FINAL

APR 10 1985

SUMMARY

ROUTE CONCEPT REPORT

ROUTE 4

(04-CC-4, P.M. 0.00 to 48.39)

This report defines the concept for development of Route 4 in District 4 for a 20 year planning period (1985-2005).

ROUTE CONCEPT

Segment A:	P.M. 0.00 to 12.67	D-40	6 lanes divided
	Slow vehicle lanes EB and WB		
Segment B:	P.M. 12.67 to 18.83	D-40	8 lanes divided
	Slow vehicle lanes EB and WB		
Segment C:	P.M. 18.83 to T31.13	D-40	8 lanes divided
Segment D:	P.M. T31.13 to 48.39	D-40	4 lanes divided

CONCEPT RATIONALE

Route 4 is a tourist/recreational, commuter, and commercial route. It has a high percentage of truck traffic. The easterly segments should be relocated.

AREAS OF CONCERN

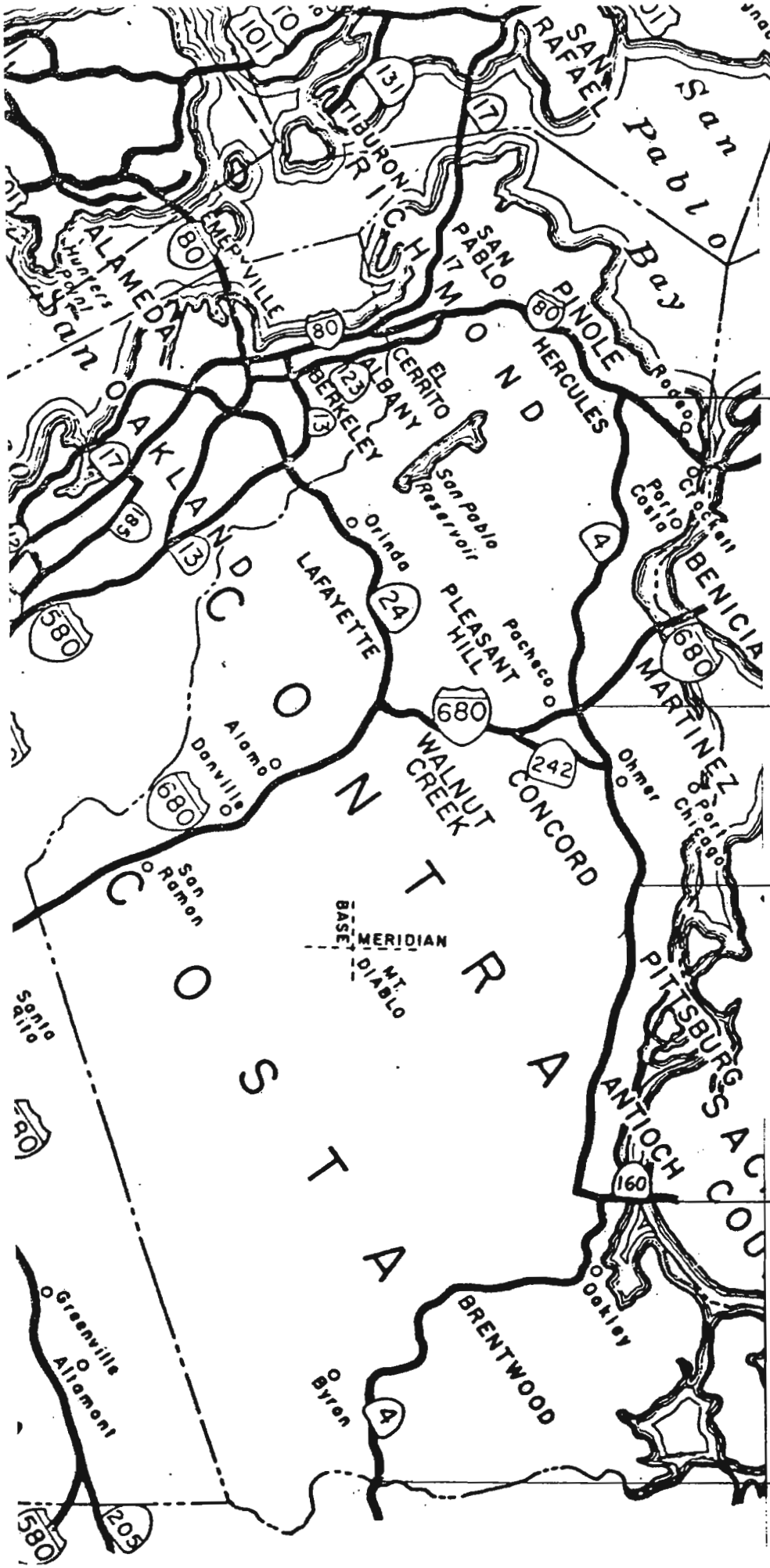
Route 4 serves a large industrial area that includes several oil refineries as well as an agricultural area that is rapidly being developed for housing and light industry. Regional population projections indicate explosive growth in the Antioch-Brentwood areas. This growth can be expected to overwhelm existing transportation facilities.

PROBLEM LOCATIONS

P.M. 0.00 to 48.39 High Truck Volumes (10% and greater).
P.M. 0.00 to T4.89 Peak Hour Congestion.
P.M. R14.67 to 27.29 Peak Hour Congestion.
P.M. 12.67 to 18.83 Accident Rate 1.35/mvm.
P.M. T31.13 to 48.39 Accident Rate 3.38/mvm.

IMPROVEMENTS

Widen from 2 (and 4) to 6 lanes from P.M. 0.00 to 12.67.
Widen from 4 (and 6) to 8 lanes from P.M. 12.67 to T31.13.
Relocate and widen from 2 to 4 lanes from P.M. T31.13 to 48.39.
Provide slow vehicle lanes EB and WB where necessary.


