APPENDIX H

CR 220 Safety Audit

CR 220 SAFETY EVALUATION

Detour Assessment

May 2014

Prepared for:

AMEC Environment & Infrastructure, Inc.
2000 S. Colorado Blvd.
Suite 2-1000
Denver, CO 80222

CDOT Region 5
3803 North Main Ave.
Suite 100
Durango, Co 81301

CDOT Region 5 Project No: FSA 5501-021

CDOT Project Code: 19378

MULLER

Muller Engineering Company, Inc.
Consulting Engineers

777 S. Wadsworth Blvd., # 4-100
Lakewood, Colorado 80226
303.988.4939 | www.MullerEng.com

Acknowledgements

Muller Engineering Company

Kenneth Ryan, PE, PTOE
Senior Traffic Engineer

Carlie Campuzano, EI
Traffic Engineer

La Plata County Public Works

Jim Davis, PE
County Engineer

Table of Contents

List of Figures

List of Tables

1 INTRODUCTION

The goal of the US 550 South Connection to US 160: Independent Alternatives Analysis project is to assess the viability of multiple roadway alignment options. One of the alignments being studied, referred to as the R5 alignment, approximately follows the existing US 550 alignment and connects to US 160 at its current location (Farmington Hill). Constructing the R5 alignment while under traffic would be extremely difficult, at best, so the option to utilize County Road (CR) 220 as a construction detour is under consideration. The approximate layout of the R5 alignment is provided on **Figure 1**.

The purpose of this Safety Evaluation is to evaluate the existing safety conditions on CR 220 and to determine whether or not CR 220, in its current state, would be suitable for use as a construction detour route.

Figure 1: R5 Alignment

1.1 STUDY DETAILS

This Safety Evaluation is based on the Road Safety Audit (RSA) procedures outlined by the Federal Highway Administration (FHWA). The RSA is a formal safety performance evaluation of an existing road or intersection to qualitatively identify elements of the road that may present a safety concern. The RSA process typically involves an independent, multidisciplinary team and, as a formal document, is incorporated into project development processes.

For the purpose of evaluating the potential use of CR 220 as a detour route for construction traffic, the formal RSA process was not required, or entirely appropriate. However, the procedure used was similar in many respects. Accident data provided by La Plata County was reviewed to identify potential crash patterns prior to an on-site field visit, and an office review was conducted to go through the "Prompt Lists" with La Plata County staff acting as the independent participant with detailed local knowledge. The completed "Prompt List" is included in the **Appendix A**.

1.2 STUDY SEGMENT

County Road 220 is a 2-lane rural collector roadway that connects US 550 on the west to SH 172 on the east and is approximately 3 miles long. The roadway was originally a farm-to-market roadway and provides access (direct and indirect) to residential and agricultural properties. According to traffic counts taken in August 2013 as part of the *US 550 South Connection to US 160: Independent Alternatives Analysis*, the Average Weekday Traffic (AWT) was 1,600 vehicles per day (vpd) on CR 220 and 7,900 vpd on US 550. The average truck traffic comprises approximately 5% of the total traffic on CR 220 and 6% of the total traffic on US 550.

General Observations

- CR 220 was originally a farm to market road that has been repaved and improved over time.
  - The geometry of this 2-lane, undivided roadway is consistent with the adjacent land use and the utilization for the roadway for the current traffic volumes and truck traffic.
- La Plata County Road Maintenance classifies this roadway as a high priority 24-hour snow removal (limited de-icing agent) route.
- Wildlife, primarily deer, is prevalent in this area; no wildlife mitigation measures are present.

Usage Observations

- La Plata County lists CR 220 as a cycling route; bicyclists have become more prevalent over time.
- CR 220 is not a special event route.
- CR 220 is used as a bus route for school aged children with several stops on CR 220 during peak traffic periods.

Roadway Characteristics

- The lanes are approximately 10 feet wide.
- The condition of the asphalt pavement surface varies by location.
- The shoulders and side slopes are not adequate for a vehicle to stop on the side of the road without encroaching into the traveled way.
- There are frequent driveway access points present along the roadway.
  - Approximately 14 accidents per mile between US 550 and CR 301.
  - Approximately 23 accidents per mile between CR 301 and SH 172.
- There are several vertical crest curves that limit sight distance at accesses.
- The only auxiliary lanes present are a right-turn deceleration lane to CR 301 and a left-turn lane approaching SH 172.
- The posted speed limit is 35 mph in each direction.
- Passing zones are present for both directions along CR 220.
  - Passing is allowed along 38% of eastbound CR 220 and 43% of westbound CR 220.
- Centerlines and edge lines are present and in good condition.
- Delineator spacing is inconsistent.
- Fixed objects, such as fences, trees, and mailboxes, are located close to the roadway.
  - This can be as little as 3-ft from the edge of travelled way.
- There are Radar Speed Display signs posted under the 35 mph Speed Limit signs just west of Meadowlark Lane (Approximately 2 miles east of US 550).

2 ACCIDENT HISTORY

Accident history for a twelve-year period, January 2001 through December 2012, was examined on CR 220 along the study section to help identify accident patterns. Accident data (containing general accident information) was obtained from La Plata County. Accident reports (containing narratives and specific information about the accidents) were also reviewed where possible. If the accident report was not available, information regarding accident location and cause was estimated based on the accident data provided by La Plata County.

