



Overview of
Healdsburg Avenue Bridge over the Russian River
Concept Selection Analysis Matrix (CSAM)
Results Summary

August 23, 2010
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CSAM Results Summary

Healdsburg Avenue Bridge over the Russian River

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CSAM Results Summary

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INTRODUCTION

Improvement Concepts are evaluated one against another over many interrelated criteria. These Concepts will be evaluated against the project review criteria, with resulting comparative advantages and disadvantages. The criteria for comparison often include traffic operating conditions, safety, improvement costs, land use, economic criterion, environmental sensitivity and right-of-way criteria, to name a few. In the case before us a critical issue will be historic preservation!

Each Concept will likely meet or exceed the threshold for some criterion, and fall short on others. In the end, the determination of the relative importance of each criterion will determine the relative merits of each Concept. As a result, evaluating improvement Concepts one against the other is complicated, and subjective.

Concept Selection Analysis Matrix (CSAM) is a process that simplifies the Concept selection process. The procedure provides a means to identify and either quantitatively or qualitatively evaluate the advantages and disadvantages of each Concept. The CSAM provides a means to "weigh" the importance of each criterion, so that the advantages and disadvantages of each Concept can be compared and ranked in relation to each other. These rankings allow the identification of preferred Concept(s), taking into consideration the technical and social concerns of the community. Matrix analysis involves a four-step process that includes:

- A) Develop a list of "evaluation criteria".**
- B) Determine "relative weighing" for each evaluation criteria.**
- C) Score each evaluation criteria for each Concept.**
- D) Calculate the weighted scores for each Concept.**

PROJECT PURPOSE

The Purpose and Need for this project was established in order to identify minimum criteria that any feasibly acceptable concept should meet if it is to be considered as one of the concepts to be carried on in the environmental review and preliminary engineering (PA-ED) process. The primary Purpose and Need for this project is to improve public safety and carrying capacity of the bridge over the Russian River through either rehabilitating/retrofitting the existing bridge, replacement with a new structure or a combination of both.

The project Purpose and Need, is defined in the Caltrans “*Project Development Procedures Manual*” which indicates that all projects, during the project initiation process shall include purpose and need based upon the needs and objectives identified in the planning process. It is very possible for concepts which do not conform to the project Purpose and Need to receive significant scoring through the criteria rating process; however, the concepts ability to provide the results identified in the Purpose and Need statements cannot be overlooked and must be included within the process. Often the Purpose and Need is used as an absolute disqualifier; if a concept is not in step with the Purpose and Need it is eliminated. We have chosen to provide an adjustment for the Purpose and Need to provide an overall ranking which considers the Purpose and Need but does not disqualify. The project Purpose and Need statements were generated early in the process and are presented below:

- **Does the Concept Address Public Safety**
- **Is the Concept Consistent with the General Plan**
- **Does the Concept Facilitate Goods Movement**
- **Does the Concept Improve Public Transportation Opportunities**
- **Does the Concept Minimize Negative Impacts to Veteran Memorial Beach Park**
- **Does the Concept Enhance Pedestrian and Bicycle Access and Facilities**

Project Purpose Rating	
Relative Conformance	Point Value
Strongly Meets	10
Adequately Meets	7
Somewhat Meets	4
Does NOT Meet	0

The Purpose and Need factor was subjectively evaluated and each was rated according to the following scale. The individual results were accumulated to develop an overall adjustment factor.

The measure of each analyzed Concept to meet the project objectives as outlined in the Project Purpose criteria was summarized and the average score on these criteria was used in the final Concept analysis summary as the “Project Purpose and Need” adjustment to the Concept rating.

Criteria	Concept No.														
	1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
	Concept Purpose and Need Ratings														
Address Public Safety	0.0	2.7	4.3	4.8	4.8	4.8	6.8	10.0	10.0	10.0	9.5	8.5	7.5	8.0	10.0
Consistent with General Plan	0.7	0.7	2.7	2.7	2.7	3.8	7.8	10.0	9.5	10.0	10.0	4.8	5.3	10.0	10.0
Facilitate Goods Movement	2.0	0.0	3.3	2.8	2.8	3.3	7.8	10.0	10.0	10.0	10.0	6.5	7.0	10.0	10.0
Improve Public Transportation Opportunities	0.0	0.0	0.7	1.3	1.3	2.5	7.8	10.0	10.0	10.0	9.5	7.0	7.0	9.5	9.0
Minimize Negative Impacts to Veterans Memorial Park	10.0	9.5	9.5	8.5	8.5	7.5	5.3	6.5	6.5	7.5	3.3	8.0	8.0	7.0	4.8
Enhance Pedestrian and Bicycle Access and Facilities	0.0	3.0	0.0	2.0	2.0	2.5	7.3	10.0	10.0	10.0	8.5	9.0	9.0	8.5	9.5
Total	12.7	15.8	20.5	22.2	22.2	24.5	43.0	56.5	56.0	57.5	50.8	43.8	43.8	53.0	53.3
Raw P&N ratings shown above represent the Project Development Team average ratings. Purpose and Need (P&N) concept adjustment factors, shown below, were derived through the total rating of each concept, divided by the highest rated concept's total rating.															
P&N Adjustment Factor	0.22	0.28	0.36	0.39	0.39	0.43	0.75	0.98	0.97	1.00	0.88	0.76	0.76	0.92	0.93