LOCATION MAP
San Pablo Bay
SAN RAFAEL
TIBURON
RICHMOND
SAN PABLO
PINOLE
HERCULES
Rodeo
EMERYVILLE
ALAMEDA
Hunters Point
OAKLAND
BERKELEY
ALBANY
EL CERRITO
San Pablo Reservoir
Orinda
LAFAYETTE
PLEASANT HILL
Pacheco
Port Costa
Crockett
BENICIA
MARTINEZ
Port Chicago
Ohmer
CONCORD
WALNUT CREEK
Alamo
Danville
San Ramon
CONTRA COSTA
BASE
MERIDIAN
MT. DIABLO
PITTSBURG
ANTIOCH
Oakley
BRENTWOOD
Byron
Greenville
Altamont
Sonoma
Sears Point
Schellville
Vine Ju
Hot Sp
CC 4 0.00
CC 4 2.67
CC 4 18.83
CC 4 31.13
CC 4 48.39

ROUTE CONCEPT REPORT

ROUTE 4

Prepared under the direction of:

4/5/85

CECIL L. SMITH, Chief Date
Transportation Planning, District 4

Recommended Approval:

4-8-85

JOHN VOSTREZ Date
Deputy District Director
Planning and Programming

I approve this Route Concept Report as the guide toward which today's decisions and/or recommendations should be directed.

Approved:

4/9/85

BURCH C. BACHTOLD Date
District Director of Transportation

Approved:

D. L. WIEMAN, Chief Date
Division of Transportation
Planning

Approved:

DONALD L. WATSON, Chief Date
Division of Highways and
Programming

Approved:

JACK KASSEL, Chief Date
Division of Project
Development

ROUTE CONCEPT REPORT

ROUTE 4
(04-CC-4, P.M. 0.00 to 48.39)

I. ROUTE DESCRIPTION

State Route 4 is a Principal and Minor Arterial that is approximately 191 miles long and traverses 5 counties, only one of which, Contra Costa County, is in District 4. Route 4 begins at Route 80 in Hercules in Contra Costa County and terminates as Route 89 south of Markleeville in Alpine County. Route 4 runs west to east and, in District 4, passes through the communities of Hercules, Martinez, Concord, Pittsburg, Antioch, and Brentwood. The route covers flat, rolling and mountainous terrain. Route 4 has been designated a scenic highway from route 160 near Antioch to Route 239 near Brentwood, and from Route 49 near Angels Camp to Route 89. The section of Route 4 that lies within District 4 is a part of the Federal Aid Primary System. Of this section, 23.2 miles are classified as rural and 25.2 miles are classified as urban.

Legislative Description of Route 4:

Route 4 is from:

(a) Route 80 near Hercules to Route 99 near Stockton via north of Concord and via Antioch.

(b) Route 99 near Stockton to Route 49 near Altaville via the vicinity of Copperopolis.

(c) Route 49 near Angeles Camp to Route 89 via Murphy, Calaveras Big Trees, and Dorrington.

II. PURPOSE OF ROUTE

In District 4, Route 4 is an east-west corridor used primarily for interregional travel. It accommodates heavy commuter and commercial traffic due to the proximity of San Francisco, Sacramento, and other large industrial centers.

III. ROUTE SEGMENTS

A. SEGMENT A (04-CC-4, P.M. 0.00 to 12.67)

This segment begins at Route 80 near Hercules and ends at Route 680. It travels trough rolling and mountainous

terrain with grades from 0-6%. The segment begins as a two lane conventional roadway until P.M. T4.70 where it becomes a four lane divided freeway. This in turn becomes a six lane freeway at P.M. R7.73. Six lanes become four lanes once again at P.M. R11.67, and remains like this to the Route 680 I/C.

(1) EXISTING FACILITIES

a. HIGHWAY FACILITY

Route Seg-ment	CO.	From P.M.	To P.M.	Segment Length Miles	Traveled Way Width FT	Number of Lanes	Shoulder Width FT	Median Width FT
A	CC	0.00	T4.70	4.70	24-32	2	0-8	0-20
	CC	T4.70	R7.73	3.03	48	4	2-8	8-46
	CC	R7.73	R11.67	3.94	60-84	6	5-10	42-46
	CC	R11.67	12.67	1.00	48	4	2-8	46

Current (1984) STIP and Construction Projects

The following are on-going construction projects or projects included in the 1984 STIP:

Fiscal Year 1982-1983

Pacheco Boulevard and Route 4 Interchange total estimated cost $650,000 (Martinez). Modify interchange and Frontage Road P.M. 12.20/12.40.

b. PUBLIC TRANSIT

AC Transit serves commuters from Richmond to Martinez; and operates a BART Express bus line (30Z) along this portion of Route 4. This line provides feeder service between Martinez and the Richmond BART Station. This line currently carries approximately 205-210 passengers/day (8 percent farebox recovery), and could easily accommodate increased

ridership. The Central Contra Costa Transit Authority provides local service in Concord and Martinez. West Contra Costa County Transit Authority (WESTCAT) serves the City of Pinole and Hercules, and the unincorporated communities of Montalvin Manor, Tara Hills, Bay View, Rodeo, Crockett, and Port Costa.

c. BICYCLES

This is a very popular route for touring bicyclists, either for day trips or out-of-State tourists. Bicycles are presently not allowed on the freeway portion of Route 4 except from P.M. R15.44 to R16.85 (Pt. Chicago Hwy. to Willow Pass Rd.). There are county roads however, that parallel the freeway section which are heavily used for bicycle traffic.

d. PARK AD RIDE

There are three park and ride facilities available along this segment. These facilities are located at the following locations:

		# Spaces	Percent in Use*
i)	Alhambra Avenue P.M. R8.5	24 spaces	75%
ii)	Pacheco Boulevard P.M. 12.4	54 spaces	69%
iii)	Rte 80 & Willow Ave (near Rte 4) P.M. 10.7	36 spaces	47%

*July, 1984

e. RAIL

AMTRAK has a train that stops in Antioch, Martinez, Richmond, and Oakland four times daily each way. Only one of the stops, Richmond, has a BART connection. A complete BART-AMTRAK coordination should be

investigated as this corridor may become highly congested in the near future. In addition, the BART West Contra Costa County Extension Study indicates that "a terminus near the State Route 4 and I-80 interchange would provide flexibility for consideration of a future extension to either the north or the east". An easterly extension should be investigated. See Future Operating Conditions.

f. HOV LANES AND RAMP METERING

None.

(2) CURRENT OPERATING CONDITIONS

The 1982 AADT ranges for 20,000 to 36,000 vehicles. The AM peak hour volume varies from 800 to 1500 vehicles eastbound and from 1000 to 2000 vehicles westbound. The truck percentage ranges for 7% to 11% with a peak hour volume of 5%. The V/C ratio is from 0.28 to 1.0, with a level of service that varies from A-55 to E-30.

