

CHAPTER II – MATRIX EVALUATION

The matrix evaluation is a screening process designed to provide an objective method to compare the different north/south and east/west alternative transportation improvement plans developed for this study. Omni-Means has developed the *Alternative Selection Decision Matrix* (ASDM) to formalize and simplify this procedure.

The ASDM provides a means to identify and either quantitatively or qualitatively evaluate the advantages and disadvantages of each of the five north/south and four east/west alternatives. The ASDM provides a means to "weigh" the importance of each criterion, so that the advantages and disadvantages of each alternative can be compared and ranked in relation to each other. These rankings allow the identification of preferred alternative(s), taking into consideration the technical and social concerns of the community.

Each alternative likely meets or exceeds the threshold for some criterion, and fall short on others. In the end, this ASDM procedure, based upon the criterion importance weighting and scoring, determines the relative merits of each alternative. The overall ASDM procedure involves a six-step process:

- 4) Develop Need and Purpose criteria
- 5) Prepare Need and Purpose initial screening check
- 6) Develop a list of "evaluation criteria".
- 4) Determine "relative weighing" for each evaluation criteria
- 5) Score each evaluation criteria for each alternative passing initial Need and Purpose screen check
- 6) Calculate the final weighted scores for each alternative

The following discussion provides a more detailed description of the process.

2.1 - NEED AND PURPOSE

The first step in the ASDM process is to develop a list of Need and Purpose criteria that is used to screen the alternatives for further matrix evaluation. Each Need and Purpose criteria have been formulated to relate specifically to the goals and objectives of the overall study, along with being consistent with existing General Plan policies. As set forth at by the RTPA, the specific goals and objectives of this study are as follows:

The purpose of the Transportation Planning Study is to identify an efficient and affordable transportation system that will minimize congestion and improve safety as development occurs in the study area. The purpose of the Traffic Impact Fee program is to assign a fair share of improvement costs to new development. The study will focus on the need for two new future roadways running north/south and east/west through the study area. The study will also examine needed improvements to existing roads such as Rhonda Road, Gas Point Road, First Street and Main Street. In collaboration with Caltrans, the study will also examine improvements to the Gas Point Road Interchange and other possible access to Interstate 5.

The need and purpose criteria presented in this working paper have been determined through joint consensus of the TAC and agency staff.

Each transportation alternative is reviewed to determine if each need and purpose criteria are met, this is step number two. This initial screening process uses a simple yes "Y" or no "N" scoring of each need and purpose criteria. Those alternatives that score fifty percent or greater "yes" scores for all of the criteria were passed to the full evaluation, as described below. Those alternatives that score less than fifty percent "yes" score were eliminated from further consideration.

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North/South Collector Facilities

NEED AND PURPOSE CHECKLIST					
Criteria	Alternative No.				
	1	2	3	4	5
Traffic Operations/Congestion	Y	Y	N	Y	Y
Safety	Y	Y	N	Y	Y
Environmental Sensitivity	Y	Y	N	Y	Y
Community Impacts	Y	Y	N	Y	Y
Constructability	Y	Y	N	Y	Y
Design Standards Conformance	Y	Y	N	Y	Y
Cost	Y	Y	Y	Y	Y
Meets Pupose and Need?	Y	Y	N	Y	Y

As shown in the above table, Alternative 3 north/south collector facility is not found to meet the purpose and need criteria. There is a fatal flaw associated with this alternative as this alternative terminates into Anderson Drive within the Vineyards specific plan area. Therefore this alternative will not be considered for subsequent evaluation of the alternatives.

East/West Collector Facility

NEED AND PURPOSE CHECKLIST				
Criteria	Alternative No.			
	1	2	3	4
Traffic Operations/Congestion	Y	Y	Y	Y
Safety	Y	Y	Y	Y
Environmental Sensitivity	Y	Y	Y	Y
Community Impacts	Y	Y	Y	Y
Constructability	Y	Y	Y	Y
Design Standards Conformance	Y	Y	Y	Y
Cost	Y	Y	Y	Y
Meets Pupose and Need?	Y	Y	Y	Y

2.2 - EVALUATION CRITERIA

The second step in the ASDM procedure is to develop a list of evaluation criterion for use in scoring each alternative under consideration. The evaluation criteria were derived from the initial list of need and purpose criteria as determined through joint consensus of the TAC and agency staff.

Following is a brief description of the seven (7) evaluation categories:

Traffic Operations: This criterion refers to the level of traffic congestion that may be associated with each of the alternatives. Congestion levels are determined through use of the LOS grading system. This system provides the ability to score each alternative based upon anticipated vehicular speeds, density and delay times (ie congestion). The traffic operations criteria specifically relates to the alternatives impact on vehicular travel.

Safety: The safety criterion provides a measure of potential safety enhancements within the study area traffic circulation system due to the proposed improvement alternatives. This criteria will specifically assess the alternatives impact on known existing high traffic accident locations.

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Cost: The cost criteria provides a means to include the expected costs for each alternative, into the decision making process, and is based upon rough planning level cost estimates. This criteria will be used to score the cost of each alternative in direct relationship to the other alternatives costs. *{Note: The costs presented in the ASDM are planning level estimates for comparative purposes only and do not represent actual costs. Actual project construction costs for each listed component or as totaled may vary substantially and therefore should not be used outside of the context of this comparison.}*

Environmental Impact: This criterion provides a subjective indication of the possible environmental effects resulting from each of the alternatives.

Community Impact: The community impact criteria specifically relates to how each alternative will impact existing residential and commercial properties within the study area. These impacts are scored based upon right-of-way, housing units and commercial square foot taken as a result of the alternative in question. In addition this criteria provides a subjective scoring of the overall community acceptance for each alternative.

