

COUNTY OF SUTTER PUBLIC WORKS DEPARTMENT

Engineering and Traffic Survey

Butte House Road between Humphrey Road
and 3500 feet East of East Butte Road

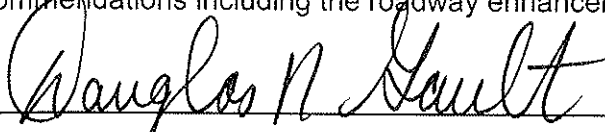
REPORT DATE: 3/14/2008

DATA COLLECTED DATE: 12/07/07 – 1/22/08

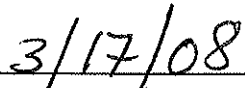
PREPARED BY: Neal Hay, Associate Civil Engineer, Public Works Department

COUNTY ROAD COMMISSIONER'S STATEMENT:

I have examined the Engineering and Traffic Survey regarding Butte House Road between Humphrey Road and a point 3500 feet east of East Butte Road. I approve the report and its recommendations including the roadway enhancements.



Douglas R. Gault, County Road Commissioner



Date

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RECOMMENDATIONS

Based on the speed data and other information, staff recommends the following visual enhancements and potential state grant projects:

1. Maintain the existing road speed limit of 55 mph and request increased recurring speed enforcement efforts by the local traffic enforcement agency.

Traveled Way Improvements

2. Install extra-large 48" diamond "Reverse Curve" W1-4 Warning signs prior to the "reverse curves" 800 feet West and 900 feet East of East Butte Rd. In addition, add an advisory speed sign under the curve warning sign reminding drivers of the 55 mph speed limit.
3. Install additional roadway delineators spaced 30 feet apart along the shoulders. The delineators would begin at a point 1900 feet West of East Butte Rd and continue to a point 800 feet West of East Butte Rd and they will also be installed at a point 900 feet East of East Butte Rd and continue to a point 3500 feet East of East Butte Rd.
4. Increase the shoulder width to 5 feet with a minimum 3 feet paved and 2 feet gravel on the outside of the reverse curves west of East Butte Rd. In the westbound direction, the increased shoulder width would begin about 750' west of East Butte Rd and continue to about 1150' west of East Butte Rd. In the eastbound direction, the increased shoulder width would begin about 900' east of Humphrey Rd and continue to about 1500' east of Humphrey Rd. The paved shoulder will include a 12" wide rumble strip.

Intersection Improvements

5. Apply for grant funding to do the following at the Butte House / Humphrey and Butte House / East Butte intersections:
 - a. Install and maintain street lights to increase visibility and awareness of the intersection.
 - b. Install left turn lanes at both intersections to potentially reduce the chance of a rear end collision.

SURVEY

Butte House Road is a two lane, east – west Rural Major Collector road in a sparsely populated area between the town of Sutter and Yuba City. Between the Urban Collectors Acacia Avenue and Township Road, it is a Rural Major Collector for a total length of 3.61 miles, and eastward to Yuba City it is an Urban Minor Arterial. Its designation as a "Rural Major Collector" is the current roadway classification per the Caltrans Functional Classification System which is part of the Caltrans Highway Performance Monitoring System.

In the 1996 Sutter County General Plan (GP) Update, Butte House Road between Township Rd and Humphrey Rd was identified as a Rural Arterial with a daily volume of 3100 vehicles, but would be more appropriately categorized as a Rural Collector based on the General Plan definition. (Table 4.7-2; page 4-15, Chapter 4, GP) The projected operating condition on Butte House Road between Township Rd and Humphrey Rd was expected to increase to 9800 vehicles daily by the year 2015. (Table 4.9-2; page 4-25, Chapter 4, GP) Finally, this

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segment of Butte House Road was not identified for roadway improvements during the life of the General Plan. (Table 4, page 22, Section 2, GP)

Survey Scope: Butte House Road between Humphrey Road and a point 3500' East of East Butte Road (1.16 miles).