A. Evaluation Criteria

The first step in the matrix procedure is to develop a list of criterion for consideration. Following is a brief description of the nine (9) evaluation categories developed by the Project Development Team, considering input from the public, recommended for use in this study:

EVALUATION CRITERIA
Evaluation Criteria
Historic Preservation
Public Safety
Environmental Sensitivity
Right of Way Impacts
Constructability
Design Standard Conformance
Cost
Transportation Operations
Funding Capability (City Contribution)

The following discussion provides a brief overview of the function each of these criteria will have in determining the most appropriate Concept for this project. A more detailed discussion is provided within the individual criteria analysis section of the report.

1. Historic Preservation

The historic nature of the project is of specific concern to nearly all involved or interested in this project. The analysis of each Concept in the context of the existing historic fabric will be a significant issue in this analysis.

2. Public Safety Improvements

One of the primary reasons this project is being advanced is the concern over the seismic integrity of the existing structure, it's sub-structure with scour/hydraulic issues and geometric deficiencies. Public safety is a measure of the overall safety of the facility for each segment of the bridge user community. For this project the public safety evaluation centers on five users of the structure and one tangential beneficiary. The five identified user groups are; the motor vehicle community, the pedestrian user, the bicyclist (both commuter and recreationalist), transit operations (Healdsburg Unified School District and Sonoma County Transit Authority) and the emergency response community. Although not a user under strict definition, individuals that may be under or adjacent to the bridge for recreational purposes are acknowledged as tangential beneficiaries considered under the public safety criteria. The safety criterion provides a measure of potential safety enhancements as a result of the proposed improvement for each Concept.

3. Environmental Sensitivity

This criterion will provide a subjective indication of the possible environmental effects resulting from each of the Concepts. Environmental consequences can result from each Concept including the “no-build” Concept. For all Concepts which may have possible negative environmental effects, appropriate mitigations will be identified.

4. Right of Way Impacts

Right-of way criteria are essentially a quantification of impacts by type and include potential impacts to homes, commercial buildings, public property, vacant land and Relocation Assistance Program (RAP) considerations.

5. Constructability

Constructability refers to the feasibility and cost implications of constructing a particular Concept. In general, this is related to ease of construction access, staging areas, project phasing and the efficient movement of traffic handling during construction, and construction duration.

6. Design Standard Conformance

Roadway and bridge design standards are set by the local agency, Caltrans the Federal Highway Administration (FHWA) and the Federal Emergency Management Agency (FEMA). For purposes of the CSAM, consistency with the requirements of each agency, or accepted standard for structure, roadway and hydraulic design will be evaluated.

7. Cost

The costs presented in the CSAM are for comparative purposes only and may not represent the actual final construction costs. Actual project construction costs for each listed component or as totaled may vary from the early estimates and therefore should not be used outside of the context of this comparative study. Two factors which influence the total cost of a project Concept are the initial capital cost and the long term maintenance requirements. Long term maintenance will be evaluated using a life cycle analysis on each bridge alternative deemed feasible.

8. Transportation Operations

This criterion refers to the quantification of transportation service provided to the area accessed via the Russian River bridge. Impacts associated with each one of the Concepts will be considered, so that the “relative” operating merits of the Concepts can be assessed from a transportation standpoint. The transportation function is not just a matter of passenger vehicle level of service (LOS), but rather a measure of the transportation service function for all road users as required by the City’s General Plan, including public transit, goods carriers, bicycle and pedestrian users as well.

9. Funding Capability (City Contribution)

This criterion is a comparative measure of the ability of the City of Healdsburg to fund each Concept under evaluation. This is NOT an evaluation of total cost as is done under criterion #7 above, rather the amount of City funding required to accomplish the implementation of each Concept is the sole basis for comparison.

B. Weighing the Evaluation Criteria

The second step in the CSAM evaluation procedure was to determine the "relative importance" of each evaluation criteria by weighing them on a scale. Certain criterion will more than likely be considered more important than others. Therefore, each evaluated criterion will be assigned a weighing which is the representation of its relative importance to the project.

Each of the evaluation criteria was weighed 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; whereas, one is the low end of the scale and indicates that the evaluation criterion is far less important.

Each criterion is weighed 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. The adjacent table presents the potential weighing level scale that was used by each community group who was asked to participate in valuing each project Criteria.

