
Community impacts	None anticipated.



Figure 18. Suggested improvements for CR 229 at NE 228th PL/NE 125th Way

Figure 3B-28. Example of the Application of Speed Reduction Markings

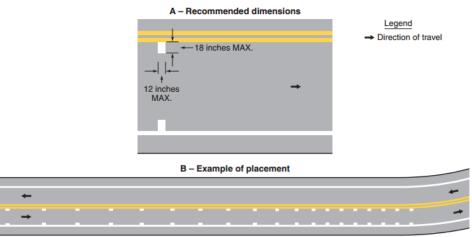


Figure 19. Speed reduction markings for southbound approach

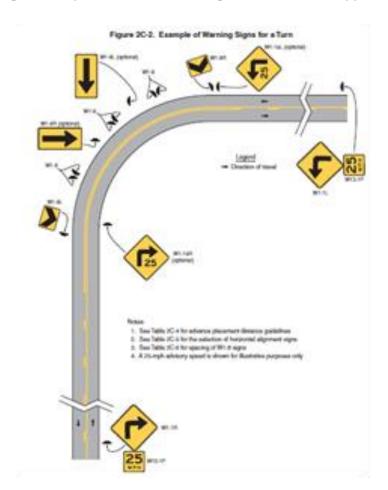


Figure 20. Signs for curve (modify curve/turn signs to reflect minor intersecting streets)

4. CR 241 / CR 18 AREA

This study area includes County Road 18 from Columbia County line to SR 121 and CR 241 from the Santa Fe River bridge to CR 241A. CR 241 at the intersection with CR 18 is identified in FDOT's All Roads Crash Analysis (ARCA) as a High Crash Location.

Note: Several crashes were reported at the intersection of CR 18 and SR 121. This intersection includes a State Highway and was not included in this pilot study for local roads. Crashes on the CR 18 approach to SR 121 were also excluded from the analysis for CR 18.

4.1 FIELD REVIEWS

• Initial daylight review – conducted afternoon of October 16, 2012

<u>Review team:</u> John Goodknight, team leader; Soowoong Noh, UF; Ilir Bejleri, UF, Srinivasan Sivaramakrishnan, UF; Shelton Arnold, Union County Road Superintendent

• Follow up nighttime review – conducted after 6 pm November 13, 2012.

Review team: John Goodknight, team leader; Soowoong Noh, UF; Phillip Haas, UF; Shelton Arnold, Union County Road Superintendent

4.2 INTERSECTION - CR 241 AT CR 18

4.2.1 Site Description

The intersection of CR 241 and CR 18 operates as a four-way stop controlled by stop signs. The intersection is at the top of a hill. The speed limit on all approaches is 50 mph. The nearest intersection in any direction with a stop condition is approximately four miles away.



Figure 21. Topography of intersection CR 241/18 (vertical scale exaggerated)

4.2.2 Analysis of Problems

4.2.2.1 From Crash Records

Of five crashes reported, three involved vehicles failing to stop at the intersection. One of these three resulted in a fatality and multiple injuries (One vehicle was fleeing law enforcement and driving without lights.) Three of the five crashes occurred during non-daylight hours.

4.2.2.2 Field Observations

Visibility of the intersection and stop signs is restricted and may have been a contributing factor in the three most serious crashes. The intersection is situated on a small "plateau" at the top of the hill and the roadway surface is hidden from view on all four approaches by the vertical curvature of the road (Figure 21 and Figure 22).

Although stop signs and advanced warning signs are in place, the stop signs are partially obscured by the roadway grade. At the time of the field investigation, some of the signs were partially obscured by vegetation, but this has been subsequently trimmed by Union County crews. Union County does not have a bucket truck and has difficulty trimming trees that overhang the road or the clear zone. This can create a serious problem where overhanging limbs create a canopy that limits visibility of the intersection or signs. Trees should also be reviewed to determine whether clear zone encroachment requires removal.

Rumble strips provide an audible warning but are not differentiated by color from the pavement so they do not provide a visual warning at night. Since the initial field investigation, the centerline and stop bars have been repainted.



Figure 22. Advanced intersection warning (westbound approach to CR 18/241 intersection)

The electric utility facility in the southeast quadrant of the intersection is lighted, but does not provide any illumination for the road. Some concern has been expressed that the lighting of this facility may distract drivers at night.

4.2.2.3 Emphasis Areas for Countermeasures

• Improve visibility of the intersection and stop signs, concentrating on both identifying the location of the crossroad and providing advanced warning to drivers. Since the

pavement of the crossing road cannot be seen by drivers approaching the intersection from any direction until they are close to the intersection, this means that signs, markings, and other traffic control devices must be especially effective in communicating conditions to drivers.

Table 5. Potential Countermeasures for Intersection at CR 241 and CR 18

Level	Countermeasure	Estimated Cost	Benefit/Cost
1.	 Upgrade signs and pavement markings. Install stop signs and advanced warnings signs on both sides of road – each approach. Install retro reflective strips on sign posts for enhanced conspicuity as described in MUTCD (Section 2A.15). Replace or augment asphalt rumble strips with retro reflective material to provide increased nighttime visibility. 	\$19,144	41.51
2.	 All level 1 improvements. Install overhead flashing signal; if conflicts with power lines prohibit overhead signal use flashers on advanced warning signs. Install flashers on advanced warning signs as a temporary measure until overhead flasher can be installed. Install luminaires on signal poles (if overhead flasher is feasible) 	\$83,791	20.29

> Factors affecting implementation

Right of way	It appears that all improvements can be implemented within existing right of way.
Environmental impacts	None anticipated.
Utilities	Overhead power lines cross the three approaches at the intersection. Initial observations suggest that there may be sufficient space to allow installation of signal poles, but this needs to be evaluated further to determine whether there is a conflict. If there is a conflict that cannot be resolved, flashers should be installed on the advanced warning signs.
Community impacts	Removal of trees may cause some adverse community reaction.
Other considerations:	Union County has indicated that they are prepared to commit to maintenance of the flasher.

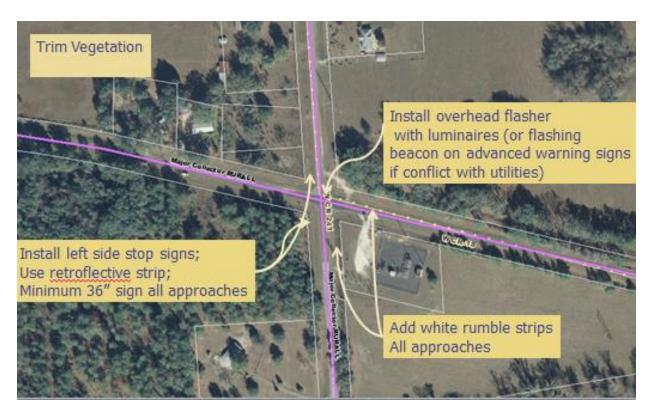


Figure 23. Suggested improvements for intersection at CR 241 and CR 18

4.3 CR 241 - ALACHUA COUNTY LINE TO CR 18

4.3.1 Site Description

CR 241 in this area approaches the bridge to Santa Fe River on a high fill section. In this area, shoulders are narrow and slopes are steep. An old guardrail was installed through most (but not all) of the area with steep slopes.

4.3.2 Analysis of Problems

4.3.2.1 From Crash Records

Two crashes occurred in this area. Both occurred at night and involved vehicles striking the guardrail. In one case the vehicle first struck the guardrail on the bridge. In the other, the vehicle lost control, travelled across the oncoming lane and struck the guardrail

4.3.2.2 Field Observations

Pavement and shoulders:

Pavement is cracked extensively, and appears to be near the end of its economic life. Shoulders have some drop-offs, but it is unclear whether this condition contributed to the crashes.

Guardrail

Although the guardrail appears to have prevented both of these crashes from becoming catastrophic, the guardrail installation is obsolete, in seriously deteriorated condition, and has gaps where critical protection is not provided. In its present condition it cannot provide the level of protection needed at this location.



Figure 24. Guardrail at CR 241 approach to Santa Fe River Bridge

4.3.2.3 Emphasis Areas for Countermeasures

- Upgrade guardrail.
- Improve shoulders. Pavement is deteriorated and any widening or shoulder paving should also be accompanied by restoration of the existing pavement.

4.4 CR 241 - CR 18 TO CR 238

4.4.1 Site Description

CR 241 through this area is straight with only minor grade changes. South of CR 241A the land use is mixed between rural and low density residential. There are occasional driveways and intersections with minor roads. North of CR 241A, the area is more residential in character. For the study period, there were no crashes reported that appeared to be related to the road conditions, so the detailed investigation concentrated on the area south of CR 241A.

4.4.2 Analysis of Problems

4.4.2.1 From Crash Records

Five crashes, including a fatality, were reported in the segment south of CR 241A. Four of these were at night. All five were lane departures, including an opposing direction sideswipe. One of the crashes was on an intersecting road at the approach to CR 241. Three involved loss of control on the right shoulder. Three vehicles struck fixed objects after losing control. The fatal crash involved a vehicle that first entered the right shoulder, crossed the opposing lane, and then struck a tree.

4.4.2.2 Field Observations

Pavement and shoulders

Pavement is narrow (less than 20'). Through much of the area the shoulders are relatively clear; however, there are areas where the shoulder slopes are steep.

Signage

Most signs are in place, though some require upgrade to conform to MUTCD standards. In one area the road is subject to chronic flooding. Union County has indicated there is a need to install signs to warn motorists of the potential for roadway flooding.

Pavement markings

The centerline was badly worn at the time of the initial field review, but has been restriped. There are no edge lines or centerline RPMs.

Clear zone conditions

There is an at least one culvert crossing without standard end treatments or guardrail protection (Figure 25). Driveway culverts generally do not have mitered end sections.



Figure 25. Culvert crossing with headwall in clear zone (CR 241 north of CR 18)

4.4.2.3 Emphasis Areas for Countermeasures

- Improve delineation of pavement edges and fixed objects with particular attention to night time visibility.
- Improve intersection signage and markings.
- Improve recovery area. This would include shoulder paving, installation or upgrade of guardrail, and elimination or mitigation of fixed objects (especially culvert ends) within the clear zone.

Table 6. Potential Countermeasures for CR 241

Level		Countermeasure	Estimated Cost	Benefit/Cost
1.	•	Upgrade signs and pavement markings (Alachua County Line to CR 238).	\$182,442	1.88
	•	Upgrade end of road treatments at "T" intersections. (Alachua County Line to CR 238).		
	Add signs designating areas where road is subject to flooding			
	•	Replace and add guardrail: The main area of concern is the high fill section at the approach to the Santa Fe River Bridge. Sites north of CR 18 need new installations.		

> Factors affecting implementation

Right of way	It appears that all improvements can be implemented within existing right of way, however, if extensive work on the slopes is required, additional rights of way or easements may be required.
Environmental impacts	Potential permit issues involving culvert crossings and shoulder widening. These appear minimal but will require further investigation.
Utilities	No significant conflicts are apparent, but will require standard coordination with utility companies.
Community impacts	None anticipated.

4.5 CR 18 - COLUMBIA COUNTY LINE TO CR 241

4.5.1 Site Description

This segment of the road includes several curves and modest hills with dense vegetation. There are several intersections and driveways along this section. These factors tend to limit visibility of roadway features to a short distance.

4.5.2 Analysis of Problems

4.5.2.1 From Crash Records

All three reported crashes resulted in injury. Two occurred at night, and one involved an effort to evade an oncoming vehicle driving without lights. Two occurred at the intersection with CR 791.

4.5.2.2 Field Observations

Pavement and shoulders

Pavement width is approximately 20 feet, with no significant distress noted. Pavement edge drop-offs are extensive throughout this section.

For the areas along CR 18, there are several locations where the recovery area involves steep slopes and/or trees are in close proximity to the travel lane.