(3) ACCIDENT RATE (1/81 to 12/83)

There were a total of 324 accidents with 221 injuries and 9 death within this segment. Seventy two percent of the total accidents happened Monday and Friday. Sixty percent of the total accidents occurred between 7 am and 7 pm. The accident rate in June and September was highest (10.4%); in August it was lowest (5.2%), and the rest of the months it was around 8%. Total accident rate for this segment is 0.98/MVM. This rate is low in comparison with the Statewide average, which is 1.26. The fatality rate is 0.027/MVM which is nearly equal to the Statewide average of 0.028.

(4) FUTURE OPERATING CONDITIONS

Segment A is closest to the metropolitan Bay Area and is in a prime area for new development. ABAG's Projections '83 report indicates that by the year 2000 the population will increase 37 percent in this area, whereas residentially, the area growth

will be 17 percent. The rural eastern part of Contra Costa County if consistent with ABAG's projections, will have a tremendous growth in the future years. The population growth and possible future employment along with more affordable community housing is projected to occur along this corridor. Future improvement of Routes 680 and 242 will improve capacity which can create more congestion on Route 4, so aditiona lanes are needed to minimize the congestion.

The 1995 AADT ranges from 27,000 at the Route 4/80 junction (P.M. 0.00) to 48,000 at the Pacheco Boulevard I/C (P.M. 12.41). AADT projections for 2005 ranges from 30,000 to 61,000 at the same locations. The 1995 AM peak hour traffic ranges from 1,200 to 2,900 eastbound, and 1,400 to 1,900 westbound. For 2005, AM peak hour traffic is projected to range from 1,500 to 3,800 eastbound, and 1,600 to 2,500 westbound. The 1995 and 2005 D/C ratio varies from 0.40 to 1.42 with LOS varying from "B-55" to "F-20"; and 0.46 to 1.68 with LOS varying from "B-55" to "F-20" respectively.

(5) ROUTE CONCEPT

For reasons presented in Section 4, Future Operating Conditions, a six lane freeway widened where possible in the median, is needed for the entire segment. Route Concept LOS is "D-40".

(6) ROUTE IMPROVEMENTS

Widen existing 2 (and 4) lanes into 6 lanes from the Route 4/80 I/C (P.M. 0.00) to the Route 4/680 I/C (P.M. 12.67). Provide slow vehicle lanes where needed.

B. SEGMENT B (04-CC-4, P.M. 12.67 to 18.83)

Segment B originates at the Route 4/680 I/C (P.M. 12.67) and is a four lane freeway from this point to P.M. R14.11. From P.M. R14.11 to R15.42, Route 4 is a six lane freeway. From P.M. 15.42 to the Willow Pass I/C (P.M. R16.85) the route is an eight lane freeway. The rest of the segment from Willow Pass I/C on is a

four lane freeway. The segment begins in rolling terrain until Willow Pass Road I/C where the route begins a steep climb up to the Willow Pass Summit. The Route remains in mountainous terrain for the rest of this segment (P.M. 18.83). The grade is 3% or greater for the entire segment with sustained grades 3/4 mile or less.

(1) EXISTING FACILITIES

a. HIGHWAY FACILITY

Route Seg-ment	CO.	From P.M.	To P.M.	Segment Length Miles	Traveled Way Width FT	Number of Lanes	Shoulder Width FT	Median Width FT
	CC	12.67	R14.11	1.44	48	4	5-10	46-78
B	CC	R14.11	R15.42	1.31	72-120	6	5-13	54 ->
	CC	R15.42	R16.85	1.43	96-120	8	5-10	99 ->
	CC	R16.85	18.83	1.98	46-59	4	2-11	6 ->

Current (1984) STIP and Construction Projects

There are no STIP or construction projects pertinent to the route concept planning process for this segment.

b. PUBLIC TRANSIT

AC Transit operates a BART Express bus line along Route 4 between Port Chicago Hwy. (P.M. R15.45) and Port Chicago Rd. (P.M. 18.83). This line provides feeder service between Pittsburg/Antioch/Brentwood and the Concord BART Station. According to the BART Express Bus Plan, 1981/82-1985/86, Line P's farebox recovery of 9% is below the 25% standard. Passengers per bus operating hour is 15 passengers/hour which is significantly below the standard, 23 passengers/hour. Finally, the ratio of transit access time to auto access time is 1.7, which is significantly greater than the performance standard of 1.3. The Central Contra Costa Transit Authority operates local routes in Concord.

c. BICYCLES

See Segment A.

d. PARK AND RIDE

There are no formal park and ride facilities along this segment.

e. RAIL

There is no rail transportation available.

f. HOV LANES AND RAMP METERING

None.

(2) CURRENT OPERATING CONDITIONS

The 1982 AADT ranges from 22,000 to 51,000 vehicles. The eastbound peak hour volume ranges from 900 to 1,800 and the westbound peak hour volume ranges from 1,300 to 3,400. The V/C ratio is from 0.34 to 0.89 and the Level of Service varies from A-55 to F-20.

The daily AADT truck percentage ranges from 5% to 10% with a peak hour volume of 6% at the junction of Route 4 and Route 242.

(3) ACCIDENT RATE (1/81 to 12/83)

There were a total of 379 accidents with no fatalities within this segment. 80% of total accidents happened Monday through Friday. 69% of accidents occurred between 7 a.m. and 7 p.m. The accident rate between 4 p.m. and 5 p.m. were the highest, 13.1% and 10.8% respectively. The March accident rate was 12.9% which was higher than all other months, where the rate was between 6% and 11%. The total accident rate for this segment was 1.35 per MVM. This rate is high in comparison with the Statewide average rate of 0.81. The fatality rate is 0.00 per MVM.

(4) FUTURE OPERATING CONDITIONS

The AADT for the year 1995 ranges from 29,000 east of Solano Way (P.M. R13.70) to 77,000 at Willow Pass Road I/C (P.M. R16.85). For the year 2005, the AADT is estimated to be from 38,000 to 120,000 at the same locations. The 1995 eastbound and westbound peak hour volume range from 1,400 to 2,800 and from 1,400 to 5,000, respectively. In the year 2005, the eastbound and westbound peak hour volumes range from 1,800 to 3,800 and from 1,300 to 8,100, respectively.

The 1995 D/C ranges from 0.37 to 1.32 and the Level of Service varies from B-55 to F-20. The 2005 D/C ranges from 0.47 to 2.13 and the Level of Service varies from B-55 to F-15.