Relative Rating Scale	
Criteria Value in this Study	Rating
Unimportant	1
Less Important	2
Important	3
Very Important	4
Critical	5

C. Criteria Weighing

The formal **Criteria** "weighing" process as undertaken in this CSAM procedure is dependent upon the evaluation and ranking of each Concept within each evaluation criteria, the result of which is the "relative weighing" to be used with respect to each study Concept. The "weighing" process is the cumulative judgment of the relative importance of each project criteria, as provided by all participants. The individual weighing for each evaluation criteria was accumulated and the "relative weighing" factor for each criteria identified. The chart below shows the various stakeholders/organizations who provided relative importance weighing input on this project. Also shown is the average score for each criteria and the resulting relative importance factor for each criteria. The relative importance factor is obtained by dividing each individual average raw score by the lowest average raw score.

RELATIVE WEIGHING WORKSHEET

Criteria	Stakeholder/Organization										
	Open House #1	City Council	County Transit	Emergency Services	County Parks	School District	of Commerc	Total	Average	Factor	
1. Historic Preservation	4.63	3.75	3.00	1.00	5.00	1.00	4.00	22.4	3.20	1.00	
2. Public Safety	4.04	4.75	5.00	5.00	5.00	4.00	5.00	32.8	4.68	1.47	
3. Environmental Sensitivity	3.94	3.75	3.00	3.50	5.00	4.00	4.00	27.2	3.88	1.22	
4. Right of Way Impacts	3.33	3.50	3.00	3.50	5.00	2.00	4.00	24.3	3.48	1.09	
5. Constructability	3.24	3.00	4.00	3.50	3.00	4.00	4.00	24.7	3.53	1.11	
6. Design Standards Conformance	3.06	3.25	3.00	3.00	3.00	4.00	3.00	22.3	3.19	1.00	
7. Cost	4.13	4.75	3.00	4.00	3.00	2.00	4.00	24.9	3.55	1.12	
8. Transportation Operations Contribution)	3.80	3.50	5.00	5.00	3.00	5.00	4.00	29.3	4.19	1.31	
	4.25	4.75	3.00	4.00	3.00	4.00	5.00	28.0	4.00	1.26	
Total/Average								235.9	33.70		

The “relative weighing” factor is applied to the individual score for each criteria for each Concept evaluated within the study. In this manner the “relative weighing” (importance) of the criteria is equally applied to all Concepts evaluated. This “adjusted” value for each criteria of evaluation is then totaled to arrive at an overall Concept criteria score. The last adjustment occurs at the conclusion of the “relative weighing” and that is the final correction for adherence to the “*Project Purpose*” as defined at the project initiation.

Internal to the CSAM criteria there may be several sub-criteria that compose the entire criteria evaluation. In these cases the PDT member or group will be requested to provide a relative importance to the sub-categories. This measure will then be applied internally to the sub-criteria in forming the overall criteria scoring. In this way, even down to the sub-criteria evaluations, critical issues are given relatively greater importance within the matrix.

For these sub-categories, the same qualitative scale of 1 to 5 will be utilized, where: a score of 5 represents a critically important element to the study, and 1 represents an element of insignificant or no importance to the project. The study categories with sub-criteria weighing include; Environmental, Right-of-Way, Constructability, Design Standards, and Traffic Operations. If the issue is inadvertently excluded in the criteria weighing process in the evaluation it will be given the score of 1 to prevent undue influence in the process results.

The following discussion provides a more detailed description of each criterion included in this process.

1. Historic Preservation

Historic Preservation is a project issue which must be considered during the evaluation of each potential project solution. The level that the project Concept measures up in the context of Historic Preservation will be determined subjectively using the information developed by ICF Jones and Stokes during their “Fatal Flaw” evaluation process. The historic preservation judgement was made by an expert in the field of historic structures and historic preservation.

Historic Preservation	
Historic Impacts	Point Value
None	10
Minimal	8
Less than Significant	6
Significant	4
Very Significant	1
Extreme	0

HISTORIC PRESERVATION EVALUATION															
Criteria	Concept No.														
	1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Historic Impacts	10	10	10	10	10	10	2	0	0	5	6	10	10	7	6
Total Score	10	10	10	10	10	10	2	0	0	5	6	10	10	7	6

2. Public Safety Improvements

Rating the safety criteria is based on review of geometric constraints, and other safety considerations. The ranking was based on the determination as to whether a Concept is expected to improve public safety (10 points), marginally improves public safety (7 points), or provides only minimal improvements to public safety (4 points), or possibly provides no improvement or deteriorates public safety (0 points).