Figure 26. Drop-offs (CR 18 west of CR 241)

> Signage and pavement markings

Upgrade of signs is needed to conform to MUTCD. Pavement markings are worn and there are no edge lines or RPM.

Clear zone conditions

The approach to the bridge at the Columbia County line has a long fill with steep slopes. A short guardrail at the bridge does not extend far enough to provide full protection and end treatments are not consistent with current standards.

Trees in some areas appear to encroach into the clear zone and may also restrict visibility of some signs.



Figure 27. Unprotected slopes on approach to bridge at Columbia County Line

4.5.2.3 Emphasis Areas for Corrections

- Enhance communications with the driver through improved signs and markings. Curvilinear alignment of the road requires more attention to advanced warning signs. End of road treatment at "T" intersections should be improved with both signage and pavement markings.
- Improve recovery area by eliminating clear zone encroachments and pavement edge dropoffs

Table 7. Potential Countermeasures for CR 18 – Columbia County Line to CR 241

Level	Countermeasure	Estimated Cost	Benefit/Cost
1.	 Upgrade signs and markings; Upgrade/ install guardrail Signing and pavement markings Upgrade signs and pavement markings Upgrade intersection treatments Remove vegetation, as required, to give adequate visibility at intersections. Upgrade / install guardrail 	\$61,249	7.57
2.	 Level 2 improvements Widen pavement and add paved shoulders 	\$612,500	2.42

> Factors affecting implementation

ractors arrecting implem	
Right of way	Right of way in this corridor is nominally 50'. Signs, marking, and guardrail can all be installed within existing right of way. Additional easements or right of way may be required for shoulder work in areas where the road is in a fill section.
Environmental impacts	The road is close to the Santa Fe River and its tributaries. Extending culverts and widening pavement may involve impacts on wetlands or streams, and permits may be required.
Utilities	Some utilities are located in this corridor. Coordination with utility companies will be required for most improvements.
Community impacts	Removal of trees may raise concerns from the community.

4.6 CR 18 - CR 241 TO SR 121

4.6.1 Site Description

Land use along this section of the road ranges from primarily agriculture at the west end to residential at the east. There are numerous driveways and intersecting streets.

4.6.2 Analysis of Problems

4.6.2.1 From Crash Records

For this section of CR 18, the crashes are summarized as follows:

Crash type	Total	Non-daylight	% Non- daylight
Lane departure to shoulder	5	1	20
Struck Animals	4	4	100
Failure to stop at intersection	3	2	67
Sideswipe	3	2	67
Improper passing	2	1	50
Collision with debris	1	0	0

Of these crash types it appears that countermeasures may be available to mitigate two types: lane departures and failure to stop at intersections. Improved recovery areas could provide some mitigation for the other types of crashes.

Most of the lane departure crashes occurred during daylight hours. Under these conditions the white limerock used for shoulder repair is generally visible and delineates the pavement edge. It is doubtful that adding edge lines would be very effective in reducing the lane departures under these conditions. Instead, it appears that elimination of the drop-offs by widening and adding a safety edge would be more effective.

4.6.2.2 Field Observations

> Pavement and shoulder conditions:

Pavement is narrow (approximately 20') and there are numerous locations where the shoulder is narrow and slopes are steep. Pavement edge drop-offs are a chronic problem. The graphic in Figure 28 indicate that most of the crashes occurred in areas with significant drop-offs.



Figure 28. Drop-offs and crash sites (CR 18 from CR 241 to SR 121)

Guardrail and culverts

Shoulders are generally narrow at culvert crossings and there are exposed headwalls or vertical drop-offs within the clear zone. Culverts at driveways and intersections do not usually include mitered end sections. Few locations have guardrail, and these installations generally do not meet current standards.



Figure 29. Culvert crossing and steep shoulder slope (CR 18 east of CR 241) without guardrail



Figure 30. Guardrail installation without end treatments (CR 18 east of CR 241)

These conditions combine to create a roadside environment in which errant vehicles have difficulty making a safe recovery. In fact, of the five reported lane departure crashes, four resulted in overturning vehicles, and the fifth struck a culvert resulting in an incapacitating injury. Since 80% of these crashes occurred during daylight, it is doubtful that lower cost measures like edge marking would provide a significant reduction in crashes.

Intersections

Three of the crashes involved vehicles entering CR 18 from intersecting roads (CR 239 and SW 111 Lane). Two of these three were at night. In one case, the investigating officer identified vegetation that obstructed the vision between the vehicle approaching the intersection and oncoming traffic.



Figure 31. Restricted sight distance at intersection (CR 239 and SW 111 Lane)

4.6.2.3 Emphasis Areas for Countermeasures

For the lane departure crashes:

- Replace obsolete or substandard guardrail with appropriate installations; add guardrail where needed.
- Eliminate or shield non- conforming features within the clear zone (culvert ends, steep slopes, trees).
- Eliminate or reduce pavement edge drop-offs (paved shoulders):
 The most severe problem with pavement edge drop-offs and the highest incidence of crashes occurs between CR 241 and SW 95th Lane (Figure 28). (The alignment of the road has two significant curves, but the existing slopes and right of way would appear to make shoulder construction in this area less costly and simpler than in other segments of the corridor.)

For intersections:

- Ensure that appropriate signs and pavement markings are in place. For "T" intersections, give special attention to end of road markings and advanced warnings.
- Check sight distance and remove vegetation where appropriate.

Table 8. Potential Countermeasures for CR 18 – CR 241 to SR 121

Level	Countermeasure	Estimated Cost	Benefit/Cost
1.	 Signing and pavement markings: Upgrade signs and pavement markings. Upgrade intersection treatments. Remove vegetation, as required, to give adequate visibility at intersections. Upgrade and install new guardrail. 	\$264,101	4.91
2.	 All Level 1 improvements. Widen pavement and add paved shoulders. 	\$3,125,000	2.25

> Factors affecting implementation

Right of way	Right of way in this corridor is nominally 50'. Signs, marking, and guardrail can all be installed within existing right of way. Additional easements or right of way may be required for shoulder work in areas where the road is in a fill section.
Environmental impacts	The road is close to the Santa Fe River and its tributaries. Extending culverts and widening pavement may involve impacts on wetlands or streams, and permits may be required.
Utilities	Some utilities are located in this corridor. Coordination with utility companies will be required for most improvements.
Community impacts	Removal of trees for sight distance improvement at intersections may raise concerns from the community.

5. OPTIONS FOR IMPLEMENTATION

Table 9 identifies options for implementing various countermeasures. Most can be implemented within existing right of way and require only simple plans or drawing. While the Local Agency Program (LAP) is the typical method used by FDOT for implementing federally funded construction projects on local road systems, Union County is not certified to perform LAP projects. Based on the understanding that the County will not be certified for this work in the near future, the options presented here are based on the assumption that FDOT will directly handle any contracting that would usually be done by the local agency through a LAP agreement.

Table 9. Options for implementing safety improvements in Union County

Improvement type	Implementation method	Issues
Sign installation	Furnish signs to Union County for installation by County crews	Union County has indicated a willingness to provide labor with County funds if sign materials can be furnished by FDOT/FHWA.
		Additional review and drawings/sketches showing sign installation details are needed. Where lowering speeds is indicated, additional studies are needed to set speed limits or advisory speeds.
		Follow up inspection or documentation of completed installations may be needed.
		Additional training for County sign personnel may be needed- especially with respect to use and interpretation of MUTCD. Such training would have long term benefits in reducing the reliance on outside technical support.
	Contract administered by FDOT	Will require preparation of plans and contract documents.
		This type of work would be a good candidate for a unit price or design-build push button contract.
		If other work such as shoulder paving is included, sign upgrades may be incorporated into such contracts; however, the urgency of some sign work (such as installation of advisory speeds, chevrons, etc.) May require immediate attention even if signs will be replaced or relocated during subsequent construction.

Table 10. Options for implementing safety improvements in Union County (continued)

Improvement type	Implementation method	Issues
Pavement markings	Perform work with FDOT crew	 Union County's striping capability is limited to a hand liner capable of applying paint only. For areas where conditions indicate a need for immediate attention, FDOT striping crews may be able to apply "temporary" striping on an emergency basis.
	Contract administered by FDOT	 Preparation of plans/sketches is required. This would be a good candidate for a district wide or state wide pavement marking contract if such a contract can be developed to qualify for federal funds. This could be a variation of the "design-build push button" concept. For areas where widening is planned, a further evaluation of the site should be made to determine whether conditions warrant immediate installation of "temporary" markings until the major project can be implemented.
Guardrail	Contract administered by FDOT	 Union County does not have capability to install or perform major repairs to guardrail. Most guardrail installations will require some engineering design. This work would appear to be a good candidate for a design-build push button contract. In areas where pavement widening or shoulder paving is planned, this work may be incorporated into the paving contract.
Widening, shoulder paving, signal installation, etc.	Contract administered by FDOT	 This work will vary in complexity from site to site. For some sites, a design-build push button contract may be appropriate. In cases involving more complex designs or environmental issues, separate plans and contracts may be required. Funds available to the County through the Small County Programs may also be used in combination with HSIP funds for this type of work.