A rapid growth of the region will generate increased commuters on the corridor. According to the MTC I-680/I-580 corridor study "It is highly probable that large numbers of future employees working in the San Ramon Valley, Pleasanton and Livermore areas will look to Pittsburg, Antioch and Brentwood for housing". As the improvements of Route 242 and Route 680 make these areas more accessible to each other, the present facilities on Route 4 will be overwhelmed with ever increasing traffic volumes.

Because of these factors, BART has been studying a possible extension into the Pittsburg/Antioch area which, if installed, should help in relieving some of the congestion. This may be only limited help as BART could be at its theoretical capacity under present conditions by the year 1985. At the present time, the BART parking lots are full by 7 a.m.

(5) ROUTE CONCEPT

For reasons stated above, this entire segment should be widened to an eight lane freeway with a median wide enough for installation of HOV lanes if necessary. Conceptual LOS is "D-40". If BART is extended along Route 4, the highway from P.M. T16.90 to 18.80 may have to be reduced in grade as

BART's preferred maximum grade is 3%. Slow vehicle lanes will also be provided where necessary.

(6) ROUTE IMPROVEMENTS

Widen the existing freeway to 8 lanes from P.M. 12.67 to P.M. 18.83. Allow wide median for future expansion or HOV lanes. Reduction in grade (for BART) to 3% or less from P.M. T16.90 to P.M. 18.83. Provide slow vehicle lanes where necessary. Joint use Park and Ride Lots should be investigated as well as other TSM measures.

C. SEGMENT C (04-CC-4, P.M. 18.83 to T31.13)

This segment starts at Port Chicago Road I/C (P.M. 18.83) and terminates at the Route 4/160 junction (P.M. T31.13). It runs through flat terrain as a four lane freeway and is a very popular truck route.

(1) EXISTING FACILITIES

a. HIGHWAY FACILITY

Route Seg-ment	CO.	From P.M.	To P.M.	Segment Length Miles	Traveled Way Width FT	Number of Lanes	Shoulder Width FT	Median Width FT
C	CC	18.83	T31.13	12.30	48-52	4	1-13	6 ->

Current (1984) STIP and Construction Projects

Fiscal Year 1985-1986

At Harbor Street OC
Widen Overcrossing and signals
P.M. 23.40/23.50
Estimated Cost $234,000

Fiscal Year 1988-1989

In Antioch at Standard Oil Avenue
New Interchange Stage I
P.M. 24.60/25.30
Estimated Cost $169,000

b. PUBLIC TRANSIT

AC Transit operates a BART Express bus line through Pittsburg and Antioch, providing feeder service to the Concord BART Station. (This line follows Route 4 itself between Bailey Rd. and Avon St., and between Somersville Rd. and "G" St. in Antioch.) For performance information, see Segment B. The Eastern Contra Costa County Transit Authority (Tri-Delta Transit) provides local service in Pittsburg and Antioch, as well as a dial-a-ride service.

c. BICYCLES

See Segment A.

d. PARK AND RIDE

There are no formal park and ride facilities available in this segment. However, there is private parking being used for this purpose. This facility is at the following location:

	# of spaces	Percent in use*
Raley's Supermarket 1375 Buchanan Road Pittsburg Adjacent to Rte. 4 P.M. 24.30	20 spaces	2%

*July 1984

e. RAIL

As of October 28, 1984, AMTRAK began stopping in Antioch, and is served twice daily in each direction. There is also parallel rail lines owned by Southern Pacific Railroad and Santa Fe, which parallels the route from west of Pittsburg to Antioch, passes south of Oakley through Brentwood and continues toward Byron. Both of these lines are currently active.

A BART extension or similar less intensive measures, such as light rail, are other long term future alternatives that can be considered.

f. HOV LANES AND RAMP METERING

None.

(2) CURRENT OPERATING CONDITIONS

The 1982 AADT ranges from 15,000 to 45,000 vehicles. The eastbound and westbound peak hour volumes range from 800 to 1,800 and 1,000 to 2,700, respectively.

The truck percentage ranges from 9% to 15% with a peak hour volume of 9% at the Route 4/160 I/C. The V/C ratio ranges from 0.26 to 0.71 and the Level of Service varies from A-55 to F-20.

(3) ACCIDENT RATE (1/81 to 12/83)

There were a total of 486 accidents with 287 injuries and 8 deaths. Seventy one percent of the total accidents occurred during the week (Mon-Fri) and sixty five percent happened between 7 a.m. and 7 p.m. Thirteen percent of the total accidents took place within the ramp intersection and exit areas. The total accident ratio is 1.01/MVM which is 13.5% higher than the Statewide average of 0.89. The fatality rate is 0.012/MVM which is a little less than the statewide average of 0.014.

(4) FUTURE OPERATING CONDITIONS

ABAG has anticipated a tremendous rate of residential growth for this area (an 87% increase). The cities of Antioch and Brentwood have annexed or intend to annex large amounts of adjacent land which they plan to develop with affordable housing. Pittsburg, Antioch, and Brentwood are expected to attract approximately 100,000 people by the year 2000. In contrast to this, only 11,000 new jobs are anticipated in this area. The major job increase in the region will occur in Central Contra Costa where 143,000 new jobs are expected. It is assumed that the Route 4 corridor will be the residence for a great number of these jobs. At the present time, the only link between the two areas is via routes

4/242/680. The volume predictions for this link are so high that even after widening the present facilities as much as is economically and politically possible, alternate means of transportation must be found if congestion problems are to be eliminated.

BART in the past has reviewed plans for extending its rail service into the Pittsburg/Antioch area which if installed will help in relieving some of the congestion. In addition to BART, the construction of an alternate route connecting Antioch/Brentwood to I-580 should be investigated. This would enable motorists and truckers an alternate route and would relieve a

tremendous portion of the traffic that normally runs through the Route 680 corridor.

The 1995 and 2005 AADT for this segment ranges for 20,000 to 67,000 and from 32,000 to 105,000, respectively. The 1995 AM peak hour traffic volumes vary from 1,000 to 2,400 in the eastbound direction, and from 1,500 to 4,400 in the westbound direction. The peak hour traffic projections for 2005 ranges from 1,400 to 3,000 in the eastbound direction, and from 2,600 to 7,100 in the westbound direction. The D/C ratio ranges from 0.39 to 1.16 (LOS "B-50" to "F-25"), and from 0.68 to 1.87 (LOS "C-50" to "F-15") for 1995 and 2005 respectively.

(5) ROUTE CONCEPT

For reasons presented in Section 4, Future Operating Conditions, an eight lane freeway with a conceptual LOS "D-40" will be needed throughout the segment.

