

# Chapter 13:

# System Evaluations

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*This chapter identifies criteria for use in evaluating the alternative bi-national alignment systems.*

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## 13.1 Introduction

*The relative feasibility of the alignment alternatives are rated in a matrix based upon identified evaluation criteria.*

### 13.1.1 Purpose and Approach

The purpose of this Chapter is to identify the criteria used to evaluate the relative advantages and disadvantages of each alignment alternative. A quantitative decision process will be used to evaluate the project alternatives and then to comparatively score them on the basis of specific decision criteria. This type of analysis allows many different types of considerations to be evaluated and represented by a single score.

The analysis begins with defining the major project goals, or the Summary Level Criteria, and then dividing each of these into subcategories. The subcategories will be given maximum point values for quantification purposes, with all subcategories adding up to a possible 100 points for each Summary Level Criteria. A matrix evaluation format is used to compare the results.

The point allocations and weighting factors presented in this Chapter are those assigned by each delegation (U.S. and Mexico) of the Binational Technical Committee (BTC).

### 13.1.2 Chapter Outline

This Chapter is divided into the following sections:

- **13.2: Evaluation Criteria**
- **13.3: Criteria Scoring System**
- **13.4: System Evaluation**

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## 13.2 Evaluation Criteria

A total of 20 criteria were selected for evaluation. These criteria were selected because they represent important issues that affect an alignment's viability, are measurable based on available information about the project concepts and differentiate the alternatives from each

*The four primary project goals concern cost, environmental impact, implementation, and operational objectives.*

other. The screening criteria goals were divided into four summary level criteria or goals as follows:

- 1) Minimize Overall Project Cost
- 2) Minimize Adverse Social and Environmental Effects
- 3) Maximize System Implementability
- 4) Maximize Operational Effectiveness and System Reliability

Subcategories were then assigned to each of these categories. A maximum of 100 points is assigned per category. The point allocation shown in **Table 13-1** below is that assigned by the two delegations of the BTC:

**Table 13-1: Screening Criteria, with Sample Maximum Point Scores**

SUMMARY LEVEL CRITERIA (GOALS)											
Minimize Overall Project Costs			Minimize Adverse Social and Environmental Effects			Maximize System Implementability			Maximize Operational Effectiveness and System Reliability		
Weighting Factor: ___%			Weighting Factor: ___%			Weighting Factor: ___%			Weighting Factor: ___%		
SUBCATEGORY CRITERIA (100 Points Each Maximum)											
Criteria	Points (Max.)		Criteria	Points (Max.)		Criteria	Points (Max.)		Criteria	Points (Max.)	
	US	MX		US	MX		US	MX		US	MX
• Total Capital Costs	25	0	• Biology & Sensitive Habitat	35	35	• Bi-National Support	15	20	• System Reliability	30	45
• Life-Cycle Costs	60	80	• Archeology	20	20	• Permit Feasibility	15	20	• Emergency Storage	15	20
• Sensitivity to Higher Energy Costs	15	20	• Hazardous Materials	5	5	• Institutional & Legal Requirements	15	20	• Operational Complexity	20	15
			• Land Use	10	10	• Completion Schedule	30	20	• Access	15	10
			• Construction Traffic	10	5	• Constructability	15	10	• Operational Flexibility / Service Area Benefits	20	10
			• Social Impacts	20	25	• Funding Availability	10	10			

*Summary Level Criteria are subdivided into well-defined evaluation units.*

### 13.2.1 Summary Criteria 1: Minimize Overall Project Cost

This Screening Criteria Goal represents a combination of capital, life cycle and sensitivity to higher energy costs.

- *Capital Costs* include the total cost of design, construction, materials, labor, contingencies, overhead, profit, administration, environmental mitigation, and right-of-way.
- *Life-Cycle Costs* include amortized capital costs plus the total cost of operating and maintaining all facilities, including energy.
- *Energy Cost Sensitivity* represents the relative sensitivity of the alignment's life-cycle costs to higher energy requirements (greater number of facilities requiring power, energy needs from pump stations, treatment plants, etc.).