6. APPENDICES

APPENDIX A - CRASH DATA

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					Ran into	Dark - Not			Ī.,	Ι.							exit right then crossed road to left
76987267	39186	10:44 PM	Injury Damage	Off Road	Water/Canal	Lighted Dark - Not	Cloudy	N	N	1	Н	NB	_ 2			Υ	ditch;overturned exit left, then crossed to right in curve
76987405	39204	2:02 AM	Only	Off Road	Ditch	Lighted	Clear	N	N	1	Υ	WB	1	Υ		Υ	overturned; fell asleep
76869193	30420	7:35 AM	Injury	Off Road	Ditch	Daylight	Clear	N	N	١,	N I	SB	1			N	Struck Deer; injury coding incorrect
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77256712	40455	12:38 AM	Only	Off Road	Ditch	Lighted Dark - Not	Clear	N	N	_1	Υ	WB	1	Υ		N	ditch; distracted exit right then crossed road to left
77251363	39829	12:45 AM	Injury	Off Road	Ditch	Lighted	Clear	N	N	1	Υ	SB	3	Υ		Υ	exit right then crossed road to left ditch;overturned
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76997234	39725	3:15 AM	Injury Damage	Off Road Direction	(standing) Motor Vehicle	Lighted	Clear	N	N	1	Y	SB	3			Υ	struck tree; overturned
77251807	39822	8:50 AM	Only	Sideswipe	in Transport	Daylight	Clear	N	N	2	N	SB	1		Υ	N	collision with turning vehicle
82011193	40017	2:54 AM	Damage Only	Single Vehicle	Animal	Dark - Not Lighted	Fog, Smog, Smoke	N	N	1	,	EB	2			N	On CR 238; exit left inot ditch
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82011139	40563	7:25 AM	Injury	Off Road	Pole/Light Support	Dawn	Fog, Smog, Smoke	N	N	1	v I	SB	2	Υ	Υ	N	Failed to negotiate curve
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77258926 82024158	South of South of Lizer Light 1/24/2010 12/23/2010	1:00 AM 4:26 PM	Injury Fatality Injury Fatality Damage Only Property	off Road Off Road	Ditch Overturn/Rollo ver Ditch Guardrail Face	Lighted Daylight Dark - Not Lighted	Clear Cloudy Clear	Accorda V	N N	Drug	Y Y Y	NB NB	5	Y	y Y	y Y	exit left exit right; speeding failed to negotiate curve
77258926 82024158 76998500	Overtum? South of Cress Day 1/24/2010 1/27/2008	1:00 AM 4:26 PM 11:15 PM	Injury Fatality Injury Froperty Damage Only Property Damage	Off Road Rollover Off Road Parked	Ditch Overturn/Rollo ver Ditch Guardrail Face Parked Motor	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted	Clear Cloudy Clear Fog, Smog,	y Accord	N N	1 1	Y Y Y	NB SB SB	5	Y	Section of the sectio	y Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time
FR 229 - TY258926 82024158 76998500 76995572	Overtum? South of Crebit Day 1/24/2010 12/23/2010 2/14/2009	1:00 AM 4:26 PM 11:15 PM	Injury Fatality Injury Fatality Damage Only Property	off Road Off Road	Ditch Overturn/Rollo ver Ditch Guardrail Face Parked Motor Vehicle	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted	Clear Cloudy Clear	N N	N N N	1 1	Y Y Y	NB NB SB	5	Y	Y	A STEELS	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see
FR 229 - 77258926 82024158 76998500 76995572	Overtum? South of Cress Day 1/24/2010 1/27/2008	1:00 AM 4:26 PM 11:15 PM 10:35 PM	Injury Fatality Injury Froperty Damage Only Property Damage	Off Road Rollover Off Road Parked	Ditch Overturn/Rollo ver Ditch Guardrail Face Parked Motor	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted	Clear Cloudy Clear Fog, Smog,	N N	N N N	1 1 2	Y Y Y	NB SB SB	5	Y	Y	Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time
FR 229 - FR 229	Overtum? South of Lizurania 1/24/2010 1/27/2008 10/29/2009	1:00 AM 4:26 PM 11:15 PM 10:35 PM	Injury Fatality Injury Property Damage Only Damage Only Injury	Off Road Rollover Off Road Off Road Parked Vehicle Rollover	Ditch Overturn/Rollover Ditch Guardrail Face Parked Motor Vehicle Overturn/Rollo	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Dawn Dark - Not	Clear Cloudy Clear Fog, Smog, Smoke	N N Y	N N N	1 1 2	Y Y Y	NB SB SB	5 2 1	Y	Y	Y Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time failed to negotiate curve
FR 229 - FR 229	Overtum? South of Lizarona 1/24/2010 1/23/2010 2/14/2009 1/27/2008 6/5/2006	1:00 AM 4:26 PM 11:15 PM 10:35 PM 6:50 AM	hjury Fatality Injury Property Damage Only Damage Only	Off Road Off Road Off Road Parked Vehicle Rollover Percent	Ditch Overturn/Rollover Ditch Guardrail Face Parked Motor Vehicle Overturn/Rollo	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Dawn Dark - Not	Clear Cloudy Clear Fog, Smog, Smoke	N N Y	N N N	1 1 2	Y Y Y	NB SB SB	5 2 1	Y	Y	Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time failed to negotiate curve
77258926 82024158 76998500 76995572 77253555 76982388	Overtum? South of Light Date 1/24/2010 1/23/2010 2/14/2009 1/27/2008 10/29/2009 Total Crashe Fatal	1:00 AM 4:26 PM 11:15 PM 10:35 PM 6:50 AM	Injury Fatality Injury Fatality Injury Property Damage Only Injury Injur	Off Road Rollover Off Road Parked Vehicle Rollover Percent 17%	Ditch Overturn/Rollover Ditch Guardrail Face Parked Motor Vehicle Overturn/Rollo	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Dawn Dark - Not	Clear Cloudy Clear Fog, Smog, Smoke	N N Y	N N N	1 1 2	Y Y Y	NB SB SB	5 2 1	Y	Y	Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time failed to negotiate curve
FR 229 - HEMP Ref. 77258926 82024158 76998500 76995572 77253555 76982388	Overtum? South of Crest Data 1/24/2010 1/27/2009 1/27/2009 6/5/2006 Total Crash- Fatal hypry	1:00 AM 4:26 PM 11:15 PM 10:35 PM 6:50 AM	Injury Fatality Injury Froperty Damage Only Injury Number 1	creen of Road Rollover Off Road Off Road Parked Vehicle Percent 17% 50%	Ditch Overturn/Rollover Ditch Guardrail Face Parked Motor Vehicle Overturn/Rollo	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Dawn Dark - Not	Clear Cloudy Clear Fog, Smog, Smoke	N N Y	N N N	1 1 2	Y Y Y	NB SB SB	5 2 1	Y	Y	Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time failed to negotiate curve
FR 229 - HEMP Ref. 77258926 82024158 76998500 76995572 77253555 76982388	Overtum? South of Light Date 1/24/2010 1/23/2010 2/14/2009 1/27/2008 10/29/2009 Total Crashe Fatal	1:00 AM 4:26 PM 11:15 PM 10:35 PM 6:50 AM	Injury Fatality Injury Fatality Injury Property Damage Only Injury Injur	creen of Road Rollover Off Road Off Road Parked Vehicle Percent 17% 50%	Ditch Overturn/Rollover Ditch Guardrail Face Parked Motor Vehicle Overturn/Rollo	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Dawn Dark - Not	Clear Cloudy Clear Fog, Smog, Smoke	N N Y	N N N	1 1 2	Y Y Y	NB SB SB	5 2 1	Y	Y	Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time failed to negotiate curve
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Habit Jee 77258926 82024158 76998500 76998572 77253555	Overtum? South of Crest Day Crest Day 1/24/2010 1/27/2009 1/27/2008 10/29/2009 6/5/2006 Total Crash Fatal hijury PDO	1:00 AM 4:26 PM 11:15 PM 10:35 PM 6:50 AM	Injury Fatality Injury Forperty Damage Only Unijury Number 1 3 2	ctreb. Y. Ctreb. Y.	Ditch Overturn/Rollover Ditch Guardrail Face Parked Motor Vehicle Overturn/Rollo	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Dawn Dark - Not	Clear Cloudy Clear Fog, Smog, Smoke	N N Y	N N N	1 1 2	Y Y Y	NB SB SB	5 2 1	Y	Y	Y	exit left exit right; speeding failed to negotiate curve failed to negotiate curve; did not see curve in time failed to negotiate curve

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76977218	7/26/2006	11:05 AM	Injury	Off Road	Ditch	Daylight	Cloudy	N	Ν	1	Υ	SB	3	Ν	Ν	Υ	Lost control on rt
					Tree	Dark - Not											
76989051	3/6/2007	8:15 PM	Injury	Off Road	(standing)	Lighted	Clear	N	N	1	Υ	?	?	N	Ν	N	No report
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70007500	4/40/0000	4:40 414	E-1-Pr	Single		Dark - Not	01				.,	NID.	_		١.		shoulder/crossed n
76997592	4/12/2009	4:10 AM	Fatality	Vehicle		Lighted	Clear	Υ	N	1	Υ	NB	5	N	N	N	lane/struck tree
			Property Damage	Opposing	Motor Vehicle	Dark - Not											
77261192	10/10/2010	8·15 PM	Only	Sideswipe	in Transport	Lighted	Clear	N	N	2	?	NB	1	N	N	N	vehicle left scene
77201102	10/10/2010	0.101111	Orny	Ciacompo	iii rranoport	Ligitiou	Oloui	Ť			Ė		Ė	· `	<u> </u>	ľ,	lost control on rt
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82038621	9/20/2011	9:35 PM	Injury	Off Road	Culvert	Lighted	Cloudy	N	N	1	Υ	WB	3	Ν	Υ	N	intersecting
			Number														
	Total Crash	nes	5														
	Fatal		1														
	Injury		4													-	
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HZMV AC	South Murther Craen Da	cresh Tim	Crash	Severity Type	first Harri	Light Cond	Meat	net	Alcol	Drug.	gelati gelati	aded steel	sial's	0 50	rect rect	inte inte	section ?
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		Crest Tith	Damage	Off Road	Çirşt Harifi Guardrail End	Dark - not	Neat	net C	Akco'		yela' Yehi	aded NB		Sec Vair		Inte Inte	
		ke Crash Tim	Damage		Guardrail End	Dark - not lighted											struck end of
<u>82827410</u>	12/16/2011	Cresh Tirr 12:01:00 AM	Damage Only Property Damage	Off Road	Guardrail End	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011	ke Crash Tim	Damage Only Property Damage		Guardrail End	Dark - not lighted	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011	Cresh Tirr 12:01:00 AM	Damage Only Property Damage	Off Road	Guardrail End	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011	Cresh Tirr 12:01:00 AM	Damage Only Property Damage Only	Off Road	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	7/2/2011	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number	Off Road injury Percent	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crash	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2	Off Road injury Percent	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crash	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2	Off Road injury Percent	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crast Fatal Injury	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2 0 1	Off Road injury Percent 0 0.5	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crash	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2	Off Road injury Percent 0 0.5	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crast Fatal Injury PDO	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2 0 1	Off Road injury Percent 0 0.5 0.5	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crast Fatal Injury PDO Daylight	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Property Damage Only Number 2 0 1 1	Off Road injury Percent 0 0.5 0.5	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crash Fatal Injury PDO Daylight Dark/other	E CRET TW 12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2 0 1 1	Off Road injury Percent 0 0.5 0.5 1	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
<u>82827410</u>	12/16/2011 7/2/2011 Total Crast Fatal Injury PDO Daylight	12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Property Damage Only Number 2 0 1 1	Off Road injury Percent 0 0.5 0.5 1 0	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail
8282741 <u>0</u>	12/16/2011 7/2/2011 Total Crash Fatal Injury PDO Daylight Dark/other Curve?	12:01:00 AM 3:30:00 AM	Damage Only Property Damage Only Number 2 0 1 1 2 0 0 1 1	Off Road injury Percent 0 0.5 0.5 0.5 0.0 0 0 0 0 0 0 0 0 0 0	Guardrail End bridge pier or support	Dark - not lighted Dark - not	Clear	N	N	1	Υ	NB	_1	N	N	N	struck end of guardrail

