

BALFOUR ROAD AND ORWOOD ROAD TRUCK RESTRICTIONS STUDY

SUBJECT: Roadway geometries and collision history and truck restriction justification for Balfour Road and Orwood Road between Byron Highway and Bixler Road.

BACKGROUND

The recent spike in truck traffic on the surrounding rural roads has resulted in numerous citizen complaints from East County residents. Apparently, trucks destined to East Cypress Road are using these rural roads as a bypass to the already congested Brentwood Boulevard. The common complaint is that trucks are encroaching upon opposing traffic, and this has prompted the County Traffic Engineer to investigate the geometric roadway conditions. The investigation looked into the ability of trucks to safely maneuver turns at intersections, and mid-block roadways were checked for conformance with accepted design criteria. Also included in the investigation are collision histories to reinforce the assertion that the roads are unsuitable for truck traffic.

TRUCK TURNING

The investigation began with obtaining aerials of the intersections. The four intersections included in this study are Balfour Road at Byron Highway and Bixler Road, and Orwood Road at Byron Highway and Bixler Road.

The WB-50 truck turning template, which delineates the wheel path of the largest truck allowed on California's local roadways, was imposed on the aerials to determine the ability of the intersection to handle the various truck turning movements.

Results: None of the four intersections was able to accommodate truck turning movements without encroaching upon the right of way of opposing vehicles, or without encroaching upon unpaved portions within the roadway right of way. An "Intersection Safety Summary" table, and the supporting aerials with imposed WB-50 truck turning templates, is included in the appendix.

EXISTING MID-BLOCK ROADWAY DESIGN

The next part of the investigation was to inventory existing lane widths, shoulder conditions, speed limits, and average daily traffic (ADT) for various roads within the Knightsen study area to determine if they meet the minimum County design criteria provided under County Standard Plan CA53i.

Results: Balfour Road is a two lane road with a width of 20 feet, no paved shoulders, a posted speed limit of 50 miles per hour, and an ADT of 5184 vehicles per day.

Balfour Road does not meet current County minimum design criteria, which requires the road to be 24 feet wide with four-foot wide paved shoulders and three-foot wide shoulder backing on each side of the road.

Orwood Road is a two lane road with a width of 20 feet, no paved shoulders, a posted speed limit of 45 miles per hour, and an ADT of 1524 vehicles per day.

Chestnut Street does not meet current County minimum design criteria, which requires the road to be 24 feet wide with two-foot wide paved shoulders and two-foot wide shoulder backing on each side of the road.

COLLISION HISTORY

Collision histories from 2001 to September 30, 2006 for Balfour Road and Orwood Road between Byron Highway and Bixler Road were researched to substantiate the investigative conclusions. The County's Crossroads Traffic Collision database was used to generate reports on mid-block collisions and is included in the appendix of this report.

Balfour Road is approximately 1.01 miles long between Byron Highway and Bixler Road and has a total of 33 reported collisions. Twenty-eight (85%) of the 33 collisions involved head-ons, broadsides, or running off the road and resulted in 21 injuries and one fatality. Violations that include driving under the influence are not included in any of the 33 collisions cited above.

Orwood Road is approximately 1.03 miles long between Byron Highway and Bixler Road and has a total of six reported collisions. All of the collisions involved running off the road, five of which hit fixed objects. No injuries were recorded. All of the collisions may be attributed to intersections and mid-blocks not meeting current design standard. Violations that include driving under the influence are not included in any of the six collisions cited above.

RECOMMENDATION

The intersections are incapable of handling truck turning movements without encroaching onto opposing traffic or damaging unpaved shoulders and existing facilities, and the mid-block roads do not meet current minimum County design criteria. These conditions, as supported by California Vehicle Code Section 35717, are the basis for restricting trucks on Balfour Road and Orwood Road.