Safety	
Level of Improvement	Point
Substantial	10
Moderate	7
Minimal (or minor)	4
No Change	0

In rating the concepts against the safety criteria all concepts, including the “no-build” concepts maintain the pedestrian facilities at a minimum acceptable level, however, the improvements proposed can improve pedestrian safety. Bicycle travel is unchanged with the “no-build” and concept 2A, and is minimally improved with the rehabilitation concepts 2B, 2C (although on-way operations prevent the return travel) and 2D; the balance of the concepts result in standard bicycle Class 2 and/or Class 3 facilities. Emergency vehicle response is unchanged with concepts 1A, 1B and 2B; 2A provides the opportunity for fire vehicle usage, and concepts, 2C, and 2D improve their usage of the structure due to the geometric changes resulting from the operational limitations to one way flow; 2C results in one way traffic in the opposite direction to emergency response.. 2E and concepts 4A, 4B, 4C, 5A and 5B provide for all emergency vehicle needs. Concepts 4C improves emergency vehicle access but results in substantial out of direction travel.

Motor vehicle safety is a direct reflection on the geometric layout of the facility. In this case concepts 1A and 2A preserve the existing bridge with the existing traffic operational conditions and do not improve traffic safety. The one way concepts, 2B, 2C and 2D, eliminate the conflicts resulting from the very sub-standard lane widths thus potentially improving traffic safety, however, the Front Street intersection with the blind access, resulting from the bridge termination at the intersection and the sight interference that the bridge fencing and vertical truss members create, is unchanged for westbound traffic. The remaining concepts create standard geometrics with improved intersection safety at Front Street. The roundabout concepts potentially provide the safest operational condition.

The following scale is recommended for use to rank each Concept:

PUBLIC SAFETY IMPROVEMENTS															
Criteria	Concept No.														
	1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Motor Vehicle Traffic	0	0	4	4	7	7	10	10	10	10	10	7	7	10	10
Pedestrian Traffic	0	7	0	0	0	0	10	10	10	10	7	10	10	7	10
Bicycle Traffic	0	10	0	0	0	4	10	10	10	10	10	10	10	10	10
Emergency Response	0	0	7	0	4	4	10	10	10	10	10	4	7	10	10
Total Score	0	17	11	4	11	15	40	40	40	40	37	31	34	37	40
Total Calibrated Score (10 High)	0	4.3	2.8	1	2.75	3.75	10	10	10	10	9.25	7.75	8.5	9.25	10

3. Environmental Sensitivity

Environmental sensitivity subjectively (field observations only) considers the potential impacts of the Concepts on various environmental criteria such as biological, wetlands, historical, neighborhood and others. The adjacent scale was used to rate each environmental issue for each concept under consideration. Cultural Resources and Biological Resources each contain two sub-categories which were individually evaluated and the combined to generate the rating for each of these two categories

Environmental Impact	
Level of Impact	Point
No Impact	10
Minimal (or minor)	7
Moderate Impact	4
Substantial Impact	0

The environmental rating for each concept is presented on the following table.

ENVIRONMENTAL SENSITIVITY																	
Criteria	Importance Weighting		Concept No.														
			1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Cultural Resources¹	3.2	15.5%	10	8.5	9	8	8	8	9	7.5	7.5	6	6	6	6	6	6
Archeology	3.6	17.2%	10	10	8	8	8	8	8	5	5	5	5	5	5	5	5
Landscapes	3.1	14.8%	10	7	10	8	8	8	10	10	10	7	7	7	7	7	7
Biological Resources	3.2	15.3%	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Wild Life, Botany, Wetlands	3.7	17.5%	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fisheries	3.3	16.0%	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Community Impacts	4.3	20.8%	10	4	10	4	7	9	10	10	8	3	3	4	0	8	6
Parks - Section 4(f)	3.1	14.8%	10	4	9	9	9	9	9	9	9	10	0	10	10	10	7
Visual Resources	3.9	18.5%	10	10	9	9	9	9	7	9	4	1	4	3	0	3	2
Noise	3.2	15.2%	10	10	7	6	6	6	7	5	5	4	4	0	0	5	5
Total Unweighted Score			60	46.5	54	46	49	51	52	50.5	43.5	34	27	33	26	42	36
Total Weighted Score			10.0	7.6	9.1	7.5	8.1	8.5	8.7	8.5	7.2	5.4	4.4	5.3	3.9	6.9	5.9
Total Calibrated Score (10 High)			10.0	7.6	9.1	7.5	8.1	8.5	8.7	8.5	7.2	5.4	4.4	5.3	3.9	6.9	5.9

4. Right of Way Impacts

Right-of-way evaluation is essentially a quantification of impacts by type and included the following:

- ◆ Homes:
One (1) point per home, full take assumed
- ◆ Commercial Buildings:
One (1) point per commercial building whether fully or partially involved
- ◆ Private Lands:
One (1) point per acre involved
- ◆ Public Lands:
One (1) point per acre involved
- ◆ Relocation Assistance Program (RAP):
Per the Uniform Relocation Assistance And Real Property Acquisition Act (Federal Uniform Act) expenses related to relocation, including searching for replacement property, tangible losses, moving expenses etc. are reimbursable by the relocating agency to the property owner. One (1) point is assigned for each potential RAP.