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77258949	5/28/2010	8:06 PM	Injury	Off Road	Tree (standing)	Paved	Not	Rain	Υ	N	1 Y	SB	2	Ν	Υ	N	failed to stop at intersection
					Motor Vehicle in												Failed to stop for turning
76999528	8/31/2008	10:45 AM	Injury	Rear End	Transport	Unpaved	Daylight	Cloudy	N	N	2 Y	WB	2	N	Υ	N	vehicle
00040007	0/40/0040	40:00 DM	la is say a	O# DI	T (-41:)	Ulananina	Dark -	01		. .	0 1/	WD					evasive maneuve - avoid
82042637	3/13/2012	10:30 PM	Injury	Off Road	Tree (standing)	Unpaved	Not	Clear	N	N	2 Y	WB	4	N	N	N	approaching vehicle no lig
			Number	Percent													
	Total Crash	es	<u>INUITIDEI</u>														
	Fatal		0														
	Injury		3		ì						+						
	PDO			0%													
				1													
	Daylight		1	33%													
	Dark/other		2	67%													
	Curve?		C														
	Intersection?		2							Ш							
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R 18/C	CR 241 Inte			Severity Severity	ype its hamin	tivent Care	Shoulder .	ond	inet C	jond	And St	plate of the state	it of	o col	trect of the control	th state	School Connects
R 18/C	Cresh Date			Severity Crash T	ype First Harmtu.	theur Type C	Shoulder Light	ord	inet C	ond	Drug S	interest of the control of the contr	hird	o col	Curi de la curi	intel	Detugna Connents
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R 18/C	Crash Day	s Craen i		Severity Crash T	Pres Hamilia Motor Vehicle in Transport	Livert Type 5	Daylight	ord Mea	N N	Jond Alco	April 1	was was		o con training the state of the	Y Y	ty interest	Exhibiting Contributes Contributes failed stop
Hann ber	Crash Day	s Craen i	Crash	Rear End	WOLOT VOLIGIO III		Daylight Dark -									inter the second	failed stop
HSW Rec 76982408	ort Murate Crash Day	Crash S	Crash Injury	Rear End Left	WOLOT VOLIGIO III	Unpaved	Daylight Dark - Not	Clear	N	N	2 Y	WB	2	N	Υ		failed stop failed to stop;police pursu
Hann ber	ort Murate Crash Day	s Craen i	Crash Injury Fatality	Rear End	WOLOT VOLIGIO III		Daylight Dark - Not Lighted		N				2	N	Υ	Jack V	failed stop
HSMV Ref.	ort Murate Crash Day	Crash S	Injury Fatality Property	Rear End Left Leaving	Transport	Unpaved	Daylight Dark - Not Lighted Dark -	Clear	N	N	2 Y	WB	2	N	Υ		failed stop failed to stop;police pursu
HSMV Ref.	Great Day 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1 (1987) 1	2:00 PM 8:58 PM	Crash Injury Fatality	Rear End Left Leaving	WOLOT VOLIGIO III	Unpaved	Daylight Dark - Not Lighted	Clear	N	N	2 Y	WB	5	N	Υ		failed stop failed to stop;police pursu
76982408 77258185	ort. huntre f Crosh Dai 9/23/2006 7/2/2010	2:00 PM 8:58 PM	Crost Injury Fatality Property Damage	Rear End Left Leaving Right	Transport Motor Vehicle in	Unpaved	Daylight Dark - Not Lighted Dark - Not	Clear	N N	N N	2 Y	WB SB	5	N N	Y		failed stop failed to stop;police pursu no lights
76982408 77258185	ort. huntre f Crosh Dai 9/23/2006 7/2/2010	2:00 PM 8:58 PM	Injury Fatality Property Damage Only	Rear End Left Leaving Right	Transport Motor Vehicle in	Unpaved	Daylight Dark - Not Lighted Dark - Not	Clear	N N	N N	2 Y	WB SB	5	N N	Y		failed stop failed to stop;police pursu no lights
76982408 77258185	9/23/2006 7/2/2010	2:00 PM 8:58 PM 6:41 AM	Injury Fatality Property Damage Only Property Damage Only	Rear End Left Leaving Right	Transport Motor Vehicle in Transport	Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Daylighted	Clear	N N	N N	2 Y	WB SB	5	Z Z	Y		failed stop failed to stop;police pursu no lights
Fesh Res 76982408 77258185 77258972	9/23/2006 7/2/2010	2:00 PM 8:58 PM 6:41 AM	Injury Fatality Property Damage Only Property Damage Only Property	Rear End Left Leaving Right Angle	Motor Vehicle in Transport Motor Vehicle in Transport	Unpaved Unpaved Paved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Daylighted Daylight Dark -	Clear	Z Z	N N N	2 Y	SB WB	5	Z Z	Y Y		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Property Damage	Rear End Left Leaving Right Angle Other	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
Fesh Res 76982408 77258185 77258972	9/23/2006 7/2/2010 10/24/2010	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Property	Rear End Left Leaving Right Angle	Motor Vehicle in Transport Motor Vehicle in Transport	Unpaved Unpaved Paved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Daylighted Daylight Dark -	Clear	Z Z Z	N N N	2 Y	WB SB WB NB	5	N N N	Y Y		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Property Damage Only	Rear End Left Leaving Right Angle Other	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only	Rear End Left Leaving Right Angle Other Other	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	Gr. huntre 1 Great Day 9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only	Rear End Left Leaving Right Angle Other Other	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Number	Rear End Left Leaving Right Angle Other Other Percent 3	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal Injury	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Property Damage Only Property Damage Only 1	Rear End Left Leaving Right Angle Other Other Percent 20% 20%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Number	Rear End Left Leaving Right Angle Other Other Percent 20% 20%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal Injury PDO	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Number 1 1 2 3	Rear End Left Leaving Right Angle Other Other Percent 20% 3 60%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal Injury	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Property Damage Only Property Damage Only 1	Rear End Left Leaving Right Angle Other Other 20% 20% 60% 40%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal Injury PDO Daylight	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Number 1 1 3	Rear End Left Leaving Right Angle Other Other Percent 20% 3 60% 40% 60%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal Injury PDO Daylight Dark/other	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Property Damage Only 1 1 2 3	Rear End Left Leaving Right Angle Other Other 20% 20% 8 60% 8 60% 6 60% 0 9%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot
76982408 77258185 77258972 76997225	9/23/2006 7/2/2010 10/24/2010 7/22/2008 2/18/2011 Total Crash Fatal Injury PDO Daylight Dark/other Curve?	2:00 PM 8:58 PM 6:41 AM 4:20 PM	Injury Fatality Property Damage Only Property Damage Only Property Damage Only Property Damage Only 2 3	Rear End Left Leaving Right Angle Other Other 20% 60% 60% 60% 60% 60% 60% 60% 60% 60%	Motor Vehicle in Transport Motor Vehicle in Transport Motor Vehicle in Transport Thrown or Falling Object	Unpaved Unpaved Paved Unpaved	Daylight Dark - Not Lighted Dark - Not Lighted Dark - Not Lighted Daylight Daylight Dark - Not	Clear Cloudy Clear Clear	Z Z Z	Z Z Z Z	2 Y 2 Y 2 Y	WB SB WB NB	5	N N N	Y Y N		failed stop failed to stop;police pursu no lights failed to stop stalled vehicle rolled back object fell from trailer inot

CR 18 fro	om CR 2	41 to SR	121										Т				
	or Muniper							'	7				$\overline{/}$	7,	7,	7	
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			Property				Daik -										
70000040	4/47/2007	C: 40 DM	Damage	Single	Animal	Llanavad	Not	Claudu	N.	N.I	1 N						
76989040	1/17/2007	6:49 PIVI	Only Property	Vehicle	Animal	Unpaved	Lighted Dark -	Cloudy	N	N	111		1	N	N	N	Struck Cow
			Damage	Single			Not										
76989039	1/17/2007	6:48 PM	Only	Vehicle	Animal	Unpaved	Lighted	Cloudy	N	Ν	1 N		1	N	Ν	Ν	Struck Cow
77253543	7/22/2000	1:50 DM	lniun/	Pollovor	Overturn/Rollov	Linnayad	Dovlight	Cloor	NI.	N	1 Y	EB		N	N	~	Distracted - exited to right shoulder
11200040	7/23/2009	1.50 PW	Injury Property	Rollover	er	Unpaved	Daylight Dark -	Clear	N	IN		ED	+-	IN	IN	r	snoulder
			Damage				Not										
77260800	4/23/2010	9:36 PM	Only	Other	Animal	Unpaved	Lighted	Clear	N	Ν	2 N	Ц	1	Ν	Ν	Ν	Struck Horse
70007040	4/44/0000	7:00 DM	lando com c	O# DI	E		Day Barba	01	ļ.,			.	١,	١			Dt Oberelder there exercises
76997212	4/11/2008	7:00 PM	Injury Property	Off Road	Fence	Unpaved	Daylight	Clear	N	N	1 Y	EB	3	N	N	Υ	Rt Shoulder - then crossover
			Damage		Overturn/Rollov				1								
82042590	5/7/2011	4:35 PM	Only	Rollover	er	Unpaved	Daylight	Clear	N	Ν	1 Y	WE	1	Υ	Ν	Υ	Shoulder
					N4-4>/ ! : ! :		Dark -		1								
82025351	12/13/2011	6:00 AM	Injury	Other	Motor Vehicle in Transport	Unpaved	Not Lighted	Cloudy	N	NI	2 V	EB	١,	Y	Υ	N	Improper passing
02023331	12/13/2011	0.00 AW	Property	Otrici	Transport	Oripaveu	Ligitieu	Cioudy	IN	IN			 '	ť	r'	IN	improper passing
			Damage		Overturn/Rollov												
82034430	7/22/2012	12:00 AM	Only	Rollover	er	Unpaved	Daylight	Clear	Υ	N	1 Y	EB	1	Υ	N	Υ	Shoulder
			Property Damage		Other Non-												
76987288	6/22/2007	9:45 AM	Only	Other	Fixed Object	Unpaved	Daylight	Cloudy	N	N	2 N	ıl	1	N	N	N	Road debris struck vehicle
	0, 1, 1, 1, 0, 1,		1,	-			Dark -		Ť								
							Not										
76993040	11/4/2007	2:00 AM	Injury	Off Road Left	Tree (standing) Motor Vehicle in	Unpaved	Lighted	Cloudy	Υ	N	1 Y	SB	3	N	Υ	N	approach from CR 239
76869174	9/22/2007	2·46 PM	Injury	Leaving	Transport	Unpaved	Daylight	Clear	N	N	2 Y	SB	4	N	Υ	N	approach from CR 239; tree obstructed view
	0,111,110		,				Dark -		Ť								
				Single			Not										exit to shoulder - struck
77251821	5/11/2009	5:33 AM	Injury	Vehicle		Unpaved	Lighted Dark -	Clear	N	N	1 Y	EB	4	N	Υ	N	culvert
					Motor Vehicle in		Not										opposing sideswipe; not
76999592	3/3/2010	9:57 PM	Injury	Rear End	Transport	Unpaved	Lighted	Clear	Υ	N	2 N	ΙЕВ	3	N	Υ	N	related to intersection
			Property														
77057050	44/0/0040	4:40 DM	Damage	Other	Motor Vehicle in		Day Barba	01						١.			improper passing - turning
77257859	11/6/2010	4:12 PM	Only Property	Other	Transport	Unpaved	Daylight	Clear	N	N	211	I WE	1	N	Υ	N	vehicle
			Damage	Opposing	Motor Vehicle in												
82042580	3/11/2011	6:50 PM	Only	Sideswipe	Transport	Unpaved	Dusk	Clear	N	Ν	2 N	I WE	1	Ν	Ν	Ν	hit /run
00040507	4/40/0044	44.00.414		Opposing	Motor Vehicle in	l	D 11.	01	. .			.	١.	L.	L.	ļ.,	
82042587	4/16/2011	11:00 AM	Injury Property	Sideswipe	Transport	Unpaved	Daylight Dark -	Clear	N	N	2 N	I EB	4	N	N	IN	driver blacked out
			Damage	Single			Not										
82044937	3/23/2011	12:45 AM	Only		Animal	Unpaved	Lighted	Clear	N	Ν	1 N		1	Ν	Ν	N	Crash report not available
							Dark -										
82079888	3/18/2012	12:35 AM	Injury	Off Road	Fence	Unpaved	Not Lighted	Cloudy	N	N	1 🗸	SB	1,	N	V	NI	approach from SW 111 Lane
02073000	3/10/2012	12.00 AW	illijury	Oli itoau	i crice	Oripaved	Ligitica	Cioudy	i v	1.4	<u> </u>	00			Ė	1.4	Japproach nom OW 111 Lane
			Number														
	Total Crash	es	17														
	Fatal		9					-			\vdash	-	-	-	-		
	Injury PDO		8								\vdash	+					
				-1.70													
	Daylight		12														
	Dark/other		6								Ш	-	-	-	-		
	Curve? Intersection?		3						-		\vdash	+	+	-	-		
	Overturn?		4								\vdash						