SITE CONDITIONS and the NEED for SURVEY

A recent fatality in December 2007 prompted requests to survey / study this segment of Butte House Road for potential deficiencies and to analyze speed and accident data.

The Sutter County Public Works Department reviewed the segment of Butte House Road between Humphrey Road and 0.66 mile east of East Butte Road. Butte House Road is classified as a "Rural Major Collector" in the Caltrans Functional Classification System which is part of the Caltrans Highway Performance Monitoring System.

The roadway is of good quality and has two large radius reverse curves and two intersections in the studied segment. The traveled way is 24' wide and the gravel shoulder width varies from 3 feet to 7 feet wide with power poles along the road shoulder and a drainage ditch along portions of the northern shoulder.

The latest traffic count records an average daily traffic volume (ADT) at 4369 vehicles per day.

Although residences do occur along its frontage, the number does not satisfy the "residential density" standards set for in the California Manual of Uniform Traffic Control Devices (MUTCD), 13 houses within a ¼ mile on one side or 16 houses within a ¼ mile on both sides. On a collector or arterial road, the use of radar as a means of enforcing the speed limit requires completion of a traffic speed survey within the previous five years to enforce the prima facie speed of 55 mph (per CA Vehicle Code Section 40802 (2)).

Data and Analysis of Roadway Conditions and Traffic Control Devices:

1. Signage

At the T-intersections with Humphrey Road and East Butte Road, Butte House is the major road, so its through traffic does not stop. At both, the appropriate intersection warning signs are in place. Before either of the curves from both directions, Butte House Rd has the appropriate road warning signs, W1-4, per the California MUTCD alerting drivers about the curves. Along the roadway shoulders in both directions, delineators are spaced at 60 foot intervals, which exceeds the California MUTCD recommendation of 90' spacing for curves with 1000 feet or less radius.

2. Roadway

The traveled roadway meets the engineering and safety design guidelines specified in the Caltrans Highway Design Manual dated September 2006 and the California Manual of Uniform Traffic Control Devices dated September 2006. It has one lane in each direction and the median is striped double yellow for no passing. The traveled way width is 24 feet with 11'-4" wide lanes and a gravel shoulder that varies between 3 feet and 7 feet wide. The gravel shoulder is packed well and there is minimal difference in the traveled way grade and shoulder grade. Also, per the Highway Design Manual, Topic 309.1.3c, a minimum of 4' Clear Recovery Zone is provided from the edge of the traveled

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way to utility poles, etc. Measured distances from the edge of the traveled way to adjacent power poles varied between 9 feet and 15 feet.

3. Right of Way

The right of way for Butte House Rd is 66 feet.

4. Pedestrian Crossing / Non-motor Vehicle Crossings

There are no pedestrian crossings on Butte House Rd at the intersections.

5. Turn Lanes / Bicycle Lanes

There are no designated bicycle lanes on Butte House Rd and there is no designated right or left turn lane at its intersections with Humphrey and East Butte. Also, no acceleration lanes exist for traffic turning onto Butte House from Humphrey or East Butte.

6. Speed Limits / Zones

The existing speed limit on Butte House Rd over the studied length is 55 mph. There are no school zones along the studied segment that require speed reduction.

7. Site Distances

This segment of Butte House Road is in compliance with the recommended sight and stopping distances per the CA MUTCD Table 201.1. The passing sight distance was not considered since this segment of Butte House is striped with a double yellow median with no passing allowed.

8. Reported Accidents

A review of Statewide Integrated Traffic Records System (SWITRS) accident data and local accident reports for the last ten years from January 1998 through December 2007 shows a total of 31 accidents over this segment of Butte House Road. Over that time frame a total of 4 fatal accidents with 4 deaths have occurred on December 2007, March 2004, July 2003 and July 2001.

A recent double fatality in February 2008 is not included in the analysis as it is still under investigation by the California Highway Patrol (CHP).

A. Fatal Accident Summary:

July 2, 2001, 2:15 am – Single fatality when a vehicle driving westbound ran off the road and hit an object 1584' East of East Butte Road. Per the CHP, the primary accident cause was Driving Under the Influence.