During the twelve-year study period, there were 48 reported accidents along the study section: 39 accidents were property damage only and 9 accidents resulted in 11 injuries. Of the 48 reported accidents, 12 occurred at the intersection of CR 220 and US 550; these accidents were excluded from this analysis since this intersection is going to be reconfigured as a part of the US 550 reconstruction. **Table 1** summarizes the number and severity of accidents on CR 220 between US 550 and SH 172 over the twelve-year study period. The complete listing provided by La Plata County for this section of CR 220 is provided in **Appendix B**.

Table 1: CR 220 (US 550 to SH 172)

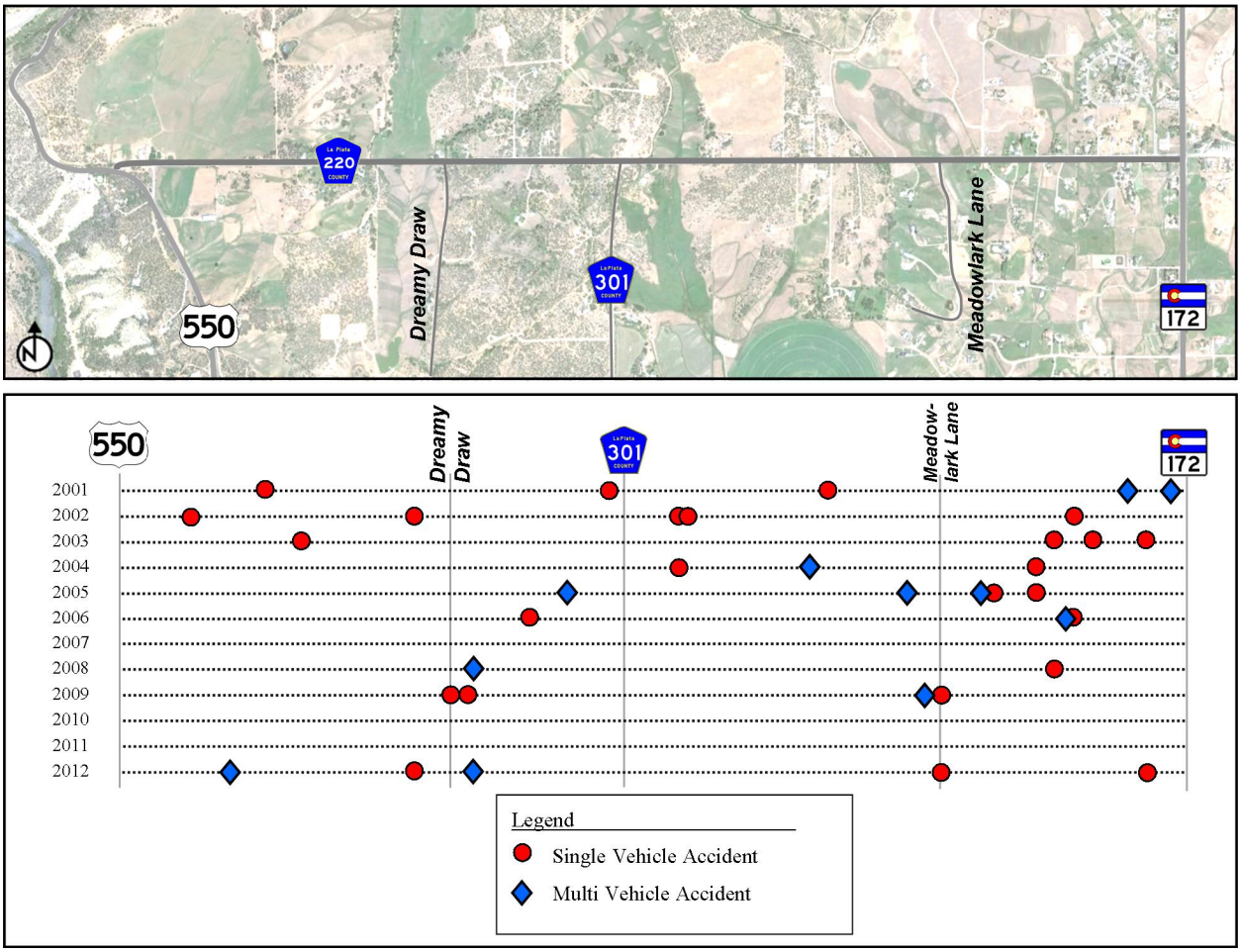
Year	Number of Accidents			
	PDO[1]	Injury	Fatality	Total
2001	4	1	0	**5**
2002	4	1	0	**5**
2003	3	1	0	**4**
2004	3	0	0	**3**
2005	3	2	0	**5**
2006	2	1	0	**3**
2007	0	0	0	**0**
2008	2	0	0	**2**
2009	4	0	0	**4**
2010	0	0	0	**0**
2011	0	0	0	**0**
2012	3	2	0	**5**
Average/Total	**28**	**8**	**0**	**36**

[1] Property Damage Only

In general, the number and severity of accidents fluctuated from year to year, peaking at 5 accidents per year in 2001, 2002, 2005, and 2012. No accidents were reported in the years 2007, 2010, and 2011.

Of the 36 analyzed accidents on CR 220, 25 were single-vehicle accidents and 11 were multi-vehicle accidents. **Figure 2** shows the approximate location of accidents along CR 220 along with the number of vehicles involved by year.

Figure 2: CR 220 Accidents by Year and # of Vehicles



This graphic shows that the frequency of accidents was higher on the east end of CR 220 approaching SH 172, which coincides with a higher frequency of accesses and driveways. This concentration was somewhat more prevalent in the first half of the twelve-year study period (2001 – 2006), while fewer accidents near CR 220 in the latter half of the study period. The Radar Speed Display sign placed just west of Meadowlark Lane may have been installed around the time of this shift and could account for this shift in accident pattern.