### 13.2.2 Summary Criteria 2: Minimize Environmental / Social Impacts

This Screening Criteria Goal represents a combination of biological, archeological, hazardous materials, land use, construction traffic, and social subcategories addressing basic environmental issues.

- *Biology and Sensitive Habitat* concerns minimizing the impact to special (endangered or threatened) species, habitat, waters/wetlands or other areas that have been designated to be protected by local, state or federal environmental protection regulations.
- *Archeology* concerns the presence of prehistoric, historic, Native American, or other cultural resource sites that have been previously identified and would be impacted by an alignment.
- *Hazardous Materials* concerns whether any hazardous sites are located within an alignment corridor and the level of remediation that would be required (this does not include hazardous materials to be located at future sites only existing conditions)
- *Land Use* concerns the number of land use impacts, will the project change the general use of an area (i.e. converting farmlands to access roads, etc.).
- *Construction Traffic* concerns minimizing disruptions to local communities from construction traffic (i.e. would access to

businesses, residences, or recreational areas, be disrupted by lengthy detours, delays, etc. caused by construction).

- *Social Impacts* concerns whether the project will cause displacements/relocations of businesses and residents or contribute to changes in lifestyle or standards of living.

### **13.2.3 Summary Criteria 3: Maximize System Implementability**

Subcategories to this Screening Criteria Goal include bi-national support, permit feasibility, institutional & legal requirements, completion schedule, constructability, and funding availability.

- *Bi-National Support* is defined as the governmental parties in the U.S. and Mexico preferring one alignment to another.
- *Permit Feasibility* concerns the level of difficulty involved with obtaining permits required for construction (i.e. can they be obtained and if so, how difficult is the approval process).
- *Institutional and Legal* issues concern the number of institutions or agencies involved in approving the project. Legal issues concern how well an alignment performs in meeting legislative treaties, statutes, codes and regulations.
- *Completion Schedule* measures the projected completion date for each alignment alternative.
- *Constructability* issues concern whether project construction will be easy or difficult (i.e. steep grades, site access conditions, construction corridor widths, staging areas available, phased construction).
- *Funding Availability* addresses the issue of whether funding is readily available or if funding of one alignment would be easier to secure than another.

### **13.2.4 Summary Criteria 4: Maximize Operational Effectiveness and System Reliability**

This Screening Criteria goal examines how well an alternative meets the primary project goals of supplying the allocated water and how easy the facilities will be to operate and maintain. All of the alignments were felt to meet the primary project goals. Therefore, no explicit measures were included for these concerns. Other operational

issues were measured that did present different results. The subcategories include:

- *System Reliability* concerns the risk of system outage based upon the relative probability an alternative being out of service and in need of repair from a range of possible causes (earthquake, landslide, etc.) and the expected time it would take to repair the facility.
- *Emergency Storage* concerns whether the alternative meets the emergency storage needs of the water agency.
- *Operational Complexity* represents the level of difficulty an alternative would be to operate. How easy are the plant's to operate, are there existing standards in place or would they have to be created.
- *Access* concerns whether access to project facilities is available, are there improved roads, trails, or is the terrain easily traversed for maintenance activities.
- *Operational Flexibility / Service Area Benefits* concern whether a project component can be interconnected or used with other existing water facilities to augment water supplies or is it a stand-alone facility.

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### 13.3 Criteria Scoring

*A rating process was developed to factor in different levels of significance for criteria applied in Mexico or the U.S.*

The matrix evaluation process is based upon a scoring method that uses a point system. The point scores reflect performance ratings from numeric assignments. The lower score represents poor performance and the higher score represents better performance.

If several alternatives satisfy a criterion to the same extent, they would be assigned the same score. Specific performance score definitions were developed for each criterion. The alternative that has the highest total score is considered to offer the best balance of minimizing impacts and maximizing benefits. Each alignment will be evaluated on its own merits. Except for cost, the definitions of performance scores were based on absolute, rather than comparative, measures.