Design Standards: Roadway and interchange design standards are set by the local agency, Caltrans and the FHWA. This criteria scores each alterantive as it relates to these design standards. The level of deviation from a mandatory or advisory standard is scored.

Constructability: The constructability criteria has two components; ability to phase, and ability to finance. Ability to phase refers to the ease of constructing a particular alternative and the impacts expected during the construction phase. Ability to finance refers to funding, and funding timing issues.

2.3 - WEIGHING EVALUATION CRITERIA

The third step in the ASDM evaluation procedure is determining the "relative importance" of each evaluation criteria by assigning a weighing value to each. Certain criterion is considered by both the TAC and community to be more important than others. Therefore, each evaluated criterion is assigned a relative weighted value to indicate its relative importance in relation to the other criteria.

Each of the evaluation criterions are weighted on a scale of one to five. Five is the upper end of the scale and indicates that the evaluated criterion is of extreme importance. One therefore is the low end of the scale and indicates that the evaluation criterion is far less important. Each criterion is weighted independent of the others. For example, multiple criteria may be considered extremely important and each assigned a five. Conversely, other criteria may be considered far less important and assigned lower numbers.

Relative Weighing Scale	
1	Unimportant
2	Less Important
3	Important
4	Very Important
5	Critical

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Criteria	Average Score
Major Categories	
Traffic Operations/Congestion	5
Safety	4
Environmental Sensitivity	4
Right of Way Impacts	3
Constructability	4
Design Standards Conformance	2
Cost	3
Community Impacts	
Right-of-Way	2
Residential Unit Take	4
Commercial Square Footage Take	4
Loss of Access	3
Community Acceptance	4

2.4 - EVALUATION CRITERIA SCORING

The fourth step in the ASDM procedure is evaluating and scoring each alternative (passing the Need and Purpose initial screening procedure) within each evaluation category. The scoring in each evaluation category is then multiplied by the “importance weighting” and totaled with the other categories to arrive at an overall ranking.

Within the ASDM, there may be some multiplication of impacts. For instance, an alternative that impacts a commercial building is scored low for the impact, then receive another low score resulting from the cost increase for the property acquisition, and if the business required relocation, a low score for relocation assistance. In this way, major impacts are given relatively greater importance within the matrix thereby affecting final scoring totals.

Throughout the ASDM, there are various criteria that are not easily quantifiable but nonetheless represent an important consideration in the Alternative Selection process. For these criteria, a qualitative scale of one (1) to ten (10) was utilized, where; one (1) represents a significant impact (bad) and therefore does not provide a high score, and ten (10) represents little or no impact (good), and scores high.

Following is a description of each recommended evaluation criteria.

Traffic Operations

This criterion refers to the level of traffic congestion, traffic volumes and travel times associated with each of the alternatives. Congestion levels are determined through use of the LOS grading system. This system provides the ability to score each alternative based upon anticipated vehicular speeds, density and delay times (ie congestion). Additionally, this criteria also scores the expected vehicles miles traveled (VMT), and contributions to I-5 mainline peak hour traffic flows for each alternative.

To score the alternatives based on Levels of Service, a point system was applied to quantify LOS operations for the facilities analyzed. Points were assigned for expected changes in LOS from a base “No Project” alternative. Improvements to LOS conditions score higher and LOS deterioration score lower. A total of five (5) letter grade changes (both positive and negative) from LOS “A” through “F”. For example, if the “No Project” condition is expected to have a LOS C value and the alternative is expected to result in LOS “E” conditions, then the alternative shows a -2 LOS grade change. Conversely, if the

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alternative is expected to result in LOS A conditions then a +2 LOS grade change is scored. Intersection and Roadway Levels of service for the “No Project” and “Plus Project” conditions are included in the Appendix A. The scoring of each of the eleven grade changes possible are listed below:

Scoring Scale	
<i>Level of Service Grade Change</i>	<i>Score</i>
+5	10
+4	9
+3	8
+2	7
+1	6
0	5
-1	4
-2	3
-3	2
-4	1
-5	0

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North/South Collector Facilities				
TRAFFIC OPERATIONS ON STUDY AREA ROADWAYS AND INTERSECTIONS				
Location	Alternative No.			
	1	2	4	5
Roadways				
Gas Point Rd. – Happy Valley to W. Anderson Dr	5	5	5	5
Gas Point Rd. – W. Anderson Dr. to I-5	6	6	6	6
4 th St – I-5 to Ball’s Ferry Rd.	5	5	5	5
1 st St. – Greengate Rd. to I-5	5	5	5	5
1 st St. - I-5 to Locust St.	5	5	5	5
Main St. – County Line to 1 st St.	5	5	5	5
Main St. – 1 st St. to Gas Point Rd.	5	5	5	5
Main St. – Gas Point Rd to I-5	5	5	5	5
Rhonda Rd. – Gas Point Rd. to SR 273	5	5	5	5
W. Anderson Dr. – Gas Point Rd to Olinda Rd.	5	5	5	5
Locust Rd. – 1 st St to 4 th St.	5	5	5	5
Locust Rd. – 4 th St. to Kimberly Rd.	5	5	5	5
Locust Rd. – Kimberly Rd. to Deschutes Rd.	5	5	5	5
Balls Ferry Road – 1 st St. to 4 th St.	5	5	5	5
Deschutes Rd. – SR 273 to I-5	5	5	5	5
Deschutes Rd. – I-5 to Ball’s Ferry Rd.	5	5	5	5
Intersections				
Gas Point Road / W. Anderson Drive	5	5	5	5
Gas Point Road / Rhonda Road	8	8	8	8
Gas Point Road / I-5 SB Ramps	7	7	7	7
Gas Point Road / I-5 NB Ramps	8	8	8	8
4 th Street / Main Street	8	8	8	8
4 th Street / Locust Road	5	5	5	5
4 th Street / Ball’s Ferry Road	5	5	5	5
1 st Street / Main Street	5	5	5	5
1 st Street / Locust Road	5	5	5	5
Balls’s Ferry Road / Panorama Point Road	5	5	5	5
Deschutes Road / I-5 NB Ramps / Locust Road	8	8	8	8
Deschutes Road / I-5 SB Ramps	5	5	5	5
State Route 273 / Factory Outlet Drive	4	4	4	4
Score	5.5	5.5	5.5	5.5