Right-of-Way Impacts		
Impacts	Point Value	
	Structures/ Relocation	Acreage
0	10	10
1	7	8
2	4	6
3	0	4
4	0	1
>4	0	0

RIGHT-OF-WAY																	
Criteria	Categorical Weighing		Concept No.														
			1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Homes Impacted	3.4	21%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	10.0	0.0	10.0	10.0
Commercial Buildings Impacted	3.3	20%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	10.0	10.0	0.0	0.0
Public Lands Required (ac)	3.6	22%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.0	8.0	10.0	8.0	10.0	8.0	8.0
Private Land (ac)	2.2	13%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.0	8.0	4.0	8.0	0.0	0.0	8.0
Relocation Assistance	4.0	24%	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
Total Unweighted Score			50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	26.0	26.0	14.0	26.0	34.0	8.0	26.0
Total Weighted Score			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	4.9	4.9	2.7	4.8	7.2	1.8	4.9
Total Calibrated Score (10 High)			10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	4.9	4.9	2.7	4.8	7.2	1.8	4.9

5. Constructability

Constructability refers to the feasibility and cost implications of constructing a particular Concept. This includes traffic handling during construction, equipment access capability, adequate staging areas, seasonal issues due to river flow and utility relocation considerations. Points are applied based on a qualitative ranking scale using the following criteria:

- ◆ **Structure Staging/Equipment Access:**
Ease of constructing a new bridge or rehabilitating the existing bridge; road closures, short duration or extensive detouring would all go into this evaluation.
- ◆ **Effects on Adjacent Veterans Memorial Park and Beach:**
Construction activity that would affect park and/or beach access will be considered.
- ◆ **Traffic Handling/Ped-Bicycle Access:** The evaluation will consider Motor vehicle access interruption, pedestrian and bicycle access interruptions whether short term or long term will be considered in this qualitative evaluation.
- ◆ **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).
- ◆ **Construction Duration:**
The longer the project takes to construct, the greater the inconvenience to the public.

Constructability		
Improvement Phasing (structure, street, utility and duration)	Ped/Bike/Beach Access	Point Value
Readily/<12 mos	Access Maintained	10
Limited/(12-15 mos)	Access Limited	7
Minimal (or minor)/(15-18 mos)	Access Restricted	4
None(>18 mos)	Access Eliminated	0

CONSTRUCTABILITY																	
Criteria	Categorical Weighing		Concept No.														
			1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Traffic Handling	3.3	16%	10	10	7	7	7	7		4	4	10	10	10	10	4	4
Ped/Bicycle Access	2.9	14%	10	10	7	7	7	7		4	4	10	10	10	10	4	4
Equipment Accessibility	3.0	14%	10	10	7	7	7	7		4	4	4	4	7	7	4	4
Adequate Staging Areas	2.8	13%	10	10	7	7	7	7		4	4	4	4	7	7	0	0
Veterans Beach Impacts	3.4	16%	10	10	7	7	7	7		0	4	7	4	7	7	7	4
Construction Duration	2.8	13%	10	10	7	7	7	7		7	7	4	4	0	0	4	4
Temporary Utility Relocations*	2.8	13%	10	10	7	7	7	7		0	0	7	7	7	7	0	0
Total Unweighted Score			70	70	49	49	49	49	0	23	27	46	43	48	48	23	20
Total Weighted Score			10.0	10.0	7.0	7	7	7	0.0	3.2	3.9	6.7	6.2	6.9	6.9	3.4	2.9
Total Calibrated Score (10 High)			10.0	10.0	7.0	7.0	7.0	7.0	0.0	3.2	3.9	6.7	6.2	6.9	6.9	3.4	2.9

6. Design Standards Conformance

Roadway and interchange design standards are set by the local agency, Caltrans and the FHWA. For purposes of the CSAM, and consistent with the Caltrans' Highway Design Manual, three levels of standards are identified: Mandatory, Advisory and preferential. 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. Since this project does not reside on the Caltrans System, a simpler, more streamlined process will be adhered to. Deviations from normal design requirements as outlined in the governing documents of Caltrans, FHWA, City of Healdsburg or some yet to be identified funding source will govern. Relevant standards that can be quantified and measured in the CSAM will be rated as follows:

Design Standards	
Level of Conformity	Point Value
Fully Conforms	10
Minor Deviation	7
Acceptable Deviation	4
Un-acceptable Deviation	0

