HARRIS COUNTY FLOOD CONTROL DISTRICT

US Army Corps of Engineers
Galveston District

HARRIS COUNTY FLOOD CONTROL DISTRICT
September 2013 (Revised February 2014)

MAIN REPORT AND ENVIRONMENTAL ASSESSMENT

GENERAL REEVALUATION REPORT

Appendix C – Cost Estimates

WHITE OAK BAYOU, TEXAS

FEDERAL FLOOD DAMAGE REDUCTION PROJECT

APPENDIX C
COST ESTIMATES

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ATTACHMENTS

LIST OF TABLES

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LIST OF ACRONYMS

AAE	Average Annual Equivalent
CWBS	Civil Works Breakdown Structure
GRR	General Reevaluation Report
HCAD	Harris County Appraisal District
HCFCD	Harris County Flood Control District
LERRD	Land, easements, right-of-way, relocations, and disposal areas
LPP	Locally Preferred Plan
NED	National Economic Development
OMRR&R	Operation, Maintenance, Repair, Replacement & Rehabilitation
ROW	Right-of-Way
USACE	United States Army Corps of Engineers
WRDA	Water Resources Development Act

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APPENDIX - C
COST ESTIMATES

1.0 INTRODUCTION

This technical appendix documents the methodologies and results of cost estimates prepared in support of the General Reevaluation Report (GRR) for White Oak Bayou. The costs presented in this appendix are the estimated first costs associated with the component analysis, plan formulation, and recommended plan evaluation. The cost estimates for each component or alternative were prepared using information obtained through engineering design and analysis in order to provide a relative comparison of the economic performance of the components or alternatives. The technical analyses for this study were conducted in accordance with the most current U.S. Army Corps of Engineers (USACE) guidance as applicable to feasibility studies under the Water Resources Development Act (WRDA) of 1996, Section 211(f). Cost estimates during the Plan Formula process were determined based on 2002 price levels unless otherwise stated. For the Recommended Plan the plan cost was updated to FY 2013 levels using the MCACES program. A risk analysis using the Crystal Ball program was performed for the Recommended Plan.

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2.0 PROCEDURES

The following paragraphs present the general procedures and methodologies applied to develop the cost estimates for the flood damage reduction components during the different stages of the analysis.

2.1 Component Optimization

The unit cost method was used to develop the cost estimates for the component analysis. A component is defined as an individual structural or nonstructural flood damage reduction measure that forms the building blocks of alternative plans. For each component, the major construction items were identified and the quantity of each item was estimated.

The typical construction categories and items used in this study are presented in Section 3.0. For each construction item, a unit cost was estimated based on the local experience with similar projects in Harris County. The cost for each construction item was developed by multiplying the unit cost by its estimated quantity. The total cost was obtained by summing the individual construction items for each component. The cost for each component was also divided into two groups: construction costs and LERRD (land, easement, right-of-way, relocations and suitable dredged/excavated material disposal areas) costs, in accordance with the U.S. Army Corps of Engineers (USACE) engineering regulation ER1105-2-100 (Reference 1).

A contingency factor was applied to each cost item to reflect the estimated degree of uncertainty associated with each cost item.

2.2 Plan Formulation

The probable capital cost for each plan was taken as the sum or total cost of all the components in that plan.

2.3 Formulated Plan Re-optimization

The same cost estimate method for plan formulation was used to develop costs during the formulated plan re-optimization described in the GRR Section 4; however, the environmental mitigation cost item was based on more detailed available information.

2.4 Recommended Plan Evaluation

The capital costs for the Recommended Plan (RF-31) were separately estimated using the MCACES (Micro Computer – Aided Cost Engineering System) model prepared by Atkins for 2013 cost levels. Operation, maintenance, repair, replacement & rehabilitation (OMRR&R) costs were included in the costs for each component.

3.0 COST CATEGORIES AND ASSUMPTIONS

The following paragraphs describe the major construction categories and cost items used to develop the cost estimates used in the Plan Formulation process. Similar cost categories were used in preparing the MCACES model. The cost categories include:

1) Mobilization
2) Earthwork
3) Structures
4) General Items
5) Vegetation Recovery
6) Utility Modification
7) Engineering Design
8) Construction Management
9) Real Estate
10) Environmental Mitigation
11) Contingencies

Structural components were generally defined as specific channel improvement reaches, detention basins, or levee sites. For each component, a cost estimate consisting of these major cost categories was developed. Under each major category, several specific cost items were typically used. The quantities and unit costs for these specific items were multiplied and then summed to develop a total cost for each category. The totals for each category were then added to obtain a total cost for each component. All the categories or items were not necessarily used in all the components or alternatives.

The following paragraphs present the typical construction categories and assumptions made in the Plan Formulation process to develop the unit cost and quantities for each cost item. A summary of unit costs and assumptions is presented in Attachment C-1. All costs are based on year 2002 construction costs. The standard code of account used in the construction costs is the Civil Works Breakdown Structure (CWBS), ER 1110-2-1302 (Reference 2) and EM 1110-2-1304 (Reference 3).

3.1 Mobilization

The following cost items were identified under the Mobilization category.

Mobilization/Demobilization – This is a lump sum bid item associated with the initial establishment of contractor's facilities and equipment for starting the project, and the removal and cleanup of these facilities, equipment, and the site at the end of the project. The cost was based on 10 percent of the construction cost for channel modification and detention components. For levee components,

a lump sum fee of $10,000 was used for mobilization, based on experience with other levee projects.

Demolition / Removal of Buildings – This item covers the cost of removing existing buildings and structures where required, particularly for the nonstructural buyout options. The units are square feet, and the unit costs were $4.40 and $15 per square foot for demolition associated with detention basins and levees respectively.

3.2 Earthwork

The following cost items are identified under the Earthwork cost category.

Clearing and Grubbing – This cost item was estimated by calculating the acreage of wooded area to be cleared for the construction activity. The area was estimated based on a review of aerial photography. The unit cost of $3,500 per acre was based on recent bid tabulations.

Excavation – The excavation cost was based on the estimated in-place volume to be excavated and a unit cost of $3 per cubic yard. The volumes for channel modification were obtained from the output of the HEC-RAS hydraulic models. The volumes for detention components were estimated based on the in-place excavation volume for the detention basin design.

Excavation of Contaminated Soil – This item was estimated at a unit cost of $8 per cubic yard based on additional safety measures to be used in handling contaminated soil.

Fill and Compaction – This item was used where fill and compaction were considered for areas where future structures may be built or for the construction of an earthen levee, or a dike/berm as part of the conversion of an in-line detention facility to an off-line facility. For the levees and detention basins, the quantity was estimated as the in-place volume for construction of the levee of berm. A unit cost of $4 per cubic yard was chosen assuming the use of on-site fill, and a unit cost of $12 per cubic yard was chosen for off-site fill.

Haul – This quantity was estimated by multiplying the in-place excavation volume by the typical haul distance based on the shortest likely route from the excavation site to the most likely soil placement site. The unit cost was $1.50 per cubic yard – mile.

Disposal – This item was anticipated to cover the cost for disposal of excavated soil with a unit cost of $2 per cubic yard.

Turf Establishment – This item includes the cost of hydro mulching to establish turf. This quantity was calculated by measuring the excavation acreage and multiplying by 110 percent to account for the increased area of side slopes and top of banks of detention facilities. A unit cost of $2,500 per acre was used.

Haul, Treatment and Disposal of Contaminated Soil – A unit cost of $65 per cubic yard was estimated for the cost of haul, treatment and disposal of Class I non-hazardous waste.

3.3 Structures

The following cost items are included as part of the Structures cost category.

Backslope Swale and Backslope Drain (Structure) – Backslope swales and backslope drains were used for erosion protection to be placed parallel to the length of the channel or around the perimeter of the detention basins. The backslope drain was placed at 600-foot intervals. Unit costs are $2 per linear foot for swales and $3,000 each for drains. The unit costs were obtained from recent bid tabulations.

5-Ince Slope Paving – Channel concrete paving was assumed 5” in thickness and has a unit cost of $40 per square yard.

Removal of Existing Concrete Paving of Channel was estimated by the area of removal and a unit cost of $10 per square yard.

Remove and Replace/Extend Existing Bridge – The quantity of removal and replacement/extension of existing bridges was based on the proposed channel modifications in the HEC-RAS model. The estimates were prepared for each bridge considered for replacement or extension. The unit cost was based on a cost per square foot of surface area. The unit costs were $95 and $105 per square foot for concrete and steel bridges respectively.

Concrete Low Flow Channel – A concrete low flow channel was used in detention facilities for draining the basins and was estimated by a unit cost of $400 per cubic yard. The quantity was calculated based on a 12-foot wide, 4-inch thick concrete swale.

Outfall Pipes were used for detention drainage or connecting between storage cells of proposed detention basins. The unit costs varied for different pipe sizes and construction materials.

Remove and Replace Concrete Paving– This item was estimated by area, in square yards, of the ramps such as those used in bridge modifications. The unit cost of $75 per square yard was based on recent bids.

Levee Walls were used for levee components and were estimated by the square footage of wall above ground. The unit cost of the wall varied based on the wall height and was based on experience.

Pumping Station – Pump stations were designed as part of internal drainage options for levee components. The design was based on a pumping station with capacity to provide protection within the levee protection area for a specified storm event. A cost of $35 per gallon per minute of pumping capacity was used based on experience.

Removal of Existing Drop Structure – An existing drop structure would be removed as part of a bypass channel near Jersey Village. A lump sum cost of $20,000 was assumed.

Removal of Existing Temporary Control Structure – An existing temporary control structure near North Houston-Rosslyn Road would be removed as part of the channel modifications. A lump sum cost of $80,000 was assumed.

Removal of Existing Inlet Structure – An existing inlet structure to E200-00-00 would be removed as part of a bypass channel near Jersey Village. A lump sum cost of $25,000 was estimated.

Sheet Piling was used for detention basin inlet structures. The quantity was estimated by design as the square footage of the weir structure. A unit cost of $25 per square foot was used based on experience.

Riprap was used for erosion control on outfall structures. Its design was based on local design criteria, and a unit cost of $35 per square yard was obtained from recent bids.

Flap Gates were used for reverse inflow control for detention facility outfalls. Their unit costs varied for different sizes.

The cost of **Elevating Buildings** was developed for the flood proofing components based on the building area in square feet and the unit costs described in the memorandum shown in Attachment C-2.

3.4 General Items

The following cost items were considered under the General Items category.