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East/West Collector Facility				
TRAFFIC OPERATIONS ON STUDY AREA ROADWAYS AND INTERSECTIONS				
Location	Alternative No.			
	1	2	3	4
Roadways				
Gas Point Rd. – Happy Valley to W. Anderson Dr	5	5	5	5
Gas Point Rd. – W. Anderson Dr. to I-5	6	6	6	6
4 th St – I-5 to Ball’s Ferry Rd.	5	5	5	5
1 st St. – Greengate Rd. to I-5	5	5	5	5
1 st St. - I-5 to Locust St.	5	5	5	5
Main St. – County Line to 1 st St.	5	5	5	5
Main St. – 1 st St. to Gas Point Rd.	5	5	5	5
Main St. – Gas Point Rd to I-5	5	5	5	5
Rhonda Rd. – Gas Point Rd. to SR 273	5	5	5	5
W. Anderson Dr. – Gas Point Rd to Olinda Rd.	5	5	5	5
Locust Rd. – 1 st St to 4 th St.	5	5	5	5
Locust Rd. – 4 th St. to Kimberly Rd.	5	5	5	5
Locust Rd. – Kimberly Rd. to Deschutes Rd.	5	5	5	5
Balls Ferry Road – 1 st St. to 4 th St.	5	5	5	5
Deschutes Rd. – SR 273 to I-5	5	5	5	5
Deschutes Rd. – I-5 to Ball’s Ferry Rd.	5	5	5	5
Intersections				
Gas Point Road / W. Anderson Drive	5	5	5	5
Gas Point Road / Rhonda Road	8	8	8	8
Gas Point Road / I-5 SB Ramps	7	7	7	7
Gas Point Road / I-5 NB Ramps	8	8	8	8
4 th Street / Main Street	8	8	8	8
4 th Street / Locust Road	5	5	5	5
4 th Street / Ball’s Ferry Road	5	5	5	5
1 st Street / Main Street	5	5	5	5
1 st Street / Locust Road	5	5	5	5
Balls’s Ferry Road / Panorama Point Road	5	5	5	5
Deschutes Road / I-5 NB Ramps / Locust Road	8	8	8	8
Deschutes Road / I-5 SB Ramps	5	5	5	5
State Route 273 / Factory Outlet Drive	4	4	4	4
Score	5.5	5.5	5.5	5.5

The second scoring category under this criteria is congested travel time and VMT. Total congested travel time and VMT expected for each alternative with the least expensive alternative is ranked as lower than the most expensive alternative.

The scoring scale for this criteria is based upon the relative differential in Travel time and VMT between each of the different alternatives. The median travel time and VMT of all alternatives is determined and used as the benchmark score of “5”.

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Scoring Scale	
<i>Percent Variance from Median</i>	<i>Score</i>
25% less than median	10
20% less than median	9
15% less than median	8
10% less than median	7
5% less than median	6
Equal to median	5
5% greater than median	4
10% greater than median	3
15% greater than median	2
20% greater than median	1
25% greater than median	0

North/South Collector Facilities

TRAVEL TIME AND VMT ON STUDY AREA ROADWAYS				
	Alternative No.			
	1	2	4	5
Estimated Travel Time (Minutes)	114.41	109.96	105.52	107.74
<i>Median Travel Time</i>	109.96			
<i>Percent Variance from Median Travel Time</i>	4%	0%	-4%	-2%
Score	5.0	5.0	5.0	5.0
Estimated VMT	181,243	169,243	157,243	163,243
<i>Median VMT</i>	163,243			
<i>Percent Variance from Median VMT</i>	11%	4%	-4%	0%
Score	2.0	5.0	5.0	5.0

East/West Collector Facility

TRAVEL TIME AND VMT ON STUDY AREA ROADWAYS				
	Alternative No.			
	1	2	3	4
Estimated Travel Time (Minutes)	109.52	109.96	110.41	110.18
<i>Median Travel Time</i>	110.29			
<i>Percent Variance from Median Travel Time</i>	-1%	0%	0%	0%
Score	5.0	5.0	5.0	5.0
Estimated VMT	168,043	169,243	170,443	169,243
<i>Median VMT</i>	169,243			
<i>Percent Variance from Median VMT</i>	-1%	0%	1%	0%
Score	5.0	5.0	5.0	5.0

The final scoring category under this criteria is the expected traffic volume contributions to I-5 mainline peak hour traffic flows. This scoring category provided the ability to score each alternative in respect to its ability to keep locally generated traffic on local parallel facilities as opposed to on I-5 mainline.

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The scoring scale for this criteria is based upon the relative differential in expected I-5 mainline peak hour traffic between each of the different alternatives. The median peak hour volume contributed to I-5 of all alternatives is determined and used as the benchmark score of “5”.