A review of the accident reports indicated that a high frequency of single vehicle accidents (16 of 25, 64%) involved a vehicle that ran off of the road; *wild animal* type accidents also represented a high proportion of single vehicle accidents on CR 220 (6 of 25, 24%).

Run-off-Road Collisions

Of the 16 single-vehicle run-off-road accidents, 10 were off-right, 4 were off-left, and 2 were unknown. In most cases (10 of 16), the vehicle drifted off of the road and was unable to renter the roadway. It is likely that speed was a contributing factor in 7 of 10 accidents. Of these, 6 of 7 accidents involved vehicles driving over the posted speed limit during good roadway conditions; the remaining accident involved icy roadway conditions.

Wild Animal Collisions

Accidents involving *wild animals* are somewhat frequent on CR 220 due to the large number of animals in the general area. The presence of deer in the roadway was also a contributing factor in 2 of the run-off-road accidents.

Multi-Vehicle Accidents

A review of the multi-vehicle accidents (11 of 36) did not indicate any concentrations of accidents at a particular access point or location along the roadway. These 11 accidents can be summarized as follows:

- 4 accidents resulted from a failed passing maneuver.
  - 1 of 4 was attempting to pass a vehicle turning into an access point.
- 3 were head-on collisions.
  - 1 of 3 during a passing maneuver.
  - 2 of 3 occurred when a vehicle went off road, overcorrected, and then re-entered the road.
- 3 occurred at driveway accesses.
- 1 was due to a stopped school bus.

3 SAFETY EVALUATION FINDINGS

This section of the report documents the issues discussed during the office review and site visit that may arise if CR 220 is used as a detour route for US 550 in its current condition. The prompt list was used to help guide the discussion and to help ensure that all aspects of the roadway that may affect safety were discussed.

When discussing the items on the prompt list, the item was first discussed as it pertains to CR 220 in its current state and usage. Secondly, each item was discussed assuming CR 220 was being used as a detour route carrying a higher volume of traffic (including truck traffic) with the potential for higher travel speeds (40 mph). These are both important elements to consider, because even if the posted speed limit remains 35 mph, field observations indicate that vehicles frequently drive CR 220 at higher speeds. This tendency to exceed the posted speed limit is likely to occur under the detour traffic, especially considering that the detour results in approximately 6 miles of out-of-direction travel to Durango which causes drivers to become more impatient. Even with enforcement and extra signage to keep speeds down, the possibility of higher speed travel must be considered from a safety perspective because of the increased exposure at higher traffic volumes.

Many of the items on the prompt list were redundant, did not apply to CR 220, or did not apply to the issue of its use as a detour route. The following discussion is therefore limited to the elements that are considered pertinent to the evaluation.

3.1 ROAD ALIGNMENT AND CROSS SECTION

Issue: Appropriateness of Posted Speed Limit

CR 220 was originally constructed as a farm to market road and was built with no design speed. The posted speed limit on CR 220 is currently 35 mph, which appears to provide adequate sight distance for the crest vertical curves located in the study section. However, vehicles are often observed traveling faster than

the posted speed limit and many of the accidents that occurred in the past could be attributed to vehicles traveling at higher speeds.

If CR 220 is used as a detour route, it is likely that vehicles (possibly including truck) will continue to exceed the 35 mph posted speed limit. The combination of higher traffic volumes and higher speeds suggests that the existing vertical alignment will no longer be adequate, since sight distances will be substandard for 40 mph travel speeds.

Issue: Number and Location of Accesses

There are multiple accesses along CR 220, many of which are residential driveways. Sight distances are limited at many property access points, but are considered adequate given the 35 mph posted speed and low traffic volumes. Mailboxes are present in close proximity to the roadway, and it is likely that mail service vehicles encroach into the traveled way due to minimal shoulders, placement of the mailboxes adjacent to the roadway, and steep slope drop offs adjacent to CR 220.

Under detour traffic volumes and speeds, the frequency of accesses and the sight distances at the accesses would no longer be consistent with the road's function. Since auxiliary lanes and shoulders are not provided for residential accesses, or for most county road intersections, vehicles would have to slow or stop on CR 220 in order to enter/exit an access. Stopped vehicles, such as mail delivery trucks, that may encroach on the traveled way will become a greater hazard as the increased volume (in both directions) will limit safe passing opportunities. In addition, in many cases the sight distances at the accesses are not adequate for travel speeds in excess of 35 mph.

Issue: Lane and Shoulder Widths

The lane widths on CR 220 are narrow (10 feet or less) and the shoulders are narrow or non-existent; this condition is not optimal for vehicles to recover without overcorrection. While the number of reported accidents on CR 220 was low overall, a high proportion of accidents on CR 220 occurred when a vehicle ran off of the road and was not able to reenter safely. This cross section may be adequate for the existing road usage, given the low vehicular volumes and vehicle speeds present on CR 220. However, the lane and shoulder widths do not meet current La Plata County standards.

If CR 220 was used as a detour for US 550, the road would serve a significantly higher amount of vehicular traffic, including a substantial number of trucks that have few viable alternative routes. Under this condition, the lane and shoulder widths would be inappropriate and would likely result in additional run-off-road accidents given the lack of safe recovery space. Two trucks passing in the opposite direction could be problematic in some locations, and the higher volume would increase the chances of this condition occurring. Furthermore, any wide-load truck traffic would create a significant disruption in traffic flow with the roadway this narrow, especially given the proximity of mailboxes to the roadway.