EPA Stormwater Pollution Prevention – This item was generally estimated by measuring the distance along the length of channel modifications, the perimeter of the detention basin, or the perimeter of the levee and multiplying that distance

by $2 per linear foot. An additional cost of $5,000 was included for each stabilized construction access point.

Traffic Control was a cost item associated with the traffic diversion or providing temporary traffic facilities during the construction period. The cost varied based on the traffic flow of the roads or bridges involved in that component.

3.5 Vegetation Recovery

Vegetation Recovery includes **Tree Planting** and **Shrub Planting** which were anticipated to provide limited landscaping to replace the vegetation destroyed by the construction at the detention sites, along channel modifications, and at levees. The number of tree and shrub plantings were computed assuming one tree and one shrub were planted every 25 linear feet along the perimeter of the detention basins or the length of channel modification. The unit costs were estimated to be $120 per tree and $25 per shrub.

3.6 Utility Modification

Existing information concerning the location, type, and size of utilities in the area of proposed construction was obtained from the known utility providers in the area including the City of Houston, Reliant Energy, Entex, Southwestern Bell, TV cable companies and oil and gas pipeline companies. The utility information was plotted on a base map to determine the utilities affected by the proposed project or specific component. Estimates of the removal, rerouting, and other potential adjustments were developed. The following are cost items under the Utility Modification cost category.

Outfall Modification – Modifications to existing storm sewer outfalls were needed for those outfalls located within the area of proposed channel modifications. The unit cost was based on recent bid tabs, supplier information, or experience. The unit cost varied based on the pipe sizes.

Remove and Replace Water Lines – The removal and replacement of existing water lines occurred where the water line crossed a bridge to be removed/replaced or the line over the bayou where channel modifications were proposed. The unit cost varied based on the size of pipe and was based on recent bid tabs, a supplier's quote, or experience. The unit cost is on a linear foot basis and covers the cost of removal of the existing line, replacement with a new line, and trench safety cost.

Remove and Replace Sanitary Lines – Similar to the water lines, sanitary lines would be removed and replaced for those lines crossing a bridge that was to be removed/replaced or the line over the bayou at locations where channel modifications were proposed. The unit cost varied based on the size of pipe and was based on recent bid tabs, a supplier's quote, or experience. The unit cost is on a linear foot basis and covers the cost of removal of the existing line, replacement with a new line, and trench safety cost.

Relocation of Other Utilities – Relocation of other utilities such as electric cables, telephone cables/lines and petroleum lines was based on the information obtained from the respective utility companies. Either unit cost or lump sum cost was used depending on the information provided by the related utility companies.

3.7 Engineering Design

Engineering Design cost is anticipated to cover the engineering design and associated survey required. Based on experience, the cost was estimated as 12 percent of the total construction and LERRD costs, excluding real estate costs.

3.8 Construction Management

Construction Management cost was estimated as 10 percent of the total construction and LERRD costs, excluding real estate costs. This cost is anticipated to cover the cost for construction supervision, material testing, quality and schedule control, and other construction management services. The percentage was based on experience.

3.9 Real Estate

Real estate costs pertain to the various categories of LERRD costs. The following are cost items under the Real Estate cost category.

ROW Acquisition – Right-of-way (ROW) Acquisition costs are presented in Appendix F – Real Estate Plan. For component analysis and plan formulation, the cost was based on comparable data from a 2005 gross appraisal, assessed values from the Harris County Appraisal Data (HCAD) database, or an assumed value per square foot based on experience. For the Recommended Plan evaluation, the cost was based on the gross appraisal values in year 2011.

Building Fair Market Value – This item is intended to cover the improvement values of the structures to be acquired. For component analysis and plan formulation, the values from the 2002 HCAD database were generally used. For the Recommended Plan evaluation, the values were based on the gross appraisal conducted in year 2011.

Relocation – Relocation costs were estimated as a unit cost of $20,000 per residential structure, $3,500 per apartment/mobile home acquisition, and $3.50 per square foot of commercial/public structure acquisition based on 2002 levels. For year 2011, the costs are $28,000, $7,350, and $6.00 for these three respective items. This cost item was to compensate for relocation of the home/building owner and was based on recent experience.

Administrative Fees include the costs for the appraisal, closing costs, and consultant fees incurred with property acquisition. The fees were generally estimated as $1,500 appraisal and consultant fee for residential structures, $8,000 appraisal and consultant fee for commercial/public structures, and a closing cost of 1 percent of the fair market or appraised value cost. The closing cost of 1 percent is intended to include title and negotiating costs.

3.10 Environmental Mitigation

Based on a review of baseline environmental information (see Environmental Assessment), mitigation may be necessary for potential jurisdictional wetlands impacts for some components. A wetlands mitigation cost equal to a half percent of the total construction cost was estimated for channel and detention components during component optimization and plan formulation. A detailed evaluation on wetland impact mitigation was conducted during plan re-optimization. A total of 13.24 acres of wetlands are impacted by the Recommended Plan (RF-31). Twelve acres of wetlands mitigation is planned. Seven acres will be constructed in detention basin HOL.3B at an estimated cost of $40,700 per acre and five acres of wetlands will be purchased at the Greens Bayou mitigation bank at a cost of $21,400 per acre.

3.11 Contingencies

Contingencies were added to costs as a percentage in the Plan Formulation process. Percentages varied from 10 to 25 percent. The following contingencies were used: earthwork 15 percent, structures and general items 10 percent, utility relocations 20 percent, R.O.W. acquisition 25 percent and structure relocations 20 percent. No contingency was added to mobilization, which was itself estimated as 10 percent of construction. Contingencies were not added to R.O.W. costs for property that the District already owns and for which acquisition costs will not vary.

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4.0 COST ESTIMATES – COMPONENT OPTIMIZATION

Based on the methodology and assumptions described in Sections 2.0 and 3.0, the cost for each component option was developed, as summarized in Tables C-1, C-2, C-3 and C-4 for channel, detention, levee and non-structural components, respectively. These tables show the component identification, a description of each option, and the total construction cost. Detailed printouts of cost estimates for each component are shown in Attachments C-3, C-4, C-5 and C-6. These detailed printouts show the cost categories, estimated quantities, extended price, and total construction cost for each component option.

Table C-1. Channel Component Optimization Costs

ID	Description	Capital Cost ($1,000)
TG: Channel Modification from Tidwell to Gessner		
TG.1	Channelization of E100-00-00 within existing ROW. Earthen channel with bottom width of 45 - 50 ft.	$15,374
TG.2	Channelization of E100-00-00. ROW acquisition required. Earthen channel with bottom width of 50 - 60 ft.	$33,779
TG.3	Channelization of E100-00-00. ROW acquisition required. Earthen channel with bottom width of 60 - 80 ft.	$65,249
TG.4	Channelization of E100-00-00. ROW acquisition required. Earthen channel with bottom width of 80 - 100 ft.	$115,914
TG.5	Channelization of E100-00-00. ROW acquisition required. Earthen channel with bottom width of 100 - 120 ft.	$136,838
TG.6	Channelization of E100-00-00. ROW acquisition required. Earthen channel with bottom width of 200 ft.	$238,478
TG.7	Channelization of E100-00-00 within existing ROW. Concrete-lining channel with 3:1 side slopes and 45 - 50 ft bottom width.	$62,245
TG.8	Channelization of E100-00-00 within existing ROW. Concrete-lining with 2:1 side slopes and 80 - 90 ft bottom width.	$71,309
TG.9	Channelization of E100-00-00 within existing ROW. Concrete-lining with 2:1 side slopes from flowline to 10 ft height. Earthen channel with benches (10 ft wide) and 3:1 side slopes to top of banks. Bottom width 45 - 50 ft.	$35,487
TG.10	Channelization of E100-00-00 within existing ROW. Concrete-lining with 2.5:1 side slopes and 60 - 70 ft bottom width.	$64,869
TG.11	Channelization of E100-00-00. ROW acquisition required. Concrete-lined channel with 2:1 side slopes and 100 - 120 ft bottom width.	$117,943

Table C-1 (continued)

ID	Description	Capital Cost ($1,000)
GE200: Channel Modification from Gessner to E200-00-00		
GE200.0	Channelization of E100-00-00 within existing ROW.	$1,470
GE200.1	Creation of bypass channel by removing berms at E200-00-00 and E141-00-00.	$493
GE200.2	Channelization of E200-00-00 and E141-00-00 within existing ROW. Lower flowline by ~5-10 ft.	$7,445
GE200.3	Channelization of E200-00-00 and E141-00-00 with ROW acquisition required. Lower flowline by ~7-15 ft.	$22,091
GE200.4	Channelization of E100-00-00 within existing ROW. Creation of bypass channel by removing berms at E200-00-00 and E141-00-00.	$1,922
GE200.5	Channelization of E100-00-00 within existing ROW. Channelization of E200-00-00 and E141-00-00 within existing ROW; Lower flowline by ~5-10 ft.	$8,875
GE200.6	Channelization of E100-00-00 within existing ROW. Channelization of E200-00-00 and E141-00-00 with ROW acquisition required; Lower flowline by ~7-15 ft.	$23,520
E200H: Channel Modification from E200-00-00 to Huffmeister		
E200H.1	Channelization of E100-00-00 within existing ROW. Earthen channel with bottom width of 40 - 60 ft.	$7,827
E200H.2	Channelization of E100-00-00 within existing ROW. Earthen channel with bottom width of 50 - 80 ft.	$11,107
E200H.3	Channelization of E100-00-00 within existing ROW. Earthen channel with bottom width of 60 - 100 ft.	$16,376
E200H.4	Channelization of E100-00-00 with ROW acquisition required. Earthen channel with bottom width of 80 - 120 ft.	$62,496