Scoring Scale	
<i>Percent Variance from Median Traffic Increase</i>	<i>Score</i>
25% less than median traffic increase	10
20% less than median traffic increase	9
15% less than median traffic increase	8
10% less than median traffic increase	7
5% less than median traffic increase	6
Equal to median traffic increase	5
5% greater than median traffic increase	4
10% greater than median traffic increase	3
15% greater than median traffic increase	2
20% greater than median traffic increase	1
25% greater than median traffic increase	0

North/South Collector Facilities

PEAK HOUR TRAFFIC CONTRIBUTIONS TO I-5 MAINLINE				
Mainline Traffic Contribution	Alternative No.			
	1	2	4	5
Estimated Mainline Traffic Contribution	2,813	2,063	1,688	1,631
<i>Median VMT</i>	2,063			
<i>Percent Variance from Median VMT</i>	36%	0%	-18%	-21%
Score	0	5	8	10

East/West Collector Facility

PEAK HOUR TRAFFIC CONTRIBUTIONS TO I-5 MAINLINE				
Mainline Traffic Contribution	Alternative No.			
	1	2	3	4
Estimated Mainline Traffic Contribution	1,875	1,875	1,875	1,875
<i>Median VMT</i>	1,875			
<i>Percent Variance from Median VMT</i>	0%	0%	0%	0%
Score	5	5	5	5

Safety

Impacts are determined by percentage improvements (subjective determination) to existing high accident locations using TASAS and SWITRS for both County and State facilities. Scoring for each alternative is based upon percentage improvement of traffic safety (again subjective) as follows.

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Scoring Scale		
Percentage Improvement		Score
100% Improvement		10
90% Improvement		9
80% Improvement		8
70% Improvement		7
60% Improvement		6
50% Improvement		5
40% Improvement		4
30% Improvement		3
20% Improvement		2
10% Improvement		1
0% Improvement		0

North/South Collector Facilities

TRAFFIC SAFETY ON THE ROADWAY SYSTEM					
Safety Improvement	Importance Weighing	Alternative No.			
		1	2	4	5
Percentage Improvement		80%	70%	60%	60%
<i>Score</i>	4	8	7	6	6
Weighted Score		8.0	7.0	6.0	6.0

East/West Collector Facility

TRAFFIC SAFETY ON THE ROADWAY SYSTEM					
Safety Improvement	Importance Weighing	Alternative No.			
		1	2	3	4
Percentage Improvement		60%	60%	60%	60%
<i>Score</i>	4	6	6	6	6
Weighted Score		6.0	6.0	6.0	6.0

Costs

The individual scoring for each alternative is based on the estimated costs, with the least expensive alternative scoring highest, and the most expensive alternative scoring lowest. *{The costs presented in the ASDM will be for comparative purposes only and will not represent actual costs. Actual project construction costs for each listed component or as totaled may vary substantially and therefore should not be used outside of the context of this comparison.}*

The rating scale for this criteria is based upon the relative cost differential between each of the different alternatives. Preliminary cost estimates for the Gas Point Road and Main Street interchange improvements are included in Chapter III. The median cost of all alternatives was determined and used as the benchmark score of “5”.

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Scoring Scale	
<i>Percent Variance from Median Cost</i>	<i>Score</i>
25% less than median improvement cost	10
20% less than median improvement cost	9
15% less than median improvement cost	8
10% less than median improvement cost	7
5% less than median improvement cost	6
Equal to median improvement cost	5
5% greater than median improvement cost	4
10% greater than median improvement cost	3
15% greater than median improvement cost	2
20% greater than median improvement cost	1
25% greater than median improvement cost	0

North/South Collector Facilities

IMPROVEMENT COSTS WITHIN STUDY AREA				
Location	Alternative No.			
	1	2	4	5
New East/West Collector (average cost)	\$26,432,142	\$26,432,142	\$26,432,142	\$26,432,142
New North/South Collector	\$12,639,264	\$29,350,741	\$22,821,572	\$17,599,204
I-5/Gas Point Road Interchange Improvements	\$14,000,000	\$14,000,000	\$14,000,000	\$14,000,000
I-5/Main Street Interchange Improvements	\$8,181,000	\$8,181,000	\$8,181,000	\$8,181,000
Gas Point Road Improvements	\$8,230,000	\$8,230,000	\$8,230,000	\$8,230,000
Rhonda Road Improvements	\$2,264,400	\$2,264,400	\$2,264,400	\$2,264,400
<i>Total Cost</i>	\$71,746,806	\$88,458,283	\$81,929,114	\$76,706,746
<i>Median Cost</i>	\$79,317,930			
<i>Percentage Variance from Median Cost</i>	-10%	12%	3%	-3%
Score	4	2	5	6
<p><i>Note:</i> Cost Estimates for the Main Street and Gas Point Road Interchanges are included in Table ES 1. The costs do not tie exactly to Table ES 1 because they were refined after the matrix work was completed.</p>				

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East/West Collector Facility				
IMPROVEMENT COSTS WITHIN STUDY AREA				
Location	Alternative No.			
	1	2	3	4
New East/West Collector	\$26,304,749	\$26,358,182	\$27,149,298	\$25,916,339
New North/South Collector (average cost)	\$21,326,686	\$21,326,686	\$21,326,686	\$21,326,686
I-5/Gas Point Road Interchange Improvements	\$14,000,000	\$14,000,000	\$14,000,000	\$14,000,000
I-5/Main Street Interchange Improvements	\$8,181,000	\$8,181,000	\$8,181,000	\$8,181,000
Gas Point Road Improvements	\$8,230,000	\$8,230,000	\$8,230,000	\$8,230,000
Rhonda Road Improvements	\$2,264,400	\$2,264,400	\$2,264,400	\$2,264,400
<i>Total Cost</i>	\$80,306,835	\$80,360,268	\$81,151,384	\$79,918,425
<i>Median Cost</i>	\$80,112,630			
<i>Percentage Variance from Median Cost</i>	0%	0%	1%	0%
Score	5	5	5	5
<p><i>Note:</i> Cost Estimates for the Main Street and Gas Point Road Interchanges are included in Table ES1. The costs do not tie exactly to Table ES 1 because they were refined after the matrix work was completed.</p>				