July 25, 2003, 6:35 pm – One fatality and one injury when a vehicle driving Northbound on Humphrey Road, failed to stop at the Stop sign with Butte House Road, went through the intersection and stopped in the irrigation ditch on the North side of Butte House Rd. The vehicle was driven by a 9 year old boy who operated the steering wheel, while his father sat beside him and assisted with the steering wheel and operated the accelerator and brake. At the intersection, the father applied the accelerator instead of the brake and the vehicle went through the intersection. The father was not wearing a seatbelt, was ejected from the vehicle through the windshield and died from his injuries. Per the CHP, the primary accident cause was the father Driving Under the Influence.

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March 16, 2004, 2:00 pm – Single fatality as the vehicle was driving eastbound, ran off the road and impacted the Sutter Irrigation District canal that runs North and South under Butte House Road. The victim was not wearing his seat belt and drowned after he exited the vehicle into the canal and lost consciousness from his injuries. Witnesses estimated his speed at 75 mph – 80 mph. Per the CHP, the primary accident cause was failing to maintain the vehicle path on the right side of the roadway and they believe speed was a contributing factor.

December 3, 2007, 3:40 pm – One fatality and three injuries when a vehicle driving eastbound veered onto the southern shoulder, corrected back onto the roadway and into the path of another vehicle. Per the CHP, the primary accident cause was failing to maintain the vehicle path on the right side of the roadway.

None of the causes of the fatal accidents were due to roadway conditions or deficiencies, and the only common cause is the relation to alcohol in 2 of the accidents.

B. Other Accidents and Patterns:

At the Butte House / Humphrey intersection, there have been 8 accidents in the study period including the fatal accident of July 25, 2003 described above. Of those, 5 involved vehicles turning left across oncoming traffic. Two were caused by Driving Under the Influence and the other accident was the result of unsafe speed.

The common elements in the 5 left turning accidents appears to be conflicts with other traffic as drivers attempted to turn southward onto Humphrey Rd and the majority occurred during dusk / dark conditions. We believe Recommendation No. 5 will potentially assist drivers during their transitions of this intersection.

At the Butte House / East Butte intersection, there have been 5 accidents in the study period. Of those, 2 involved vehicles turning left across oncoming traffic. One was caused by Driving Under the Influence and the other 2 accidents were the result of unsafe speed and crossing into oncoming traffic.

There seems to be no common cause in these accidents, but the intersection improvements that raise driver awareness could potentially reduce traffic conflicts. We believe the improvements in Recommendation No. 5 will potentially assist drivers during their transitions of this intersection.

Along Butte House Rd in the studied segment, there have been 12 accidents excluding the fatalities and those at the intersections. Of those, 2 were caused by Driving Under the Influence. Another two were caused by vehicles crossing lanes into oncoming traffic. Two more of the accidents involved vehicles trying to avoid animals or objects on the roadway. One accident was a rear end collision as a result of a vehicle attempting to turn left into a driveway on the south side of Butte House Rd. Finally, 5 were caused by vehicles running off the road and unsafe speed.

To address the common cause of drivers leaving the roadway, Recommendation Nos. 2, 3 and 4 may potentially assist drivers in focusing their attention on the roadway and reminding them of the proper speed over this road segment.

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At least 25% of the accidents referenced unsafe speed as a primary or contributing cause of an accident. Additionally, the traffic survey recorded a critical speed (85% percentile) of 62 mph, 7 mph above the posted speed limit. Consequently, our Recommendation Nos. 1 and 2 should remind drivers of the appropriate speed over this roadway segment.