APPENDIX B - BASIS OF COST ESTIMATES

Countermeasure / Activity	Cost	Units	Lifespan	Item Number (from FDOT Average Unit Cost)
Remove vegetation	\$ 1,000.00	each location	1	N/A
Upgrade signs to meet MUTCD standards	\$ 3,909.50	mile	6	see group section below
Turn/sharp curve treatments MUTCD 2C-2	\$ 4,515.67	each location	6	see group section below
Warning sign	\$ 250.87	each	6	0700 20 11
Chevron	\$ 250.87	each	6	0700 20 11
Stop sign	\$ 250.87	each	6	0700 20 11
Curve warning sign with advisory speed plates	\$ 376.31	each	6	based on 0700 20 11
Remove single post sign	\$ 14.85	each	6	0700 20 60
T-intersection upgrade	\$ 1,106.68	each location	6	see group section below
Object marker sign	\$ 125.23	each	6	0705 10 3
Edgelines	\$ 0.66	feet	6	0711 11111
Centerlines	\$ 0.67	feet	6	0711 11211
RPMs	\$ 3.34	each	6	0706 3
Transverse rumble strips	\$ 3.09	feet	6	713102111
Stop bar (12" preformed tape)	\$ 7.35	feet	6	713101111
Retroreflective strip for sign post	\$ 70.00	each	6	N/A
Guardrail	\$ 15.08	feet	25	0536 1 1
Guardrail removal	\$ 1.29	feet	25	0536 73
Guardrail anchorage assembly	\$ 1,596.44	each	25	0536 85 22
Culvert with mitered end sections	\$ 2,262.90	each	25	0430173118 and 430982125
Overheard flashing signal	\$ 50,000.00	each	20	N/A
Luminaires on signal poles	\$ 358.68	each	6	0715 11111
Widen and pave shoulder (basic)	\$ 350,000.00	mile	25	see group section below
Widen and pave shoulder (with added work)	\$ 500,000.00	mile	25	see group section below
Signal maintenance	\$ 1,000.00	ea	1	N/A
Contingency and engineering	25.0%			
Interest rate	4.0%			

Upgrade signs to m	SALANITOD A	tom dowdo								
			to and require replacement to	correct ciz	o location	or conditio	n			
			ete and require replacement to	correct SIZ	e, location,	or conditio	or)			
	erage of 10 sig		oer mile - use cost of type 3 m	orkore						
	ost of signs as		ber fille - use cost of type 3 fil	iaikeis						
Use average c			st sign < 12 sf				\$	250.87		
	remove existir		· ·				\$	14.85		
	Terriove existii	ig single post	total cost				\$		per sign	
	inctall object a	markoro	total cost				\$		per sign	
	install object r	liaikeis					Φ	120.23	per sign	
	Cost per mile	to upgrade	existing signs				\$	3,909.50	per mile	
			J . J .				Ė	,		
T" intersection up	•									
	•		ograde of existing signs							
			the following items:							
			s - (usually obsolete)							
			dvanced warning signs - but th							
Actual work re			to location, but these items r	epresent th	e typical re				ent.	
			signs on main line			W2-2	\$	250.87		
			on minor approach			W3-1	\$	250.87		
			rrow at end of road			W1-7	\$	265.72		
	Remove and r						\$	265.72		
	Add Stop Bar		(12" preformed tape		10' @\$7.3	5/ft)	\$	73.50		
	Cost per inte	rsection to a	dd "T" intersection treatme	nts			\$	1,106.68	per inters	ection
lpgrade Guardrail										
, ,		ail will be rem	oved and replaced							
			ar enough to meet need.							
			eatment at all breaks in guardi	rail Acutal	design will	may vary f	rom	this estima	ite	
	guardrail is not			all. Acutal	uesign wiii	illay valy i	loiii	uns esume	uc.	
i awing under (juaruran 15 110l	moraudu III III	iio coliiiale.							
Turn/sharp curve to Assumptions:		TCD 2C-2								
	Use signing la	ayout per Figu	ire 2C-2 MUTCD							
	Actual layout	to be adjuste	d to site conditions.							
Signs Require										
	Advanced war	ning with advi	sory plate		W1-1R and	d W13-1P	\$	376.31	2	752.
			t of single post plus 1/2 of cos	t for additio	nal face)					
	Warning sign	at beginning	of curve		W1-1aR		\$	250.87	2	501.
	Turn signs				W1-6R		\$	250.87	2	501.
	Chevrons				W1_8		\$	050.07		2759.
							Ψ	250.87	11	
							φ	250.87	11	
	Total Signing	g cost for Cu	rve/Turn		_		Φ	250.87	11	\$4,515.6
Nidon and Bassinfa		g cost for Cu	rve/Turn		_		Ψ	250.87	11	\$4,515.6
	ce	g cost for Cu	rve/Turn		_		Ψ	250.87	11	\$4,515.6
Viden and Resurfa	ce nate:								11	\$4,515.6
	ce nate: Cost estimate	e is based on	total project cost per mile for s		ects on cou		n Dis		11	\$4,515.6
	ce nate: Cost estimate Data obtained	e is based on	total project cost per mile for s	based on d	ects on cou		n Dis		11	\$4,515.6
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APPENDIX C - CALCULATION OF BENEFIT/COST RATIOS

Site:	CR 229, S-Ct	iive South of S	- ובו דו	· IIIIIIIIIIIIIII E	xtenaea iron	11 OK 121		yrıs anu n							
Length:		miles	2.2					J							
- U	4752	feet	11616												
Countermeasure				Level 1						Level 2					
								annuity	annual					annuity	annual
				unit	cost/unit	number	cost	factor	cost	unit	cost/unit	number	cost	factor	cost
Upgrade signs to MU	JTCD standard	S		mile	\$3,909,50	2.2	\$ 8,601	5.24	\$ 1,641		\$3,909.50	1.3	\$ 5,082	5.24	\$ 970
Pavement Markings					, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,				,				
<u> </u>	Centerline			lf	\$ 0.67	23,232	\$ 15,456	5.24	\$ 2,948		\$ 0.67	6,864	\$ 4,567	5.24	\$ 871
	Edge line			lf	\$ 0.66		\$ 15,368		\$ 2,932		\$ 0.66	6,864	\$ 4,541	5.24	
	RPMs			ea	\$ 3.34		\$ 1,940	5.24			\$ 3.34	343	\$ 1,146	5.24	
	Rumble Strips	2		ou	ψ 0.0-1	001	Ψ 1,040	0.2	Ψ ΟΙΟ		ψ 0.04	040	ψ 1,140	0.24	Ψ 210
Upgrade "T" intersect															
Curve Treatments (M															
Curve rreatments (w	Advanced wa	rning ciane		ea	\$ 250.87	2	\$ 502	5.24	\$ 96		\$ 250.87		\$ -		
				ca	\$ 230.07		Φ 302	3.24	φ 30		φ 230.0 <i>i</i>		φ -		
		gs signs with a	advisory		A 070 04		. 750				6 070.04				
	speed plates			ea	\$ 376.31	2	\$ 753	5.24			\$ 376.31		\$ -		
	Chevons			ea	\$ 250.87	20		5.24			\$ 250.87		\$ -		
	Turn arrow			ea	\$ 250.87	1	\$ 251	5.24			\$ 250.87		\$ -		
	Sign removal			ea	\$ 14.85	3	\$ 45	5.24	\$ 8		\$ 14.85		\$ -		
Guardrail															
	Number of sit	es													
	Removal										\$ 1.29		\$ -		
	Install new										\$ 15.08		\$ -		
	Anchorage as										\$1,596.44		\$ -		
Culvert extensions (w		d)									\$2,262.90		\$ -		
Widen and Resurface	e										\$ 500,000	0.9	\$450,000	15.62	\$ 28,805
Other															
	Stop sign			ea	\$ 250.87	2	\$ 502	5.24	\$ 96		\$ 250.87		\$ -		
	Stop sign ren	noval		ea	\$ 14.85	1	\$ 15	5.24	\$ 3		\$ 14.85		\$ -		
	Stop bar			lf	\$ 7.35	10	\$ 74	5.24	\$ 14		\$ 7.35		\$ -		
Subtotal							\$ 48,522		\$ 9,256				\$465,336		\$ 31,731
Subiolai															r 7000
Engineering and cont	tingencies				25%	,	\$ 12,131		\$ 2,314		25%		\$116,334		\$ 7,933
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality	s 6 6 1				25%	N re	\$ 60,653 Note: Ui egular j	oavem	\$11,570 e for w	rking	nd resu and sigr	ning sl	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj	s 6 6 1				25%	N n	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve	\$11,570 e for w ent ma	rking kings	nd resu	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and conf Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj	s 6 6 1				25%	N n	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and conf Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj	s 6 6 1				25%	N n	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and conf Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj	s 6 6 6 1 1 1 1 0 0 2 2 2				25%	N n	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co	s 6 6 6 1 1 1 1 0 0 2 2 2 2 2 2 2 5 5 t 5				25%	N n	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road	s 6 6 6 1 1 1 0 0 2 2 2				25%	N n	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road	s 6 6 6 1 1 0 2 2 2 2 2 2 2 5 4 0 2 , 0 0 3 \$ 2 , 4 1 2 , 0 1 8				25%	N n C V	\$ 60,653 Note: Ui egular µ Costs fo vork she	oavem r Leve ow as	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs	\$ 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			Curve	25%	N n C V	\$ 60,653 Note: Ui egular i Costs fo	oavem r Leve ow as	\$11,570 e for w ent ma	rking kings	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatit Level 1 Combin	\$ 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			Curve	Edgelines	N n C V	\$ 60,653 Note: Ui egular p Costs fovork sho	oavem r Leve ow as	e for w. ent ma I 2 mai I evel 2	rking kings impr	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatie Level 1 Combin CMF - Fatal	\$ 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				Edgelines 0.741	N n C V	\$ 60,653 Note: Unegular posts for york shu	curve (e for when the man in a man in	rking kings impr	and resu and sigr and sig	ning sl ning re	\$581,670 includes nown in	Level	\$ 39,664 for 1.
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Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal	\$ 6 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			CMF CMF CMF Curve	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular process for york shown	Curve C CMF CMF Widen	e for when the man shape of the	rkings kings impre	and resu and sign and sign ovement	ning shing reference control c	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury	\$ 6 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular process for work shown shown shown shown shown sign of the shown sign of the shown	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatit Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury	\$ 6 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			CMF CMF CMF Curve	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular process for work shown shown shown shown shown sign of the shown sign of the shown	Curve C CMF CMF Widen	e for when the form of the for	rkings kings impre	and resu and sign and sign overment	ning shing reference control c	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - Fatal CMF - Injury CMF - Fatal CMF - Injury CMF - PDO	\$ 6 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular process for work shown shown shown shown shown sign of the shown sign of the shown	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - Fatal CMF - Injury CMF - Fatal CMF - Injury CMF - PDO	\$ 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatin Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit	\$ 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced	s 6 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit	s 6 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366 \$ 1,612,958		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit	s 6 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year	s 6 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366 \$ 1,612,958		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit Benefit per year	s 6 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366 \$ 1,612,958		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatit Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio	s 6 6 6 6 1 1 1 0 0 2 2 2 2 5 5 5 5 5 402,003 \$ 2,412,018 0 1 Factors 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Level 2 4.01230366 \$1,612,958 \$ 268,826 Level 2 \$ 268,826		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio Annual Benefit	s 6 6 6 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366 \$1,612,958 \$ 268,826 Level 2 \$ 268,826		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatin Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit	s 6 6 6 6 1 1 1 0 0 2 2 2 2 5 5 5 5 5 402,003 \$ 2,412,018 0 1 Factors 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Level 2 4.01230366 \$1,612,958 \$ 268,826 Level 2 \$ 268,826		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular properties for the control of the control	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit Benefit per year Benefit/Cost Ratio Annual Benefit Annual Cost	s 6 6 6 6 1 1 1 0 0 2 2 2 2 5 5 5 5 5 402,003 \$ 2,412,018 0 1 Factors 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Level 2 4.01230366 \$1,612,958 \$ 268,826 Level 2 \$ 268,826 \$ 39,664 6.78		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular process for work shown shown shown shown shown sign of the shown sign of the shown	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.
Engineering and cont Total Cost Crashe: Study Period (years) Total Crashes K - fatality A - incapacitating inj B - non inc. inj C - possible inj O - PDO Crash Co 2-Lane rural road Total crash costs Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combin CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit Benefit per year Benefit/Cost Ratio Annual Benefit Annual Cost	s 6 6 6 6 1 1 1 0 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Level 2 4.01230366 \$1,612,958 \$ 268,826 Level 2 \$ 268,826 \$ 39,664		CMF CMF CMF Curve CMF	Edgelines 0.741 0.741 0.741 Edgelines 0.741	Curve W CMF CMF CMF CMF CMF	\$ 60,653 Note: Unegular process for work shown shown shown shown shown sign of the shown sign of the shown	Curve C CMF CMF Widen CMF CMF	e for when the form of the for	curve W	and resu and sign and sign overment	Curve	\$581,670 includes nown in eflect the	Level	\$ 39,664 for 1.