It was assumed in the evaluation process, that the portions of the project located in Mexico would be constructed in accordance with Mexican laws and the work within each country would comply with that country's environmental laws. In many cases the alignment alternatives are a combination of construction in the U.S. and in Mexico.

Definitions of the performance score rating system for each criterion are presented below. Score values shown are provided as a suggestion only, with the actual values to be chosen by each country. Higher scores will represent better performance, midrange scores intermediate performance and low scores will represent poor performance.

- **GOAL 1: MINIMIZE OVERALL PROJECT COSTS**

Total Capital Costs

These are rated in order of the estimated values from highest to lowest. The lowest cost alternative will score the maximum points for this criterion and higher cost alternatives score fewer points, but no alternative would receive less than one point.

Life Cycle Costs

These are rated in the same manner as Total Capital Costs.

Sensitivity to Higher Energy Costs

The alternative with the lowest total energy requirements scores the maximum points for this criterion. An alternative with medium energy requirements would score less points (approximately half) and the alternative with the highest energy requirements would score the lowest points (one point or more).

- **GOAL 2: MINIMIZE ADVERSE SOCIAL AND ENVIRONMENTAL EFFECTS**

Biology and Sensitive Habitat – Based upon the maximum points assigned by each country, the alternatives would score as follows:

Maximum = No impacts to existing sensitive wildlife species or habitats.

*Numeric point values included in this Chapter were selected by the BTC.*

Mid-Range = Potential adverse impacts to sensitive wildlife species, resulting in the temporary loss of occupied habitat for a core population of listed animal species.

Minimum = Unavoidable adverse impacts would result in the permanent loss of occupied habitat used by the core population of listed animal species, or would affect a "narrow" endemic species.

Archeology - as follows:

Maximum = No known historic or pre-historic resources or Native American Traditional Cultural Properties would be impacted.

Mid-Range = One or more untested, but unlikely to be significant (based on survey data only) archeological site(s), or no more than one potentially eligible site are known to exist within or is contiguous to the alternative.

Minimum = One or more previously known (evaluated and/or tested) significant, or more than one potentially eligible archeological site(s) are present within or contiguous to the alternative.

Hazardous Materials - as follows:

Maximum = No contaminated sites are evident along the entire alignment.

Mid-Range = Contaminated site(s) identified along the alignment would not be expected to affect project construction or operation.

Minimum = Contaminated site(s) identified along the alignment could affect project construction operation.

Land Use - as follows

Maximum = Over 75% of the project facilities would be located in urban development or vacant land, and the remainder would not be of an incompatible use and right-of-way for majority of property is readily available.

Mid-Range = The project would be located in prime agricultural land, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance that is available for farming and some lands may be privately owned.

Minimum = The project would be located in an area, or areas designated for extraction or mining other uses not compatible with the project or the alignment crosses numerous private parcels and right-of-way negotiations will be required.

Construction Traffic - as follows:

Maximum = Project does not interfere with existing traffic patterns, flow, or volume during construction.

Mid-Range = Project has minimal impacts on existing traffic patterns, flow, or volume during construction, and does not reduce the availability of existing parking.

Minimum = Project requires traffic detours or creates substantial delays in traffic flow during construction or reduces carrying capacity or existing parking.

Social Impacts - as follows:

Maximum = No residents or businesses displaced, improve standard of living in area.

Mid-Range = A couple of displacements, no change in standard of living.

Minimum = Many displacements or decrease in standard of living.

• **GOAL 3: MAXIMIZE SYSTEM IMPLEMENTABILITY**

Bi-National Support - as follows:

Maximum = Project proponents and lead agencies support project.

Mid-Range = Mixed reaction from project proponents and lead agencies.

Minimum = Negative reaction from one country or both.

Permit Feasibility - as follows:

- Maximum = Permit requirements few or covered under existing programs.
- Mid-Range = Permitting requirements involve a few agencies or departments not currently involved in the project and local agency permits.
- Minimum = Permitting requirements involve many agencies on the federal, state and local levels and would require significant time and effort to obtain approval and could be potential fatal flaws.