An alternate route for trucks should use Highway 4 (also known as Brentwood Boulevard in Brentwood). However, commercial vehicles are allowed ingress and egress by direct route to and from a restricted street for the purposes of making pickups and deliveries, as stipulated under Section 35703 of the California Vehicle Code.

None of these recommendations should affect the City of Brentwood, as they currently have truck restrictions on Balfour Road, thus providing a seamless truck restriction system for both jurisdictions.

APPENDIX

Balfour Road and Orwood Road Truck Restrictions Study – Intersection Safety Summary

Crossroads Traffic Collision Database – Traffic Collision History Reports

Contra Costa County Public Works Department Standard Plan CA53i

EAST COUNTY TRUCK ROUTE STUDY INTERSECTION SAFETY SUMMARY

Intersection	Northbound Approach	Southbound Approach	Eastbound Approach	Westbound Approach
Balfour Rd.@ Byron Hwy	Truck left turn onto WB Balfour Road encroaches 100 LF of EB Balfour Road. Truck right turn onto EB Balfour Road encroaches 115 LF of unpaved shoulder.	Truck left turn onto EB Balfour Road encroaches 60 LF of WB Balfour Road. Truck right turn onto WB Balfour Road encroaches 130 LF of unpaved shoulder.	Truck right turn onto SB Byron Hwy encroaches 130 LF of unpaved shoulder. Truck left turn onto NB Byron Hwy encroaches 65 LF of SB Byron Hwy.	Truck right turn onto NB Byron Hwy encroaches 110 LF of unpaved shoulder. Truck left turn onto SB Byron Hwy encroaches 60 LF of NB Byron Hwy.
Balfour Rd.@ Bixler Road	Truck left turn onto WB Balfour Road encroachment* Truck right turn onto EB Balfour Road encroachment*	Truck right turn onto WB Balfour Road encroaches 150 LF of unpaved shoulder. Truck left turn onto EB Balfour Road encroachment*	Truck right turn onto SB Bixler Road encroaches 160 LF of unpaved shoulder. Truck left turn onto NB Bixler Road encroachment*	Truck left turn onto SB Bixler Road encroachment* Truck right turn onto NB Bixler Road encroachment*
Bixler Road @ Orwood Rd.	Truck right turn onto EB Orwood Road encroaches 155 LF of unpaved shoulder. Orwood curve onto WB Orwood Road encroaches 145 LF of EB Orwood Road.	Orwood curve onto SB Bixler Road encroaches 180 LF of unpaved shoulder.	Truck left turn onto SB Bixler Road encroaches 140 LF of NB Bixler Road. Orwood curve onto SB Bixler Road encroaches 180 LF of unpaved shoulder.	Truck left turn onto SB Bixler Road encroaches 140 LF of NB Bixler Road.
Orwood Road @ Byron Hwy	Truck right turn onto EB Orwood Road encroaches 110 LF of unpaved shoulder.	Truck left turn onto EB Orwood Road encroaches 45 LF of WB Orwood Road.	No eastbound approach to the intersection.	Truck right turn onto NB Byron Hwy encroaches 80 LF of unpaved shoulder.

Note: WB-50 Truck Turning Template used to determine intersection performance

* Current aerials do not show recent improvements to the east side of Bixler Road - encroachments cannot be determined.

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Traffic Engineering Division

Traffic Collision History Report
Midblock Collisions

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Street: BALFOUR ROAD
Limit 1: BYRON HIGHWAY
Limit 2: BIXLER ROAD

