

APPENDIX B: COST ENGINEERING

COST ANALYSIS

Cost Benefit Ratio

Each alternative in this study was compared using a cost-benefit methodology. The benefits reflect the advantages of restoring the eco system or “eco benefits”. The total project costs associated with each plan reflect the cost side of the ratio.. The cost benefit array for the alternatives provided a good measurement tool to evaluate the best ecological return for a given investment.

Cost Methodology

In a typical study, alternatives are selected for evaluation by the Project Delivery Team (PDT) The designers take each alternative and prepare a preliminary design for that alternative which includes the necessary design quantities. A construction cost is then calculated based on these scoping quantities. The quantities for the final selected plan, Alternative V, are shown in Table 32. Material quantities were provided by the US Army Corps of Engineers (USACE) Memphis District Design Branch. The only deviation from these quantities was associated with the various plant habitat on the project. The Design Engineer provided plant quantities in acres. The Galveston District Biologist provided additional application rates for the various plant species as follows:

- Riparian Planting – 300 plants per acre
- Emergent Habitat Planting – 40’ c-c spacing
- Emergent Habitat Planting (Herbaceous) – 3’ c-c spacing

Using the plant space calculator found at <http://www-users.math.umn.edu/~white004/personal/plantcalc.html> , the cost estimator was able to populate plant quantities for the three species as shown in Table 32 below.

Table 1. Alternative V - Scheduled Quantity Values

| Seg. | Silt Fence | A. | B. | C. | D. | E. | F. | G. | H. | I. | J. | K. | L. | M. |
|-------------|-------------------|-----------|-----------|-----------|--------------|-----------|-----------|--------------|-----------|--------------|-----------|-----------|-----------|-----------|
| No. | LF | EA | EA | EA | Acres | CY | EA | Acres | EA | Acres | EA | CY | EA | CY |
| 40 | 3,545 | 2 | | 1 | 31.49 | 2889 | 8502 | 28.34 | 38 | 31.49 | 6,818 | | | 944 |
| 41 | 2,575 | 2 | | 1 | 15.80 | 2098 | 6105 | 20.35 | 27 | 20.35 | 4,973 | | 1 | 861 |
| 42 | 4,950 | 1 | | 1 | 35.18 | 4033 | 41325 | 47.75 | 53 | 53.05 | 9,500 | | 1 | 1,319 |
| 43 | 4,800 | 3 | | 1 | 33.99 | | 9177 | 30.59 | | 33.99 | | | | |
| 44 | 2,700 | 2 | | 1 | 5.55 | 2200 | 5583 | 18.61 | 29 | 18.61 | 5,197 | | | 718 |
| 45 | 525 | 1 | | 1 | 4.87 | 428 | 1461 | 4.87 | 5 | 4.87 | 1,005 | | | 139 |
| 46 | 2,525 | 2 | | 1 | 4.09 | 2057 | 615 | 2.05 | 27 | 4.09 | 4,862 | | | 667 |
| 53 | | 1 | 1 | 1 | | | | | | | | 7,863 | | |
| 54 | | 1 | 1 | 1 | | | | | | | | 41,665 | | |
| 59 | 1,710 | 1 | | 1 | 1.68 | 1,393 | 609 | 2.03 | 18 | 3.03 | 3,297 | | 1 | 472 |
| 60 | | 1 | 1 | 1 | | | | | | | | 14,571 | | |
| 61 | 768 | 1 | 1 | 1 | 3.81 | 142 | 495 | 1.65 | 8 | 3.3 | 1,453 | 72,713 | | 236 |
| 62 | 658 | 1 | 1 | 1 | 1.38 | 341 | 183 | 0.61 | 7 | 1.21 | 1,285 | 14,341 | | 194 |
| 66 | 1,600 | 1 | 1 | 1 | 14.02 | 830 | 1989 | 6.63 | 17 | 13.25 | 3,073 | 21,198 | | 1,111 |
| 67 | 3,900 | 3 | | 1 | 10.46 | 3,178 | 4,911 | 16.37 | 42 | 18.2 | 7,488 | | | 1,051 |
| 71 | 989 | 2 | | 1 | 5.45 | 806 | 2,007 | 6.69 | 10 | 7.43 | 1,900 | | | 278 |
| 72 | 2,336 | 1 | | 1 | 4.37 | 1,903 | 2,148 | 7.16 | 25 | 7.96 | 4,471 | | | 694 |
| 75 | 5,540 | 1 | 1 | 1 | 0.25 | 4,514 | 288 | 0.96 | 60 | 1.07 | 10,674 | 47,920 | | 764 |
| 76 | 620 | 1 | | 1 | 0.25 | 505 | 195 | 0.65 | 6 | 0.65 | 1,173 | | | 174 |
| 84 | 3,191 | 2 | 1 | 1 | 5.58 | 2,600 | 2,823 | 9.41 | 34 | 9.41 | 6,147 | 50,101 | | 833 |
| 93 | 5,148 | 2 | | 1 | 13.25 | | 324 | 1.08 | 55 | 4.36 | 9,892 | *42,235 | 1 | 958 |
| 94 | 3,750 | 2 | | 1 | 9.67 | | 357 | 1.19 | 40 | 4.79 | 7,209 | *46,351 | 1 | 694 |
| 95 | 9,670 | 2 | | 1 | 20.87 | | 5,634 | 18.78 | 104 | 20.87 | 18,610 | *202,035 | 1 | 2,778 |
| 96 | 1,345 | 2 | | 1 | 12.43 | 1,096 | 3,729 | 12.43 | 14 | 12.43 | 2,570 | | | 431 |
| 161 | 14,815 | 2 | | 1 | 18.83 | | 5,649 | 18.83 | 160 | 18.83 | 28,502 | *141,460 | 1 | 4,444 |
| 98 | 4,887 | 1 | | 1 | 7.88 | 3,982 | 4,839 | 16.13 | 52 | 17.92 | 9,389 | | | 1,417 |
| 99 | 3,118 | 1 | | 1 | 5.95 | 2,541 | 2,445 | 8.15 | 33 | 9.06 | 5,979 | | 1 | 861 |
| 100 | 1,930 | 2 | | 1 | 7.72 | 1,573 | 2,196 | 7.32 | 21 | 8.14 | 3,744 | | 1 | 500 |
| 101 | 6,762 | 1 | | 1 | 21 | 5,510 | 13,593 | 45.31 | 73 | 45.31 | 13,021 | | | 1,833 |
| 104 | 4,727 | 1 | | 1 | 5.71 | 3,852 | 5,592 | 18.64 | 51 | 18.64 | 9,109 | | | 1,278 |
| 105 | 6,409 | 1 | 1 | 1 | 11.72 | 2,374 | 8,712 | 29.04 | 69 | 29.04 | 12,351 | 81,985 | 1 | 1,750 |
| 108 | 2,053 | 1 | 1 | 1 | 1.91 | 1,977 | 873 | 2.91 | 22 | 2.91 | 3,968 | 10,466 | | 236 |
| 109 | 3,171 | 1 | 1 | 1 | 8.17 | 2,584 | 2,724 | 9.08 | 34 | 9.08 | 6,091 | 33,951 | 1 | 1,333 |
| 110 | 2,345 | 1 | | 1 | 8.68 | 1,911 | 2,280 | 7.6 | 25 | 10.13 | 4,526 | | | 639 |