Environmental Sensitivity

Environmental sensitivity subjectively (field observations only) considers the potential impacts of the alternatives on various environmental criteria such as biological, wetlands, historical, neighborhood, etc. The following rating scale and criteria is used to score each alternative for environmental impacts:

Scoring Scale	
<i>Severity of Impact</i>	<i>Score</i>
No Impact	10
	9
	8
Potentially Less Than Significant Impact	7
	6
Potentially Significant Impact Unless Mitigation Incorporated	5
	4
Significant Impact Unless Mitigation Incorporated	3
	2
	1
Potentially Significant and Unavoidable Impact	0

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ENVIRONMENTAL SENSITIVITY					
Criteria	Importance Weighting	Alternative No.			
		1	2	4	5
Land Use	5	7	7	7	7
Recreation	2	7	7	7	7
Farmlands	3	7	7	7	7
Socio-Economic (Section 4f)	5	7	7	7	7
<i>Biological Resources</i>					
Vegetation	5	3	3	3	3
Wildlife (species of concern)	5	3	3	3	3
Riparian Areas	5	3	3	3	3
Cultural Resources (historical)	5	3	3	3	3
Hydrology	3	3	3	3	3
Noise	3	7	7	7	7
Air	4	2	5	5	5
Services & Utilities	3	7	7	7	7
Aesthetics	3	7	7	7	7
<i>Total Unweighted Score</i>		5.1	5.3	5.3	5.3
Weighted Score		4.8	5.0	5.0	5.0

East/West Collector Facility

ENVIRONMENTAL SENSITIVITY					
Criteria	Importance Weighting	Alternative No.			
		1	2	3	4
Land Use	5	7	7	7	7
Recreation	2	7	7	7	7
Farmlands	3	7	7	7	7
Socio-Economic (Section 4f)	5	7	7	7	7
<i>Biological Resources</i>					
Vegetation	5	3	3	3	3
Wildlife (species of concern)	5	3	3	3	3
Riparian Areas	5	3	3	3	3
Cultural Resources (historical)	5	3	3	3	3
Hydrology	3	3	3	3	3
Noise	3	7	7	7	7
Air Quality	4	5	5	5	5
Services & Utilities	3	7	7	7	7
Aesthetics	3	7	7	7	7
<i>Total Unweighted Score</i>		5.3	5.3	5.3	5.3
Weighted Score		5.0	5.0	5.0	5.0

Community Impacts

The scoring scale for this criterion is based upon the level of impacts to currently developed areas within the Shasta County Southern Region. Some alternatives would require relocation of existing buildings, while other alternatives affect only undeveloped portions of the study area. Generally, the total number of buildings, and acreage of currently developed parcels was used to determine the level of significance. Community impacts criteria are essentially a quantification of impacts by type and include the following (and include impacts during project construction):

- Right-of-way taken
- Residential Impact
- Commercial square footage (KSF) take
- Loss of access
- Community Acceptance
- Community Accessibility
- Local economy impacts

Scoring for the community impacts is the same as the scoring for the cost criteria, where the scoring is based upon percentage difference from median for all alternatives. The criteria for right-of-way is acres, residential impact in number of units, commercial square footage taken is thousand square feet (KSF), and loss of access is total daily trips affected.

Adverse Community Impacts	
<i>Variance from Median</i>	<i>Score</i>
25% less than median	10
20% less than median	9
15% less than median	8
10% less than median	7
5% less than median	6
Equal to median	5
5% greater than median	4
10% greater than median	3
15% greater than median	2
20% greater than median	1
25% greater than median	0

Community Acceptance	
<i>Variance from Median</i>	<i>Score</i>
Very Strong Community Acceptance	10
	9
Strong Community Acceptance	8
	7
	6
Community Neutral	5
	4
	3
Strong Community Opposition	2
	1
Very Strong Community Opposition	0

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North/South Collector Facilities

COMMUNITY IMPACTS					
Criteria	Importance Weighting	Alternative No.			
		1	2	4	5
<i>Adverse Community Impacts</i>					
Right-of-Way Take (Acres)	2	84.63	99.23	84.39	76.58
<i>Median Right-of-Way Take</i>		84.51			
<i>Percent Variance from Median Right-of-Way Take</i>		0%	17%	0%	-9%
<i>Score</i>		5	2	5	7
Residential Impact	4	8	12	9	9
<i>Median Residential Unit Impact</i>		9			
<i>Percent Variance from Median Residential Unit Impact</i>		-11%	33%	0%	0%
<i>Score</i>		7	0	5	5
Commercial Building Square Footage Take	4	0	0	0	0
<i>Median Square Footage Take</i>		0			
<i>Percent Variance from Median Square Footage Take</i>		0%	0%	0%	0%
<i>Score</i>		5	5	5	5
Loss-of-Access (ADT)	3	3,000	3,000	3,000	3,000
<i>Median Loss-of-Access ADT</i>		3,000			
<i>Percent Variance from Median AMT</i>		0%	0%	0%	0%
<i>Score</i>		5	5	5	5
Community Acceptance	4	4	4	8	8
<i>Score</i>		4	4	8	8
<i>Total Unweighted Score</i>		5.2	3.2	5.6	6.0
Weighted Score		5.2	3.2	5.8	6.0