(6) ROUTE IMPROVEMENTS

Widen existing lanes to an 8 lane freeway from P.M. 18.83 to P.M. T31.13. Allow wide median for future expansion.

More convenient joint-use park and ride lots should be investigated, in addition to stronger promotion of the existing park-and-ride lot as well as other TSM measures.

D. SEGMENT D (04-CC-4, P.M. T31.13 to 48.39)

This segment is a two lane conventional highway that runs from the Route 4/160 I/C to the Contra Costa/San Joaquin County line over flat terrain. From P.M. 39.74, the highway becomes substandard in width, except for a four mile section (P.M. R44.30 to 48.30) where a 40 ft. paved section is being provided. If the extension of Route 84 and new Rte. 239 are built, they will both connect with Route 4 near P.M. 41.50. A section of this segment from Route 160 near Antioch to Route 239 (unconstructed) near Brentwood has been designated a part of the State Scenic Highway System.

(1) EXISTING FACILITIES

a. HIGHWAY FACILITY

Route Segment	County	From P.M.	To P.M.	Segment Length Miles	Traveled Way Width FT	Number of Lanes	Shoulder Width FT	Median Width FT
D	CC	T31.13	48.39	17.26	20-62	2	0-11	0

Current (1984) STIP and Construction Projects

Fiscal Year 1983-1984

Borden Jct to Old River Br.
Widen existing hwy to 40 feet
R44.30/48.30
Fully funded by others

Fiscal Year 1985-1986

Spruce St. at 2nd St. to Railroad Avenue in Brentwood
Realignment to existing hwy
P.M. 38.70/39.10
Estimated Cost $1,482,000

b. PUBLIC TRANSIT

AC Transit operates a BART Express bus along Route 4 between the Route 160 I/C and Brentwood. This line provides feeder service

to the Concord BART Station. See Segment B for performance indicators. Also, the Eastern Contra Costa Transit Authority (Tri-Delta Transit) operates a dial-a-ride service along the Route 4 corridor between Concord and Brentwood.

c. BICYCLES

There is no special designated bicycle lane along the road, but bicycles are allowed on this segment of Route 4.

d. PARK AND RIDE

There is a private facility that is being used by Park and Ride commuters at the following location:

	# of spaces	% in use*
- Adajacent to Rte. 4 P.M. 37.10 Raley's Supermarket 3632 Lone Tree Way Antioch *July 1984	30	37%

e. RAIL

See Segment C

f. HOV LANES AND RAMP METERING

None.

(2) CURRENT OPERATING CONDITIONS

The 1982 AADT ranges from 4,000 to 18,000 vehicles. The peak hour volume ranges from 300 to 800 for the eastbound direction and from 300 to 700 for the westbound direction. The truck percentage is 9% to 16% with a peak hour volume of 9%. The V/C ratio ranges from 0.30 to 0.87 and the Level of Service varies from A-55 to D-35. This segment is a very popular truck route. This segment of Route 4 is

included in the State Scenic Highway System and is a popular route for bicyclists as well as for tourists.

(3) ACCIDENT RATE (1/81 to 12/83)

There were a total of 554 accidents with 395 injuries and 13 deaths within this segment. Seventy percent of the total accidents happened during the week (Mon.-Fri.) and sixty-nine percent occurred between 7 a.m. and 7 p.m. Fifty-four percent of all accidents occurred in the westbound direction as compared to forty-six percent in the eastbound direction. Thirty-one percent of the total accidents occurred within an intersection. In thirty-seven percent of all accidents, a truck was involved.

The total accident rate was 3.38/MVM and the fatality rate was 0.073/MVM, which are 43 percent and 16 percent greater than their respective Statewide averages of 2.36 and 0.063.

(4) FUTURE OPERATING CONDITIONS

See Segment C.

The 1995 and 2005 AADT ranges from 6,000 to 24,000 and from 9,000 to 39,000, respectively. The 1995 eastbound peak hour volumes are projected to range from 200 to 1,400 eastbound, and 300 to 1,700 westbound. Projected traffic volumes for 2005 varies from 300 to 2,000 eastbound, and from 600 to 2,900 westbound. The D/C ratio ranges from 0.25 to 1.87 (LOS "A-55" to "F-15") and from 0.45 to 2.67 (LOS "B-55" to "F-15") for 1995 and 2005, respectively.

(5) ROUTE CONCEPT

For reasons presented in Segment C, Section 4, Future Operating Conditions, relocate and provide a 4 lane freeway taking into account the terminus of Routes 84 and 239. The conceptual LOS is "D-40".

(6) ROUTE IMPROVEMENTS

Route 4 should be relocated from P.M. T31.13 to P.M. R44.37. The entire segment should be a 4 lane freeway with a wide median to allow for future expansion.

IV. COORDINATION

This Route Concept Report has been discussed with District 10 to assure conformity with the overall concept of Route 4.

EXHIBIT A

EXISTING FACILITIES (ROADWAY)
Route 4

Route Segment	County	From PM	To PM	Segment Length (Miles)	Traveled Way Width (Feet)	Number of Lanes	Shoulder Width (Feet)	Median Width (Feet)
A	CC	0.00	12.67	12.67	24-48	2C,4F,6F	0-10	0 to 4
B	CC	12.67	18.83	6.16	48-120	4F,6F,8F	2-13	6 ->
C	CC	18.83	T31.13	12.30	48-52	4F	1-13	6 ->
D	CC	T31.13	48.39	17.26	20-62	2C	0-11	0-4

EXHIBIT B

Route 4 Accident Report Between 1/81 and 12/83

Location P.M.	Segment No.	No. of Accidents Total	Fatal	Inj.	F+I	Person Killed	Person Injury	Accident Rate* Fatal	F+I	Tot	Statewide Rate* ° Fatal	F+I	Tot
CC 0.00 to 12.67	A	324	9	152	161	9	221	0.027	0.48	0.98	0.028	0.55	1.26
CC 12.67 to 18.83	B	379	0	154	154	0	229	0.000	0.55	1.35	0.010	0.31	0.81
CC 18.83 to 31.13	C	486	6	194	200	8	287	0.012	0.41	1.01	0.014	0.35	0.89
CC 18.83 to 48.39	D	554	12	219	231	13	395	0.073	1.41	3.38	0.063	1.11	2.36

* Rates are per MVM (Million Vehicle Miles).

° Statewide averages for this type of facility in comparable terrain.