DESIGN STANDARDS																	
Criteria	Categorical Weighing		Concept No.														
			1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Bridge Structure Standards																	
Current Seismic	4.8	11.2%	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
AASHTO Structural	4.7	11.1%	0	0	7	7	7	7	7	10	10	10	10	10	10	10	10
L.R.F.D. Design Methods	4.7	11.1%	0	0	4	4	4	4	4	10	10	7	7	7	7	7	7
Roadway Standards																	
Travel Lane Width	4.0	9.4%	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Shoulder Width	3.6	8.5%	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10
Height Clearance	3.8	9.1%	0	0	4	4	4	4	10	10	10	10	10	10	10	10	10
Caltrans Bicycle Facility	3.5	8.3%	0	10	0	4	4	7	10	10	10	10	10	10	10	10	10
Other Standards:																	
FHWA Scour Criteria	4.5	10.6%	0	0	7	7	7	7	7	10	10	7	7	7	7	10	10
FHWA Hydraulic Criteria	4.5	10.6%	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10
<i>Total Unweighted Score</i>			0	10	42	66	66	69	78	90	90	84	84	84	84	87	87
<i>Total Weighted Score</i>			0.0	0.8	4.5	6.6	6.6	6.9	7.7	9.0	9.0	8.3	8.3	8.3	8.3	8.6	8.6
Total Calibrated Score (10 High)			0.0	0.9	5.0	7.4	7.4	7.7	8.5	10.0	10.0	9.3	9.3	9.3	9.3	9.6	9.6

7. Costs

The costs presented in the CSAM will be for comparative purposes only and will be adequate for this comparative analysis. These costs will likely vary from final cost estimates derived at the conclusion of this project. Actual project construction costs for each listed component or as totaled may vary from the final actual construction cost and therefore should not be used outside of the context of this comparative study. The individual ranking for each Concept is based on the estimated costs. For example, if this study results in five (5) Concepts being evaluated, the least expensive Concept would be ranked as ten while the remaining Concepts will score inversely proportional to the least expensive.

COST															
Criteria	Concept No.														
	1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Bridge/Roadway Improvement Costs	\$0	\$200	\$7,400	\$6,715	\$6,715	\$7,165	-	\$22,890	\$13,790	\$13,415	\$14,535	\$24,465	\$19,855	\$15,950	\$14,750
Right of Way Costs	\$0	\$0	\$0	\$0	\$0	\$0	-	\$2,170	\$2,170	\$6,990	\$2,750	\$3,970	\$21,440	\$2,550	\$2,460
Project Engineering and Administrative Costs	\$1,000	\$1,280	\$4,670	\$4,560	\$4,560	\$4,630	-	\$7,710	\$4,830	\$4,770	\$4,940	\$8,250	\$6,700	\$5,150	\$4,970
TOTAL CAPITAL COST (\$1000's)	\$1,000	\$1,480	\$12,070	\$11,275	\$11,275	\$11,795	-	\$32,770	\$20,790	\$25,175	\$22,225	\$36,685	\$47,995	\$23,650	\$22,180
LIFE CYCLE MAINTENANCE COST (\$1000's)	\$0	\$0	\$5,300	\$5,300	\$5,300	\$5,300	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL COST (\$1000's)	\$1,000	\$1,480	\$17,370	\$16,575	\$16,575	\$17,095	-	\$32,770	\$20,790	\$25,175	\$22,225	\$36,685	\$47,995	\$23,650	\$22,180
Total Calibrated Score (10 High)	10.0	10.0	9.5	10.0	10.0	9.7	0.0	5.1	8.0	6.6	7.5	4.5	3.5	7.0	7.5

8. Transportation Operations

Transportation Operations refers to the quantification of traffic operations at key intersection locations and/or roadway segments served by the river crossing. For this project we have identified several locations in the vicinity of the bridge that should be evaluated for appropriate operations. In order to help score and rank the Concepts based on Levels of Service, a point system is applied to quantify LOS operations for the facilities analyzed. Points are assigned for LOS “A” through “F”, as shown on the adjacent table.

The existing river crossing is limited in its availability to all modes of transportation. The current load limit, as well as geometric limitations, has precluded school bus and public transit from effectively accessing this region of the city via Healdsburg Avenue and the river crossing. This element will be considered within this overall “transportation operations” as well. In addition, the current river crossing serves bicycle and pedestrian traffic, these modes will be qualitatively analyzed and included within the overall “transportation operations” evaluation. Five (5) intersections near the bridge project were determined to be effected by changes in travel patterns, and were therefore used to evaluate the level of service (LOS) as it relates to the concepts. The city threshold LOS is level D, meaning anything worse than LOS D would represent unacceptable traffic operations.

LOS Operations Point System	
Level of Service	Point Value
A	10
B	10
C	7
D	3
E	0
F	0

City of Healdsburg LOS Threshold “D” varying

Public transit (including school bus transportation) is currently not using the existing structure to load and geometric concerns. Pedestrian traffic is provided for on the existing structure with two sidewalks, one to each side. Bicycle traffic is not accommodated in a manner consistent with the general plan nor the adopted bicycle master plan (Class 2 – bicycle lanes); bicyclists are required to travel within the motor vehicle travel lanes with no shoulders available. Each concept was evaluated as to its ability to accommodate these alternative transportation modes. The overall criteria rating is as shown on the following table.