| | | | | | | | | | | | | | | |
|--------------|----------------|-----------|-----------|-----------|---------------|---------------|----------------|---------------|--------------|---------------|----------------|------------------|-----------|---------------|
| 111 | 2,201 | 1 | 1 | 1 | 0.38 | 1,793 | 399 | 1.33 | 23 | 1.33 | 4,247 | 56,056 | | 139 |
| 112 | 2,465 | 2 | | 1 | 15.47 | 3,378 | 4,083 | 13.61 | 26 | 15.12 | 4,750 | | | 667 |
| 117 | 6,070 | 3 | 1 | 1 | 15.17 | 4,946 | 2,928 | 9.76 | 65 | 14.58 | 11,680 | 65,971 | 1 | 944 |
| 142 | 5,047 | 1 | 1 | 1 | 8.79 | 4,112 | 1,983 | 6.61 | 54 | 9.86 | 9,724 | 134,844 | 1 | 1,333 |
| 149 | 3,229 | 3 | 1 | 1 | 8.73 | 2,631 | 1,551 | 5.17 | 34 | 6.89 | 6,203 | 11,748 | | 556 |
| 150 | | 1 | 1 | 1 | | | | | | | | 20,053 | | |
| 151 | | 1 | 1 | 1 | | | | | | | | 19,715 | | |
| 166 | 5,071 | 1 | | 1 | 11.29 | | 1,932 | 6.44 | 55 | 7.15 | 9,780 | *20,605 | 1 | 1,306 |
| 167 | 17,321 | 1 | 1 | 1 | 60.62 | | 15,282 | 50.94 | 187 | 56.60 | 33,308 | 122,404 | | 4,028 |
| 201 | 10,137 | 1 | | 1 | 29.47 | 8,260 | 3,615 | 12.05 | 109 | 48.21 | 19,504 | | | 2,736 |
| 202 | 4,790 | 3 | | 1 | 9.71 | 3,903 | 4,683 | 15.61 | 51 | 15.61 | 9,221 | | | 1,361 |
| Total | 169,393 | 68 | 18 | 45 | 491.64 | 86,340 | 156,819 | 522.73 | 1,763 | 618.82 | 316,694 | 1,280,251 | 14 | 42,040 |