Table C-2. Detention Component Optimization Costs

ID	Area (ac)	Volume (ac-ft)	Description	Capital Cost ($1,000)
Detention at Tidwell - W. Little York (TWLY)				
TWLY.0	18	160	Modification of facility E500-05-00; off-line facility	$3,984
TWLY.2	45	516	Expansion of E500-05-00; off-line facility	$9,340
TWLY.3	69	1032	Expansion of E500-05-00; off-line facility	$22,834
TWLY.5	123	1658	Expansion of E500-05-00; off-line facility	$52,629
Detention at North Houston-Rosslyn Road (NHR)				
NHR.0	33	360	Modification of E500-04-00; off-line facility	$3,021
NHR.1	33	595	Modification and expansion of E500-04-00; off-line facility	$7,956
NHR.2	62	811	Expansion of E500-04-00; off-line facility	$14,527
NHR.3	83	1069	Expansion of E500-04-00; off-line facility	$13,765
NHR.4	139	1211	Expansion of E500-04-00; off-line facility	$46,276
Detention at Hollister Road (HOL)				
HOL.1	57	444	Excavation north of pipeline	$15,102
HOL.2	94	522	Expansion south of pipeline	$18,816
HOL.3	136	730	Expansion of facility to the west	$28,533
HOL.4	174	827	Expansion of facility to the east	$38,166
Detention at Fairbanks-North Houston (FNH)				
FNH.0	86	360	Modification of E500-01-00; off-line facility	$4,219
FNH.1	86	843	Expansion of E500-01-00; off-line facility	$15,096
FNH.2	143	1271	Expansion of E500-01-00 & new facility E500-02-00 south of bayou	$29,438
FNH.3	184	1717	Expansion of E500-01-00, new facility E500-02-00 south of bayou, & new facility west of Fairbanks-North Houston	$45,188
FNH.4	222	2111	Expansion of E500-01-00, new facility E500-02-00 south of bayou, & new facility west of Fairbanks-North Houston	$58,684
Detention at Gessner-Beltway 8 (GBW)				
GBW.1	21	229	In-line facility north of bayou	$5,066
GBW.2	45	427	New facility (E500-10-00) located north and south of bayou.	$12,741
GBW.3	51	519	New facility located north and south of bayou, with expansion of facility to the south.	$18,271
GBW.4	83	700	New facility located north and south of bayou, with expansion of facility to the south.	$35,251
Detention at Rio Grande (RG)				
RG.0	9	100	Off-line facility north of E135-00-00	$3,711
RG.1	26	277	Off-line facility north of E135-00-00	$9,900
RG.2	45	399	Expansion of facility north of E135-00-00	$14,529
RG.3	117	882	Expansion of facility south of E135-00-00	$44,883
RG.4	45	277	RG.1 + channelization of E135-00-00	$10,607
Detention at Jones Road (JR)				
JR.1	23	134	Off-line facility; south of pipeline easement and east of Jones Rd.	$5,252
JR.2	39	220	Expansion of facility north of pipeline easement, east of Jones Rd.	$8,829
JR.3	53	295	Expansion of facility west of Jones Rd.	$12,422
JR.4	66	420	Expansion of facility west of Jones Rd.	$17,247
JR.5	74	470	Expansion of facility west of Jones Rd.	$29,386

Table C-3. Levee Component Optimization Costs

ID	Description	Capital Cost ($1,000)
Levee at Inwood Forest and Arbor Oaks		
LIA3_1	Levee height at 4% protection, minimum facility	$9,153
LIA2_1	Levee height at 2% protection, minimum facility	$10,497
LIA1_1	Levee height at 1% protection, minimum facility	$11,186
LIA4_1	Levee height at 0.4% protection, minimum facility	$13,236
LIA5_1	Levee height at 0.2% protection, minimum facility	$14,620
Levee at Woodland Trails		
LWT1_1	Levee height at 1% protection, minimum facility	$13,031
LWT1_2	Levee height at 1% protection, pumping capacity at 20% flood frequency	$61,928
LWT1_3	Levee height at 1% protection, pumping capacity at 4% flood frequency	$70,833
LWT1_4	Levee height at 1% protection, pumping capacity at 1% flood frequency	$79,433
LWT1_5	Levee height at 1% protection, detention capacity at 20% flood frequency	$52,741
LWT1_6	Levee height at 1% protection, detention capacity at 4% flood frequency	$68,338
LWT1_7	Levee height at 1% protection, detention capacity at 1% flood frequency	$89,762
LWT2_1	Levee height at 20% protection, minimum facility	$8,117
LWT2_2	Levee height at 20% protection, pumping capacity at 20% flood frequency	$57,014
LWT2_3	Levee height at 20% protection, pumping capacity at 4% flood frequency	$65,919
LWT2_4	Levee height at 20% protection, pumping capacity at 1% flood frequency	$74,519
LWT2_5	Levee height at 20% protection, detention capacity at 20% flood frequency	$47,827
LWT2_6	Levee height at 20% protection, detention capacity at 4% flood frequency	$63,423
LWT2_7	Levee height at 20% protection, detention capacity at 1% flood frequency	$84,848
LWT3_1	Levee height at 4% protection, minimum facility	$11,239
LWT3_2	Levee height at 4% protection, pumping capacity at 20% flood frequency	$60,136
LWT3_3	Levee height at 4% protection, pumping capacity at 4% flood frequency	$69,041
LWT3_4	Levee height at 4% protection, pumping capacity at 1% flood frequency	$77,641
LWT3_5	Levee height at 4% protection, detention capacity at 20% flood frequency	$50,949
LWT3_6	Levee height at 4% protection, detention capacity at 4% flood frequency	$66,545
LWT3_7	Levee height at 4% protection, detention capacity at 1% flood frequency	$87,970
LWT4_1	Levee height at 0.4% protection, minimum facility	$15,677
LWT4_2	Levee height at 0.4% protection, detention capacity at 20% flood frequency	$55,386
LWT4_3	Levee height at 0.4% protection, pumping capacity at 20% flood frequency	$64,573
LWT4_4	Levee height at 0.4% protection, pumping capacity at 1% flood frequency	$82,079
LWT5_1	Levee height at 0.2% protection, minimum facility	$16,623
LWT5_2	Levee height at 0.2% protection, detention capacity at 20% flood frequency	$56,333
LWT5_3	Levee height at 0.2% protection, pumping capacity at 20% flood frequency	$65,520
LWT5_4	Levee height at 0.2% protection, pumping capacity at 1% flood frequency	$83,025
LWT5_5	Levee height at 0.2% protection, pumping capacity at 0.4% flood frequency	$87,219
LWT5_6	Levee height at 0.2% protection, pumping capacity at 0.2% flood frequency	$93,537

Table C-4. Non-Structural Component Optimization Costs

ID	Description	Capital Cost ($1,000)
NSB-50%	Buyout and Removal of 5 structures within 50% floodplain	$5,898
NSB-20%	Buyout and Removal of 651 structures within 20% floodplain	$157,773
NSB-10%	Buyout and Removal of 1,195 structures within 10% floodplain	$321,071
NSB-4%	Buyout and Removal of 3,121 structures within 4% floodplain	$833,410
NSB-2%	Buyout and Removal of 4,476 structures within 2% floodplain	$1,378,881
ELEV-50%	Elevating structures within 50% floodplain	$12,953
ELEV-20%	Elevating structures within 20% floodplain	$117,878
ELEV-10%	Elevating structures within 10% floodplain	$291,068
ELEV-4%	Elevating structures within 4% floodplain	$687,174
ELEV-2%	Elevating structures within 2% floodplain	$1,077,628

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5.0 COST ESTIMATES – PLAN FORMULATION

Component costs presented in Section 4.0 were used to establish costs for the formulated alternatives. As described in Chapter 4 of the General Reevaluation Report (GRR), a systematic approach was used to formulate alternative plans in a logical and incremental fashion to maximize net economic benefits. Alternative plans were formulated by incrementally adding components to the anchor or lead component in the alternative. Two alternatives were formulated with a channel modification component as the anchor (i.e., TG.8, TG.2), and one alternative was formulated with two top-performing detention basins as anchors (i.e., FNH.3+JR.4). For each alternative, the total cost is the sum of the costs of all components in that plan. The capital costs for each step of the plans are summarized in Tables C-5, C-6, and C-7 for plans formulated with TG.8, TG.2, and FNH.3+JR.4 as anchors, respectively. These costs were used to perform the economic comparison of alternatives.

A last-added analysis was performed to consider the effect of each isolated component in comparison to the net economic benefits of the formulated plan with all the components in place. Table C-8 shows the capital cost of the last-added analysis for the three formulated plans.

Table C-5. Plan Formulation Costs for TG.8 Anchor Plan

ID	Plan	Capital Cost ($1,000)
Anchor TG.8		$71,309
TG.8+GE200		
TG.8_1.1	GE200.0	$72,778
TG.8_1.2	GE200.2	$78,754
TG.8_1.3	GE200.3	$93,399
TG.8_1.4	GE200.5	$80,183
TG.8_1.5	GE200.6	$94,829
TG.8+E200H		
TG.8_1.6	E200H.1	$79,136
TG.8_1.7	E200H.2	$82,415
TG.8_1.8	E200H.3	$87,684
TG.8_1.9	E200H.4	$133,804
TG.8+TWLY		
TG.8_1.10	TWLY.0 (160 ac-ft)	$75,293
TG.8_1.11	TWLY.2 (516 ac-ft)	$80,649
TG.8_1.12	TWLY.3 (1032 ac-ft)	$94,143
TG.8_1.13	TWLY.5 (1658 ac-ft)	$123,938
TG.8+NHR		
TG.8_1.14	NHR.0 (360 ac-ft)	$74,330
TG.8_1.15	NHR.1 (595 ac-ft)	$79,265
TG.8_1.16	NHR.3 (1069 ac-ft)	$93,029
TG.8_1.17	NHR.4 (1211 ac-ft)	$117,584
TG.8+HOL		
TG.8_1.18	HOL.1 (444 ac-ft)	$86,410
TG.8_1.19	HOL.2 (522 ac-ft)	$90,124
TG.8_1.20	HOL.3 (730 ac-ft)	$99,842

ID	Plan	Capital Cost ($1,000)
TG.8+FNH		
TG.8_1.21	FNH.0 (360 ac-ft)	$75,528
TG8_1.22	FNH.1 (843 ac-ft)	$86,404
TG8_1.23	FNH.2 (1271 ac-ft)	$100,747
TG8_1.24	FNH.3 (1717 ac-ft)	$116,496
TG.8+GBW		
TG8_1.25	GBW.1 (229 ac-ft)	$76,374
TG8_1.26	GBW.2 (427 ac-ft)	$84,050
TG8_1.27	GBW.3 (519 ac-ft)	$89,580
TG.8+RG		
TG8_1.28	RG.1 (277 ac-ft)	$81,209
TG8_1.29	RG.2 (399 ac-ft)	$85,838
TG8_1.30	RG.3 (882 ac-ft)	$116,153
TG.8+JR		
TG8_1.31	JR.2 (220 ac-ft)	$80,138
TG8_1.32	JR.4 (420 ac-ft)	$88,556
TG8_1.33	JR.5 (470 ac-ft)	$100,694
TG.8+Non-structural buyouts		
TG.8_1.34	NSB-50%	$71,504
TG.8_1.35	NSB-20%	$104,923
TG.8_1.36	NSB-10%	$228,285
TG.8_1.37	NSB-4%	$643,668
TG8_1.38	NSB-2%	$867,086