Public Transit/Bicycle /Pedestrian Point	
Quality of Service	Point Value
Public Transit/School Bus Service	
Full Access	10
Limited Access	5
No Access	0
Bicycle/Pedestrian Facilities	
Full Access	10
Limited Access	5
No Access	0

Design Year 2035 - Transportation Operations																	
Prime Study Intersections Peak Hour Level of Service (LOS)	Categorical		Concept No.														
	4.17	25%	1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Healdsburg Ave & Bailhache			D	A	D	C	B	D	D	D	D	D	D	B	A	D	D
Healdsburg Ave & Veterans Park Entrance			C	A	C	B	B	C	C	C	C	C	C	A	A	C	C
Healdsburg Ave & Front/Kennedy			F	F	F	D	F	F	F	C	C	A	A	C	C	A	A
Healdsburg Ave (Central Healdsburg) & NB 101 Off-ramp			C	F	C	C	C	C	C	C	C	C	C	C	C	C	C
Front Street/Mason/First Street			C	C	C	B	C	C	C	C	C	C	C	C	C	C	C
LOS Score			5.9	6.6	5.9	9.0	8.3	5.9	5.9	7.6	7.6	8.3	8.3	10.0	10.0	8.3	8.3
Public Transportation	4.25	26%															
Public Transit and School Bus Operations			0.0	0.0	5.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0
Public Transit Score			0.0	0.0	5.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0
Bicycle Facilities	3.71	23%															
Bicycle Facilities			0.0	10.0	0.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Bicycle Facility Score			0.0	10.0	0.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Facilities	4.29	26%															
Pedestrian Facilities			0.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Pedestrian Facility Score			0.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Unweighted Score			5.9	26.6	20.9	29.0	28.3	25.9	35.9	37.6	37.6	38.3	38.3	35.0	40.0	38.3	38.3
Total Weighted Score			1.5	6.5	5.4	7.3	7.1	6.5	8.9	9.4	9.4	9.6	9.6	8.7	10.0	9.6	9.6
Calibrated Score (10 High)			1.5	6.5	5.4	7.3	7.1	6.5	8.9	9.4	9.4	9.6	9.6	8.7	10.0	9.6	9.6

9. Funding Capability (City Contribution)

This criterion is a comparative measure of the ability of the City of Healdsburg to fund each Concept under evaluation. Total cost is **NOT** considered within this analysis, rather the amount of City funding required (after the application of any and all available State, Federal and other identified funding sources) to accomplish the implementation of each Concept is the sole basis for comparison. The cost to the City is measured as their proportionate share of the entire project cost, for example, with the Highway Bridge Program (HBP) funding the city is responsible for 11.5% of the project cost. Through this process it has been determined that the HBP program will be eligible for funding on *bridge rehabilitation concepts or replacement concepts only*.

The project team includes Blais & Associates, a firm that specializes in grant writing and submittals. They have identified a series of potential grant opportunities to rehabilitate the historic bridge should a replacement motor vehicle bridge become the ultimate project. These opportunities include:

- ◆ **Proposition 84 – State Parks Program** – Up to \$5M 100% Funding
- ◆ **Recreation Trails Grant Program** - Up to \$400k 88±% Funding
- ◆ **Land and Water Conservation Grant Program** - Up to \$500k 50% Funding
- ◆ **Re-authorization of SAFETEA-LU** – Call for projects expected soon
- ◆ **SAFETEA-LU – Historic Preservation** – 88±% Funding
- ◆ **Recreational Trails Grant Program** – Up to \$400k 88±% Funding
- ◆ **Bicycle Transportation Account** – Up to \$1.5M 90% Funding
- ◆ **Save Americas Treasures** – Up to \$700k 50% Funding
- ◆ **Preserve America Grant Program** – Up to \$250k 50% Funding

City of Healdsburg Funds Required	Rating Scale
<\$1500K	10
\$2000k	9
\$2500k	7
\$3000k	5
\$3300k	3
\$3600k	2
\$4000k	1
>\$4000K	0

They have estimated, based on their experience that this project could be expected to obtain from these programs, in the aggregate up to \$4.1M toward the rehabilitation of the Historic Bridge for Bicycle and Pedestrian usage. This estimate is based upon the grant/concept type and the probability for success for this specific project. To achieve this level of grant commitment would require matching the eligible grant with the individual concept being considered. For example one of the most attractive is Proposition 84 however, concepts which provide direct park access would be more likely to achieve success than alternatives which do not. The grant opportunities, including Federal Transportation earmarks which can be expected to receive broad support, are many and success seems likely. The city request for grants and earmarks could range upward to \$6M to \$7M the city match on these requests would likely be up to \$700k with the city total cost including additional local share of HBR funding and any additional funding that may not be include in these funding sources.