Institutional and Legal Requirements - as follows:

- Maximum = Alignment meets or exceeds the international treaty and bi-national agreement goals and legislation applicable to each country. Property administration issues for this project would involve no agencies different from those identified in IBWC Minute No. 301.
- Mid-Range = Institutional control and property administration issues for this project would involve one or two agencies different from those identified in IBWC Minute No. 301 and is in general conformance with the international treaties and bi-national agreements.
- Minimum = Institutional control and property administration issues involve three or more agencies different than those identified in IBWC Minute No. 301 or alternative conflicts with international treaty and bi-national agreements.

Completion Schedule - as follows:

- Maximum = Earliest construction completion date.
- Mid-Range = Mid-range (between earliest and latest) construction completion date.
- Minimum = Latest construction completion date.

Constructability –as follows:

- Maximum = Excavation is expected to be easy, and no blasting or special construction difficulties are anticipated.

Staging area(s) for construction would not impact sensitive natural resources and would not require arrangement of easement

Mid-Range = Excavation is expected to be in hard formations but no blasting or other special construction difficulties are anticipated. Staging area(s) for construction would not impact sensitive natural resources but would require arrangement of easement.

Minimum = Blasting may be required, or special construction difficulties, such as concrete paved streets, are anticipated. Staging area(s) for construction would impact sensitive resources and would require arrangement of easement, or staging area(s) could not be located within 1 mile of the alignment.

Funding Availability - as follows:

Maximum = Firm commitments for funding have been identified.

Mid-Range = Potential commitments for funding have been identified.

Minimum = Funding sources not known.

- **GOAL 4: MAXIMIZE OPERATIONAL EFFECTIVENESS AND SYSTEM RELIABILITY**

System Reliability- as follows:

Maximum = No risk of system outage from natural or manmade events.

Mid-Range = Minimal risk of system outage from natural or manmade events.

Minimum = High risk of system outage from natural or manmade events.

Emergency Storage - as follows:

Maximum = Alternative provides emergency storage required by each country.

Mid-Range = Alternative meets emergency storage needs for only one country.

Minimum = Alternative does not meet emergency storage needs of either country.

Operational Complexity- as follows:

Maximum = Facilities are unmanned or minimally staffed and easy to operate.

Mid-Range = Facility must be staffed, but can be low level, medium (some training required to operate).

Minimum = Fully staffed facilities, with difficult operating procedures, not automated.

Access - as follows:

Maximum = Facilities are accessible by existing roads.

Mid-Range = Portions of alignment are inaccessible or require new access roads.

Minimum = Majority of alignment is inaccessible by existing roads. Substantial construction required for new access roads.

Operational Flexibility/Service Area Benefits- as follows:

Maximum = System can tie into numerous other existing systems or in several different ways to create operating alternatives for water purveyor.

Mid-Range = System can tie into one or two other systems, mid-range of alternatives available to water purveyor.

Minimum = System not capable of tying into any other system.

## 13.4 System Evaluation

Each country conducted its own evaluation of the alignments. At the summary goal level, each country has assigned its own weighting factors to the four goals, as shown in **Table 13-2** below.

**Table 13-2: Goal Weighting Factors**

SUMMARY LEVEL CRITERIA (GOALS)	WEIGHTING FACTORS	
	U.S.	MEX.
1. Minimize Overall Project Costs	40%	60%
2. Minimize Adverse Social and Environmental Effects	25%	20%
3. Maximize System Implementability	20%	10%
4. Maximize Operational Effectiveness and System Reliability	15%	10%
<b>Total:</b>	100%	100%

**Table 13-3 and 13.4 below** present Screening Criteria Evaluation Matrices. Each matrix includes each of the ten alignments identified in this feasibility study and is based upon the screening criteria and scoring method described in this chapter. It is separated into Summary Level Goals with respective subcategories. The scores shown are those entered separately by the United States (Table13-3) and Mexican (Table 13-4) delegations of the BTC.