Table C-5 (continued)

ID	Plan	Capital Cost ($1,000)
TG.8+JR.4+		
TG.8_2.1	GE200.5	$97,431
TG.8_2.2	E200H.3	$104,932
TG.8_2.3	TWLY.2	$97,897
TG.8_2.4	NHR.1	$96,512
TG.8_2.5	HOL.2	$107,372
TG.8_2.6	FNH.1	$103,652
TG.8_2.7	GBW.2	$101,297
TG.8_2.8	RG.2	$103,086
TG.8_2.9b	NSB-20%	$103,800
TG.8+JR.4+GBW.2+		
TG.8_3.1	GE200.5	$110,172
TG.8_3.2	E200H.3	$117,673
TG.8_3.3	TWLY.2	$110,638
TG.8_3.4	NHR.1	$109,253
TG.8_3.5	HOL.2	$120,113
TG.8_3.6	FNH.1	$116,393
TG.8_3.7	RG.2	$115,827
TG.8_3.8	NSB-20%	$116,364

ID	Plan	Capital Cost ($1,000)
TG.8+JR.4+GBW.2+E200H.3+		
TG.8_4.1	GE200.0	$119,143
TG.8_4.2	GE200.2	$125,118
TG.8_4.3	GE200.3	$139,764
TG.8_4.4	GE200.5	$126,548
TG.8_4.5	GE200.6	$141,193
TG.8_4.6	TWLY.0	$121,657
TG.8_4.7	TWLY.2	$127,014
TG.8_4.8	TWLY.3	$140,507
TG.8_4.9	TWLY.5	$170,302
TG.8_4.10	NHR.0	$120,694
$125,629	NHR.1	$135,224
$139,394	NHR.3	$148,944
$163,949	NHR.4	$173,481
$132,775	HOL.1	$142,318
$136,489	HOL.2	$146,115
$146,206	HOL.3	$155,713
$121,892	FNH.0	$131,488
$132,769	FNH.1	$142,367
$147,111	FNH.2	$156,672
$121,384	RG.0	$130,967
$127,573	RG.1	$137,134
$132,203	RG.2	$141,749
$162,517	RG.3	$172,044
$117,868	NSB-50%	$127,464
$132,740	NSB-20%	$142,336
$206,674	NSB-10%	$216,269

Table C-5 (continued)

ID	Plan	Capital Cost ($1,000)
TG.8+JR.4+GBW.2+E200H.3+TWLY.3+		
TG.8_5.1	FNH.1	$155,603
TG.8_5.2	HOL.2	$159,323
TG.8_5.3	NHR.1	$148,463
TG.8_5.4	RG.1	$150,407
TG.8_5.5	GE200.0	$141,977
TG.8_5.6	NSB-20%	$148,791
TG.8+JR.4+GBW.2+E200H.3+TWLY.3+ FNH.1+		
TG.8_6.1	HOL.2	$174,419
TG.8_6.2	NHR.1	$163,559
TG.8_6.3	RG.1	$165,503
TG.8_6.4	GE200.0	$157,073
TG.8_6.5	NSB_T8J4G2 EH3T3F1-20%	$163,887
TG.8+JR.4+GBW.2+E200H.3+TWLY.3+ FNH.1+GE200.0+		
TG.8_7.1	NHR.0	$160,094
TG.8_7.2	NHR.1	$165,028
TG.8_7.3	NHR.3	$178,793
TG.8_7.4	HOL.1	$172,174
TG.8_7.5	HOL.2	$175,888
TG.8_7.6	HOL.3	$185,606
TG.8_7.7	RG.0	$160,784
TG.8_7.8	RG.1	$166,973
TG.8_7.9	RG.2	$171,602
TG.8_7.10	NSB-50%	$157,268
TG.8_7.11	NSB-20%	$165,357
TG.8_7.12	NSB-10%	$201,493
TG.8+JR.4+GBW.2+E200H.3+TWLY.3+ FNH.1+GE200.0+NSB_20%+		
TG.8_8.1	NHR.1	$173,313
TG.8_8.2	HOL.2	$184,172
TG.8_8.3	RG.0	$169,068
TG.8+JR.4+GBW.2+E200H.3+TWLY.3+ FNH.1+GE200.0+NSB_20%+NHR.1+		
TG.8_9.1	HOL.2	$192,128
TG.8_9.2	RG.0	$177,024

Table C-6. Plan Formulation Costs for TG.2 Anchor Plan

ID	Plan	Capital Cost ($1,000)
Anchor TG.2		$33,779
TG.2+GE200		
TG.2_1.1	GE200.0	$35,249
TG.2_1.2	GE200.2	$41,224
TG.2_1.3	GE200.3	$55,870
TG.2_1.4	GE200.6	$57,299
TG.2+E200H		
TG.2_1.5	E200H.1	$41,606
TG.2_1.6	E200H.2	$44,886
TG.2_1.7	E200H.3	$50,155
TG.2_1.8	E200H.4	$96,275
TG.2+TWLY		
TG.2_1.9	TWLY.2 (516 ac-ft)	$43,102
TG.2_1.10	TWLY.3 (1069 ac-ft)	$56,613
TG.2_1.11	TWLY.5 (1211 ac-ft)	$86,409
TG.2+NHR		
TG.2_1.12	NHR.1 (595 ac-ft)	$41,735
TG.2_1.13	NHR.3 (1069 ac-ft)	$55,500
TG.2_1.14	NHR.4 (1211 ac-ft)	$80,055
TG.2+HOL		
TG.2_1.15	HOL.1 (444 ac-ft)	$48,881
TG.2_1.16	HOL.2 (522 ac-ft)	$52,595
TG.2_1.17	HOL.3 (730 ac-ft)	$62,313
TG.2_1.18	HOL.4 (827 ac-ft)	$71,378

ID	Plan	Capital Cost ($1,000)
TG.2+FNH		
TG.2_1.19	FNH.1 (843 ac-ft)	$48,875
TG.2_1.20	FNH.2 (1271 ac-ft)	$63,217
TG.2_1.21	FNH.3 (1717 ac-ft)	$78,967
TG.2_1.22	FNH.4 (2111 ac-ft)	$92,463
TG.2+GBW		
TG.2_1.23	GBW.1 (229 ac-ft)	$38,845
TG.2_1.24	GBW.2 (427 ac-ft)	$46,520
TG.2_1.25	GBW.3 (519 ac-ft)	$52,051
TG.2+RG		
TG.2_1.26	RG.1 (277 ac-ft)	$43,679
TG.2_1.27	RG.2 (399 ac-ft)	$48,309
TG.2_1.28	RG.3 (882 ac-ft)	$78,623
TG.2+JR		
TG.2_1.29	JR.2 (220 ac-ft)	$42,608
TG.2_1.30	JR.4 (420 ac-ft)	$51,027
TG.2_1.31	JR.5 (470 ac-ft)	$63,165
TG.2+Non-structural buyouts		
TG.2_1.32	NSB-50%	$33,976
TG.2_1.33	NSB-20%	$60,686
TG.2_1.34	NSB-10%	$225,250
TG.2_1.35	NSB-4%	$790,043
TG.2_1.36	NSB-2%	$1,263,106

Table C-6 (continued)

ID	Plan	Capital Cost ($1,000)
TG.2+JR.4+		
TG.2_2.1	GE200.0	$52,496
TG.2_2.2	E200H.3	$67,402
TG.2_2.3	TWLY.3	$73,861
TG.2_2.4	NHR.3	$72,747
TG.2_2.5	HOL.3	$79,560
TG.2_2.6	FNH.2	$80,465
TG.2_2.7	GBW.2	$63,768
TG.2_2.8	RG.2	$65,556
TG.2+JR.4+HOL.3+		
TG.2_3.1	GE200.0	$81,030
TG.2_3.2	E200H.3	$95,936
TG.2_3.3	TWLY.3	$102,394
TG.2_3.4	NHR.3	$101,281
TG.2_3.5	FNH.2	$108,998
TG.2_3.6	GBW.2	$92,301
TG.2_3.7	RG.2	$94,090
TG.2+JR.4+HOL.3+GBW.2+		
TG.2_4.1	GE200.0	$93,771
TG.2_4.2	GE200.2	$99,746
TG.2_4.3	GE200.3	$114,392
TG.2_4.4	GE200.5	$101,176
TG.2_4.5	GE200.6	$115,821
TG.2_4.6	E200H.1	$100,128
TG.2_4.7	E200H.2	$103,408
TG.2_4.8	E200H.3	$108,677
TG.2_4.9	E200H.4	$154,797
TG.2_4.10	TWLY.0	$96,286
TG.2_4.11	TWLY.2	$101,642
TG.2_4.12	TWLY.3	$115,135
TG.2_4.13	TWLY.5	$144,931
TG.2_4.14	NHR.1	$100,257
TG.2_4.15	NHR.3	$114,022
TG.2_4.16	NHR.4	$138,577
TG.2_4.17	FNH.0	$96,520
TG.2_4.18	FNH.1	$107,397
TG.2_4.19	FNH.2	$121,739
TG.2_4.20	FNH.3	$137,489
TG.2_4.21	RG.1	$102,201
TG.2_4.22	RG.2	$106,831
TG.2_4.23	RG.3	$137,145

ID	Plan	Capital Cost ($1,000)
TG.2+JR.4+HOL.3+GBW.2+FNH.1+		
TG.2_5.1	GE200.5	$116,272
TG.2_5.2	E200H.2	$118,504
TG.2_5.3	TWLY.2	$116,738
TG.2_5.4	NHR.3	$129,118
TG.2_5.5	RG.2	$121,927
TG.2+JR.4+HOL.3+GBW.2+FNH.1+RG.2+		
TG.2_6.1	GE200.5	$130,801
TG.2_6.2	E200H.2	$133,033
TG.2_6.3	TWLY.2	$132,757
TG.2_6.4	NHR.3	$143,647
TG.2+JR.4+HOL.3+GBW.2+FNH.1+RG.2+ E200H.2+		
TG.2_7.1	GE200.0	$134,503
TG.2_7.2	GE200.2	$140,478
TG.2_7.3	GE200.5	$141,908
TG.2_7.4	GE200.6	$156,553
TG.2_7.5	TWLY.0	$137,018
TG.2_7.6	TWLY.2	$143,868
TG.2_7.7	TWLY.3	$155,867
TG.2_7.8	NHR.1	$140,989
TG.2_7.9	NHR.3	$154,754
TG.2_7.10	NHR.4	$179,309
TG.2+JR.4+HOL.3+GBW.2+FNH.1+RG.2+ E200H.2+GE200.0+		
TG.2_8.1	TWLY.2	$145,843
TG.2_8.2	NHR.3	$156,223