Date Range Reported: 1/1/2001 - 9/30/2006

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# KId
	1/1/01 20:30	1584' West of	BALFOUR ROAD/BIXLER ROAD	Overtaken	Non-Collision	West	Other Unsafe Turning			Improper Turning	0	0
	3/12/01 17:55	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Driving Under Influence	0	0
	3/12/01 17:56	33' East of	BALFOUR ROAD/BYRON HIGHWAY	Hit Object	Fixed Object	East	Ran Off Road			Driving Under Influence	0	0
	3/17/01 07:00	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	South	Making Left Turn	South	Proceeding Straight	Unsafe Speed	0	0
	4/23/01 07:50	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
	6/2/01 00:30	0' In Int.	BIXLER ROAD/BALFOUR ROAD	Hit Object	Fixed Object	East	Ran Off Road			Driving Under Influence	1	0
	8/5/01 11:30	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	South	Proceeding Straight	North	Making Left Turn	Auto R/W Violation	1	0
	10/2/01 14:53	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Auto R/W Violation	1	0
	10/18/01 07:50	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Auto R/W Violation	0	0
	10/21/01 21:20	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Entering Traffic	Other Than Driver or Ped	0	0
	11/26/01 17:30	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Head-On	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	1	0

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Street: BALFOUR ROAD
Limit 1: BYRON HIGHWAY
Limit 2: BIXLER ROAD

Date Range Reported: 1/1/2001 - 9/30/2006

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# KId
0052341	1/4/02 14:29	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Auto R/W Violation	1	0
0021762	1/18/02 07:49	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Auto R/W Violation	0	0
0320468	2/26/02 21:33	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	East	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	0	0
0159344	4/17/02 09:45	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Rear-End	Other Motor Vehicle	West	Stopped in Road	South	Proceeding Straight	Auto R/W Violation	1	0
0255583	6/15/02 19:20	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Entering Traffic	Unsafe Starting or Backing	0	0
0255579	6/17/02 17:00	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	2	0
0292574	7/10/02 06:20	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Auto R/W Violation	0	0
0306422	7/23/02 14:29	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	1
0354833	8/14/02 10:30	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
0470577	10/21/02 21:30	0' In Int.	BALFOUR ROAD/BIXLER ROAD	Hit Object	Fixed Object	East	Proceeding Straight			Unsafe Speed	2	0
0630911	1/21/03 13:05	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Auto R/W Violation	0	0

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Street: BALFOUR ROAD
Limit 1: BYRON HIGHWAY
Limit 2: BIXLER ROAD

Date Range Reported: 1/1/2001 - 9/30/2006

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# Kld
0659410	2/15/03 18:04	3696' East of	BALFOUR ROAD/BYRON HIGHWAY	Hit Object	Fixed Object	East	Proceeding Straight			Unsafe Speed	0	0
1091208	10/27/03 15:05	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	1	0
1124774	11/4/03 12:20	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Entering Traffic	North	Proceeding Straight	Auto R/W Violation	1	0
1113072	11/4/03 17:00	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Driving Under Influence	0	0
1259553	1/19/04 13:15	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	East	Entering Traffic	North	Proceeding Straight	Auto R/W Violation	0	0
1285564	2/3/04 08:05	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Slowing/Stopping	Auto R/W Violation	1	0
1381658	4/7/04 06:10	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	West	Stopped in Road	South	Proceeding Straight	Auto R/W Violation	0	0
1381651	4/10/04 17:10	15' South of	BALFOUR ROAD/BYRON HIGHWAY	Rear-End	Other Motor Vehicle	North	Slowing/Stopping	North	Stopped in Road	Unsafe Speed	0	0
1386701	4/18/04 08:43	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	3	0
1518613	6/26/04 16:55	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Sideswipe	Other Motor Vehicle	North	Making Left Turn	North	Proceeding Straight	Wrong Side of Road	0	0
1559530	7/18/04 14:55	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Auto R/W Violation	4	0

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Midblock Collisions**

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Street: BALFOUR ROAD
Limit 1: BYRON HIGHWAY
Limit 2: BIXLER ROAD

Date Range Reported: 1/1/2001 - 9/30/2006

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# KId
1560574	7/20/04 14:13	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Auto R/W Violation	0	0
1635379	9/10/04 08:05	0' In Int.	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Auto R/W Violation	2	0
1760648	10/15/04 16:31	0' In Int.	BYRON HIGHWAY/BALFOUR ROAD	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Auto R/W Violation	1	0
2046484	5/13/05 13:28	2112' East of	BALFOUR ROAD/BYRON HIGHWAY	Broadside	Other Motor Vehicle	North	Making Left Turn	East	Proceeding Straight	Unsafe Starting or Backing	1	0