EXHIBIT C

EXPLANATION TO TRAFFIC VOLUME TABLES

COLUMN	DESCRIPTION
SEGMENT	Description of the Route Segment
CO	County Abbreviations
MILE POST	Mile Post in County
DESCRIPTION	Description of the Route Segment
AADT	Annual Average Daily Traffic Count
AM PK	Morning Peak Hour Traffic
AH	Volumes Ahead Direction
BK	Volumes Back Direction
NO L	Number of Lanes (Existing) One Direction
V/C	Volume/Capacity: Ratio Volume Traffic to Max. No. of Traffic/Hr.
LOS	Level of Service According to the Functional Classification of the Route Relative to the Terrain and Facility.
LN	Number of Lanes Needed to Meet LOS "D" One Direction.
% TRUCK AADT	Truck % of Average Annual Daily Traffic Count.
% TRUCK PK HR	Truck % at Peak Hour

TRAFFIC PROJECTION

1983/1984 ROUTE CONCEPT STUDY
ROUTE 4

SEGMENT	CO	MILE POST	DESCRIPTION	TRUCK %	1982 AA DT	1982 PK HR	1982 AA DT	1982 AM AH	1982 PK BK	1982 NO L	1982 V/C	1982 LOS	1982 LN	1995 AA DT	1995 AM AH	1995 PK BK	1995 NO L	1995 V/C	1995 LOS	1995 LN	2005 AA DT	2005 AM AH	2005 PK BK	2005 NO L	2005 V/C	2005 LOS	2005 LN
	CC	0.00	Jct Rte 80																								
					11	6	21	9	13	1	0.72	C	1	27	13	16	1	0.89	D	1	30	15	18	1	1.00	E	2
	CC	0.57	Willow Ave																								
					11	6	21	9	12	1	1.00	E	2	27	13	16	1	1.38	F	2	30	15	19	1	1.57	F	2
	CC		(Several intersections)																								
					11	6	20	8	11	1	1.00	E	2	27	12	15	1	1.42	F	2	30	16	16	1	1.68	F	2
A	CC	T 4.89	Cummings Skyway																								
					9	5	23	9	11	2	0.29	A	2	29	16	16	2	0.42	B	2	34	18	18	2	0.47	B	2
	CC	R 5.17	McEwen Rd I/C																								
					9	5	23	9	10	2	0.34	A	2	31	17	14	2	0.45	B	2	35	20	16	2	0.53	C	2
	CC	R 8.57	Alhambra Ave I/C																								
					9	5	28	11	15	3	0.30	A	2	38	23	15	3	0.40	B	2	42	26	17	3	0.46	E	2
	CC	R 9.19	Pine St I/C																								
					9	5	28	11	16	3	0.28	A	2	38	23	15	3	0.43	B	3	46	28	19	3	0.49	B	3
	CC	R10.35	Morello Ave I/C																								
					9	5	33	14	18	3	0.32	A	2	43	27	18	3	0.47	B	3	56	35	23	3	0.61	C	3
	CC	12.41	Pacheco Blvd I/C																								
					7	4	36	15	20	3	0.35	A	2	48	29	19	3	0.51	C	3	61	38	25	3	0.67	C	3
	CC	12.67	Jct Rte 680																								
					7	4	33	13	19	2	0.50	B	2	43	20	20	2	0.53	C	2	53	25	25	2	0.66	C	2
	CC	13.70	Solano Way																								
					8	5	22	9	13	2	0.34	A	2	29	14	14	2	0.37	B	2	38	18	13	2	0.47	B	2
	CC	R14.67	Jct Rte 242																								
					10	6	46	16	30	2	0.79	D	2	69	28	41	2	1.08	F	3	99	38	57	2	1.5	F	4
B	CC	R15.44	Port Chicago Hwy I/C																								
					5	4	47	18	30	2	0.79	D	2	70	28	42	2	1.11	F	3	106	35	66	2	1.74	F	
	CC	R16.85	Willow Pass Rd I/C																								
					5	4	51	17	34	2	0.89	F	2	77	27	50	2	1.32	F	3	120	35	81	2	2.13	F	5
	CC	18.83	Port Chicago Rd I/C																								
					9	5	44	18	26	2	0.68	F	2	67	23	43	2	1.13	F	3	103	30	69	2	1.82	F	5

TRAFFIC PROJECTION

1983/1984 ROUTE CONCEPT STUDY
ROUTE 4

SEGMENT	CO	MILE POST	DESCRIPTION	TRUCK %	1982 AA DT	1982 PK HR	1982 AA DT	1982 AM AH	1982 PK BK	1982 NO L	1982 V/C	1982 LOS	1982 LN	1995 AA DT	1995 AM AH	1995 PK BK	1995 NO L	1995 V/C	1995 LOS	1995 LN	2005 AA DT	2005 AM AH	2005 PK BK	2005 NO L	2005 V/C	2005 LOS	2005 LN
	CC	20.13	Bailey Ave I/C																								
				9	5	43	16	26	2	0.68	F	2	64	22	42	2	1.11	F	3	100	29	67	2	1.76	F	4
	CC	23.05	Railroad Ave I/C																								
				9	5	45	17	27	2	0.71	C	2	67	24	44	2	1.16	F	3	105	30	71	2	1.87	F	5
	CC	24.32	Loveridge Rd I/C																								
				9	5	35	13	21	2	0.55	C	2	53	18	34	2	0.89	F	3	83	24	55	2	1.45	F	4
	CC	26.01	Somersville Rd I/C																								
				9	5	42	16	25	2	0.66	C	2	62	22	41	2	1.08	F	3	98	28	66	2	1.74	F	4
C	CC	26.94	Contra Loma Blvd I/C																								
				9	5	34	13	20	2	0.53	C	2	51	18	33	2	0.87	D	2	80	23	54	2	1.42	F	4
	CC	27.29	G St I/C																								
				9	5	31	11	19	2	0.50	B	2	46	16	30	2	0.79	D	2	73	21	49	2	1.29	F	3
	CC	R27.79	A St I/C																								
				11	6	19	8	14	2	0.37	B	2	29	12	22	2	0.58	C	2	45	15	35	2	0.92	E	3
	CC	R28.94	Hillcrest Ave I/C																								
				11	6	15	8	10	2	0.26	A	2	20	10	15	2	0.39	B	2	32	14	26	2	0.68	C	2
	CC*	T30.90	So Jct Rte 160																								
				15	9	15	8	10	2	0.26	A	2	20	11	16	2	0.42	B	2	32	15	27	2	0.71	C	2
	CC*	31.13	No Jct Rte 160																								
				11	6	18	7	7	1	0.74	C	1	24	11	17	1	0.89	D	1	39	15	29	1	1.53	F	2
	CC		(Several Intersections)																								
				11	6	13	6	5	1	0.58	C	1	17	8	13	1	0.68	C	1	28	12	21	1	1.11	F	2
	CC	T32.76	Oakley Rd																								
				11	6	14	7	5	1	0.63	C	1	18	9	13	1	1.16	F	2	30	12	23	1	1.84	F	3
	CC		(Several Intersections)																								
				11	6	14	7	5	1	0.75	C	1	18	9	13	1	1.38	F	2	30	12	23	1	2.19	F	3
D	CC	33.82	O Hara Aves																								
				11	6	12	6	4	1	0.67	C	1	17	8	13	1	1.40	F	2	26	11	21	1	2.13	F	3
	CC		(Several Intersections)																								
				11	6	11	5	4	1	0.45	C	1	17	8	12	1	1.00	E	2	26	10	19	1	1.45	F	2