Table C-7. Plan Formulation Costs for FNH.3+JR.4 Anchor Plan

ID	Plan	Capital Cost ($1,000)
Anchor JR.4+FNH.3		$62,435
FNH.3+JR.4+GE200		
DA_1.1	GE200.0	$63,904
DA_1.2	GE200.1	$62,928
DA_1.3	GE200.2	$69,880
DA_1.4	GE200.3	$84,525
DA_1.5	GE200.6	$85,955
FNH.3+JR.4+TWLY		
DA_1.6	TWLY.2 (516 ac-ft)	$71,775
DA_1.7	TWLY.3 (1032 ac-ft)	$85,269
DA_1.8	TWLY.5 (1658 ac-ft)	$115,064
FNH.3+JR.4+NHR		
DA_1.9	NHR.1 (595 ac-ft)	$70,391
DA_1.10	NHR.3 (1069 ac-ft)	$84,155
DA_1.11	NHR.4 (1211 ac-ft)	$108,711
FNH.3+JR.4+HOL		
DA_1.12	HOL.1 (444 ac-ft)	$77,537
DA_1.13	HOL.2 (522 ac-ft)	$81,251
DA_1.14	HOL.3 (730 ac-ft)	$90,968
DA_1.15	HOL.4 (827 ac-ft)	$100,033
FNH.3+JR.4+GBW		
DA_1.16	GBW.1 (229 ac-ft)	$67,500
DA_1.17	GBW.2 (427 ac-ft)	$75,176
DA_1.18	GBW.3 (519 ac-ft)	$80,706
DA_1.19	GBW.4 (618 ac-ft)	$85,518
FNH.3+JR.4+RG		
DA_1.20	RG.1 (277 ac-ft)	$72,335
DA_1.21	RG.2 (399 ac-ft)	$76,964
DA_1.22	RG.3 (882 ac-ft)	$107,279

ID	Plan	Capital Cost ($1,000)
FNH.3+JR.4+GBW.3+		
DA_2.1	GE200.2	$88,152
DA_2.2	TWLY.2	$90,047
DA_2.3	NHR.3	$102,427
DA_2.4	HOL.3	$109,240
DA_2.5	RG.1	$90,606
FNH.3+JR.4+GBW.3+HOL.3+		
DA_3.1	GE200.2	$116,685
DA_3.2	TWLY.2	$118,580
DA_3.3	NHR.3	$130,960
DA_3.4	RG.1	$119,140
FNH.3+JR.4+GBW.3+HOL.3+GE200.2		
DA_4.1	TWLY.0	$120,669
DA_4.2	TWLY.2	$126,025
DA_4.3	TWLY.3	$139,519
DA_4.4	NHR.1	$124,641
DA_4.5	NHR.3	$138,405
DA_4.6	NHR.4	$162,961
DA_4.7	RG.0	$120,396
DA_4.8	RG.1	$126,585
DA_4.9	RG.2	$131,214

Table C-8. Costs for Last-Added Analysis

ID	Plan	Capital Cost ($1,000)
TG.8 Anchor Formulated Plan: TG.8+JR.4+GBW.2+E200H.3+TWLY.3+FNH.1+GE200.0+NSB_20%+NHR.1+RG.0		
TG8_9.2	Formulated Plan	$177,024
TG8_LA1	Remove TG.8	$105,715
TG8_LA2	Remove JR.4	$159,776
TG8_LA3	Remove GBW.2	$164,282
TG8_LA4	Remove E200H.3	$160,648
TG8_LA5	Remove TWLY.3	$154,189
TG8_LA6	Remove FNH.1	$161,928
TG8_LA7	Remove GE200.0	$175,554
TG8_LA8	Remove NSB-20%	$168,739
TG8_LA9	Remove NHR.1	$169,068
TG8_LA10	Remove RG.0	$173,313
TG.2 Anchor Formulated Plan: TG.2+JR.4+HOL.3+GBW.2+FNH.1+RG.2+E200H.2+GE200.0+TWLY.2		
TG2_8.1	Formulated Plan	$143,843
TG2_LA1	Remove TG.2	$110,064
TG2_LA2	Remove JR.4	$128,152
TG2_LA3	Remove HOL.3	$115,310
TG2_LA4	Remove GBW.2	$131,102
TG2_LA5	Remove FNH.1	$128,747
TG2_LA6	Remove RG.2	$129,314
TG2_LA7	Remove E200H.2	$132,737
TG2_LA8	Remove GE200.0	$142,374
TG2_LA9	Remove TWLY.2	$134,503
Detention Anchor Formulated Plan: FNH.3+JR.4+GBW.3+HOL.3+GE200.2+RG.1		
DA_4.8	Formulated Plan	$126,585
DA_LA1	Remove FNH.3	$81,397
DA_LA2	Remove JR.4	$109,338
DA_LA3	Remove GBW.3	$108,314
DA_LA4	Remove HOL.3	$98,052
DA_LA5	Remove GE200.2	$119,140
DA_LA6	Remove RG.1	$116,685

6.0 COST ESTIMATES – PLAN RE-OPTIMIZATION

Further re-optimization was performed on the two plans formulated with channel modification components as anchors (i.e., TG.8, TG.2), as described in Chapter 4 of the GRR. This re-optimization is best considered a final fine-tuning of the component sizes because of the potential for the combination of plan components to change the performance of individual components. A “tighter” range of sizes was considered for both channel and detention components. For channel components, the upstream and downstream limits of the channel component were also optimized. For detention components, additional sizes of storage volumes were evaluated. Project costs were adjusted to reflect more current estimates of the anticipated environmental mitigation costs based on more detailed environmental field investigations of the components. Another detention component cost was modified to reflect a new multi-family residential development on a previously undeveloped tract. The estimated costs for the components considered in the plan re-optimization are summarized in Tables C-9 and C-10 for channel modification and detention components, respectively. Detailed printouts of cost estimates for each component are shown in Attachments C-7 and C-8.

The capital costs for each step of the plan re-optimization are summarized in Tables C-11 and C-12 for TG.8 and TG.2 anchor plans, respectively. The cost estimate for TG.2-RF29 is presented in Attachment C-8.a. This plan was identified as the best economically performing plan.

Table C-9. Channel and Buyout Component Re-optimization Costs

ID	Description	Capital Cost ($1,000)
TG.2	Channelization of E100-00-00 from Cole Creek to Gessner. ROW acquisition required. Bottom width 50 - 60 ft.	$33,382
TG.2A	Reoptimization of TG.2 - stop channel modification at Fairbanks-North Houston.	$24,881
TG.2B	Reoptimization of TG.2 - stop channel modification at E122-00-00.	$19,766
TG.2C	Reoptimization of TG.2 - stop channel modification at Vogel Creek.	$5,853
TG.8	Channelization of E100-00-00 from Cole Creek to Gessner within existing ROW; concrete-lining. Bottom width 80 - 90 ft. SS 2:1.	$96,364
TG.8A	Reoptimization of TG.8 - stop channel lining at Fairbanks-North Houston. Earthen channel upstream of Fairbanks-North Houston to Gessner.	$83,776
TG.8B	Reoptimization of TG.8 - stop channel lining at E122-00-00. Earthen channel upstream of E122-00-00 to Gessner.	$62,106
GE200.0	Channelization of E100-00-00 within existing ROW to remove sediment buildup.	$1,478
GE200.2	Channelization of E200-00-00 and E141-00-00 within existing ROW. Lower flowline by ~5-10 ft.	$7,419
GE200.5	Combination of GE200.0 and GE200.2	$8,857

Table C-9.
Channel and Buyout Component Re-optimization Costs (continued)

E200H.2	Channelization of E100-00-00 within existing ROW from E200-00-00 to Huffmeister. Bottom width 50 - 80 ft.	$11,111
E200H.2A	Reoptimization of E200H.2 - stop channel modifications at FM1960.	$8,840
E200H.2B	Reoptimization of E200H.2 - stop channel modifications at Jones Rd.	$7,267
E200H.3	Channelization of E100-00-00 within existing ROW from E200-00-00 to Huffmeister. Bottom width 60 - 100 ft.	$16,372
E200H.3A	Reoptimization of E200H.3 - stop channel modifications at FM1960.	$13,208
E200H.3B	Reoptimization of E200H.3 - stop channel modifications at Jones Rd.	$9,332
Buyout Component		
NSB_T8J4G2 EH3T3-20%	Removal of Flooded Structures in TG8+JR4+GBW2+E200H3+TWLY3 Residual 20% Floodplain	$8,284

Table C-10. Detention Component Re-optimization Costs

ID	Area (ac)	Volume (ac-ft)	Description	Capital Cost ($1,000)
Detention at Tidwell - W. Little York (TWLY)				
TWLY.0	15	160	Modification of facility E500-05-00; off-line facility	$3,984
TWLY.1	25	274	New facility E500-06-00	$7,940
TWLY.2	45	516	Expansion of E500-05-00; off-line facility	$9,306
TWLY.2.5	52	774	Expansion of E500-05-00; off-line facility	$17,061
TWLY.3	69	1032	Expansion of E500-05-00; off-line facility	$22,748
TWLY.3.5	86	1290	Expansion of E500-05-00; off-line facility	$28,435
Detention at North Houston-Rosslyn Road (NHR)				
NHR.0	37	360	Modification of E500-04-00; off-line facility	$3,021
NHR.1	37	595	Modification and expansion of E500-04-00; off-line facility	$7,956
NHR.2	87	811	Expansion of E500-04-00; off-line facility	$14,505
NHR.3	87	1069	Expansion of E500-04-00; off-line facility	$21,676
NHR.4	143	1211	Expansion of E500-04-00; off-line facility	$46,212
Detention at Hollister Road (HOL)				
HOL.1	57	444	Excavation north of pipeline	$15,049
HOL.2	94	522	Expansion south of pipeline	$18,847
HOL.3	136	730	Expansion of facility to the west	$53,033
Detention at Fairbanks-North Houston (FNH)				
FNH.0	34	360	Modification of E500-01-00; off-line facility	$4,219
FNH.1	86	843	Expansion of E500-01-00; off-line facility	$15,099
FNH.2	136	1271	Expansion of E500-01-00 & new facility E500-02-00 south of bayou	$29,404
FNH.3	184	1717	Expansion of E500-01-00, new facility E500-02-00 south of bayou, & new facility west of Fairbanks-North Houston	$45,105
FNH.4	215	2111	Expansion of E500-01-00, new facility E500-02-00 south of bayou, & new facility west of Fairbanks-North Houston	$58,647
Detention at Gessner-Beltway 8 (GBW)				
GBW.1	21	147	In-line facility north of bayou	$6,795
GBW.2	45	345	New facility (E500-10-00) located north and south of bayou.	$14,508
GBW.3	51	437	New facility located north and south of bayou, with expansion of facility to the south.	$20,038
GBW.4	56+	618	New facility located north and south of bayou, with expansion of facility to the south.	$35,254
Detention at Rio Grande (RG)				
RG.0	16	100	Off-line facility north of E135-00-00	$3,698
RG.1	45	277	Off-line facility north of E135-00-00	$9,866
RG.2	45	398	Expansion of facility north of E135-00-00	$14,481
RG.3	117	881	Expansion of facility north & south of E135-00-00	$44,775
Detention at Jones Road (JR)				
JR.1	23	134	Off-line facility; south of pipeline easement and east of Jones Rd.	$5,235
JR.2	39	220	Expansion of facility north of pipeline easement, east of Jones Rd.	$8,800
JR.3	54	295	Expansion of facility west of Jones Rd.	$12,382
JR.4	66	420	Expansion of facility west of Jones Rd.	$17,193
JR.5	75	470	Expansion of facility west of Jones Rd.	$29,324