CHAPTER II – MATRIX EVALUATION

East/West Collector Facility					
COMMUNITY IMPACTS					
Criteria	Importance Weighting	Alternative No.			
		1	2	3	4
<i>Adverse Community Impacts</i>					
Right-of-Way Take (Acres)	2	88.82	88.90	90.08	88.24
<i>Median Right-of-Way Take</i>		88.86027			
<i>Percent Variance from Median Right-of-Way Take</i>		0%	0%	1%	-1%
<i>Score</i>		5	5	5	5
Residential Impact	4	1	0	0	1
<i>Median Residential Unit Impact</i>		0.5			
<i>Percent Variance from Median Residential Unit Impact</i>		100%	-100%	-100%	100%
<i>Score</i>		0	10	10	0
Commercial Building Square Footage Take	4	0	0	0	0
<i>Median Square Footage Take</i>		0			
<i>Percent Variance from Median Square Footage Take</i>		0%	0%	0%	0%
<i>Score</i>		5	5	5	5
Loss-of-Access (ADT)	3	3,000	3,000	3,000	3,000
<i>Median Loss-of-Access ADT</i>		3,000			
<i>Percent Variance from Median AMT</i>		0%	0%	0%	0%
<i>Score</i>		5	5	5	5
Community Acceptance	4	6	8	7	6
<i>Score</i>		6	8	7	6
<i>Total Unweighted Score</i>		4.2	6.6	6.4	4.2
Weighted Score		4.1	7.0	6.7	4.1

Design Standards Conformance

Roadway and interchange design standards are set by the local agency, Caltrans and the FHWA. The roadway design standards criteria is divided into State and Local facilities. On the State highway system, it is required that a Design Exception Fact Sheet be prepared and approved for each deviation from a mandatory or advisory standard. Design preferences do not require a separate approval process, however any deviation from a preferred design must be justifiable. Relevant standards that can be quantified in the ASDM are as follows:

State Facilities:

- Mandatory Design Exceptions
 - Local Access opposite an Off Ramp
 - Interchange Spacing (<1500m)
 - Intersection Spacing (<125m)
- Advisory Design Exceptions
 - Intersection Spacing (<160m)
 - Auxiliary Lane Requirements (<600m)
 - Weaving Length (<500m)
- Preferences
 - No Loop Off Ramps
 - No Hook On Ramps
 - Good Pedestrian/ADA and Bicycle Compatibility

- Good Driver Expectation

Local Facilities:

- County Design Standards
 - Roadway Cross-Section
 - Intersection Spacing
 - Design Speed
 - Max. Grade
 - Pedestrian Facility

Points are applied for each standard using the following qualitative ranking scale:

Scoring Scale	
<i>Percentage of Design Exceptions</i>	<i>Score</i>
0% design exceptions	10
10% design exceptions	9
20% design exceptions	8
30% design exceptions	7
40% design exceptions	6
50% design exceptions	5
60% design exceptions	4
70% design exceptions	3
80% design exceptions	2
90% design exceptions	1
100% design exceptions	0

CHAPTER II – MATRIX EVALUATION

North/South Collector Facilities					
DESIGN STANDARDS					
Percentage of Design Exceptions					
Criteria		Alternative No.			
		1	2	4	5
<i>State Facilities</i>					
Interchange Spacing (<1500m)		0%	0%	0%	0%
Intersection Spacing (<125m)		0%	0%	0%	0%
Aux Lane Length (<600m)		0%	0%	0%	0%
Design Speed		10%	10%	10%	10%
Turning Pocket Lengths		10%	10%	10%	10%
Deceleration Distance		10%	10%	10%	10%
Pedestrian/ADA/Bicycles		0%	0%	0%	0%
<i>County Facilities</i>					
Roadway Cross-Section		0%	0%	0%	0%
Intersection Spacing		0%	0%	0%	0%
Design Speed		0%	0%	0%	0%
Max. Grade		0%	0%	0%	0%
Pedestrian Facility		0%	0%	0%	0%
Scoring					
Criteria	Importance Weighting	Alternative No.			
		1	2	4	5
<i>State Facilities</i>					
Interchange Spacing (<1500m)	5	10	10	10	10
Intersection Spacing (<125m)	5	10	10	10	10
Aux Lane Length (<600m)	4	10	10	10	10
Design Speed	4	9	9	9	9
Turning Pocket Lengths	3	9	9	9	9
Deceleration Distance	3	9	9	9	9
Pedestrian/ADA/Bicycles	5	10	10	10	10
<i>County Facilities</i>					
Roadway Cross-Section	5	10	10	10	10
Intersection Spacing	5	10	10	10	10
Design Speed	5	10	10	10	10
Max. Grade	3	10	10	10	10
Pedestrian Facility	5	10	10	10	10
<i>Total Unweighted Score</i>		9.8	9.8	9.8	9.8
Weighted Score		9.8	9.8	9.8	9.8