TRAFFIC PROJECTION

1983/1984 ROUTE CONCEPT STUDY
ROUTE 4

SEGMENT	CO	MILE POST	DESCRIPTION	TRUCK %	1982 AA DT	1982 PK HR	1982 AA DT	1982 AM AH	1982 PK BK	1982 NO L	1982 V/C	1982 LOS	1982 LN	1995 AA DT	1995 AM AH	1995 PK BK	1995 NO L	1995 V/C	1995 LOS	1995 LN	2005 AA DT	2005 AM AH	2005 PK BK	2005 NO L	2005 V/C	2005 LOS	2005 LN
	CC	R34.92	Cypress Rd		11	6	10	4	4	1	0.44	D	1	14	7	11	1	1.00	E	2	23	9	17	1	1.44	F	2
	CC		(Several Intersections)		11	6	10	4	4	1	0.44	B	1	14	7	11	1	1.00	E	2	23	9	17	1	1.44	F	2
	CC	36.58	Delta Rd		11	6	9	4	3	1	0.39	D	1	13	7	11	1	1.00	E	2	20	11	16	1	1.50	F	2
	CC	37.07	Lane Tree Way		9	5	14	6	5	1	0.65	C	1	21	12	14	1	1.53	F	2	33	17	21	1	2.24	F	3
	CC	38.81	Spruce St		9	5	15	8	5	1	0.87	D	1	22	14	14	1	1.87	F	2	35	20	20	1	2.67	F	3
	CC		(Several Intersections)		9	5	7	3	3	1	0.38	B	1	11	6	6	1	0.75	D	2	18	10	10	1	1.25	F	2
	CC	39.74	South City Limits		11	6	7	3	5	1	0.40	B	1	11	5	7	1	0.6	C	2	17	8	10	1	0.90	E	2
	CC		(Several Intersections)		13	8	7	3	5	1	0.40	B	1	11	5	7	1	0.6	C	2	17	7	11	1	0.90	E	2
	CC	43.97	Marsh Creek Rd		16	9	8	3	5	1	0.42	B	1	11	5	8	1	0.68	C	2	17	7	13	1	1.05	F	2
	CC	R44.37	Jct Byron Highway		14	9	4	3	3	1	0.30	A	1	6	2	3	1	0.25	A	2	9	3	6	1	0.45	B	1
	CC	R44.37	CC/S.Joaquin Co. Line																								

TRAVEL DEMAND PROJECTIONS METHODOLOGY (ABSTRACT)

1995 & 2005 Demand Person Trips Projections
34 x 34 ABAG/MTC Region Superdistricts Matrix
Computer-Assisted Four-Step Conventional Gravity
Model. (Housing & Employment based on ABAG's "Projections 83")

December 1983

INTRODUCTION: This medeling procedure developed traffic volume expansion factors and applied them to "census" volumes ("1980 Traffic Volumes on California State Highways") of State Highway segments at ABAG/MTC superdistrict (SD) borders (screenlines).

These projected 1995 and 2005 volumes were the basis for projecting volumes on all mainline segments for the 1983/84 "Route Concept Reports."

In essence, this methodology is consistent with the elments of the conventional "four-step" procedure for travel demand forecasting as summarized in the FHWA/UMTA outline for UTPS models and as described in the NCHRP guide for urban travel estimations ("Quick Response").

SUMMARY: Criteria and methods used in each one of the four "steps":

1. Trip Generation: Based on ABAG projections per 34 MTC "superdistrict." Productions per MTC-observed person trips produced and households; attractions per employment (and housing), adjusted to observed attractions.

2. Trip Distribution: Based on zonal trips produced and attracted, distribution factors based on travel times, and calibration factors derived from MTC-observed vs. simulated 1980 trip interchanges.

3. Assignment: Based on zonal trip interchanges, "fastest path" criteria and experience of travel patterns.

4. Modal Split: Implies; it was assumed that, on the segments evaluated, modal percentages and occupacy rates would remain essentially unchanged.

ASSUMPTIONS: The following parameters would remain essentially unchanged between 1980 and 2005:

1. Trip production rates, as functions of the number of households and their superdistrict of location.

2. Trip attraction rates and adjustment factors, as functions of jobs, housing units and superdistrict of location.

3. Speeds: Change in corridor speeds may be proportional to regionwide speed changes, or may differ without significantly affecting distribution or assignment.

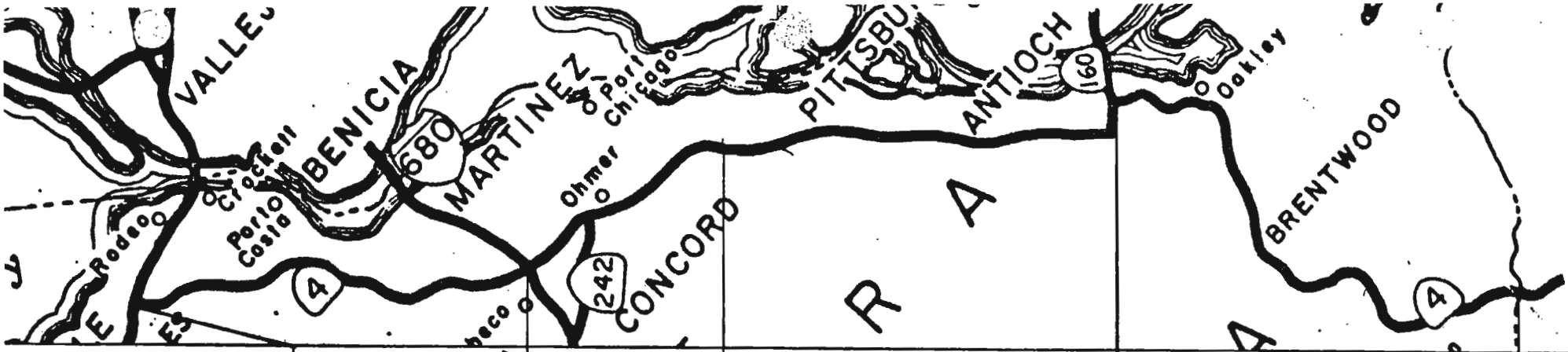
4. Time vs. Distribution Factor Functions, and Calibration Factors. Increased socio-economic densities vs. higher fleet efficiencies and/or real earnings would have compensatory effects on trip lengths.