**Table 13-3: Screening Criteria Evaluation Matrix – United States (US)**

<b>Goal 1: Minimize Overall Project Cost</b>											
	<b>Max. Pts.</b>	1	2	3	4	5	6	7	8	9	10
	<b>US</b>	US	US	US	US	US	US	US	US	US	US
Total Capital Costs	25	25	24.1	24.4	24.7	12.4	12	17.5	23.7	22.3	22.1
Life-Cycle Costs (exc. Energy)	60	50.7	57.3	56.7	60	38	30	44	53.3	50.7	56.0
Sensitivity to Higher Energy Costs	15	7	9.7	9.9	11.5	10.5	9.5	9.6	9.6	15	11.3
<b>Goal 1 Point Subtotal:</b>	<b>100</b>	<b>82.7</b>	<b>91.1</b>	<b>91</b>	<b>96.2</b>	<b>60.9</b>	<b>51.5</b>	<b>71.1</b>	<b>86.6</b>	<b>88</b>	<b>89.4</b>
<b>Goal 1 Weighted Point Subtotal:</b>	<b>40</b>	<b>33.1</b>	<b>36.4</b>	<b>36.4</b>	<b>38.5</b>	<b>24.4</b>	<b>20.6</b>	<b>28.4</b>	<b>34.6</b>	<b>35.2</b>	<b>35.8</b>
<b>Goal 2: Minimize Adverse Social and Environmental Effects</b>											
	<b>Max. Pts.</b>	1	2	3	4	5	6	7	8	9	10
	<b>US</b>	US	US	US	US	US	US	US	US	US	US
Biology and Sensitive Habitat	35	21	28	24.5	21	21	21	21	24.5	28	28
Archeology	20	20	20	20	20	20	20	20	20	20	20
Hazardous Materials	5	4.5	4	3.5	3.5	4	4.5	4.5	4.5	4.5	4
Land Use	10	9	10	10	10	9	7.5	7.5	8	7.5	8.5
Construction Traffic	10	9	9	9	9	9	9	9	9	9	6
Social Impacts	20	12	16	16	16	14	14	14	16	12	14
<b>Goal 2 Point Subtotal:</b>	<b>100</b>	<b>75.5</b>	<b>87</b>	<b>83</b>	<b>79.5</b>	<b>77</b>	<b>76</b>	<b>76</b>	<b>82</b>	<b>81</b>	<b>80.5</b>
<b>Goal 2 Weighted Point Subtotal:</b>	<b>25</b>	<b>18.9</b>	<b>21.8</b>	<b>20.8</b>	<b>19.9</b>	<b>19.3</b>	<b>19.0</b>	<b>19.0</b>	<b>20.5</b>	<b>20.3</b>	<b>20.1</b>
<b>Goal 3: Maximize System Implementability</b>											
	<b>Max. Pts.</b>	1	2	3	4	5	6	7	8	9	10
	<b>US</b>	US	US	US	US	US	US	US	US	US	US
Bi-National Support	15	12.8	14.2	14.2	15	10.5	7.5	12.8	14.2	4.5	12.8
Permit Feasibility	15	12	12	12	12	10.5	10.5	10.5	10.5	7.5	12
Institutional & Legal Requirements.	15	12	12	12	12	10.5	10.5	10.5	10.5	6	12
Completion Schedule	30	24	24	24	24	24	24	24	24	15	24
Constructability	15	15	12	10.5	10.5	12	12	12	15	7.5	12
Funding Availability	10	7	7	7	7	7	7	7	10	5	7
<b>Goal 3 Point Subtotal:</b>	<b>100</b>	<b>82.8</b>	<b>81.2</b>	<b>79.7</b>	<b>80.5</b>	<b>74.5</b>	<b>71.5</b>	<b>76.8</b>	<b>84.2</b>	<b>45.5</b>	<b>79.8</b>
<b>Goal 3 Weighted Point Subtotal:</b>	<b>20</b>	<b>16.6</b>	<b>16.2</b>	<b>15.9</b>	<b>16.1</b>	<b>14.9</b>	<b>14.3</b>	<b>15.4</b>	<b>16.8</b>	<b>9.1</b>	<b>16</b>
<b>Goal 4: Maximize Operational Effectiveness and Reliability</b>											
	<b>Max. Pts.</b>	1	2	3	4	5	6	7	8	9	10
	<b>US</b>	US	US	US	US	US	US	US	US	US	US
System Reliability	30	27.0	19.5	13.5	13.5	19.5	19.5	19.5	27.0	9.0	19.5
Emergency Storage	15	15	15	15	15	15	15	15	7.5	7.5	15
Operational Complexity	20	14.0	16.0	16.0	17.0	15.0	16.0	15.0	16.0	18.0	18.0
Access	15	9.8	10.5	10.5	10.5	9.8	10.5	10.5	12.8	13.5	10.5
Operational Flexibility / Service Area Benefits	20	18	18	18	18	18	18	18	19	19	19
<b>Goal 4 Point Subtotal:</b>	<b>100</b>	<b>83.8</b>	<b>79</b>	<b>73</b>	<b>74</b>	<b>77.3</b>	<b>79.0</b>	<b>78</b>	<b>82.3</b>	<b>67</b>	<b>82.0</b>
<b>Goal 4 Weighted Point Subtotal:</b>	<b>15</b>	<b>12.6</b>	<b>11.9</b>	<b>11.0</b>	<b>11.1</b>	<b>11.6</b>	<b>11.9</b>	<b>11.7</b>	<b>12.3</b>	<b>10.1</b>	<b>12.3</b>
<b>OVERALL WEIGHTED POINT TOTAL:</b>	<b>100</b>	<b>81.1</b>	<b>86.3</b>	<b>84.0</b>	<b>85.6</b>	<b>70.1</b>	<b>65.8</b>	<b>74.5</b>	<b>84.3</b>	<b>74.6</b>	<b>84.1</b>