3.2 TRAFFIC MIX AND ROAD USERS

Issue: Bicycle Traffic

CR 220 is a cycling route in La Plata County, with an estimated weekday volume of 10-20 bicycles per day in the summer months. CR 220 is inadequate as a bicycle route under current conditions, since lane widths are narrow and shoulders are not consistently provided.

If CR 220 was used as a detour, traffic volumes would increase substantially, creating an even worse safety condition for cyclists. Bicyclists on the roadway would be nearly impossible to pass without encroaching into the opposite direction of traffic. Since passing zones are intermittent, and the fact that passing opportunities would be limited by the increase in traffic volume, this could result in a significant decrease in operations as traffic might queue behind the bicyclist. This would pose a safety risks to the bicyclist, the traffic in the queue seeking passing opportunities, and vehicles in the opposite direction.

Issue: Bus and Truck Traffic

CR 220 is a bus route for school aged children with multiple stops on CR 220. Florida Mesa Elementary School is located off of SH 172 approximately 0.75 miles north of CR 220. There is already some truck traffic present on CR 220, with around 100 trucks using the road daily. The narrow lane width and minimal shoulders are not adequate for large truck traffic in its current state. As mentioned earlier, the lane and shoulder widths do not meet current La Plata County standards.

If US 550 traffic was detoured onto CR 220, the narrow lane widths and minimal shoulders would be even less appropriate for the roadway use. If the detour route is required when school is in session, the higher traffic volume and speeds, in particular during the morning peak period, may create an unsafe condition for school busses and school-aged children.

Issue: Socioeconomic Impacts

CR 220 is a collector roadway that provides direct access to multiple private driveways and was originally built as a farm to market road. The traffic volume on CR 220 is currently low and mostly serves residential traffic in the vicinity.

If CR 220 were used as a detour, residents would be faced with additional delays entering or exiting their properties, as well as increased noise and reduced air quality due to the higher traffic volumes on CR 220.

3.3 ACCIDENTS

This section summarizes the discussion of the accident history review during the office and field visit as it pertains to the use of CR 220 as a detour route.

Issue: Accident Patterns

There was a maximum of 5 accidents per year during a twelve-year study period. The two most prominent single vehicle accident patterns were run-off-road and wild animal accidents. Crashes involving vehicles that went off of the road, and were unable to recover safely, were most often attributed to higher than appropriate speeds. It is likely that the narrow lane widths, minimal shoulders, the shoulder drop off to the ditch, and other obstructions (such as mailboxes) were contributing factors in these accidents. The

frequency of wild animal accidents is strongly influenced by the number of deer that are exposed to vehicular traffic.

If CR 220 is used as a detour with its current configuration, the frequency of both run-off-road and wild animal accidents would almost certainly increase. Without improvements to the roadway geometry, the increase in exposure alone would be expected to result in additional accidents. This is especially true for wild animal accidents which is primarily dependent on exposure.

There were several patterns of multi-vehicle accidents, but no significant concentrations by location could be identified. This suggests that the increased traffic volumes resulting from the CR 220 detour would also increase the likelihood of multi-vehicle accidents. Fewer passing opportunities due to increased traffic volumes (and potentially increased driver frustration) could lead to additional accidents from failed passing attempts and could also increase head-on collisions. Higher volumes would reduce gaps in traffic and may lead to more driveway access accidents, in particular when a vehicle turning left from CR 220 blocks through traffic while waiting for a gap.

4 CONCLUSIONS AND RECOMMENDATIONS

The safety evaluation of CR 220 for use as a detour route in its current configuration was based on a review of twelve-years of accident data, field visits, and a detailed discussion of the roadway features with La Plata County staff. The roadway has several features that may be adequate for a collector roadway with low traffic volumes, but do not meet current La Plata County standards.

If CR 220 is used as a detour route during construction of the US 550 R5 alignment, and the roadway features that contribute to the historic accident experience remain unchanged, the frequency of single-vehicle and multi-vehicle accidents will likely increase. Overall, the narrow lanes, limited passing opportunities, narrow or non-existent shoulders, frequency of access points, mailboxes, and sight distances that are not adequate for the expected travel speeds would create extremely undesirable safety conditions with the significant increase in vehicular and truck traffic.

APPENDIX A

Prompt Lists

GENERAL TOPICS	Yes / No Existing	Yes / No Detour	COMMENTS
Scope of project, function, traffic mix, road users			
Is the design consistent with the function of the road, i.e., there is no potential confusion to the driver about the road function?	NO	NO	Limited vertical site distance, difficult to see to/from driveways
Will the proposed design safely accommodate passenger vehicles; heavy vehicles; buses (consider also school buses)	NO	NO	CR 220 is a school bus route.
Will the proposed design safely accommodate pedestrians? Consider all classes, e.g., school children, elderly, disabled etc.	NO	NO	There are no shoulders and narrow lane widths.
Will the proposed design safely accommodate bicyclists? Check whether the proposed facility included in or related to bicycle and pedestrian facilities identified in a master plan.	NO	NO	There are approximately 10-20 bicycles/day in the summer. Shoulders should be added, if possible.
Will the proposed design safely accommodate motorcyclists?	NO	NO	Limited vertical site distance
Will the proposed design safely accommodate special vehicles (e.g., farm equipment, horse and buggy traffic)	NO	NO	There are narrow lanes and site distance issues.
Is the design flexible enough to accommodate unforeseen increases in volumes or changes in traffic mix?	NO	NO	Narrow lanes, no shoulders
Will the proposed design be consistent with adjacent roads, land forms and traffic management?	NO	NO	Roads nearby are similar or dirt
Type and degree of access to property and developments			
Is the degree of access control consistent with the road's function and with other sections of the road?	YES	NO	Multiple driveways with limited site distance
Will sight distances be adequate at intersections?	YES	NO	Steep vertical curves
Will sight distances be adequate at property accesses?	YES	NO	Steep vertical curves
Is the design speed (or the likely operating speed) compatible with the number and type of intersections/property accesses?	YES	NO	Multiple driveways with limited site distance
Wider network effects			
Have any harmful safety effects of the design upon the surrounding road network been identified and adequately dealt with?	NO	NO	
Is the project consistent with the surrounding road network classification hierarchy?	NO	NO	