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Traffic Collision History Report
Midblock Collisions

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Street: BALFOUR ROAD
Limit 1: BYRON HIGHWAY
Limit 2: BIXLER ROAD

Date Range Reported: 1/1/2001 - 9/30/2006

Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# KId
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Total Number of Collisions: 37 **Segment Length:** 1.01 miles (5,319')

Settings Used For Query

<u>Parameter</u>	<u>Setting</u>
Limit 1	Include Intersection Related
Limit 2	Include Intersection Related
Intermediate Intersections	Include Intersection Related

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Traffic Engineering Division**

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Midblock Collisions**

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Street: ORWOOD ROAD
Limit 1: BYRON HIGHWAY
Limit 2: BIXLER ROAD

Date Range Reported: 1/1/2001 - 9/30/2006

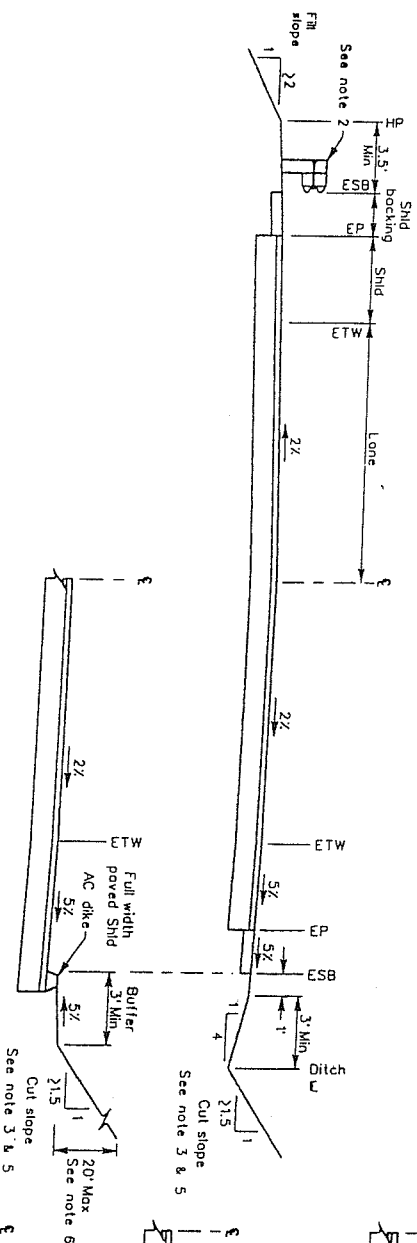
Report No.	Date Time	Dist/Dir	Location	Type of Collision	Motor Veh. Involved With	DOT1	MPC 1	DOT2	MPC 2	PCF	# Inj	# KId
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0804314	9/3/02 00:01	50' West of	ORWOOD ROAD/BIXLER ROAD	Hit Object	Fixed Object	West	Ran Off Road			Unknown	0	0
1015416	4/27/03 05:40	0' In Int.	ORWOOD ROAD/BYRON HIGHWAY	Hit Object	Other Object	West	Other Unsafe Turning			Driving Under Influence	2	0
1345384	9/17/03 20:50	120' West of	ORWOOD ROAD/BIXLER ROAD	Hit Object	Fixed Object	West	Proceeding Straight			Other Equipment	0	0
1385753	3/13/04 18:30	0' In Int.	ORWOOD ROAD/BIXLER ROAD	Hit Object	Fixed Object	West	Proceeding Straight			Unsafe Speed	0	0
1698623	4/10/04 07:00	0' In Int.	BYRON HIGHWAY/ORWOOD ROAD	Hit Object	Fixed Object	West	Proceeding Straight			Unsafe Speed	0	0
	10/14/04 23:45	1584' East of	ORWOOD ROAD/BYRON HIGHWAY	Overtaken	Non-Collision	West	Ran Off Road			Unsafe Speed	0	0