**Table 13-4: Screening Criteria Evaluation Matrix – Mexico (MX)**

<b>Goal 1: Minimize Overall Project Cost</b>											
	<b>Max. Pts.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>
Total Capital Costs	0	-	-	-	-	-	-	-	-	-	-
Life-Cycle Costs (exc. Energy)	80	76.4	78.9	78.7	80	72	69.4	74	77.4	50	78.4
Sensitivity to Higher Energy Costs	20	13.2	16.6	16.9	20	17.9	16.3	16.4	16.4	20	19.5
<b>Goal 1 Point Subtotal:</b>	<b>100</b>	<b>89.6</b>	<b>95.5</b>	<b>95.6</b>	<b>100</b>	<b>89.9</b>	<b>85.7</b>	<b>90.4</b>	<b>93.8</b>	<b>70</b>	<b>97.9</b>
<b>Goal 1 Weighted Point Subtotal:</b>	<b>60</b>	<b>53.8</b>	<b>57.3</b>	<b>57.4</b>	<b>60</b>	<b>53.9</b>	<b>51.4</b>	<b>54.2</b>	<b>56.3</b>	<b>42</b>	<b>58.7</b>
<b>Goal 2: Minimize Adverse Social and Environmental Effects</b>											
	<b>Max. Pts.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>
Biology and Sensitive Habitat	35	16	17	17	16	13	13	14	13	13	18
Archeology	20	20	20	20	20	20	20	20	20	17.5	20
Hazardous Materials	5	4	4	3.5	3.5	3	3.5	3.5	3.5	3	3.5
Land Use	10	3.5	4	3.5	3.5	4	4	5	5	5	6
Construction Traffic	5	4	4.5	4.5	4	4	4.5	4.5	4.5	3	3
Social Impacts	25	20	20	20	20	17.5	16	16	16	13.5	18
<b>Goal 2 Point Subtotal:</b>	<b>100</b>	<b>67.5</b>	<b>69.5</b>	<b>68.5</b>	<b>67.0</b>	<b>61.5</b>	<b>61</b>	<b>63</b>	<b>62</b>	<b>55</b>	<b>68.5</b>
<b>Goal 2 Weighted Point Subtotal:</b>	<b>20</b>	<b>13.5</b>	<b>13.9</b>	<b>13.7</b>	<b>13.4</b>	<b>12.3</b>	<b>12.2</b>	<b>12.6</b>	<b>12.4</b>	<b>11.0</b>	<b>13.7</b>
<b>Goal 3: Maximize System Implementability</b>											
	<b>Max. Pts.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>
Bi-National Support	20	13.2	13.2	13.2	8.4	4.5	4.6	8.6	13	10	11.6
Permit Feasibility	20	16	16	16	12	6	6	3	3	1	16
Institutional & Legal Requirements.	20	8	8	8	6	4	5	3	1	2	7
Completion Schedule	20	20	20	20	20	15	10	10	10	1	20
Constructability	10	5	3	1	2	3	4	8	7	0	6
Funding Availability	10	10	9	9	8	5	5	7	9	5	8
<b>Goal 3 Point Subtotal:</b>	<b>100</b>	<b>72.2</b>	<b>69.2</b>	<b>67.2</b>	<b>56.4</b>	<b>37.5</b>	<b>34.6</b>	<b>39.6</b>	<b>43.0</b>	<b>19.0</b>	<b>68.6</b>