* Items with this denotation indicate the Resaca is dry therefore land based equipment was used in lieu of dredging equipment.

- A. – Construction Entrance and Exit
- B. – Turbidity Curtain
- C. – Environmental Protection
- D. – Clearing and Grubbing
- E. – Pervious Backfill
- F. – Riparian Planting (Shrubs)
- G. – Riparian Turfing
- H. – Emergent Habitat Planting
- I. – Removal of Invasive Species
- J. - Emergent Habitat Planting (Herbaceous)
- K. – Dredging
- L. – Control Structure Modifications
- M. – Top Soil

For this project, there were 64 segments across three Resaca's: Town Resaca, Resaca de La Guerra, and Resaca Del Rancho Viejo. In order to evaluate alternatives, each segment was costed. Costs were formulated for each element of work identified. The different elements of work are shown in Table 32 above. Generally, in an alternative selection phase, the cost estimator simply uses a parametric or unit cost type estimate for deriving costs. However; on this particular study the cost estimator elected to go ahead and formulate costs using a detailed cost estimate format including the use of U.S Army Corps of Engineers' (USACE) MII software. Within the software the cost estimator constructed a bid schedule of quantities based upon design and proceeded to formulate costs. There are 4 subgroups to the direct cost formulation for each bid item. They include labor, equipment, materials and subcontracting. The software breaks down the costs into these subgroups and applies indirect overheads and profit. Labor rates were reviewed from Davis Bacon wage rates provided at <http://www.wdol.gov/dba.aspx>. However; the labor rates ultimately used were provided in the MII 2015 costbook consistent with Galveston Districts standard operating practice.

Equipment was selected based on historic experience, preference, and crew makeup. Within the MII software there is an RSMeans Database from which equipment can be selected. Every couple of years these databases for labor and equipment are reevaluated and indexed to the current year. The equipment manual is divided based on region and Brownsville, TX is in Region VI. Fuel Prices were taken from the AAA fuel gage report website (<http://gasprices.aaa.com>). Since Brownsville is not found in the database, the fuel prices for the next closest city in proximity (Corpus Christi, TX) were used. Since fuel prices have remained stable for the last five years, current rates were presumed to be adequate as escalation will be captured in future re-calculations of the estimate. Standard practice at the Memphis District has been to deduct 0.40 cents per gallon from the cost of on road diesel to arrive at the cost for off road diesel. This has been consistent with what our estimators have observed in the field.

Material prices were provided by local suppliers within the Brownsville, Texas area. The items that the estimator had quoted were the material and delivery costs for pervious backfill and top soil. Quotes for plantings including the Riparian Shrubs, Riparian Turfing, Emergent Habitat Planting, Emergent Habitat Planting (Herbaceous), and turfing were provided by the Nature Conservancy in Brownsville, TX.

In order to populate direct costs within the project; labor and equipment are combined into crews. Production rates are then applied to the crews based on the estimator's knowledge and experience. Once the materials and crews are tied to the quantities and production rates, they produce the direct costs for that item of work. For this project, the estimator elected to subcontract the landscaping and environmental controls for the project. The Prime Contractor was assumed to construct the remaining items including the dredging work. All aforementioned direct costs had indirect costs applied. Indirect costs are the costs that are not specifically associated with any one item of work but with multiple items of work. Indirect costs applied include job office overhead, home office overhead, profit and bond. These items are distributed as a % over the construction items. Job office overhead is generally found to range between 5-10% in

the U.S. but it can be more based on the project itself. Home Office generally ranges between 7-15% but can also be more based upon government allowed expenses and accounting practices. Profit generally ranges from 3-12% based upon competition and type of work. Bond generally ranges from 1-2% and is based on the contractors past history of performance.