Funding Capability-City Contribution (Funds in 1000's)															
City of Healdsburg Funds Required	Concept No.														
	1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
City Funds Required	\$1,000	\$1,480	\$1,992	\$1,901	\$1,901	\$1,961	-	\$3,759	\$2,385	\$2,451	\$2,112	\$19,677	\$32,425	\$2,468	\$1,583
Rating Score	10	10	9	9	9	9		1	7	7	7	0	0	7	9

D. COMPOSITE SCORES

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

SUMMARY CATEGORICAL RANKING - WEIGHTED SCORING																
Criteria	Relative Weighing	Conce														
		1A	1B	2A	2B	2C	2D	2E	3A	3B	4A	4B	4C	4D	5A	5B
Historic Preservation	1.00	10.0	10.0	10.0	10.0	10.0	10.0	2.0	0.0	0.0	5.0	6.0	10.0	10.0	7.0	6.0
Public Safety	1.47	0.0	6.2	4.0	1.5	4.0	5.5	14.7	14.7	14.7	14.7	13.6	11.4	12.5	13.6	14.7
Environmental Impacts	1.22	12.2	9.3	11.0	9.1	9.9	10.4	10.6	10.4	8.8	6.5	5.4	6.5	4.8	8.4	7.2
Right-of-way Acquisition	1.09	10.9	10.9	10.9	10.9	10.9	10.9	10.9	5.3	5.3	3.0	5.2	7.9	1.9	5.3	6.4
Constructability	1.11	11.1	11.1	7.8	7.8	7.8	7.8	0.0	3.6	4.3	7.4	6.9	7.7	7.7	3.8	3.3
Design Standards	1.00	0.0	0.9	5.0	7.4	7.4	7.7	8.5	10.0	10.0	9.3	9.3	9.3	9.3	9.6	9.6
Cost	1.12	11.2	11.2	10.6	11.2	11.2	10.8	-	5.6	8.9	7.3	8.3	5.0	3.9	7.8	8.3
Transportation Operations	1.31	2.0	8.6	7.1	9.6	9.4	8.6	11.8	12.3	12.3	12.6	12.6	11.4	13.1	12.6	12.6
Funding Capability (City Contribution)	1.26	12.6	12.6	11.3	11.3	11.3	11.3	-	1.3	8.8	8.8	8.8	0.0	0.0	8.8	11.3
Total Weighted Score		69.9	80.8	77.8	78.8	81.9	83.0	58.5	63.2	73.0	74.5	76.0	69.2	63.2	76.9	79.3
Purpose and Need Scoring																
<p>The project Purpose and Need, is defined in the Caltrans "Project Development Procedures Manual" which indicates that all projects, during the project initiation process shall include purpose and need based upon the needs and objectives identified in the planning process. It is very possible for concepts which do not conform to the project Purpose and Need to receive significant scoring through the criteria rating process; however, the concepts ability to provide the results identified in the Purpose and Need statements cannot be overlooked and must be included within the process. Often the Purpose and Need is used as an absolute disqualifier; if a concept is not in step with the Purpose and Need it is eliminated. We have chosen to provide an adjustment for the Purpose and Need to provide an overall ranking which considers the Purpose and Need but does not disqualify.</p>																
Address Public Safety		N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Consistent with General Plan		N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Facilitate Goods Movement		N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Improve Public Transportation Opportunities		N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Minimize Neg Impacts to Veterans Memorial Park		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
Enhance Ped and Bicycle Access and Facilities		N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Project Purpose and Need Adjustment		0.22	0.28	0.36	0.39	0.39	0.43	0.75	0.98	0.97	1.00	0.88	0.76	0.76	0.92	0.93
Total Ranking Score		15.39	22.25	27.74	30.36	31.55	35.34	43.73	62.08	71.13	74.55	67.21	52.78	48.17	70.91	73.57

E. REVISIONS SUMMARY

August 23, 2010 – Original Posting

August 25, 2010 – Revisions:

- Page 2, “Revision Summary” added to Table of Contents
- Page 4, Project Purpose Checklist replaced with Concept Purpose and Need Rating Matrix Table, previously contained in Appendix
- Page 12, Right of Way Concept Ratings adjusted to be consistent with Scoring Criteria and reflect recent planned usage of commercial building located in northwest quadrant of Healdsburg Avenue/Front Street
- Page 13, Constructability Ratings adjusted to be consistent with Scoring Criteria
- Page 15, Project Cost Table (Capital Improvement Cost, Right of Way Cost and Life Cycle Costs) updated to reflect reduction in painting cost estimate; increased cost under Concept 4 series seismic rehabilitation to allow for replacement of existing concrete deck with lightweight deck, geometric changes required by Caltrans and other recent cost data updates
- Page 15, Life Cycle Maintenance Cost updated to remove initial “capital improvement cost” from the formula
- Page 18, In the third sentence of first paragraph in Section D, Composit Scores, the words “lowest point total” were changed to “highest point total”
- Page 18, Summary Categorical Ranking – Weighted Scoring table updated
- Page 19, Added new section, “Revision Summary”

August 30, 2010 - Revisions:

- Page 16, Pedestrian rating for Concepts 2A updated
- Page 18, Summary Categorical Ranking – Weighted Scoring table for Concepts 2A – 2D updated