ATTACHMENTS

1. Speed and Volume Summary on Butte House Rd.
2. Details indicating the Roadway Enhancements for the road segments West of East Butte Rd and East of East Butte Rd.
3. Accident Summary - January 1998 to June 2007

REFERENCES

1. Sutter County "General Plan Update" 1996
2. Caltrans "Highway Design Manual" – September 2006
3. Caltrans "Manual of Uniform Traffic Control Devices" – September 2006
4. American Association of State Highway and Transportation Officials "Geometric Design of Highways and Streets" 2004

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Butte House Road between Humphrey Road
and 3500 feet East of East Butte Road

SPEED and VOLUME SUMMARY

From December 7, 2007 – January 22, 2008, the Public Works Department conducted field surveys and performed traffic counts to document existing roadway conditions and measure both vehicle speed and traffic volume. We placed Nu-Metrics Hi-Star Model NC-97 units that count vehicles by category and also register vehicle speed. The associated software calculates the Average Daily Traffic (ADT) and the 85th percentile speed during the observation period.

RESULTS

The following determinations can be derived from speed surveys to help analyze the results:

Critical Speed is the 85th percentile traffic speed, or the speed exceeded by 15% of all traffic. Traffic engineering convention suggests that the speed limit be set within 5 mph of this figure. Studies have shown that setting speed limits above or below this range tends to increase traffic accidents and reduce the credibility of speed enforcement efforts.

Median Speed is the speed at which half the vehicles travel above and half below this speed.

Pace is the 10mph range of speeds at which the greatest portion of traffic travels. A pace containing 70% of all traffic is considered normal and desirable.

Flagrant Speeders are those vehicles traveling more than 10 mph over the posted speed limit.

Speed Limit:	55 mph
Critical Speed:	62 mph
Median Speed:	55 mph
Pace:	50 - 59 mph
% in Pace:	58%
Flagrant speeders:	7.2% (+ 65 mph)

The posted speed limit is appropriate for the existing road users. Based on the California MUTCD, Section 2B.13, the posted speed limit should normally be set within 5 mph of the critical speed, unless unusual conditions are noted. The proportion of flagrant speeders is not excessive and could be regulated with random speed enforcement.

**Nu-Metrics Traffic Analyzer Study
Computer Generated Summary Report
City: Sutter
Street: Butte House Rd Eastbound**

A study of vehicle traffic was conducted with HI-STAR unit number 4636. The study was done in the 1 lane on Butte House Rd Eastbound in Sutter, CA in Sutter county. The study began on 01/17/2008 at 11:00 AM and concluded on 01/18/2008 at 11:00 AM, lasting a total of 24 hours. Data was recorded in 15 minute time periods. The total recorded volume of traffic showed 2,107 vehicles passed through the location with a peak volume of 87 on 01/18/2008 at 07:45 AM and a minimum volume of 0 on 01/18/2008 at 12:45 AM. The AADT Count for this study was 2,107.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin.

Chart 1

0	10	15	20	25	30	35	40	45	50	55	60	65	70	75
to	to	to	to	to	to	to	to	to	to	to	to	to	to	>
9	14	19	24	29	34	39	44	49	54	59	64	69	74	
0	6	4	2	2	9	28	93	269	569	649	325	112	30	8

At least half of the vehicles were traveling in the 55 - 59 mph range or a lower speed. The average speed for all classified vehicles was 55 mph with 53.3 percent exceeding the posted speed of 55 mph. The HI-STAR found 53.3 percent of the total vehicles were traveling in excess of 55 mph. The mode speed for this traffic study was 55 mph and the 85th percentile was 62.45 mph.

CLASSIFICATION

Chart 2 lists the values of the eight classification bins and the total traffic volume accumulated for each bin.

Chart 2

0	21	28	40	50	60	70	80
to	to	to	to	to	to	to	>
20	27	39	49	59	69	79	
2003	49	31	5	9	6	2	1

Most of the vehicles classified during the study were Passenger Cars. The number of Passenger Cars in the study was 2,052 which represents 97.40 percent of the total classified vehicles. The number of Small Trucks in the study was 31 which represents 1.50 percent of the total classified vehicles. The number of Trucks/Buses in the study was 5 which represents 0.20 percent of the total classified vehicles. The number of Tractor Trailers in the study was 18 which represents 0.90 percent of the total classified vehicles.