Table C-11. Costs for Final Optimization of TG.8 Anchor Plan

ID	Plan	Capital Cost ($1,000)
Formulated Plan		
TG.8-9.2	TG.8+JR.4+GBW.2+E200H.3+TWLY.3+ FNH.1+GE200.0+NSB_20%+NHR.1+RG.0	$203,700
Optimize E200H.3		
TG.8-RF1	E200H.3A	$200,537
TG.8-RF2	E200H.3B	$196,661
Optimize TG.8		
TG.8-RF3	TG.8A	$187,949
TG.8-RF4	TG.8B	$166,279
Optimize JR.4 (420 ac-ft)		
TG.8-RF5	JR.3 (295 ac-ft)	$195,726
TG.8-RF6	JR.5 (470 ac-ft)	$212,668
Optimize GBW.2 (427 ac-ft)		
TG.8-RF7	GBW.1 (229 ac-ft)	$192,823
TG.8-RF8	GBW.3 (519 ac-ft)	$206,066
TG.8-RF9	Remove GBW.2	$186,029
Optimize TWLY.3 (1032 ac-ft)		
TG.8-RF10	TWLY.2.5 (774 ac-ft)	$187,136
TG.8-RF11	TWLY.3.5 (1290 ac-ft)	$198,510
Optimize FNH.1 (843 ac-ft)		
TG.8-RF12	FNH.0 (360 ac-ft)	$181,943
TG.8-RF13	FNH.2 (1271 ac-ft)	$207,128
Optimize GE200.0		
TG.8-RF14	GE200.2	$198,765
TG.8-RF15	GE200.5	$200,202
Optimize NHR.1 (595 ac-ft)		
TG.8-RF16	NHR.0 (360 ac-ft)	$187,889
TG.8-RF17	NHR.2 (811 ac-ft)	$199,373
Optimize RG.0 (100 ac-ft)		
TG.8-RF18	RG.1 (277 ac-ft)	$198,991
TG.8-RF19	Remove RG.0	$189,125
Optimize TWLY.3 (1032 ac-ft)		
TG.8-RF20	TWLY.3B	$178,782
TG.8-RF21	TWLY.3C	$179,502
TG.8-RF22	TWLY.3D	$180,189

Table C-11 (continued)

ID	Plan	Capital Cost ($1,000)
Formulated Plan		
Optimize Non-Structural		
TG.8-RF23	Refine to Single Parcel	$187,747
Replace GE200.0		
TG.8-RF24	Replace GE200.0 w/ GE200.7	$189,478
Remove TWLY		
TG.8-RF25	Remove TWLY.3	$166,729

Table C-12. Costs for Final Optimization of TG.2 Anchor Plan

ID	Description	Capital Cost ($1,000)
Formulated Plan		
TG.2	TG.2+JR.4+HOL.3+GBW.2+FNH.1+RG.2+ E200H.2+GE200.0+TWLY.2	$143,352
TG.2	Updating HOL.3 Costs	$205,393
Updating HOL.3 (730 ac-ft)		
TG.2-FR1	Replace w/HOL.2 (522 ac-ft)	$135,405
Optimize E200H.2		
TG.2-RF2	E200H.2A	$133,135
TG.2-RF3	E200H.2B	$131,562
Optimize TG.2		
TG.2-RF4	TG.2A	$124,634
TG.2-RF5	TG.2B	$119,518
TG.2-RF6	TG.2C	$105,606
Optimize JR.4 (420 ac-ft)		
TG.2-RF7	JR.3 (295 ac-ft)	$119,823
TG.2-RF8	JR.5 (470 ac-ft)	$136,765
Optimize HOL.2 (522 ac-ft)		
TG.2-RF9	HOL.1 (444 ac-ft)	$120,836
TG.2-RF10	HOL.3 (730 ac-ft)	$158,820
Optimize GBW.2 (427 ac-ft)		
TG.2-RF11	GBW.3 (519 ac-ft)	$130,163
TG.2-RF12	GBW.4 (618 ac-ft)	$145,379
Optimize FNH.1 (843 ac-ft)		
TG.2-RF13	FNH.0 (360 ac-ft)	$119,283
TG.2-RF14	FNH.2 (1271 ac-ft)	$144,468
TG.2-RF15	FNH.3 (1717 ac-ft)	$160,169
TG.2-RF16	FNH.4 (2111 ac-ft)	$173,711
Optimize RG.2 (399 ac-ft)		
TG.2-RF17	RG.1 (277 ac-ft)	$155,554
TG.2-RF18	RG.3 (882 ac-ft)	$190,463
TG.2-RF19	RG.0 (100 ac-ft)	$149,386
Remove TWLY.2 (516 ac-ft)		
TG.2-RF20	Remove TWLY.2	$146,248
Updating GE200.0		
TG.2-RF21	Remove GE200.0	$144,770
TG.2-RF22	Adding GE200.7	$146,387
Adding Non-Structural		
TG.2-RF23	Adding non-structural by parcel	$149,715
Additional Component Analysis		
TG.2-RF24	Changing to TG.2A1, HOL.5, GE200.7A	$175,444
TG.2-RF25	Changing to TG.2A3, HOL.5, GE200.7A	$175,000
Hollister Optimization		
TG.2-RF26	Substituting HOL.1 into RF-25	$158,251
TG.2-RF27	Substituting HOL.3 into RF-25	$171,740
TG.2-RF28	Substituting HOL.3B into RF-25	$166,503
TG.2-RF29	Substituting HOL.3B into RF-24	$166,908

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7.0 COST ESTIMATES – RECOMMENDED PLAN

The costs and economic data presented in the previous section were initially updated to 2009 levels as part of the final plan optimization. The costs were updated by Adkins using the MCACES program (TRACES MII Version 4.1). A review of the current economic performance of the individual components of the TG.2-RF29 plan was performed based on the updated MCACES costs and economic data. Subsequently the costs were updated to 2011 levels using the MCACES program. The following process was followed.

1. A last-added analysis was performed starting with the plan components that were generally the least economically beneficial components of the TG.2-RF29 plan, using 2009 costs and benefits. RG.1 was found to no longer be beneficial, since removing RG.1 from the plan increases net benefits by approximately $350,000.
2. The resulting plan, which eliminated RG as a component, is identified as RF-30. A last added analysis was then performed for this plan using 2009 costs and benefits. All of the remaining components were removed individually from the plan, and net benefits were then calculated. The one non-structural component, NSB.1, was shown to no longer contribute net benefits. Therefore it was removed from the plan. The resulting plan identified as RF-30 LA NSB1 is now considered to be the NED Plan.
3. The components of the resulting NED Plan as well as the RG and NSB components were subsequently reevaluated using 2011 costs and benefits. The RF-30 LA NSB1 was still found to be the NED Plan.

The NED Plan has an estimated direct construction cost of $248 million based on 2011 cost levels using the MCACES results from the plan optimization process, without contingencies. This cost excludes the Recreation Plan direct costs of $15 million, also from the MCACES results. The recreation plan costs are presented in Appendix F – Recreation Plan. The NED plan was presented in the February 2013 draft of the GRR and the EA. This version of the GRR and EA was distributed to required agencies, interested parties and to the public for review and comment as part of the NEPA process. Significant public comment was received in opposition to the acquisition of the area identified as the FNH.3-W cell for construction of additional detention storage. Acquisition of this area would require relocation of 11 residences. Concerns were raised regarding the historical, social, and environmental significance of the area to be acquired. Based on these concerns the Local Sponsor reviewed the performance of the flood protection plan resulting from the removal of this area from the plan. The resulting plan is referred to in the plan formulation as RF-31. Damages are reduced approximately $35.6 million in comparison to the NED damage reduction of $37.4.The capital cost of the plan is approximately $232 million in comparison to the NED Plan cost of $ 248 million. Net benefits are approximately $22.1 million in comparison to the NED net benefits of $23.7 million. The benefit-cost ratio is 2.73 in comparison to the NED benefit-cost ratio of 2.74. Based on these

comparisons, it was decided that the flood protection and economic performance of the Tentatively Recommended Plan would not be significantly impacted by removing this area. It was decided to adopt the resulting plan which contains all the features of the NED Plan (RF-30 LA NSB1) except the FNH.3-W cell as the Locally Preferred Plan (RF-31).

The Local Sponsor has already constructed certain components of the Recommended Plan, Status of construction components is as follows:

- **Channel TG.2A1:** channel modifications from E122-00-00 to Gessner have been constructed. Modifications to the channel segment from Cole Creek to E122-00-00 remain to be constructed.

- **Channel GE200.7A:** 2.9 miles of channel modifications to the Jersey Village channel and ditch E141-00-00 within the existing right-of-way has been constructed. Modifications to the approximately 2.1 mile channel segment of the bayou remain to be constructed

- **Channel E200H.2A:** none of the approximately 3.4 miles of earthen channel modifications from detention channel E200-00-00 to FM1960 has been constructed.

- **Detention JR.4:** detention facility providing a detention volume of 420 ac-ft. has been constructed.