Segment Evaluation – Indirect Costs

When estimating costs for each segment of work, a project schedule was forecast for that segment and the corresponding days were used to calculate the job office overhead costs. The Home Office percentage used was 8% and profit percentage used was 10%. This was based upon historical rates seen for similar projects of this type. Bond rates were determined based on the Class B surety rates within the MII software. The abbreviated risk analysis was used to calculate risks for each item of work and then applied to each segment accordingly. A copy of the risk analysis used in the segment evaluation is provided in **Appendix I**. The rates above were used for the Prime Contractor. For the subcontractor's costs, the estimator used the following rates:

- subJOOH – 5%
- subHOOH – 5%
- Profit – 10%

Bond – Bond Table calculated using Class B.

TENTATIVELY SELECTED PLAN (TSP)

Evaluation – Indirect Costs

The Biologist in reviewing alternatives combined segments to make 8 alternatives from which to evaluate. These were evaluated on the sum of the segment cost vs habitat benefit. The final selected plan was Alternative V. The following rates were used for this alternative:

- JOOH – 10%
- HOOH – 10%
- Profit - 10%
- Bond – Bond Table calculated using Class B.

The subcontractor's rates for Alternative V did not change.

TPCS – Total Project Cost Summary

Once the construction costs were formulated they could then be entered into the Total Project Cost Summary (TPCS). The TPCS for the final selected alternative, Alternative V, is provided below.

**** TOTAL PROJECT COST SUMMARY ****

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PROJECT: **Brownsville Resacas Feasibility Eco Restoration Study ALT V**
PROJECT NO:
LOCATION: **Brownsville, Texas**

DISTRICT: **Galveston District**

PREPARED: **5/26/2017**

POC: **Welch, Jerry, Chief Cost Engineering, Memphis District**

This Estimate reflects the scope and schedule in report: **Feasibility Study**

| Civil Works Work Breakdown Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | |
|--------------------------------------|--|------------------|-----------------|----------|------------------|---|------------------|-----------------|---|------------------------|-----------------------------------|------------------|-----------------|------------------|
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | COST (\$K) | CNTG (\$K) | CNTG (%) | TOTAL (\$K) | Program Year (Budget EC): Effective Price Level Date: 2019 1-Oct-18 | | | | TOTAL FIRST COST (\$K) | ESC (%) | COST (\$K) | CNTG (\$K) | FULL (\$K) |
| | | | | | | ESC (%) | COST (\$K) | CNTG (\$K) | REMAINING COST (\$K) Spent Thru: 5/23/2017 | | | | | |
| 02 | RELOCATIONS | \$4,185 | \$753 | 18% | \$4,938 | 1.9% | \$4,265 | \$768 | \$5,033 | \$5,033 | 19.5% | \$5,098 | \$918 | \$6,015 |
| 06 | FISH AND WILDLIFE FACILITIES | \$83,699 | \$15,066 | 18% | \$98,765 | 1.9% | \$85,309 | \$15,356 | \$100,664 | \$100,664 | 19.5% | \$101,952 | \$18,351 | \$120,303 |
| CONSTRUCTION ESTIMATE TOTALS: | | \$87,884 | \$15,819 | | \$103,703 | 1.9% | \$89,574 | \$16,123 | \$105,697 | \$105,697 | 19.5% | \$107,050 | \$19,269 | \$126,319 |
| 01 | LANDS AND DAMAGES | \$87,386 | \$17,477 | 20% | \$104,863 | 1.9% | \$89,066 | \$17,813 | \$106,879 | \$106,879 | 17.2% | \$104,355 | \$20,871 | \$125,226 |
| 30 | PLANNING, ENGINEERING & DESIGN | \$13,183 | \$2,373 | 18% | \$15,556 | 3.9% | \$13,697 | \$2,465 | \$16,163 | \$16,163 | 38.7% | \$18,992 | \$3,419 | \$22,411 |
| 31 | CONSTRUCTION MANAGEMENT | \$13,183 | \$2,373 | 18% | \$15,556 | 3.9% | \$13,697 | \$2,465 | \$16,163 | \$16,163 | 43.4% | \$19,642 | \$3,535 | \$23,177 |
| PROJECT COST TOTALS: | | \$201,636 | \$38,042 | 19% | \$239,678 | | \$206,034 | \$38,867 | \$244,902 | \$244,902 | 21.3% | \$250,039 | \$47,094 | \$297,133 |