This chart indicates the relationship between Level of Service and minimum operating speed for a given facility type.

Assigned Level of Service	Facility Type	Minimum Operating Speed
B	Freeways, expressways, or multilane conventional highways	55 MPH
B	Two-lane conventional highways	50 MPH
C	Freeways or expressways	50 MPH
C	Multilane conventional highways	45 MPH
C-45	Two-lane conventional highways	45 MPH
C	Two-lane conventional highways	40 MPH
D	Freeway or expressways	40 MPH
D	Conventional Highways	35 MPH
D	Conventional Highways with controlling traffic signals	15-30 MPH*

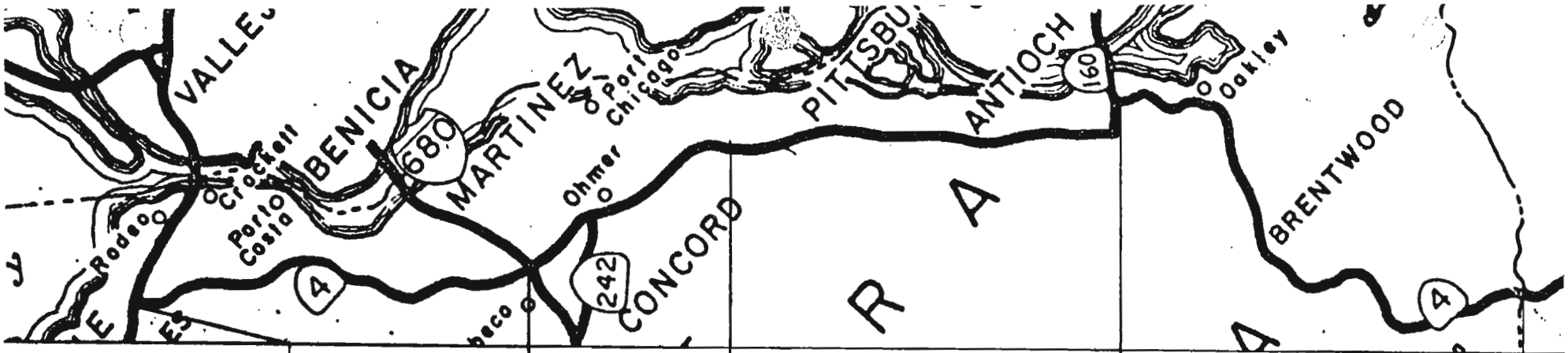
*This conditions is shown on the tabulation of route segments under the "LOS" headings as D35.

Operating level of service on a roadway is a measure of the speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort, convenience, and operating cost. A roadway designed for a certain level of service will actually operate at different levels throughout the day. The level of service on a roadway varies inversely as some function of the traffic volume.



SEGMENT		A (CC 0.00 – CC 12.67)		B (CC 12.67 – CC 18.83)		C (CC 18.83 – CC 31.13)		D (CC 31.13 – CC 48.39)	
NO. OF LANES PROPOSED	PRESENT	2-6		4-8		4		2	
	1995	2-6		4-8		4		2	
	2005	2-6		4-8		4		2	
LEVEL OF SERVICE PROPOSED	PRESENT	E	A	A	F	F	A	D	A
	1995	F	B	B	F	F	B	F	A
	2005	F	B	B	F	F	C	F	B
TERRAIN		ROLLING		ROLLING-MOUNTAINOUS		FLAT		FLAT	
GRADES		0-6%		3% →		0-3%		0-3%	
ACCIDENTS PER MVM		0.98		1.35		1.01		3.38	
FATALITIES PER MVM		0.027		0.000		0.012		0.073	

EXHIBIT D



SEGMENT		A (CC 0.00 – CC 12.67)	B (CC 18.83)	C (CC 31.13)	D (CC 48.39)
AADT. (1000's)	PRESENT	20-36	22-51	15-45	4-18
	1995	27-48	29-77	20-67	6-24
	2005	30-61	38-120	32-105	9-39
P.H.V. (100's)	PRESENT	8-20	9-34	8-27	3-8
	1995	12-29	14-50	10-44	2-17
	2005	15-38	13-81	14-71	3-29
AVG HWY SPEED		60-70	65-70	70	50
OPERATING SPEED		28-57	31-50	45-61	27-37
V/C	PRESENT	0.28-1.00	0.34-0.89	0.26-0.71	0.30-0.87
D/C	1995	0.40-1.42	0.37-1.32	0.39-1.16	0.25-1.87
	2005	0.46-1.68	0.47-2.13	0.68-1.87	0.45-2.67
YEAR CAPACITY WILL BE REACHED		—	1990	1992	1995

EXHIBIT E

EXHIBIT F

Route 4

COMPARISON OF FUTURE LOS WITH ROUTE CONCEPT

SEGMENT	NO. LANES/LOS			ROUTE CONCEPT		NEEDS	
	1982	1995	2005	Proposed Lanes	LOS	Lanes	Target LOS
A CC 0.00 to 12.67	2-6/ A-55- E-30	2-6/ B-55- F-20	2-6/ B-55- F-20	6	D-40	4-6	D-40
B CC 12.67 to 18.83	4-8/ A-55- F-20	4-8/ B-55 F-20	4-8/ B-55 F-15	8	D-40	8	D-40
C CC 18.83 to 31.13	4/ A-55- F-20	4/ B-50 F-25	4/ F-25 C-50	8	D-40	8	D-40
D CC 31.13 to 48.39	2/ A-55- D-35	2/ A-55- F-15	2/ B-55- F-15	4	D-40	4	D-40