- **Detention HOL.3B:** detention facility providing 730 ac-ft of detention volume on 94 acres located at Hollister Road on land south of the bayou has been constructed.

- **Detention GBW.3:** detention facility on two properties totaling 40 acres located north and south of the bayou near Gessner Road and Beltway 8 and providing an estimated detention volume of 427 ac-ft. has been completed. Acquisition of the third property consisting of 11 acres and construction of the 92 ac-ft volume are required.

- **Detention FNH.2:** detention facility near Fairbanks-North Houston Road on two properties totaling 142 acres and providing an estimated total detention volume of 1,269 ac-ft. has been constructed.

None of the Recreation Plan components have been constructed.

The final cost estimate presented herein and in the GRR Main Report is based on the actual costs for the components that have already been constructed, without escalation, and the estimated costs for the future construction, based on FY 2013 price levels. The results of this final cost estimate for the Recommended Plan prepared using the MCACES are presented in Attachment C-9. The

resulting total first cost of the Recommended Plan is approximately $100 million. The flood control components comprise approximately $100 million, and the Recreation Plan components comprise approximately $8million. No contingencies are included in these costs.

8.0 RISK ANALYSIS

A risk analysis of the project costs for the Recommended Plan was performed using the Crystal Ball software, and the MCACES cost estimate. The MCACES cost estimate total without contingencies is approximately $100 million excluding Recreation Plan direct costs of approximately $9 million. The Crystal Ball analysis indicates that a 23 percent contingency for the future component construction would be appropriate to ensure that there is an 80 percent certainty that the total project cost would not exceed $110 million, excluding Recreation Plan costs. Including the Recreation Plan, the total cost with 80 % certainty would be approximately $122 million.

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9.0 OPERATION, MAINTENANCE, REPAIR, REPLACEMENT & REHABILITATION COSTS

Annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs were defined as the additional OMRR&R costs due to the implementation of the Recommended Plan (RF-31), such as the maintenance for newly planted trees and shrubs, and the enlargement or addition of detention facilities.

For the flood damage reduction components of the Recommended Plan, the following describes the OMRR&R cost development. An annual unit cost of $4,000 per acre was recommended by the local sponsor to cover the maintenance of newly planted trees and shrubs for the first three years. For regular maintenance associated with channel widening and detention basins, an annual unit OMRR&R cost of $240 per acre was used based on the experience of the local sponsor. This annual cost is anticipated to cover the costs of mowing, trash removal and slope maintenance. Unit Cost per acre per year is based on $4,000 per acre per year for first three years to initially establish and maintain grasses, trees and shrubs. Also incurred is a unit price of $240/AC for mowing three times per year ($80 for each time per acre) over the 50 year lifetime of this project. The $4,000 annuity was the brought to a present value and then annualized to 50 years. This value was added to the $240/AC for 50 years to achieve the unit price. Based on a 50-year analysis period for the Recommended Plan, the unit cost is equivalent to $888 per acre per year over the 50-year analysis period. The total OMRR&R cost for the Recommended Plan is shown in Table C-13 based on 2009 cost levels. The 2009 cost was updated to FY 2013 levels using Consumer Price Index adjustments. The resulting FY 2013 cost is $327,721.

For the Recreation Plan, annual OMRR&R costs were estimated as a percentage of the total estimated recreation plan construction costs. Based on an estimated 0.7 %, the annual OMRR&R costs total approximately $72,000.

Table C-13 ANNUAL OMRR&R COST ESTIMATE FOR RECOMMENDED PLAN (RF-31) PLAN) FLOOD DAMAGE REDUCTION COMPONENTS

Item	Description		Area (AC)	Unit Cost* ($/AC)	Total Cost ($)	Notes
1	TG.2A	Earthen channel modification from Tidwell to Fairbanks N. Houston Road	0.0	$888	$0	Assuming no maintenance area increased
2	JR.4	Detention facility located north and south of E100-00-00 near Jones Road	66	$888	$61,272	
3	HOL.3B	Detention facility located south of E100-00-00 at Holister Road	94	$888	$83,472	
4	GBW.3	Detention facility located north and south of E100-00-00 between Gessner and Beltway 8	51	$888	$49,728	
5	FNH.2	Detention facility located north and south of E100-00-00 at Fairbanks N. Houston Road	142.1	$888	$163,392	
7	E200H.2A	Earthen channel modification from E200-00-00 to FM 1960	0.0	$888	$0	Assuming no maintenance area increased
8	GE200.0	Channel modification on E100-00-00 from Gessner to E200-00-00	0.0	$888	$0	Assuming no maintenance area increased
Total			**353.1**		**$313,552**	
Total (Escalated to FY 2013 based on CPI)					**$327,721**	

Note: * Unit Cost is based on $4,000 per acre per year for first three years to initially establish and maintain grasses, trees and shrubs. Also incurred is a unit price of $240/AC for mowing three times per year ($80 for each time per acre) over the 50 year lifetime of this project. The $4000 annuity was the brought to a present value and then annualized to 50 years. This value was added to the $240/AC for 50 years to achieve the unit price. Unit prices are based on 2009 cost levels.

10.0 REFERENCES

The following reports or publications served as technical references related to the engineering design conducted as part of the GRR study:

1. U.S. Army Corps of Engineers, June 10, 2004, *Planning – Planning Guidance Notebook, ER1105-2-100*

2. U.S. Army Corps of Engineers, March 31, 1994, *Engineering and Design – Civil Works Cost Engineering, ER1110-2-1302*

3. U.S. Army Corps of Engineers, March 31, 2000, Engineering and Design – Civil Works Construction Cost Indexing System (CWCCIS), EM1110-2-1304

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ATTACHMENT C-1

Summary of Unit Prices

White Oak Bayou (E100-00-00) 211 (f) GRR Study

SUMMARY OF UNIT PRICES

Description	Unit	Unit Price	% Cont.	Comments/Assumptions
MOBILIZATION				
Mobilization/Demobilization	LS	10% of Cost	0	All detention and bridge modification components
Mobilization/Demobilization	LS	10% of Cost	0	All channel improvements
Mobilization/Demobilization	LS	$10,000	20	1 each for the levee and the internal improvements
EARTHWORK				
Clearing and Grubbing	AC	$3,500	14-18	
Excavation	CY	$3	14-18	Including stripping of topsoil and compaction
Excavation of Contaminated Soil	CY	$8	14-18	Equipment excavation, $2000/day and 250 CY/day
Fill and Compaction (On-site fill)	CY	$4	14-18	Fill material located on-site
Fill and Compaction (Off-site fill)	CY	$12	14-18	Fill material hauled in from off-site
Fill and Compaction (Stockpile Site)	CY	$4	14-18	Soil placement areas
Fill Materials	CY	$8	14-18	
Spreading	CY	$1	14-18	For soil placement areas
Haul	CYMI	$1.50	14-18	
Haul	CY	$3.00	20	for levee components
Disposal	CY	$2.00	14-18	Price is site dependent and ranges from $1.58 to $2.09/CY
Haul, Treatment and Disposal of Contaminated Soil	CY	$65	14-18	Class I Non-hazardous Waste
Turf Establishment	AC	$2,500	14-18	110% of the area, including hydromulching
STRUCTURE				
Backslope Swale	LF	$2	10	
Backslope Drain (structure)	EA	$3,000	10	600 ft interval
5" Slope Paving	SY	$40	10	
Remove Existing Bridge	SF	$50	23	
Remove and Replace Bridge (Concrete)	SF	$95	23	
Remove and Replace Bridge (Steel)	SF	$105	23	
Concrete Paving for Ramp	SF	$40	23	
Remove and Replace Concrete Paving for Ramp	SY	$75	10	
Remove Existing Concrete Paving of Channel	SY	$10	10	
Concrete Low Flow Channel	CY	$400	10	
Inter Locking Concrete Block Lining	SY	$35	10	
Sheet Piling (inlet structure)	SF	$25	10	
Levee Wall 0-5	SF	$100	20	Floodwall for levee component
Levee Wall 5-10	SF	$150	20	Floodwall for levee component
Levee Wall 10-15	SF	$200	20	Floodwall for levee component
Levee Wall 15-20	SF	$250	20	Floodwall for levee component
Levee Wall 20-25	SF	$300	20	Floodwall for levee component
Levee Wall 25<	SF	$350	20	Floodwall for levee component
Removal of Existing Drop Structure	LS	$20,000	10	
Removal of Existing Control Structure	LS	$80,000	10	
Removal of Existing Inlet Structure	LS	$25,000	10	Existing Jersey Village bypass inlet structure
Pumping Station	GPM	$35	20	For levee components
Riprap	SY	$35	10	
New Road Construction	SF	$30	15	
Flap Gate (72")	EA	$12,000	10	
Flap Gate (60")	EA	$9,000	10	
Flap Gate (36")	EA	$5,000	10	
OUTFALL MODIFICATIONS				
6" - 21" and Backslope drain	EA	$3,000	10	Assuming modification length = 30 ft CGMP
24" - 36"	EA	$3,700	10	Assuming modification length = 30 ft CGMP
42" - 60"	EA	$4,500	10	Assuming modification length = 30 ft CGMP
66" - 84"	EA	$5,000	10	Assuming modification length = 30 ft CGMP
90" - 120"	EA	$8,000	10	Assuming modification length = 30 ft CGMP
72" x 60" Box	EA	$10,000	20	Assuming modification length = 30 ft
120" x 120" Box	EA	$13,500	20	Assuming modification length = 30 ft
UTILITY MODIFICATIONS				
Water Line (12" STL)	LF	$100	20	
Water Line (16" CI)	LF	$30	20	
Water Line (60" CI)	LF	$400	20	
Waste Water Line (=<12")	LF	$23	20	
Waste Water Line (14" to 16")	LF	$30	20	
Waste Water Line (24" to 27")	LF	$50	20	
Electric Cables	LS	$10,000	20	
Telephone Cables	EA	$11,400	20	