TWO LANE RURAL SHOULDERLANE WIDTHS					
MINIMUM (Shld backing/Shld/Lane)	ADT <250	<400	<1000	<3000	<6000
DESIRABLE * (Shld backing/Shld/Lane)	1.5'/0'/1'	0'/1'/1'	2'/1'/1'	2'/2'/12'	3'/4'/12'
	0'/1'/1'	2'/1'/1'	2'/4'/12'	2'/5'/12'	3'/5'/12'
					0'/8'/12'

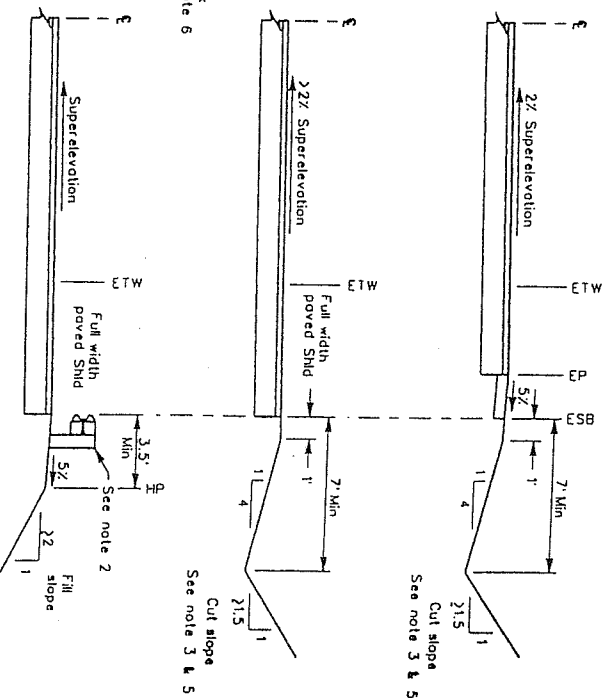


 REGISTERED PROFESSIONAL ENGINEER
 R. M. LITCH
 No. 31422
 Exp. 12/31/04
 CIVIL
 STATE OF CALIFORNIA
 PLANS APPROVAL DATE
 PUBLIC WORKS DIRECTOR
 2-28-02
 The County of Contra Costa or its officer or agent shall not be responsible for the accuracy or completeness of electronic copies of this plan.

TYPICAL RURAL 2-LANE ROAD SECTION



TYPICAL RURAL 2-LANE ROAD SUPERELEVATED SECTION



NOTES:

- These guidelines do not override County Ordinance Code requirements for development projects.
- Guardrail may be required, depending on embankment height and slope. (See Caltrans Guidelines)
- Distance to cut slope from ETW may be increased for sight distance in curves. (See Caltrans Design Manual)
- Use desirable if it does not significantly increase R/W or construction costs, especially where there is high percentage of trucks.
- A wider swale and/or buffer between toe of slope and roadway should be considered where there is potential rock fall, the slope is highly erosive or there is significant longitudinal surface flows.
- If cut slope is > 20' to bench or top of cut, buffer width shall be increased.
- Design ADT shall be approved by the Public Works Department.

NO. 1	DATE	REVISION DESCRIPTION	BY
1	2-02	Supersedes Standard Plan CA53 dated 11-99	P.W.
2			
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COUNTY OF CONTRA COSTA
 PUBLIC WORKS DEPARTMENT
 MARTINEZ, CALIFORNIA
 STANDARD PLAN
TWO LANE RURAL ROAD GUIDELINES

SCALE: NO SCALE
 DRAWN BY: L. COSTA
 CHECKED BY: M. HOLLINGSWORTH
 DATE: 2-02
 PLAN NO. CA531