Site:	CR 229 Inters	section with	NF 125th	Way and NE 2	28th	Place						
Length:		miles				000						
g	1320											
Countermeasure				Level 1								
											a	annual
				unit	со	st/unit	number		cost	annuity factor		cost
Upgrade signs to MUT	CD standards			mile	\$	3,909.50	0.25	\$	977	5.24	\$	186
Pavement Markings					Ť	-,		Ť			Ť	
0	Centerline			lf	\$	0.67	2,640	\$	1,756	5.24	\$	335
	Edge line			lf	\$	0.66	2,640		1,746	5.24	\$	333
	RPMs			ea	\$	3.34	66	\$	220	5.24	\$	42
	Rumble Strip	S		lf	\$	3.09	200	\$	618	5.24	\$	118
Upgrade "T" intersection	ons											
Curve Treatments (MU												
	Advanced wa	rning sign		ea	\$	250.87	2	\$	502	5.24	\$	96
	Curve warnin	g signs with	advisory									
	speed plates			ea	\$	376.31	2	\$	753	5.24	\$	144
	Chevrons			ea	\$	250.87	11	\$	2,760	5.24	\$	526
	Turn arrow si	gns		ea	\$	250.87	2	\$	502	5.24	\$	96
	Sign removal			ea	\$	14.85	2	\$	30	5.24	\$	6
Guardrail												
	Number of si	tes					1					
	Removal			lf	\$	1.29	50	\$	65	15.62	\$	4
	Install new			lf	\$	15.08	130	\$	1,960	15.62	\$	125
	Anchorage a	ssembly		ea	\$	1,596.44	2	\$	3,193	15.62	\$	204
Culvert extensions (wit	h mitered end)		ea	\$	2,262.90	1	\$	2,263	15.62	\$	145
Widen and Resurface												
Other												
	Stop sign			ea	\$	250.87	3		753	5.24	_	144
	Stop sign rer	noval		ea	\$	14.85	2	\$	30	5.24		6
	Stop bar			lf	\$	7.35	20	\$	147	5.24	_	28
Subtotal								\$	18,274		_	2,538
Engineering and contin	gencies					25%		\$	4,568		\$	634
Total Cost								\$	22,842		\$	3,172
Crashes												
Study Period (years)	6											
Total Crashes	3											
K - fatality	0											
A - incapacitating inj	0											
B - non inc. inj	1											
C - possible inj	2											
O - PDO	0											
Crash Cos	ts											
2-Lane rural road cost												
Total crash costs	\$1,206,009											
Crash Modificatio	n Factore											
Level 1 Combine				Curve E	=dapli	inge	Curve Warni	na	Siane	Curve Che	v#∩r	ne
CMF - Fatal	0.404586			CMF - Fatal	Lugen		CMF - Fatal	lig		CMF - Fatal	VIOI	0.78
CMF - Injury	0.404586			CMF - Injury			CMF - Injury			CMF - Injury		0.78
CMF - PDO	0.5317416			CMF - PDO			CMF - PDO			CMF - PDO		0.78
OWI - 1 DO	0.3317410			CIVII - I DO		0.7-1	OWI - 1 DO		0.32	CIVII - I DO		0.70
Benefit												
	Level 1											
Crashes Reduced	1.786242											
Benefit	\$ 718,075											
Benefit per year	\$ 119,679											
Benefit/Cost Ratio												
Delietit/COSt Katio	Level 1											
Annual Benefit	\$ 119,679				-							
Annual Cost	\$ 119,679											
B/C Ratio	37.73											
S, S ratio	31.13											
	Level 1	Level 2										
Net Present Value	\$ 116,507	\$ -										

Site:	CR 229 (north	1)	SR 121 to Ba	ker County L	ine - except	intersection a	t 125 Way 8	& 228 Pla	ce								
Length:		miles															
	35904	feet															
				Level 1						Level 2							
					., .			annuity	annual		., .,			annuity	annual		
Countermeasure				unit	cost/unit	number	cost	factor	cost	unit	cost/unit	number	cost	factor	cost		
Upgrade signs to MU	ICD standard	S		mile	\$3,909.50	6.8	\$ 26,585	5.24	\$ 5,071		\$ 3,909.50		\$ -				
December 14 and in ma																	
Pavement Markings	0			.,	• • • • •	74.000	0 47 774	E 0.4			• • • • • •		•				
	Centerline			lf	\$ 0.67		\$ 47,774	5.24			\$ 0.67		\$ -				
	Edge line			lf	\$ 0.66 \$ 3.34		\$ 47,501		\$ 9,061		\$ 0.66 \$ 3.34		\$ - \$ -				
	RPMs			ea	\$ 3.34	1,795	\$ 5,996	5.24	\$ 1,144		\$ 3.34		Ъ -				
	Rumble Strip	5															
Upgrade "T" intersec	tions			ea	\$1,106.68		\$ 6,640	E 24	\$ 1,267		\$ 1,106.68		\$ -				
opgrade i intersec	tions			ca	\$ 1,100.00	0	φ 0,040	3.24	φ 1,207		\$ 1,100.00		Ψ -				
Curve Treatments (M	LITCD 2C-2)			ea	\$ 4,515.67	3	\$ 13,547	5.24	\$ 2,584		\$ 4,515.67		\$ -				
Carro maamonto (m	0.00 20 2,			-	V 1,010.07		ψ 10,011	0.2.	Ψ 2,001		ψ 1,010.01		_				
Guardrail																	
	Number of sit	98				2											
	Removal	00		If	\$ 1.29	200	\$ 258	15.62	\$ 17		\$ 1.29		\$ -				
	Install new			lf	\$ 15.08	400					\$ 15.08		\$ -				
	Anchorage as	sembly		ea .	\$ 1,596.44		\$ 12,772	15.62			\$ 1,596.44		\$ -				
		,			. ,		,		. 2.0		. ,						
Culvert extensions (v	vith mitered er	ıd)		ea	\$2,262.90	3	\$ 6,789	15.62	\$ 435		\$ 2,262.90		\$ -				
		,			. ,		, .,										
Widen and Resurface	9										\$ 350,000	6.8	\$2,380,000	15.62	\$ 152,348		
Subtotal							\$ 173,893		\$ 29,896				\$2,380,000		\$ 152,348		
Engineering and cont	tingencies				25%		\$ 43,473		\$ 7,474		25%		\$ 595,000		\$ 38,087		
Total Cost							\$ 217,366		\$ 37,369				\$2,975,000		\$ 190,436		
Curve Cras	shes		Non-Curve	e Crashes													
Study Period (years)	6		Study Period		1												
Total Crashes	3		Total Crashes	7	1												
K - fatality	0		K	0													
A - incapacitating inj	0		A	1													
B - non inc. inj	1		В	1													
C - possible inj	0		С	1													
O - PDO	2		0	4													
Crash Co	sts																
2-Lane rural road	\$ 402,003																
Total crash costs	\$4,020,030																
Crash Modification	Factors																
Level 1 Non-Curve Co			ns to MUTCD		elines	Lvl 1 Curve (aming Sign	Curve E			e Chevrons				
CMF - Fatal	0.79815			CMF		CMF - Fatal				CMF	0.741		0.78				
CMF - Injury	0.79815			CMF		CMF - Injury				CMF	0.741		0.78				
CMF - PDO	0.87327	CMF	0.93	CMF	0.939	CMF - PDO	0.5317416	CMF	0.92	CMF	0.741	CMF	0.78				
	L						l										
Level 2 Non-Curve Co					elines	Widen							Varning Signs				
CMF - Fatal	0.61106364			CMF	0.939			CMF		CMF - Fatal				CMF	0.741		0.78
CMF - Injury	0.61106364			CMF	0.939			CMF		CMF - Injury				CMF	0.741		0.78
CMF - PDO	0.61478208	CMF	0.93	CMF	0.939	CMF	0.88	CMF	0.8	CMF - PDO	0.3743461	CMF	0.92	CMF	0.741	CMF	0.78
Crashed Reduced	Level 1																
Curve		1.94155679															
Non-curve	1.11247	2.70768076															
5 e.			-														
Benefit	Laurel	l l C	ļ														
	Level 1	Level 2	!														
Crashes Reduced		4.64923755	!														
Benefit	\$1,063,057		1														
Benefit per year	\$ 177,176	\$ 311,501	1														
			-														
Benefit/Cost Ratio																	
	Level 1	Level 2															
Annual Benefit	\$ 177,176																
Annual Cost	\$ 37,369																
B/C Ratio	4.74	1.64	Į														
Net Present Value		Level 2															