HEADWAY

During the peak time period, on 01/18/2008 at 07:45 AM the average headway between the vehicles was 10.23 seconds. The slowest traffic period was on 01/18/2008 at 12:45 AM. During this slowest period, the average headway was 900.0 seconds.

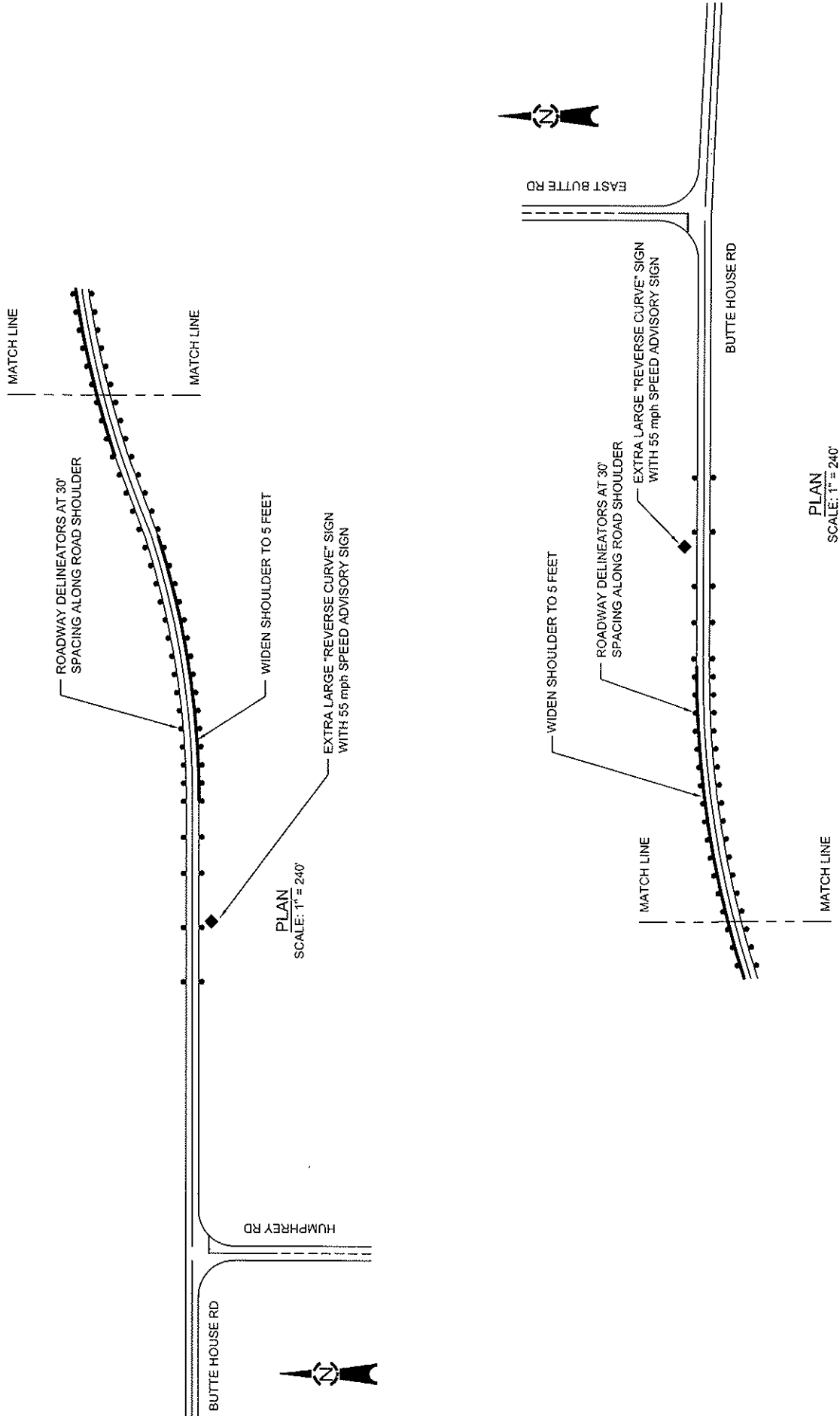
WEATHER

The roadway surface temperature over the period of the study varied between 35 and 72 degrees Fahrenheit. The HI-STAR determined that the roadway surface was Dry 100.00 percent of the time.



