



2023 - 2024

College of Engineering

# **I-10 FREEWAY SENIOR PROJECT**

California State Polytechnic University, Pomona

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## **Weighted Decision Matrix**



## Study Participants

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## 1. Methodology

Each alternative is evaluated based on seven weighted criteria listed below, where each criterion descending by weight value.

**B/C (7)** – FHWA B/C ratio is a new measure on evaluating proposed designs – like Caltrans methodology. The main difference is when evaluating the benefits; where benefits are monetized by primarily crash reduction which would translate to a reduction in travel time and emissions. The FHWA is implementing this new methodology to incorporate the Safe Systems Approach, where evaluating crash severity and frequency is the primary goal of a Project.

**ISOAP Results (6)** – Assessment of each proposed design's safety and operational performance. This includes (but not limited to) the evaluation of crash frequency, operational safety hazards, and review of the existing site to mitigate any potential geometric hazards.

**Environmental Impact (5)** – Evaluation of each proposed design based on the PEAR process.

**Right of Way Impact (3)** – Evaluation of the proposed design's impact on the land, which incorporates (but not limited to) the land's owner (City, Agency, Tribal Land), the geological impacts, and easements acquisitions.

**Complete Streets (4)** – An evaluation to determine the feasibility of recommended complete street elements. Penalties are given based on substituting the recommended element with a less preferable alternative to that element.

**Constructability (2)** – A high-level analysis of each proposed design's ease of staging and may include an assessment on delay due to rerouting or closure to the roadway.

**User Expectations (1)** – A high-level analysis of the driver's behavior due to each design of the alternative; penalty is given (but not limited to) the driver's perceived knowledge of the operations of the facility, the amount of traffic devices to ensure the driver's compliance to the facility, and the roadway "prima facie" (at first glance) to its road users.

## 2. Decision Matrices

Each criterion is weighted on a scale from 1 to 7, where 7 represents the greatest weight to a rating, and 1 represents the lowest weight. Each alternative is given a rating as well as from 1 to 7 and then multiplied by the weight. The purpose of this rating system is to prioritize the alternative based on the most influential criterion. The weighted ratings are totaled from each criterion and the greatest total weighted rating for an alternative would represent the most feasible design alternative for the Project.

The alternative that scored the greatest for the East Ramsey Street interchange is Tight, with a total weighted score of 205. A summary of the scoring is tabulated in Table 1.



The alternative that scored the greatest for the Main Street interchange is Hooks, with a total weighted score of 206. A summary of the scoring is tabulated in Table 2.

Table 1 – East Ramsey Street Interchange							
Criterion	Weight	Alt #1 (Trumpet)		Alt #2 (Hybrid)		Alt #3 (Tight)	
		Rating	Weighted	Rating	Weighted	Rating	Weighted
B/C	7	4	28	9	63	6	42
Traffic Evaluation	6	3	18	9	54	6	36
Environmental Impact	5	4	20	4	20	8	40
Complete Streets	4	5	20	5	20	8	32
Right of Way Impact	3	2	6	5	15	9	27
Constructability	2	4	8	4	8	9	18
User Expectation	1	8	8	10	10	10	10
<b>Total:</b>		-	108	-	190	-	205

Table 2 – Main Street Interchange							
Criterion	Weight	Alt #1 (SPUI)		Alt #2 (Hooks)		Alt #3 (Tight)	
		Rating	Weighted	Rating	Weighted	Rating	Weighted
B/C	7	7	49	9	63	4	28
Traffic Evaluation	6	10	60	6	36	3	18
Environmental Impact	5	7	35	7	35	4	20
Complete Streets	4	7	28	8	32	7	28
Right of Way Impact	3	6	18	8	24	4	12
Constructability	2	5	10	7	14	8	16
User Expectation	1	4	4	2	2	8	8
<b>Total:</b>		-	204	-	206	-	130