- _____ Welch, Jerry, Chief Cost Engineering, Memphis District
- _____ Shakhar, Misar, Project Management Galveston District
- _____ Nelson, Timothy J., Chief Real Estate, Galveston Dis
- _____ Laird, Diana J., Chief Planning, Galveston District
- _____ Clay, Michael, Chief Design Branch, Memphis District
- _____ Hrametz, Joseph, Chief Operations, Galveston District
- _____ Carelock, Don, Chief Construction, Galveston District
- _____ Cole, Curtis, Chief Contracting, Galveston District
- _____ Thomas, Robert C., Chief PM-PB, Galveston District
- _____ Miller, Valerie, Chief DPM, Galveston District

ESTIMATED TOTAL PROJECT COST: \$297,133
ESTIMATED FEDERAL COST: 55% \$163,423
ESTIMATED NON-FEDERAL COST: 45% \$133,710

22 - FEASIBILITY STUDY: \$5,448
ESTIMATED FEDERAL COST: 53% \$2,874
ESTIMATED NON-FEDERAL COST: 47% \$2,574

ESTIMATED FEDERAL COST OF PROJECT \$166,297

**** TOTAL PROJECT COST SUMMARY ****

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**** CONTRACT COST SUMMARY ****

PROJECT: Brownsville Resacas Feasibility Eco Restoration Study ALT V
LOCATION: Brownsville, Texas
This Estimate reflects the scope and schedule in report: Feasibility Study

DISTRICT: Galveston District
POC: Welch, Jerry, Chief Cost Engineering, Memphis District
PREPARED: 5/26/2017

| WBS Structure | | ESTIMATED COST | | | | PROJECT FIRST COST (Constant Dollar Basis) | | | | TOTAL PROJECT COST (FULLY FUNDED) | | | | |
|--------------------------------------|---|--|------------|----------|-------------|--|------------|------------|-------------|-----------------------------------|---------|------------|------------|------------|
| | | Estimate Prepared: 5/23/2017 Estimate Price Level: 1-Oct-17 | | | | Program Year (Budget EC): 2019 Effective Price Level Date: 1-Oct-18 | | | | | | | | |
| | | RISK BASED | | | | | | | | | | | | |
| WBS NUMBER | Civil Works Feature & Sub-Feature Description | COST (\$K) | CNTG (\$K) | CNTG (%) | TOTAL (\$K) | ESC (%) | COST (\$K) | CNTG (\$K) | TOTAL (\$K) | Mid-Point Date | ESC (%) | COST (\$K) | CNTG (\$K) | FULL (\$K) |
| A | B | C | D | E | F | G | H | I | J | P | L | M | N | O |
| PHASE 1 or CONTRACT 1 | | | | | | | | | | | | | | |
| 02 | RELOCATIONS | \$4,185 | \$753 | 18.0% | \$4,938 | 1.9% | \$4,265 | \$768 | \$5,033 | 2028Q1 | 19.5% | \$5,098 | \$918 | \$6,015 |
| 06 | FISH AND WILDLIFE FACILITIES | \$83,699 | \$15,066 | 18.0% | \$98,765 | 1.9% | \$85,309 | \$15,356 | \$100,664 | 2028Q1 | 19.5% | \$101,952 | \$18,351 | \$120,303 |
| CONSTRUCTION ESTIMATE TOTALS: | | \$87,884 | \$15,819 | 18.0% | \$103,703 | | \$89,574 | \$16,123 | \$105,697 | | | \$107,050 | \$19,269 | \$126,319 |
| 01 | LANDS AND DAMAGES | \$87,386 | \$17,477 | 20.0% | \$104,863 | 1.9% | \$89,066 | \$17,813 | \$106,879 | 2027Q1 | 17.2% | \$104,355 | \$20,871 | \$125,226 |
| 30 | PLANNING, ENGINEERING & DESIGN | | | | | | | | | | | | | |
| 0.022 | Project Management | \$1,933 | \$348 | 18.0% | \$2,281 | 3.9% | \$2,008 | \$362 | \$2,370 | 2027Q1 | 37.4% | \$2,759 | \$497 | \$3,256 |
| 0.02 | Planning & Environmental Compliance | \$1,758 | \$316 | 18.0% | \$2,074 | 3.9% | \$1,827 | \$329 | \$2,155 | 2027Q1 | 37.4% | \$2,509 | \$452 | \$2,961 |
| 0.0363 | Engineering & Design | \$3,190 | \$574 | 18.0% | \$3,764 | 3.9% | \$3,314 | \$597 | \$3,911 | 2027Q1 | 37.4% | \$4,554 | \$820 | \$5,373 |
| 0.01 | Engineering Tech Review ITR & VE | \$879 | \$158 | 18.0% | \$1,037 | 3.9% | \$913 | \$164 | \$1,078 | 2027Q1 | 37.4% | \$1,255 | \$226 | \$1,481 |
| 0.01 | Contracting & Reprographics | \$879 | \$158 | 18.0% | \$1,037 | 3.9% | \$913 | \$164 | \$1,078 | 2027Q1 | 37.4% | \$1,255 | \$226 | \$1,481 |
| 0.015 | Engineering During Construction | \$1,318 | \$237 | 18.0% | \$1,555 | 3.9% | \$1,369 | \$246 | \$1,616 | 2028Q1 | 43.4% | \$1,964 | \$353 | \$2,317 |
| 0.0167 | Planning During Construction | \$1,468 | \$264 | 18.0% | \$1,732 | 3.9% | \$1,525 | \$275 | \$1,800 | 2028Q1 | 43.4% | \$2,187 | \$394 | \$2,581 |
| 0.02 | Project Operations | \$1,758 | \$316 | 18.0% | \$2,074 | 3.9% | \$1,827 | \$329 | \$2,155 | 2027Q1 | 37.4% | \$2,509 | \$452 | \$2,961 |
| 31 | CONSTRUCTION MANAGEMENT | | | | | | | | | | | | | |
| 0.105 | Construction Management | \$9,228 | \$1,661 | 18.0% | \$10,889 | 3.9% | \$9,588 | \$1,726 | \$11,314 | 2028Q1 | 43.4% | \$13,749 | \$2,475 | \$16,224 |
| 0.02 | Project Operation: | \$1,758 | \$316 | 18.0% | \$2,074 | 3.9% | \$1,827 | \$329 | \$2,155 | 2028Q1 | 43.4% | \$2,619 | \$471 | \$3,091 |
| 0.025 | Project Management | \$2,197 | \$395 | 18.0% | \$2,592 | 3.9% | \$2,283 | \$411 | \$2,694 | 2028Q1 | 43.4% | \$3,273 | \$589 | \$3,863 |
| CONTRACT COST TOTALS: | | \$201,636 | \$38,042 | | \$239,678 | | \$206,034 | \$38,867 | \$244,902 | | | \$250,039 | \$47,094 | \$297,133 |