BUTTE HOUSE RD - HUMPHREY RD TO EAST BUTTE RD ROADWAY VISUAL ENHANCEMENTS - SEGMENT WEST OF EAST BUTTE RD

CREATED BY: NPH DATE: MARCH 14, 2008

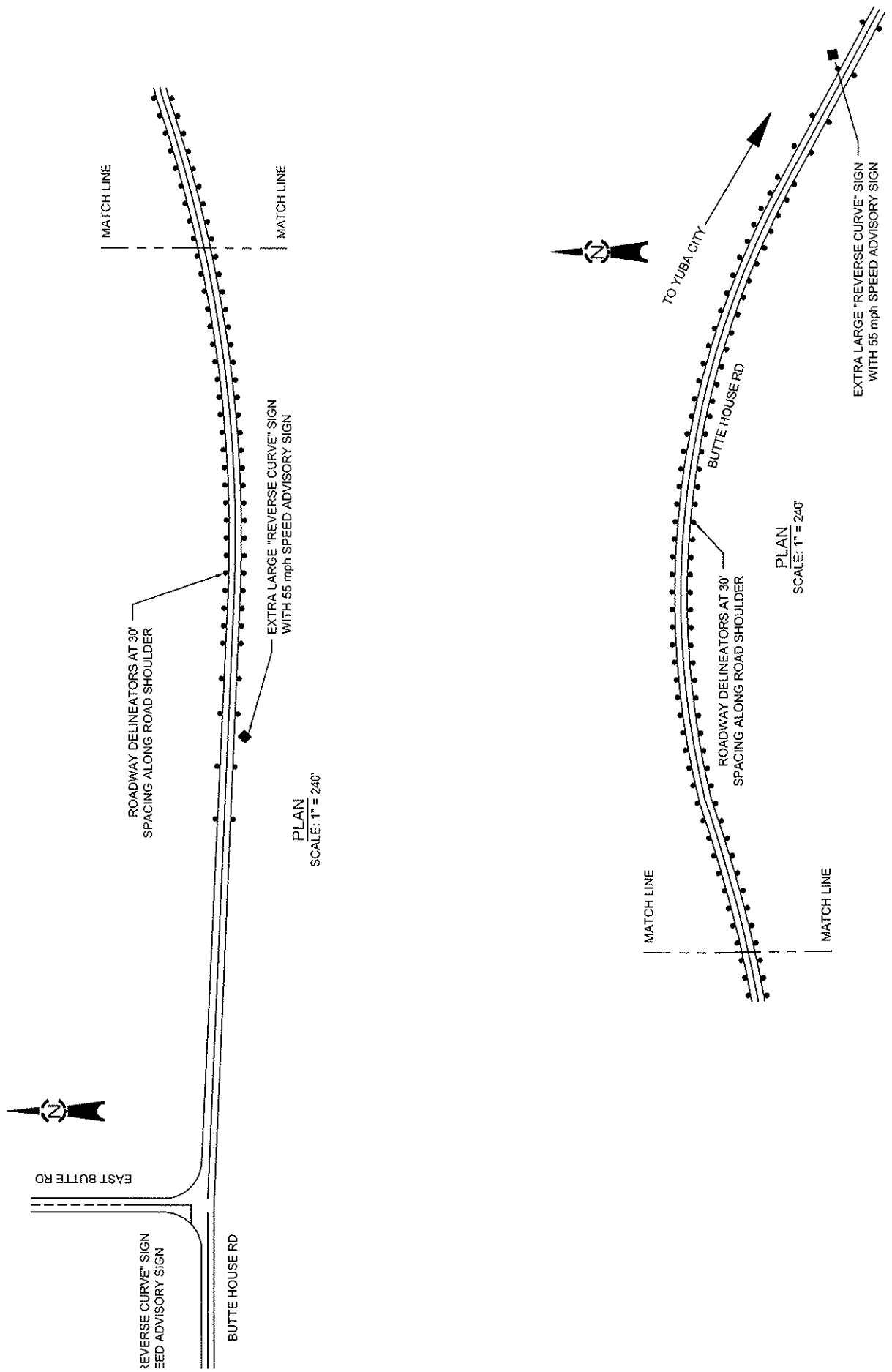




BUTTE HOUSE RD - HUMPHREY RD TO EAST BUTTE RD

ROADWAY VISUAL ENHANCEMENTS - SEGMENT EAST OF EAST BUTTE RD

CREATED BY: NPH DATE: MARCH 14, 2008



ACCIDENT SUMMARY
BUTTE HOUSE ROAD – HUMPHREY RD TO EAST BUTTE RD
January 1998 to June 2007

Accident No.	Date	Time	Station	Vehicle 1 Direction	Collision	Cause	Injuries / Fatalities
1	4/24/99	14:30	18+04	EB	Hit object	Crossed ctr line	1 / 0
2	8/01/00	07:40	19+98	EB	Overtuned	Ran off road	1 / 0
3	4/17/05	22:00	20+69	EB	Sideswipe	Improper passing	0 / 0
4	3/15/06	07:25	25+50	WB	Hit object	Unsafe speed/Ran off rd	0 / 0
5	7/25/03	18:35	25+95	NB	Hit object	DUI / Ran off road	1 / 1
6	1/01/06	21:00	26+05	NB	Hit object	DUI	0 / 0
7	11/02/04	16:30	25+90	WB	Head on	Making left turn	2 / 0
8	12/14/05	18:35	26+05	EB	Broadside	Making left turn	0 / 0
9	2/22/01	07:40	26+50	WB	Rear end	Following too close	0 / 0
10	3/30/01	18:00	26+50	WB	Rear end	Following too close	1 / 0
11	3/09/06	17:40	26+50	WB	Rear end	Following too close	1 / 0