CHAPTER II – MATRIX EVALUATION

East/West Collector Facility					
DESIGN STANDARDS					
Percentage of Design Exceptions					
Criteria		Alternative No.			
		1	2	3	5
<i>State Facilities</i>					
Interchange Spacing (<1500m)		0%	0%	0%	0%
Intersection Spacing (<125m)		0%	0%	0%	0%
Aux Lane Length (<600m)		0%	0%	0%	0%
Design Speed		10%	10%	10%	10%
Turning Pocket Lengths		10%	10%	10%	10%
Deceleration Distance		10%	10%	10%	10%
Pedestrian/ADA/Bicycles		0%	0%	0%	0%
<i>County Facilities</i>					
Roadway Cross-Section		0%	0%	0%	0%
Intersection Spacing		0%	0%	0%	0%
Design Speed		0%	0%	0%	0%
Max. Grade		0%	0%	0%	0%
Pedestrian Facility		0%	0%	0%	0%
Scoring					
Criteria	Importance Weighting	Alternative No.			
		1	2	3	4
<i>State Facilities</i>					
Interchange Spacing (<1500m)	5	10	10	10	10
Intersection Spacing (<125m)	5	10	10	10	10
Aux Lane Length (<600m)	4	10	10	10	10
Design Speed	4	9	9	9	9
Turning Pocket Lengths	3	9	9	9	9
Deceleration Distance	3	9	9	9	9
Pedestrian/ADA/Bicycles	5	10	10	10	10
<i>County Facilities</i>					
Roadway Cross-Section	5	10	10	10	10
Intersection Spacing	5	10	10	10	10
Design Speed	5	10	10	10	10
Max. Grade	3	10	10	10	10
Pedestrian Facility	5	10	10	10	10
<i>Total Unweighted Score</i>		9.8	9.8	9.8	9.8
Weighted Score		9.8	9.8	9.8	9.8

Constructability

This criterion is divided into two sections; Ability to Finance and Ability to Phase the project. The rating scale for these criteria is based upon the anticipated ability to fund and phase the alternative. Funding mechanisms both internal to the County, and external (State and Federal funding) are considered in this category.

Phasing refers to the ease of constructing a particular alternative. In general, this is directly related to how efficiently traffic can be handled during construction.

CHAPTER II – MATRIX EVALUATION

Scoring Scale	
Percentage of Design Exceptions	Score
Very Strong Possibility of Full Funding/Phasing	10
	9
Strong Possibility of Full Funding/Phasing	8
	7
	6
Likely Possibility of Full Funding/Phasing	5
	4
	3
Extremely Difficult to Fund/Phase	2
	1
Totally Infeasible to Fund/Phase	0

Project elements such as earthen fills, bridges, ramps, utility relocations and roadways that can be constructed with minimal impact to existing facilities are preferred from a constructability standpoint. Points are applied using the qualitative ranking scale using the following criteria:

Structure Phasing – ease of constructing a new bridge while utilizing the existing bridge.

Freeway Ramps - On and off ramps are typically not closed during construction except for brief periods. Construction of a new ramp in the same location as an existing ramp will require significant traffic handling and staging. One point per conflicting ramp.

Utilities – Can utilities be relocated ahead of the construction of the project (good), or does the project need to be in place to complete the relocation (poor).

Geometry – Are other roadways available to shift traffic onto? Or must traffic be carried through the work zone.

North/South Collector Facilities					
CONSTRUCTABILITY					
Criteria	Importance Weighting	Alternative No.			
		1	2	4	5
<i>Ability to Finance</i>					
Federal Funding	5	2	2	2	2
State Funding	5	2	2	2	2
Local Funding	5	2	2	2	2
<i>Ability to Phase</i>					
Intersections	5	5	5	5	5
Roadways	5	5	5	5	5
Ramps	5	5	5	5	5
Structures	5	5	5	5	5
Utilities	5	5	5	5	5
Grading	5	5	5	5	5
<i>Total Unweighted Score</i>		4.0	4.0	4.0	4.0
Weighted Score		4.0	4.0	4.0	4.0

CHAPTER II – MATRIX EVALUATION

East/West Collector Facility CONSTRUCTABILITY					
Criteria	Importance Weighting	Alternative No.			
		1	2	3	4
<i>Ability to Finance</i>					
Federal Funding	5	2	2	2	2
State Funding	5	2	2	2	2
Local Funding	5	2	2	2	2
<i>Ability to Phase</i>					
Intersections	5	5	5	5	5
Roadways	5	5	5	5	5
Ramps	5	5	5	5	5
Structures	5	5	5	5	5
Utilities	5	5	5	5	5
Grading	5	5	5	5	5
<i>Total Unweighted</i>		4.0	4.0	4.0	4.0
Weighted Score		4.0	4.0	4.0	4.0

2.5 - COMPOSITE SCORES

In this six and final step, raw scores earned within each evaluation criteria were adjusted using their corresponding relative weighted factor to achieve a corresponding weighted score. The sum of the weighted scores for each alternative will give an overall indication of its standing with respect to the other alternatives. The alternative, or alternatives, that receive the highest point total are identified as candidate projects for further detailed evaluation.