DESIGN ISSUES (GENERAL)	Yes / No Existing	Yes / No Detour	COMMENTS
Impact of continuity with the existing network			
Do all proposed improvement sections/transitions connect with the existing highway system safely? (e.g. - US 550 and SH 172)	YES	YES	
Design speed			
Is the design speed consistent with the adjacent road sections?	NO	NO	
Has the potential that actual speeds will be greater than the design speed been avoided? (e.g., will the design discourage speeds higher than the design speed?)	NO	NO	A design speed was not used when the road was built.
Has the appropriate design speed been selected for design of horizontal and vertical alignment?	YES	NO	A design speed was not used when the road was built.
Has the appropriate design speed been selected to determine visibility requirements?	YES	NO	A design speed was not used when the road was built.
Is sight distance adequate at intersections?	NO	NO	Steep vertical curves.
Is sight distance adequate at driveways to property entrances?	NO	NO	Steep vertical curves.
Is the selected design speed consistent with expected operating and posted speed?	NO	NO	A design speed was not used when the road was built.
Design volume and traffic characteristics			
Is the design appropriate with regard to the design volume and traffic mix?	NO	NO	Narrow lanes, no shoulders
Will the design safely cope with unforeseen or large increases in traffic volume?	NO	NO	Narrow lanes, no shoulders
Will the design safely cope with unforeseen or large changes in traffic mix? (consider possible effects of increases in proportions of heavy vehicles, transit, bicyclists, etc)	NO	NO	Narrow lanes, no shoulders
Right of way			
Is there compatibility between right of way and clear zone width requirements?	NO	NO	There is not enough ROW in most places to meet clear zone requirements. In many cases, the property lines goes to the center of the road.

INTERSECTIONS	Yes / No Existing	Yes / No Detour	COMMENTS
Location, spacing, type			
Are all aspects of intersections (e.g., spacing, type, layout, etc.) appropriate from a safety perspective with respect to the broad concept of the project, function of the road and intersecting roads?	NO	NO	
Are all aspects of intersections (e.g., spacing, type, layout, etc.) appropriate from a safety perspective with respect to the traffic mix on the road and intersecting roads?	NO	NO	
Is the frequency of intersections appropriate for emergency vehicle access?	YES	YES	No problems have been noted.
Has the vertical and/or horizontal alignment been taken into account with regard to the style or spacing of intersections?	NO	NO	The alignment is not changing.
Has the possibility of removing unnecessary or non-essential intersections and providing access more safely by changes on the surrounding road network been considered?	NO	NO	Not many intersections, multiple driveways that can't be moved.
Road users, traffic mix			
Is the movement of pedestrians and bicyclists safely accommodated at all intersections?	NO	NO	No shoulders/bike facilties/sidewalks
Is the movement of heavy vehicles safely accommodated at all intersections?	NO	NO	Narrow lanes, no shoulders

TRAFFIC MANAGEMENT	Yes / No Existing	Yes / No Detour	COMMENTS
General Traffic Management			
Have any adverse area-wide effects been addressed?	NO	NO	This project might trigger improvements at CR 301.
Will the design keep travel speeds at a safe level?	NO	NO	Site distance and clear zone cannot be fixed.
Are the number and location of accesses appropriate?	YES	NO	
Have bicycle safety needs been addressed and are any bicycle facilities safely located with respect to vehicular movements?	NO	NO	
Is traffic calming used where appropriate to improve safety? (e.g. Radar Speed Limit Signs)	YES	YES	A radar speed sign was installed 4-5 years ago. Speed trailers are used on occasion. Additional patrols might be needed if this road is used as a detour.

ENVIRONMENTAL CONSTRAINTS	Yes / No Existing	Yes / No Detour	COMMENTS
Surrounding Terrain			
Is the surrounding terrain free of physical or vegetation elements which could affect the safety of the design? (e.g., heavy planting, forestry, deep cuttings, steep or rocky bluffs which constrain the design)	NO	NO	Some trees, steep ditches
Weather, sunlight			
Has consideration been given to weather records or local experience that may indicate a particular problem? (e.g., snow, ice, wind, fog.)	NO	NO	There is adequate room for snow storage and the area gets good solar exposure.
Have any negative safety effects of wind, sun angles at sunrise and sunset been considered/minimized?	NO	NO	
Will the design perform safely when there is a rain, mist, ice, fog, snowfall, blowing snow?	YES	YES	Blowing snow has not been an issue.
Has the mitigation measures for effects of snow been considered with respect to prevailing winds? Snow drifting? Open terrain?	NO	NO	
Do the gradients, curves and general design approaches fit in with the likely weather and environmental aspects of the terrain? (e.g., fog-prone, icing-prone, blowing snow areas)	NO	NO	Steep vertical curves.
Noise barriers, animal fencing			
Has the need for environmental devices been considered? (e.g., noise barriers)	NO	NO	Very low existing ADT (~700vpd), noise not an issue
Animal crossings			
Has the known animal/migration routes in surrounding areas been considered and accounted for, e.g., need for fencing and underpasses?	NO	NO	