	Interception o	f CD 10 and C	YD 244											
Site: Length:	Intersection o		feet of each ap	nroach										
Countermeasure	300	includes 500	Level 1	ргоасті					Level 2					
							annuity						annuity	annual
			unit	cost/unit	number	cost	factor	annual cost	unit	cost/unit	number	cost	factor	cost
Vegetation Removal			ea	\$1,000.00	1	\$ 1,000	0.96	\$ 1,040	ea	\$ 1,000.00	1	\$ 1,000	0.96	\$ 1,040
Upgrade signs to MU	JTCD standard	s	mile	\$3,909.50	0.38	\$ 1,481	5.24	\$ 282	mile	\$ 3,909.50	0	\$ 1,481	5.24	\$ 282
Pavement Markings														
	Centerline		If	\$ 0.67	4,000	\$ 2,661	5.24		If	\$ 0.67	4,000		5.24	
	Edge line		lf	\$ 0.66	4,000		5.24		lf	\$ 0.66	4,000		5.24	
	RPMs Rumble Strips	e	ea If	\$ 3.34 \$ 3.09	100 800		5.24 5.24		ea	\$ 3.34 \$ 3.09	100 800		5.24 5.24	
	rturible otrip	,		ψ 0.00	000	Ψ 2,471	0.24	Ψ 471		ψ 0.00	000	Ψ 2,471	0.24	Ψ 471
Upgrade "T" intersect	tions													
Curve Treatments (M	UTCD 2C-2)													
Guardrail														
	Number of sit	es												
	Removal													
	Install new Anchorage as	sembly												
Culvert extensions (w														
		iu)												
Widen and Resurface	9													
Other				_										
	Warning sign		ea	\$ 250.87	8		5.24			\$ 250.87	8	\$ 2,007	5.24	
	Warning sign Stop sign	removai	ea ea	\$ 14.85 \$ 250.87	8	\$ 59 \$ 2,007	5.24 5.24		ea ea	\$ 14.85 \$ 250.87	4 8	\$ 59 \$ 2,007	5.24 5.24	
	Stop sign rem	noval	ea	\$ 14.85	4		5.24		ea	\$ 14.85		\$ 59	5.24	
	Stop bar		lf	\$ 7.35	4		5.24		lf	\$ 7.35	4	\$ 29	5.24	
	Retroreflective	e sign post	ea	\$ 70.00	8	\$ 560	5.24	\$ 107	ea	\$ 70.00	8	\$ 560	5.24	\$ 107
Signals														
	Overhead flas	hing signal							ea	\$50,000.00	1	\$ 50,000	13.59	\$ 3,679
	Luminaires or								ea	\$ 358.68	2	\$ 717	5.24	
	Signal Mainte	enance							ea	\$ 1,000.00	1	\$ 1,000	0.96	\$ 1,040
Subtotal						\$ 15,315		\$ 3,771				\$ 67,033		\$ 8,627
Engineering and cont Total Cost	tingencies			25%		\$ 3,829 \$ 19,144		\$ 943 \$ 4,714		25%		\$ 16,758 \$ 83,791		\$ 2,157 \$ 10,783
Crashe			NU mb t but	0			0	Ψ 1,7.1.	Davidat.	0		ψ 00,701		\$ 10,700
Study Period (years)	s 6		Night Int. Study Period	Crasnes		Night Non-Int Study Period	Crasnes		Study Period	Crashes 6				
Total Crashes	5		Total Crashes	2		Total Crashes	1		Total Crashes					
K - fatality	1		K	1		K	0		K	0				
A - incapacitating inj	0		A	0		A	0		A B	0				
B - non inc. inj C - possible inj	0		B C	0		B C	0		С	1				
O - PDO	3		-											
Crash Co	sts		0	1		0	1		0	1				
2-Lane rural road			O	1			1		0	1				
cost	\$ 402,003		O	1			1		Ö	1				
	\$ 402,003 \$ 2,010,015		O	1			1		O	1				
Total crash costs	\$2,010,015		O	1			1		O	1				
Crash Modification Level 1 Combin	\$ 2,010,015 on Factors	Int, Warr	O ning Signs	Double Sto	p Sians		1		0	1				
Crash Modification	\$ 2,010,015 on Factors ed CMF	Int. Warr CMF - Fatal	ning Signs	Double Sto		0	1		O	1				
Crash Modification Level 1 Combino CMF - Fatal CMF - Injury	\$ 2,010,015 on Factors ed CMF 0.27 0.27	CMF - Fatal CMF - Injury	ning Signs 0.6 0.6	CMF - Fatal CMF - Injury	0.45 0.45	0	1		0	1				
Crash Modification Level 1 Combin CMF - Fatal	\$ 2,010,015 on Factors ed CMF 0.27 0.27	CMF - Fatal	ning Signs 0.6 0.6	CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45	0	1		O	1				
Crash Modification Level 1 Combine CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined	\$ 2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF	CMF - Fatal CMF - Injury CMF - PDO Int. Warr	ning Signs 0.6 0.6 0.6 ing Signs	CMF - Fatal CMF - Injury CMF - PDO Double Sto	0.45 0.45 0.45 p Signs	O Flashing S			phting		Night Int CMF			
Crash Modification Level 1 Combinon CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.268	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal	ning Signs 0.6 0.6 0.6 ning Signs	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal	0.45 0.45 0.45 p Signs 0.45	O Flashing S CMF - Fatal	0.84	CMF - Fatal	phting 0.881	CMF - Fatal	0.1998108	CMF - Fatal	0.881	
Crash Modification Level 1 Combine CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 1 Day CMF 0.2268 0.2268	CMF - Fatal CMF - Injury CMF - PDO Int. Warr	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6	CMF - Fatal CMF - Injury CMF - PDO Double Sto	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S	0.84 0.84		hting 0.881 0.881		0.1998108 0.1998108		0.881	
Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 1 Day CMF 0.2268 0.2268	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	hting 0.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1	\$2,010,015 nn Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 night int 1.46	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	hting 0.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modificatio Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.1268 night int	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int	ning Signs	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	hting 0.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 night int 1.46 1.6003784	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	hting 0.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combino CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 night int 1.46 1.6003784	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	hting 0.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 night int 1.46 1.6003784	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	hting 0.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit Crashes Reduced	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 inght int 1.46 1.6003784 Level 1 2.92	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784 \$1,312,853	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	o.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combinon CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 1.466 1.6003784 Level 1 2.92 \$1,173,849 \$195,641	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784 \$1,312,853 \$218,809	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	o.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit Crashes Reduced Benefit Benefit per year Benefit/Cost Ratio	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 1ight int 1.46 1.6003784 Level 1 2.92 \$1,173,849 \$195,641 Level 1	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784 \$1,312,853 \$218,809 Level 2	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	o.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit Crashes Reduced Benefit Benefit per year Benefit/Cost Ratio	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 night int 1.46 1.6003784 Level 1 2.92 \$1,173,849 \$195,641 Level 1 \$195,641	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784 \$1,312,853 \$ 218,809 Level 2 \$ 218,809	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	o.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modification Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio Annual Benefit Annual Cost	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 night int 1.46 1.6003784 Level 1 2.92 \$1,173,849 \$195,641 Level 1 \$4,714	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784 \$1,312,853 \$ 218,809 Level 2 \$ 18,809	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	o.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	
Crash Modificatic Level 1 Combin CMF - Fatal CMF - Injury CMF - PDO Level 2 Combined CMF - Fatal CMF - Injury CMF - PDO Crashed Reduced Level 1 Level 2 Benefit Crashes Reduced Benefit Benefit per year Benefit/Cost Ratio	\$2,010,015 on Factors ed CMF 0.27 0.27 0.27 0.27 Day CMF 0.2268 0.2268 0.2268 night int 1.46 1.6003784 Level 1 2.92 \$1,173,849 \$ 195,641 Level 1 \$ 195,641 \$ 4,714 41.51	CMF - Fatal CMF - Injury CMF - PDO Int. Warr CMF - Fatal CMF - Injury CMF - PDO day int 1.46 1.5464 Level 2 3.2657784 \$1,312,853 \$ 218,809 Level 2 \$ 218,809	ning Signs 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.	CMF - Fatal CMF - Injury CMF - PDO Double Sto CMF - Fatal CMF - Injury CMF - PDO	0.45 0.45 0.45 p Signs 0.45 0.45	O Flashing S CMF - Fatal CMF - Injury	0.84 0.84	CMF - Fatal CMF - Injury	o.881 0.881	CMF - Fatal CMF - Injury	0.1998108 0.1998108	CMF - Fatal CMF - Injury	0.881 0.881	

Site:				1A to Alachua	County Line	9										
Length:		Miles	4.1													
	12144	feet	21648													
			Level 1							Level 2	2					
								annuity	annual						annuity	annual
Countermeasure			unit	cost/unit	number		cost	factor	cost	unit	cost/unit	number	со	st	factor	cost
Upgrade signs to MU	TCD standa	ards	mile	\$ 3,909.50	4.10	\$	16,029	5.24	\$ 3,058	mile	\$ 3,909.50		\$	-		
Pavement Markings																
	Centerline		lf	\$ 0.67	0	\$	-	5.24	\$ -	lf	\$ 0.67		\$	-		
	Edge line		lf	\$ 0.66	43,296	\$	28,640	5.24	\$ 5,463	lf	\$ 0.66		\$	-		
	RPMs		ea	\$ 3.34	1,082	\$	3,615	5.24	\$ 690	ea	\$ 3.34		\$	-		
	Rumble St	rips														
Upgrade "T" intersect	tions		ea	\$ 1,106.68	3	\$	3,320	5.24	\$ 633	ea	1106.68		\$	-		
Curve Treatments (M	UTCD 2C-2)														
Guardrail																
	Number of	sites			12							12				
	Removal		lf	\$ 1.29	1,120	\$	1,445	15.62	\$ 92	lf	\$ 1.29	1,120	\$	1,445	15.62	\$ 92
	Install new		lf	\$ 15.08	3,620	\$			\$ 3,494	lf	\$ 15.08	3,620		4,590	15.62	
	Anchorage		ea	\$ 1,596.44	24		38,315		\$ 2,453	ea	\$ 1,596.44	24		8,315		\$ 2,453
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Ť	,	.5.52	, .,		, ,			,		, 2, .50
Culvert extensions (w	ith mitered	end)														
(
Widen and Resurface	•									mile	\$ 350,000	2.30	\$ 80	5,000	15.62	\$ 51,530
											.,					, ,,,,,,,,
Subtotal						\$	145,953		\$ 15,884				\$ 89	9,349		\$ 57,569
Engineering and cont	ingencies			25%			36,488		\$ 3,971		25%			4,837		\$ 14,392
Total Cost							182,442		\$ 19,855				\$ 1,12			\$ 71,961
						Ť	,		, .,					,		, , , , ,
South Crash	20			North C	rashes											
Study Period (years)	6			Study Period		-										
Total Crashes	2			Total Crashes		_										
	0				5 5	-										
K - fatality	·			K	1	-										
A - incapacitating inj	0			A	0	-										
B - non inc. inj	1			В	4	_										
C - possible inj	0			С	0	_										
O - PDO	1			0	0	_										
Crash Cos	s															
2-Lane rural road	\$402,003															
cost																
Total crash costs	\$804,006															
Crash Modification																
Lvl 1 Non-Guardrail C	Comb CMF		E	dgelines	Gua	ardra	ail	Lvl 1 Guardra	ail Comb. (CMF						
CMF - Fatal	0.939		CMF		CMF			CMF - Fatal								
CMF - Injury	0.939		CMF		CMF			CMF - Injury								
CMF - PDO	0.939		CMF	0.939	CMF		0.93	CMF - PDO	0.87327							
Lvl 2 Non-Guardrail (Comb CMF			dgelines	Wide	n L		Widen SI			Guardrail	Lvl 2 Guardr	ail Coml	o. CMF		
CMF - Fatal	0.718898		CMF	0.939	CMF			CMF		CMF	0.93	CMF - Fatal	0.6685	75512		
CMF - Injury	0.718898		CMF	0.939	CMF		0.88	CMF	0.87	CMF		CMF - Injury				
CMF - PDO	0.661056		CMF	0.939	CMF		0.88	CMF	0.8	CMF	0.93	CMF - PDO	0.614	78208		
South Benefit				North Benef	it											
	Level 1	Level 2				Le	vel 2									
Crashes Reduced		0.716642		Crashes Red			1.405508									
Benefit		\$288,092		Benefit	\$122,611											
Benefit per year		\$ 48,015		Benefit per yı												
Benefit/Cost Ratio			Ì													
	Level 1	Level 2														
Annual Benefit		\$142,185														
Annual Cost		\$ 71,961														
B/C Ratio	1.88	1.98														
2, 3 Ratio	1.00	1.00	-													
	Level 1	Level 2														
	FOADI I	-0 VOI 2														
Net Present Value	¢ 47 500	\$ 70,224														