12	12/27/06	20:25	27+75	EB	Hit object	Sofa in roadway	0 / 0
13	4/18/02	05:30	29+01	SB	Overtuned	Ran off road	0 / 0
14	12/03/07	15:40	37+70	EB	Head on	Crossed ctr line	1 / 1
15	3/16/04	14:00	39+26	EB	Hit object	Ran off road	0 / 1
16	8/10/98	15:30	40+95	WB	Hit object	Ran off road	0 / 0
17	2/13/04	20:40	41+05	WB	Hit object	Ran off road	0 / 0
18	8/21/06	11:12	41+95	WB	Hit object	Ran off road	0 / 0
19	6/17/02	23:15	44+00	WB	Hit animal	Animal on roadway	0 / 0
20	6/30/00	18:30	46+80	EB	Hit object	Ran off road	1 / 0
21	1/09/05	20:10	51+50	WB	Hit object	Ran off road	0 / 0
22	6/24/98	12:20	51+60	EB	Head on	Wrong side of road	2 / 0
23	10/05/06	16:04	51+70	EB	Rear end	Following too close	0 / 0
24	10/09/01	22:54	51+90	SB	Hit object	DUI	1 / 0
25	11/03/03	14:55	51+95	EB	Broadside	Making left turn	2 / 0
26	12/19/04	11:25	63+00	WB	Sideswipe	Crossed ctr line	2 / 0
27	10/10/03	17:45	63+10	WB	Head on	DUI	5 / 0
28	7/07/04	17:00	65+25	WB	Rear end	Following too close	1 / 0
29	6/28/98	13:25	67+80	EB	Hit object	DUI	0 / 0
30	7/02/01	02:15	68+05	WB	Hit Object	DUI	0 / 1
31	5/08/03	12:50	73+80	EB	Overtuned	Ran off road	1 / 0
TOTAL							23 / 4