SAFETY ASPECTS NOT ALREADY COVERED	Yes / No Existing	Yes / No Detour	COMMENTS
General safety aspects not already covered			
Has the possibility of flooding been adequately dealt with?	NO	NO	
Have any consequent unusual or hazardous conditions been considered in case there will be special events? Can these conditions be mitigated?	NO	NO	CR 220 is not a special event route.
Have any safety or collision problems on the existing network been addressed to avoid carrying them over to the new design?	NO	NO	
Has the option of providing lighting for the design been considered?	NO	NO	Residents would probably not be supportive of lighting.
Has the adequate access for emergency vehicles been provided?	YES	YES	The detour would create additional delay for emergency vehicles.
Has the issue of drivers temporary blindness due to oncoming headlights at nighttime been adequately considered?	NO	NO	Very low ADT

ALIGNMENT	Yes / No Existing	Yes / No Detour	COMMENTS
Horizontal alignment			
Is visibility adequate for drivers and pedestrians at proposed accesses?	NO	NO	Steep vertical curves.
Is adequate turning space provided for the volume and speed of traffic ?	YES	NO	
Are sight and stopping distances adequate?	NO	NO	Steep vertical curves.
Vertical alignment			
Are gradients satisfactory?	NO	NO	A "Hill Blocks View" sign was installed.
Are sight and stopping distances adequate?	NO	NO	Steep vertical curves.

SIGNS AND MARKING	Yes / No Existing	Yes / No Detour	COMMENTS
General signs and marking			
Have necessary traffic signs and road markings been provided as part of a development?	YES	YES	Bechtold Engineering reviewed the signing and striping. Jim has the strip maps.
Is priority clearly defined at all the intersection points within the development and access routes?	YES	YES	Not many intersections.
Will the signs and markings be clear in all conditions; including day/night; rain; fog; etc.?	YES	YES	Signs/markings comply with MUTCD
Do the signs and markings meet standards and guidelines	YES	YES	Bechtold Engineering reviewed the signing and striping. Jim has the strip maps.

APPENDIX B

Accident Listing

Accidents CR 220 for 2001-2013

DATE	TIME	ROAD	AGENCY	(B) SEQUENCE OF EVENTS	(D) ROAD DESCP	(E) ROAD CONTOUR	(F) ROAD SURFACE	(G) ROAD COND	(H) LIGHTING COND	(J) WEATHER COND	(L) DIRECTION OF TRAVEL
1/17/2001	11:05	CR 220					BLACKTOP	ICY			
1/25/2001	7:55	CR 220					BLACKTOP				
4/21/2001	10:45	CR 220					BLACKTOP	DRY			
5/31/2001	17:10	CR 220					BLACKTOP	DRY			
8/29/2001	10:15	CR 220					BLACKTOP	DRY			
4/7/2002	19:45	CR 220					BLACKTOP	DRY			
8/5/2002	23:30	CR 220					BLACKTOP	DRY			
8/25/2002	4:30	CR 220					BLACKTOP	DRY			
8/26/2002	1:00	CR 220					GRAVEL	DRY			
9/14/2002	15:00	CR 220					BLACKTOP	DRY			
11/20/2002	7:50	CR 220					BLACKTOP	DRY			
11/27/2002	17:30	CR 220					BLACKTOP	DRY			
1/7/2003	10:00	CR 220					BLACKTOP	DRY			
6/16/2003	1:00	CR 220					BLACKTOP	DRY			
8/15/2003	8:30	CR 220					BLACKTOP	DRY			
11/29/2003	6:45	CR 220					BLACKTOP	DRY			
3/5/2004	8:00	CR 220					UNKNOWN	UNKNOWN			
4/17/2004	21:00	CR 220					BLACKTOP	DRY			
6/8/2004	16:00	CR 220					UNKNOWN	DRY			
8/25/2004	7:10	CR 220					BLACKTOP	DRY			
9/23/2004	11:25	CR 220					BLACKTOP	DRY			
6/9/2005	13:25	CR 220					BLACKTOP	DRY			
7/15/2005	18:20	CR 220					BLACKTOP	DRY			
7/22/2005	12:10	CR 220					BLACKTOP	DRY			
10/7/2005	12:07	CR 220					BLACKTOP	DRY			
11/19/2005	1:30	CR 220					BLACKTOP	DRY			
3/9/2006	16:15	CR 220					BLACKTOP	DRY			
5/15/2006	18:30	CR 220					BLACKTOP	DRY			
8/28/2006	19:25	CR 220					BLACKTOP	DRY			
6/17/2007	16:47	CR 220					BLACKTOP	DRY			
12/5/2007	7:50	CR 220					BLACKTOP	DRY			
1/15/2008	7:55	CR 220					BLACKTOP	DRY			
1/20/2008	16:01	CR 220					BLACKTOP	DRY			
12/22/2008	18:20	CR 220					BLACKTOP	SNOWY			
2/9/2009	8:18	CR 220					BLACKTOP	ICY			
3/2/2009	7:35	CR 220					BLACKTOP	DRY			
3/15/2009	15:28	CR 220					BLACKTOP	DRY			
5/1/2009	12:05	CR 220					BLACKTOP	DRY			
6/22/2009	10:30	CR 220					BLACKTOP	DRY			
11/28/2009	23:40	CR 220					BLACKTOP	ICY			
12/31/2009	18:02	CR 220					BLACKTOP	ICY			
2/24/2012	22:30	CR 220	CSP	OVERTURN	NON INTER	STRAIGHT ON GRADE	BLACKTOP	DRY	DARK	NONE	EAST
6/14/2012	10:30	CR 220	CSP	FRONT TO FRONT	AT INTER	STRAIGHT ON LEVEL	BLACKTOP	DRY	DAYLIGHT	NONE	WEST
7/28/2012	20:15	CR 220	CSP	OVERTURN	NON INTER	STRAIGHT ON GRADE	BLACKTOP	DRY	DAYLIGHT	NONE	EAST
9/26/2012	21:45	CR 220	CSP	HIT TREE	NON INTER	STRAIGHT ON LEVEL	BLACKTOP	DRY	DARK	NONE	EAST
10/20/2012	14:30	CR 220	CSP	FRONT TO REAR	NON INTER	STRAIGHT ON LEVEL	BLACKTOP	DRY	DAYLIGHT	NONE	EAST
2/13/2013	7:48	CR 220	CSP	FRONT TO REAR	INTERSECTION RELATED	STRAIGHT ON GRADE	BLACKTOP	DRY	DAYLIGHT	NONE	WEST
5/22/2013	9:05	CR 220	CSP	WILD ANIMAL	NON INTERSECTION	STRAIGHT ON GRADE	BLACKTOP	DRY	DAYLIGHT	NONE	WEST