<b>Goal 3 Weighted Point Subtotal:</b>	<b>10</b>	<b>7.2</b>	<b>6.9</b>	<b>6.7</b>	<b>5.6</b>	<b>3.8</b>	<b>3.5</b>	<b>4.0</b>	<b>4.3</b>	<b>1.9</b>	<b>6.9</b>
<b>Goal 4: Maximize Operational Effectiveness and Reliability</b>											
	<b>Max. Pts.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>	<b>MX</b>
System Reliability	45	8	17	17	21	17	21	28	28	14	28
Emergency Storage	20	20	20	20	20	20	20	20	0	6	20
Operational Complexity	15	11	12	12	13	11	12	11	12	15	15
Access	10	4	8	6	6	8	10	8	8	1	8
Operational Flexibility / Service Area Benefits	10	8	9	10	10	9	7	5	1	1	9
<b>Goal 4 Point Subtotal:</b>	<b>100</b>	<b>51</b>	<b>66</b>	<b>65</b>	<b>70</b>	<b>65</b>	<b>70</b>	<b>72</b>	<b>49</b>	<b>37</b>	<b>80</b>
<b>Goal 4 Weighted Point Subtotal:</b>	<b>10</b>	<b>5.1</b>	<b>6.6</b>	<b>6.5</b>	<b>7</b>	<b>6.5</b>	<b>7</b>	<b>7.2</b>	<b>4.9</b>	<b>3.7</b>	<b>8</b>
<b>OVERALL WEIGHTED POINT TOTAL:</b>	<b>100</b>	<b>79.6</b>	<b>84.7</b>	<b>84.3</b>	<b>86.0</b>	<b>76.5</b>	<b>74.1</b>	<b>78.0</b>	<b>77.9</b>	<b>58.6</b>	<b>87.3</b>

Final scores for the alignments are determined by applying the goal weighting factors to the total raw scores for each summary goal and for each alignment system, and then summing the weighted score subtotals. The highest total weighted score is rated as the preferred alignment. **Table 13-5** below provides a summary table showing each country's ranked scores, as well as a combined ranking of alternatives.

**Table 13-5: Ranking of Alternatives Based on Total Weighted Scores**

U.S. RANKING			MEXICO RANKING			COMBINED RANKING		
RANK	ALIGNMENT	SCORE	RANK	ALIGNMENT	SCORE	RANK	ALIGNMENT	SCORE
1	2	86.3	1	10	87.3	1	4	171.6
2	4	85.6	2	4	86	2	10	171.4
3	8	84.3	3	2	84.7	3	2	171.0
4	10	84.1	4	3	84.3	4	3	168.3
5	3	84.0	5	1	79.6	5	8	162.2
6	1	81.1	6	7	78	6	1	160.7
7	9	74.6	7	8	77.9	7	7	152.5
8	7	74.5	8	5	76.5	8	5	146.6
9	5	70.1	9	6	74.1	9	6	139.9
10	6	65.8	10	9	58.6	10	9	133.2

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