The TPCS includes all the costs that would be incurred on the project which for this project include: Lands and Damages or Real Estate Costs, Utility Relocations, Construction Costs, Planning, Engineering and Design, and Supervision and Administration. It is important to note that the study costs are not included in the Planning portion of the TPCS. These items are broke out by chart of accounts as follows:

- 01 – Lands and Damages
- 02 - Relocations
- 06 – Fish and Wildlife Facilities
- 30 – Planning, E&D
- 31 – Supervision and Administration

Real Estate Costs or Lands and Damages were provided by the Galveston District Real Estate Division, Mr. David Mairs, Realty Specialist. The percentages for E&D and S&A were provided by the Galveston District Project Management Team.

SCHEDULE

During the course of the study, an overall project award schedule was prepared with the help of the PDT and is as shown in Table 33. The PDT felt the selected plan would be executed in one contract per year with a duration spanning several years. Once this was known, it made it easier for the estimator to develop costs for mobilization and demobilization for the overall project. See Table 33 for the contract award/funding schedule.

Table 2. Projected Project Contract Award Schedule for the Brownsville CityWide Project.

| Resaca Segments | Calendar Year |
|----------------------------|----------------------|
| 40, 41, 42, 43, 44 | Contract Year I |
| 45,46 | Contract Year II |
| 53,54,59,60 | Contract Year III |
| 61 | Contract Year IV |
| 62, 66, 67, 71, 72, 96 | Contract Year V |
| 75, 76, 95 | Contract Year VI |
| 84 | Contract Year VII |
| 93, 94 | Contract Year VIII |
| 161 | Contract Year IX |
| 98, 99, 100, 101, 201, 202 | Contract Year X |
| 104, 105 | Contract Year XI |
| 108, 109, 110, 111, 112 | Contract Year XII |
| 117, 142 | Contract Year XIII |
| 149, 150, 151 | Contract Year XIV |
| 166 | Contract Year XV |
| 167 | Contract Year XVI |