Accidents CR 220 for 2001-2013

DATE	TIME	ROAD	(M) VEHICLE MOVEMENT	EXACT LOCATION	NO. KILLED	NO. OF INJURY	NO. OF VECH	(N) SPEED LIMIT	(P) EST. DRIVING SPEED	#1	#2	#3
										AGE OF DRIVERS		
1/17/2001	11:05	CR 220		.3 MILES EAST OF US 550	0	1	1	45	45	54		
1/25/2001	7:55	CR 220		AT ST 172	0	0	2			98	55	
4/21/2001	10:45	CR 220		1.3 MILES EAST OF US 550	0	0	1	45	45	16		
5/31/2001	17:10	CR 220		1.8 MILES EAST OF US 550	0	0	1	45	45	23		
8/29/2001	10:15	CR 220		345 FEET WEST OF ST 172	0	0	2	35	10	76	76	
4/7/2002	19:45	CR 220		.1 MILES EAST OF CR 301	0	0	1			51		
8/5/2002	23:30	CR 220		AT US 550	0	0	1	35	55	47		
8/25/2002	4:30	CR 220		.1 MILE WEST OF US 550	0	0	1			23		
8/26/2002	1:00	CR 220		.3 MIELS WEST OF ST 172	0	1	1	35	55	17		
9/14/2002	15:00	CR 220		.1 MILES EAST OF CR 301	0	0	1	35	25	69		
11/20/2002	7:50	CR 220		26 FEET EAST OF US 550	0	0	2	35	20	26	16	
11/27/2002	17:30	CR 220		.7 MILES EAST OF US 550	0	0	1	35	40	24		
1/7/2003	10:00	CR 220		.1 MILES WEST OF ST 172	0	0	1	35		43		
6/16/2003	1:00	CR 220		2.4 MILES E OF US 550	0	1	1	35	45	20		
8/15/2003	8:30	CR 220		.5 MILES EAST OF MILEPOST 2	0	0	1	35	45	47		
11/29/2003	6:45	CR 220		.4 MILES EAST OF US 550	0	0	1	35	35	18		
3/5/2004	8:00	CR 220		AT 2342 CR 220	0	0	1			32		
4/17/2004	21:00	CR 220		1.4 MILES EAST OF US 550	0	0	1	35	35	17		
6/8/2004	16:00	CR 220		AT US 550	0	3	1			45	47	
8/25/2004	7:10	CR 220		.7 MILES WEST OF MILEPOST 1	0	0	2	35	50	22	41	
9/23/2004	11:25	CR 220		AT US 550	0	0	2	35	50	55	63	
6/9/2005	13:25	CR 220		1 MILES EAST OF CR 301	0	0	1	35	45	18		
7/15/2005	18:20	CR 220		AT ST 172	0	1	2	35	5	30	23	
7/22/2005	12:10	CR 220		1.1 MILES EAST OF US 550	0	0	2	35	10	57	31	
10/7/2005	12:07	CR 220		2.2 MILES EAST OF US 550	0	1	2	35	15	18	29	
11/19/2005	1:30	CR 220		.4 MILES WEST OF ST 172	0	0	1	35				
3/9/2006	16:15	CR 220		.3 MILES WEST OF ST 172	0	1	1	35	55	51		
5/15/2006	18:30	CR 220		.3 MILES WEST OF ST 172	0	0	2	35		22	22	
8/28/2006	19:25	CR 220		1 MILE EAST OF US 550	0	0	1	30	30	30		
6/17/2007	16:47	CR 220		15 FEET EAST OF US 550	0	0	2	35	15	81	46	
12/5/2007	7:50	CR 220		AT US 550	0	0	2	35	10	38	39	
1/15/2008	7:55	CR 220		16 FEET EAST OF US 550	0	0	2	35	3	60		
1/20/2008	16:01	CR 220		AT 2405 CR 220	0	0	1	35	70	38		
12/22/2008	18:20	CR 220		AT DREAMY DRAW	0	0	3	35	15	18	40	19
2/9/2009	8:18	CR 220		.7 MILES WEST OF ST 172	0	0	2	35	30	42	37	
3/2/2009	7:35	CR 220		11.5 FEET EAST OF US 550	0	0	2	35	15	50	49	
3/15/2009	15:28	CR 220		.05 MILES EAST OF MEADOWLARK LANE	0	0	1	35	48	17		
5/1/2009	12:05	CR 220		AT ST 172	0	0	2	35	3	33	59	
6/22/2009	10:30	CR 220		15 FEET EAST OF US 550	0	0	2	35	15	21	22	
11/28/2009	23:40	CR 220		.8 MILES EAST OF US 1550	0	0	1	35	40			
12/31/2009	18:02	CR 220		.15 MILES WEST OF MP 1	0	0	2	35	5			
2/24/2012	22:30	CR 220	GOING STRAIGHT	528' EAST OF MP 2	0	1	1	35	50	28		
6/14/2012	10:30	CR 220	MAKING LEFT TURN	AT DREAMY DRAW	0	0	2	35	10	18	43	
7/28/2012	20:15	CR 220	AVOIDING OBJECT	2 MILES 3696 FEET WEST OF ST 172	0	1	1	35	35	31		
9/26/2012	21:45	CR 220	GOING STRAIGHT	3696 FEET EAST OF US 550	0	0	1	35	35	53		
10/20/2012	14:30	CR 220	GOING STRAIGHT	CR 220 90 FT EAST OF HWY 550	0	0	2	35	30	39	42	
2/13/2013	7:48	CR 220	GOING STRAIGHT	CR 220 @ HWY 550 INTERSECTION	0	0	2	35	10	70	48	
5/22/2013	9:05	CR 220	GOING STRAIGHT	CR 220 @ 3696 FT EAST OF HWY 550	0	0	1	35	35	62		