Site:	CD 10 /\//c=1	٠١	Colum	hia County Lin	o to CB 1	2/1								
	CR 18 (West		Colum	bia County Line	e to CR 2	241								
Length:		miles												
	7392	teet												
			Level 1						Level 2	2				
							annuity						annuity	annual
Countermeasure			unit	cost/unit	number	cost	factor	annual cost	unit	cost/unit	number	cost	factor	cost
Upgrade signs to MU	TCD standard	ds	mile	\$ 3,909.50	1.40	\$ 5,473	5.24	\$ 1,044		\$ 3,909.50		\$ -		
Pavement Markings														
	Centerline		lf.	\$ 0.67	14,784	\$ 9,836	5.24	\$ 1,876		\$ 0.67		\$ -		
			lf											
	Edge line				14,784		5.24			\$ 0.66		\$ -		
	RPMs		ea	\$ 3.34	370	\$ 1,234	5.24	\$ 235		\$ 3.34		\$ -		
	Rumble Strip													
	Speed Red. I	Markings												
Upgrade "T" intersect	tions		ea	\$ 1,106.68	1	\$ 1,107	5.24	\$ 211		\$ 1,106.68		\$ -		
Curve Treatments (M	UTCD 2C-2)													
	,													
Guardrail														
	Number of -:	too			_									
	Number of si	ເປຣ	14	.	2	0 10-	4= 0=	6 =	1			•		
	Removal		If	\$ 1.29	80		15.62		1	\$ 1.29		\$ -		
	Install new		lf	\$ 15.08	1,000	\$ 15,080	15.62		ļ	\$ 15.08		\$ -		
	Anchorage a	ssembly	ea	\$ 1,596.44	4	\$ 6,386	15.62	\$ 409	l	\$ 1,596.44		\$ -		
Culvert extensions (w	ith mitered e	nd)								\$ -		\$ -		
		, , , , , , , , , , , , , , , , , , ,												
Widen and Resurface	<u>,</u>								l	\$ 350,000	1 40	\$490,000	15.62	\$ 31,366
viluon and Nesullact	,									ψ 550,000	1.40	ψ του,υυυ	13.02	ψ 51,500
Cubtotal			-			¢ 40.000		¢ 6.640	 			¢ 400 000		¢ 24 200
Subtotal				0==:		\$ 48,999		\$ 6,613	1	0==-		\$490,000		\$ 31,366
Engineering and cont	ingencies			25%		\$ 12,250		\$ 1,653	<u> </u>	25%		\$122,500		\$ 7,841
Total Cost						\$ 61,249		\$ 8,267	<u> </u>			\$612,500		\$ 39,207
Crashes	3			T-Int Cras	shes	Ì		Non T-Int C	rashes					
Study Period (years)	6			Study Period	6			Study Period						
Total Crashes	3			Total Crashes				Total Crashes						
	3													
K - fatality	0			K	0			K	0					
A - incapacitating inj	1			A	0			A	1					
B - non inc inj	0			В	0			В	0					
C - possible inj	2			С	2			С	0					
O - PDO	0			0	0			0	0					
Crash Cos	sts													
2-Lane rural road	\$ 402,003													
Total crash costs	\$1,206,009													
Crash Modification	n Factors													
Level 1 Non Int Com		Edgelin	es	Update T-Int	t signs	Level 1 Int C	omb, CMF							
CMF - Fatal														
	U 030			CME - Eatal	0.0	CMF - Eato	0.5624							
		CMF - Fatal	0.939			CMF - Fata								
CMF - Injury	0.939	CMF - Fatal CMF - Injury	0.939	CMF - Injury	0.6	CMF - Injur	0.5634							
	0.939	CMF - Fatal	0.939	CMF - Injury	0.6		0.5634							
CMF - Injury CMF - PDO	0.939 0.939	CMF - Fatal CMF - Injury CMF - PDO	0.939 0.939 0.939	CMF - Injury CMF - PDO	0.6 0.6	CMF - Injury CMF - PDC	0.5634 0.5634							
CMF - Injury CMF - PDO Level 2 Non Int Corr	0.939 0.939 bined CMF	CMF - Fatal CMF - Injury CMF - PDO Edgelin	0.939 0.939 0.939 es	CMF - Injury CMF - PDO Widen Li	0.6 0.6 ane	CMF - Injury CMF - PDC	0.5634 0.5634 houlder			Lvl 2 Int Con				
CMF - Injury CMF - PDO	0.939 0.939 bined CMF	CMF - Fatal CMF - Injury CMF - PDO	0.939 0.939 0.939 es	CMF - Injury CMF - PDO Widen Li	0.6 0.6 ane	CMF - Injury CMF - PDC	0.5634 0.5634 houlder	Update T-Int		Lvl 2 Int Con CMF - Fatal				
CMF - Injury CMF - PDO Level 2 Non Int Corr	0.939 0.939 abined CMF 0.7188984	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal	0.939 0.939 0.939 es 0.939	CMF - Injury CMF - PDO Widen La CMF - Fatal	0.6 0.6 ane 0.88	CMF - Injun CMF - PDC Widen S CMF - Fata	0.5634 0.5634 houlder 0.87	CMF - Fatal	0.6		0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal CMF - Injury	0.939 0.939 nbined CMF 0.7188984 0.7188984	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen La CMF - Fatal CMF - Injury	0.6 0.6 ane 0.88 0.88	CMF - Injun CMF - PDC Widen S CMF - Fata CMF - Injun	0.5634 0.5634 houlder 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal	0.939 0.939 nbined CMF 0.7188984 0.7188984	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen La CMF - Fatal CMF - Injury	0.6 0.6 ane 0.88 0.88	CMF - Injun CMF - PDC Widen S CMF - Fata	0.5634 0.5634 houlder 0.87	CMF - Fatal	0.6	CMF - Fatal	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO	0.939 0.939 nbined CMF 0.7188984 0.7188984	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO	0.6 0.6 ane 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC	0.5634 0.5634 houlder 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit	0.939 0.939 nbined CMF 0.7188984 0.7188984 0.661056	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red.	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC	0.5634 0.5634 houlder 0.87 0.87 0.88	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal CMF - Injury CMF - PDO Benefit	0.939 0.939 0.939 bined CMF 0.7188984 0.7188984 0.661056	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced	0.939 0.939 0.939 bibined CMF 0.7188984 0.7188984 0.661056 Level 1	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red.	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced	0.939 0.939 0.939 bined CMF 0.7188984 0.7188984 0.661056	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit	0.939 0.939 0.939 0.7188984 0.7188984 0.661056 Level 1 0.9342 \$ 375,551	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit	0.939 0.939 0.939 0.7188984 0.7188984 0.661056 Level 1 0.9342 \$ 375,551	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year	0.939 0.939 0.939 0.7188984 0.7188984 0.661056 Level 1 0.9342 \$ 375,551	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio	0.939 0.939 0.939 bibined CMF 0.7188984 0.7188984 0.661056 Level 1 0.9342 \$ 375,551 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Com CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio	0.939 0.939 0.939 bibined CMF 0.7188984 0.661056 Level 1 0.9342 \$ 375,551 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio Annual Benefit	0.939 0.939 0.939 bibined CMF 0.7188984 0.661056 Level 1 0.9342 \$ 375,551 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Fatal CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio Annual Benefit Annual Cost	0.939 0.939 0.939 bibined CMF 0.7188984 0.661056 Level 1 0.9342 \$ 375,551 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio	0.939 0.939 0.939 bibined CMF 0.7188984 0.661056 Level 1 0.9342 \$ 375,551 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Fatal CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit per year Benefit/Cost Ratio Annual Benefit Annual Cost	0.939 0.939 0.939 bibined CMF 0.7188984 0.61056 Level 1 0.9342 \$ 375,551 \$ 62,592 Level 1 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035 Level 2 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			
CMF - Injury CMF - PDO Level 2 Non Int Corr CMF - Fatal CMF - Injury CMF - PDO Benefit Crashes Reduced Benefit Benefit per year Benefit/Cost Ratio Annual Benefit Annual Cost B/C Ratio	0.939 0.939 0.939 bibined CMF 0.7188984 0.61056 Level 1 0.9342 \$ 375,551 \$ 62,592 Level 1 \$ 62,592	CMF - Fatal CMF - Injury CMF - PDO Edgelin CMF - Fatal CMF - Injury CMF - PDO Level 2 1.4184235 \$ 570,211 \$ 95,035 Level 2 \$ 95,035	0.939 0.939 0.939 es 0.939 0.939	CMF - Injury CMF - PDO Widen Li CMF - Fatal CMF - Injury CMF - PDO Crashes Red. T-Int	0.6 0.6 ane 0.88 0.88 0.88	CMF - Injury CMF - PDC Widen S CMF - Fata CMF - Injury CMF - PDC level 2 1.13732192	0.5634 0.5634 houlder 0.87 0.87	CMF - Fatal CMF - Injury	0.6	CMF - Fatal CMF - Injury	0.4313			

Site:	CR 18 (east)		CR 24	1 to SR 121										
Length:		miles												
	26400	feet												
			Level 1						Level 2	2				
0							annuity						annuity	annual
Countermeasure			unit	cost/unit	number	cost	factor	annual cost	unit	cost/unit	number	cost	factor	cost
				6 4 000 00	0	A 0.000	0.00	6 0.000						
Vegetation Removal			ea	\$ 1,000.00	2	\$ 2,000	0.96	\$ 2,080						
Unarada ajana ta MII	TCD atandara	lo.	mile	\$ 3,909.50	5.0	\$ 19,548	5.24	\$ 3,729				\$ -		
Upgrade signs to MU	TOD Standard	15	IIIIe	\$ 3,505.50	5.0	φ 15,546	3.24	\$ 3,729				Φ -		
Pavement Markings									-					
	Centerline		lf	\$ 0.67	52,800	\$ 35,128	5.24	\$ 6,701				\$ -		
	Edge line		lf		52,800		5.24		-			\$ -		
	RPMs		ea	\$ 3.34			5.24		-			\$ -		
	Rumble Strip	S	ou	ψ 0.01	1,020	ψ 1,100	0.2	ψ 011				*		
Upgrade "T" intersect	ions		ea	\$ 1,106.68	7	\$ 7,747	5.24	\$ 1,478				\$ -		
Curve Treatments (MI	JTCD 2C-2)													
Guardrail														
	Number of si	tes			5									
	Removal		lf	\$ 1.29	150		15.62					\$ -		
	Install new		lf	\$ 15.08	5,000	\$ 75,400	15.62					\$ -		
	Anchorage a	ssembly	ea	\$ 1,596.44	20	\$ 31,929	15.62	\$ 2,044				\$ -		
Culvert extensions (w	ith mitered er	nd)										\$ -		
											_			• • • • • • •
Widen and Resurface										\$ 500,000	5	\$ 2,500,000	15.62	\$ 160,030
Cultivatal						£ 244 200		e 00.074				Ф 2 F00 000		£ 400 000
Subtotal	ingonoico			25%		\$ 211,280		\$ 28,374		25%		\$ 2,500,000		\$ 160,030 \$ 40,007
Engineering and cont	ingencies			25%		\$ 52,820		\$ 7,094		25%		\$ 625,000		\$ 200,007
Total Cost						\$ 264,101		\$ 35,468				\$ 3,125,000		\$ 200,037
0				T 1: 0:				N T I O						
Crashes				T-Int Cra				Non T-Int C						
Study Period (years)	6			Study Period	6			Study Period						
Total Crashes	18			Total Crashes				Total Crashes						
K - fatality	0			K	0			K	0					
A - incapacitating inj	3			A	1			A	2					
B - non inc inj	3			В	1			В	2					
C - possible inj	3			С	1			С	2					
O - PDO	9			0	1			0	8					
Crash Cos	te													
2-Lane rural road														
	\$ 402,003													
Total crash costs	\$7,236,054													
Crash Modificatio		11. 1		E 1 P		114 71	ONE							
Level 1 Combined Cl				Edgelin		Level 1 T-li								
CMF - Fatal		CMF - Fatal		CMF - Fatal		CMF - Fatal	0.5634							
CMF - Injury		CMF - Injury		CMF - Injury		CMF - Injury	0.5634							
CMF - PDO	0.939	CMF - PDO	0.6	CMF - PDO	0.939	CMF - PDO	0.5634							
Level 2 Combined Cl	MF (non-int)	Lindate T-Int	signs	Edgelin	100	Widen I	ane	Widen Sho	ulder	Level 2 T-	Int CME			
CMF - Fatal		CMF - Fatal	_	CMF - Fatal		CMF - Fatal		CMF - Fatal		CMF - Fatal				
CMF - Injury		CMF - Injury		CMF - Injury		CMF - Injury		CMF - Injury		CMF - Injury				
CMF - PDO		CMF - PDO		CMF - PDO		CMF - PDO	0.00	CMF - PDO		CMF - PDO				
20	3.301000	1 50	0.0	1 20	5.555		0.00	100	0.0	1 50	0.00000			
Benefit			1	Crashes Re	educed	Level 1	Level 2							
	Level 1	Level 2			T-Int		2.30935							
Crashes Reduced		6.70751088			Non T-In		4.39816							
Benefit		\$2,696,439												
Benefit per year		\$ 449,407												
Benefit/Cost Ratio														
	Level 1	Level 2												
Annual Benefit	\$ 174,228	\$ 449,407												
Annual Cost	\$ 35,468	\$ 200,037												
D/C Datio	4.91	2.25												
B/C Ratio														
D/C Ratio														
	Level 1 \$ 138,760	Level 2												