CHAPTER II – MATRIX EVALUATION

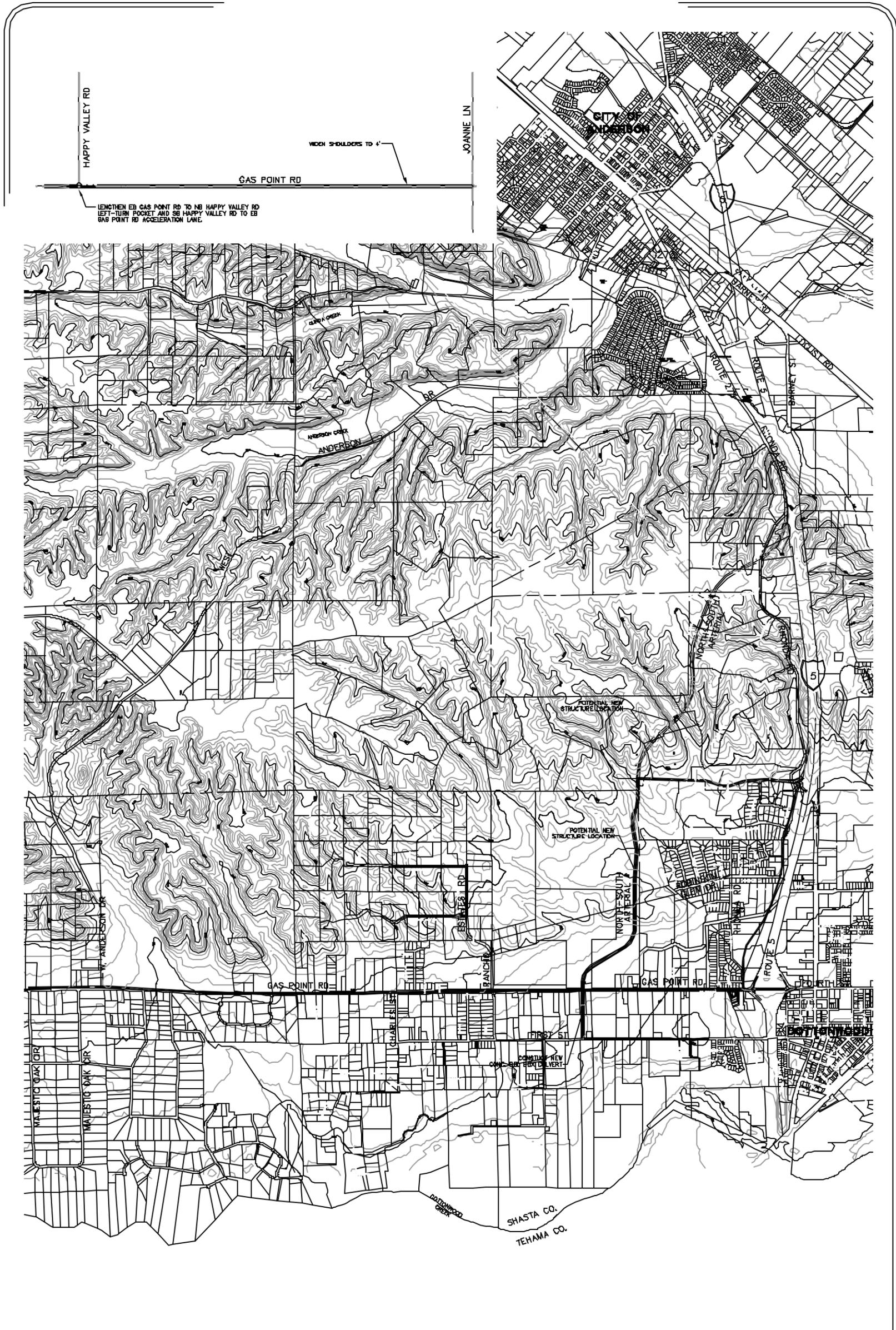
North/South Collector Facilities

FINAL SUMMARY					
Criteria	Importance Weighing	Alternative No.			
		1	2	4	5
Traffic Operations/Congestion	5	5.48	5.48	5.48	5.48
Traffic Operations/Travel Time	5	5.00	5.00	5.00	0.00
Traffic Operations/VMT	5	2.00	5.00	5.00	5.00
Contribution	5	0.00	5.00	8.00	10.00
Safety					
Unweighted Score		8.00	7.00	6.00	6.00
Weighted Score	4	8.00	7.00	6.00	6.00
Environmental Sensitivity					
Unweighted Score		5.08	5.31	5.31	5.31
Weighted Score	4	4.80	5.04	5.04	5.04
Community Impacts					
Unweighted Score		5.20	3.20	5.60	6.00
Weighted Score	3	5.22	3.15	5.77	6.04
Constructability					
Unweighted Score		4.00	4.00	4.00	4.00
Weighted Score	4	4.00	4.00	4.00	4.00
Design Standards Conformance					
Unweighted Score		9.75	9.75	9.75	9.75
Weighted Score	2	9.81	9.81	9.81	9.81
Cost	3	4.00	2.00	5.00	6.00
<i>Total Unweighted Score</i>		43.51	46.74	54.14	57.54
<i>Total Weighted Score</i>		43.31	46.48	54.10	57.37
Alternative Ranking		4	3	2	1

CHAPTER II – MATRIX EVALUATION

East/West Collector Facility					
FINAL SUMMARY					
Criteria	Importance Weighing	Alternative No.			
		1	2	3	4
Traffic Operations/Congestion	5	5.48	5.48	5.48	5.48
Traffic Operation/Travel Time	5	5.00	5.00	5.00	5.00
Traffic Operations/VMT	5	5.00	5.00	5.00	5.00
Contribution	5	5.00	5.00	5.00	5.00
Safety					
Unweighted Score		6.00	6.00	6.00	6.00
Weighted Score	4	6.00	6.00	6.00	6.00
Environmental Sensitivity					
Unweighted Score		5.31	5.31	5.31	5.31
Weighted Score	4	5.04	5.04	5.04	5.04
Community Impacts					
Unweighted Score		4.20	6.60	6.40	4.20
Weighted Score	3	4.07	6.97	6.71	4.07
Constructability					
Unweighted Score		4.00	4.00	4.00	4.00
Weighted Score	4	4.00	4.00	4.00	4.00
Design Standards Conformance					
Unweighted Score		9.75	9.75	9.75	9.75
Weighted Score	2	9.81	9.81	9.81	9.81
Cost	3	5.00	5.00	5.00	5.00
<i>Total Unweighted Score</i>		49.74	52.14	51.94	49.74
<i>Total Weighted Score</i>		49.40	52.30	52.04	49.40
Alternative Ranking		3	1	2	3

As show in the above tables, Alternative 4 of the north/south alignment and alternative 2 of the east/west alignment are ranked the first. These alternatives are identified as project candidates for further detailed evaluation. **Figure 4** illustrates the topography of the preferred arterial alignments and **Figure 5** illustrates the preferred arterial alignment improvements



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Shasta County Southern Area Study

Figure 4

Final Preferred Arterial Alignments - Topo