Accidents CR 220 for 2001-2013

DATE	TIME	ROAD	(q)CONTRIBUTING FACTOR DRIVER AND/OR PED	BIKE	PED	CAR	PU	SUV	BUS	COM	MC	OT
				VEHICLE TYPE								
1/17/2001	11:05	CR 220	FAILED TO DRIVE IN SINGLE LANE					1				
1/25/2001	7:55	CR 220	UNKNOWN			1	1					
4/21/2001	10:45	CR 220	ANIMAL			1						
5/31/2001	17:10	CR 220	FAILED TO DRIVE IN SINGLE LANE				1					
8/29/2001	10:15	CR 220	FAILED TO YIELD/APPROACHING TRAFFIC			2						
4/7/2002	19:45	CR 220	ANIMAL					1				
8/5/2002	23:30	CR 220	FAILED TO DRIVE IN SINGLE LANE				1					
8/25/2002	4:30	CR 220	ANIMAL					1				
8/26/2002	1:00	CR 220	CARELESS DRIVING			1						
9/14/2002	15:00	CR 220	ANIMAL									
11/20/2002	7:50	CR 220	VEHICLE FAILURE									
11/27/2002	17:30	CR 220	ANIMAL									
1/7/2003	10:00	CR 220	UNKNOWN									
6/16/2003	1:00	CR 220	CARELESS DRIVING									
8/15/2003	8:30	CR 220	FAILED TO DRIVE IN SINGLE LANE									
11/29/2003	6:45	CR 220	ANIMAL									
3/5/2004	8:00	CR 220	UNKNOWN				1					
4/17/2004	21:00	CR 220	ANIMAL			1						
6/8/2004	16:00	CR 220	UNKNOWN			2						
8/25/2004	7:10	CR 220	FOLLOWING TOO CLOSELY			1		1				
9/23/2004	11:25	CR 220	UNKNOWN				1		1			
6/9/2005	13:25	CR 220	UNKNOWN			1						
7/15/2005	18:20	CR 220	DUI ALCOHOL			2						
7/22/2005	12:10	CR 220	PASSED ON LEFT WHEN PROHIBITED							1	1	
10/7/2005	12:07	CR 220	FAILED TO YIELD ROW			1	1					
11/19/2005	1:30	CR 220	UNKNOWN				1					
3/9/2006	16:15	CR 220	DUI ALCOHOL				1					
5/15/2006	18:30	CR 220	FOLLOWING TOO CLOSELY				1	1				
8/28/2006	19:25	CR 220	ANIMAL				1					
6/17/2007	16:47	CR 220	CARELESS DRIVING					1	1			
12/5/2007	7:50	CR 220	FRAILED TO YIELD RIGHT OF WAY WHEN PROCEEDING			1	1					
1/15/2008	7:55	CR 220	UNKNOWN			1						
1/20/2008	16:01	CR 220	RECKLESS DRIVING				1					
12/22/2008	18:20	CR 220	CARELESS DRIVING				2	1				
2/9/2009	8:18	CR 220	UNKNOWN			1	1					
3/2/2009	7:35	CR 220	CARELESS DRIVING				1		1			
3/15/2009	15:28	CR 220	CARELESS DRIVING			1						
5/1/2009	12:05	CR 220	BACKED VEHICLE ONTO ROADWAY			1	1					
6/22/2009	10:30	CR 220	FOLLOWING TOO CLOSELY			2						
11/28/2009	23:40	CR 220	FAILED TO DRIVE IN SINGLE LANE			1						
12/31/2009	18:02	CR 220	FAILED TO DRIVE IN SINGLE LANE					1				
2/24/2012	22:30	CR 220	CARELESS DRIVING			1						
6/14/2012	10:30	CR 220	DISREGUARD TRAFFIC SIGN					2				
7/28/2012	20:15	CR 220	UNKNOWN								1	
9/26/2012	21:45	CR 220	DUI			1						
10/20/2012	14:30	CR 220	AGGRESSIVE DRIVING			1	1					
2/13/2013	7:48	CR 220	FOLLOWING TO CLOSELY			1	1					
5/22/2013	9:05	CR 220	ANIMAL					1				