White Oak Bayou (E100-00-00) 211 (f) GRR Study

SUMMARY OF UNIT PRICES

Description	Unit	Unit Price	% Cont.	Comments/Assumptions
Telephone Lines (12 x 4" PVC in 24" STL pipe)	EA	$136,800	20	$11,400 for each line
Telephone Lines (4 x 4")	EA	$45,600	20	$11,400 for each line
Telephone Lines (16 x 4" PVC)	EA	$182,400	20	$11,400 for each line
Petroleum Lines (=<6")	EA	$92,000	20	
Petroleum Lines (8"-12")	EA	$113,000	20	
Petroleum Lines (>12" or in group)	EA	$147,000	20	
Utility Modifications	AC	$20,000	20	For levee components
Drainage Modifications	AC	$20,000	20	For levee components
Removal of Waterline (8" CI)	LF	$10	20	
Removal of Waterline (12" CI)	LF	$10	20	
Removal of Waste Water Line (8" ESP)	LF	$10	20	
Removal of Waste Water Line (10" ESP)	LF	$10	20	
Removal of Storm Water Line (60" RCP)	LF	$40	20	
Removal of Storm Water Line (66" RCP)	LF	$45	20	
Removal of Storm Water Line (78" RCP)	LF	$50	20	
Removal of Other Utilities (Telephone, Cable, etc….)	LF	$25	20	
PROPOSED OUTFALL PIPES				
24" RCP	LF	$55	10	
36" RCP	LF	$70	10	
42" RCP	LF	$90	10	
48" RCP	LF	$100	10	
54" RCP	LF	$125	10	
60" RCP	LF	$135	10	
72" RCP	LF	$180	10	
36" CMP	LF	$90	10	
60" CMP	LF	$120	10	
GENERAL ITEMS				
Stormwater Pollution Prevention	LS	Varies		Based on $2/LF (perimeter)+5000, for channel & detn.
Traffic Control	EA	$200,000	15	For channel modif., extension of each bridge
Traffic Control	LS	$1,000,000	15	For channel modif., Sam Houston Tollway
Traffic Control	LS	price varies		for levee wall construction
Traffic Control	AC	$1,000		for levee internal drainage
Environmental Wetlands Mitigation Bank	AC	$22,000	5	HCFCD Greens Bayou Mitigation Bank
Vegetation Recovery				
Tree Planting	EA	$120	10	Assume 1 tree per 25 linear feet
Shrub Planting	EA	$25	10	Assume 1 shrub per 25 linear feet
House Raising				
Slab-on-grade	SF	$35	15	Add $1/SF for each additional 1 ft, up to 8 ft
Pier & beam	SF	$31	15	Add $1/SF for each additional 1 ft, up to 8 ft
ENGINEERING DESIGN		12% of Cost	10	
CONSTRUCTION MANAGEMENT		10% of Cost	10	8% for Const Mgmt & Insp. 2% for Const Mtls Testing
REAL ESTATE				
R.O.W. Acquisition	EA	Varies	25	Appraised land value or land value from HCAD
R.O.W. Acquisition	SF	$4	20	for levee wall right-of-way
Fair Market Value - Building	EA	Varies	15	HCAD Bldg. X 1.5
Consultant Fee	EA	$750	5	Provided by Flood Control
Appraisal Fee	EA	$750	5	Provided by Flood Control
Closing Cost	EA	Varies	10	1% of FMV or Appraised Value
Administrative Fees	EA	$1,500	20	Used per house in lieu of Consultant, Appraisal and Closing fees for levee component
Demolition Cost	SF	$4.40	20	
Demolition Cost	SF	$15.00	20	levee component
Relocation	EA	$20,000	20	Per house or unit
Relocation	EA	$3,500	20	Per apartment unit

ATTACHMENT C-2

Memorandum – Structure Elevation

CivilTech
Engineering, Inc.

Civil Engineering
Water Resources
Transportation
Structures
Economic Analysis

M E M O R A N D U M

TO: File

FROM: AOF

DATE: May 18, 2004

RE: Section 211(f) Federal Project – White Oak Bayou Flood Proofing: Structure Elevation

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The component analysis included the evaluation of residential, public, and commercial structures in the 50%, 20%, 10%, 4%, and 2% exceedance probability floodplains for elevation up to 1.5 feet above the 1% exceedance probability water surface elevation. As preliminary analysis, all structures were deemed eligible for elevation to 1.5 feet above the 1% exceedance probability floodplain. Structure elevation to 1.5 feet above the 1% floodplain was assumed, based on current Harris County and City of Houston floodplain management regulations. Current regulations require that all new construction or substantial improvement of a structure must have the top of slab of the lowest habitable floor elevated to at least 18 inches above the base flood elevation. It was assumed that all structures were structurally sound. However, all structure raising was limited to 8 feet (in which case another story is essentially added).

The average raise performed on 4,934 structures in the 2% exceedance probability floodplain was 3.19 feet with 45 of those structures requiring raises up to 8 feet. The average raise performed on 674 structures in the 20% exceedance probability floodplain was 3.35 feet, with 32 of the 674 structures raised up to 8 feet. The majority of the structures in the White Oak Bayou study area are slab-on-grade properties. For example, less than 2% of structures in the 20% exceedance probability floodplain and 2.5% in the 2% exceedance probability floodplain have pier and beam foundations.

Benefit Computation

The structures were evaluated in the HEC-FDA model with the new adjusted first-floor elevations. The inundation reduction benefits of elevating the structure are shown in **Table 1**. The inundation reduction benefits of the planned structure elevations ranges from $514,000 in the 50% exceedance probability floodplain to approximately $33.6 million in the 2% exceedance probability floodplain. Benefits were computed at February 2002 price levels.

Costs

Cost estimating was performed on a per square foot basis using the methodology outlined in the USACE document *Flood Proofing, How to Evaluate Your Options*, USACE/National Flood Proofing Committee, July 1993.

Table 1
Section 211(f) Federal Project - White Oak Bayou
Structure Raising Summary ($1,000s)

Exceedance Probability	Number of Structures	Without Project EAD	Elevated Structures EAD	Elevated Structures Damage Reduced
50%	13	$555	$40	$514
20%	674	$11,042	$843	$10,199
10%	1277	$18,705	$1,475	$17,230
4%	3277	$29,189	$3,450	$25,739
2%	4934	$37,952	$4,316	$33,636

EAD = Expected Annual Damages

The following unit cost estimates at January 1993 price levels were provided by the USACE document to assist in economic analysis of flood proofing measures:

- Pier and Beam Structures - $26 per square foot ($32.50 @ February 2002 Price Levels)
- Slab on Grade Structures - $30 per square foot ($37.50 @ February 2002 Price Levels)
- Fill (including hauling and compaction) - $10 per cubic yard ($12.50 @ February 2002 Price Levels)
- Landscaping (no trees, bushes or flowers) - $5 per square yard ($6.50 @ February 2002 Price Levels)

These unit cost estimates were based on nationwide averages with the USACE recommending adjustments to fit local situations. The structure unit costs include foundation, extending utilities, and miscellaneous items, such as sidewalks and driveways. In addition, the structure unit costs are applicable to a 2-foot raise. The USACE document recommends an additional $1 per square foot for each additional raise up to 8 feet. An additional 10% is recommended by the USACE to account for contractor's profit.

The unit cost estimates were deemed applicable to this study except for slab-on-grade structures for which recent local estimates indicated the USACE figure was too low. Local estimates typical of the area were obtained from a proposal by Atlas-Gulf Coast, Inc. to elevate 7 single-family residential slab-on-grade structures in Friendswood, Texas, a Houston suburb, as part of flood proofing measures undertaken by the City of Friendswood. The Atlas proposals for a 2-foot raise are shown in **Table 2**. The average cost per square foot is approximately $55. However, the costs are purely for structure elevation and do not include any improvements such as utility or driveway reconnections, which the USACE costs include. Additional costs to the $55 unit cost were explored from other sources.

A 1996 structure elevation project conducted in Denham Springs, Louisiana documented costs of raising 5 single-family slab-on-grade structures in a report entitled *Floodproofing Through Structural*

Elevation, Denham Springs, Louisiana, Amite River Basin – Elevation Demonstration Grant (FEMA Grant 956-063-001), Amite River Basin Drainage and Water Conservation District, July 1996. The structures were elevated to heights between 5.3 feet and 9 feet or to 6.7 feet above grade on average. The cost of improvements (includes finishing of the exterior of the new foundation wall, construction of steps and elevated decks, and connection of utilities) is shown in **Table 3**. The average cost of structural improvements is $10 per square foot ($11.50 @ February 2002 Price Levels and assuming the Denham Springs project reflects July 1996 Price Levels).

The expert opinion of CivilTech Engineering, Inc., based on prior and current projects in and around the Houston area, is that the additional cost per square foot for structural improvements post-raising is more likely to be $12.50 for a slab-on-grade structure. This together with the elevation unit costs of $55 per square foot was considered a more realistic local cost estimate to be used in place of the USACE nationwide figures. The cost for a 2-foot raise was estimated at $67.50 per square foot for this exercise.

Although these costs are based on construction cases applied to residential properties, they are assumed applicable to non-residential structures for this preliminary analysis. If any of the structure raising alternatives shows sufficient economic feasibility to warrant further consideration as a flood control measure, then each structure will be further investigated for its technical feasibility for raising and more detailed costing will be performed.

All other USACE recommended values were deemed applicable to this analysis. The total cost of raising, improving, landscaping, and filling at all properties in each specified exceedance probability floodplain is shown in **Table 4**. The costs are annualized in line with other component construction costs in this study. This assumes a 7 year construction period and payment amortized over 50 years with the current federal discount rate of 5.625% applied.

Table 2
Atlas Foundation Repair Cost Estimates
City of Friendswood Texas Proposal

	Building Sq-ft	Total Cost of 2-foot Raise	Cost per Sq-ft
Structure 1	1,672	$100,150	$59.90
Structure 2	1,430	$92,200	$64.48
Structure 3	1,864	$114,900	$61.64
Structure 4	2,020	$111,445	$55.17
Structure 5	2,572	$123,400	$47.98
Structure 6	2,476	$110,000	$44.43
Structure 7	2,576	$124,650	$48.39

Average Cost per Sq-ft = $54.57

Table 3
Cost of Structure Raise Improvements
Denham Springs, Louisiana

	Building Sq-ft	Raise Height (ft)	Cost of Improvement	Cost of Improvement (Pro-rate for 2-foot Raise)	Cost per Sq-ft
Structure 1	1,992	8.2	$43,783	$10,679	$5.36
Structure 2	2,250	9.0	$67,431	$14,985	$6.66
Structure 3	1,600	5.3	$39,056	$14,738	$9.21
Structure 4	3,135	5.5	$85,104	$30,947	$9.87
Structure 5	2,048	5.5	$108,071	$39,299	$19.19

Average Cost per Sq-ft = $10.06

Table 4
Section 211(f) Federal Project - White Oak Bayou
Structure Raising Summary ($1,000s)
2004 Discount Rate 5.625%

Exceedance Probability	Number of Structures	Elevated Structures Damage Reduced	Elevated Structures Capital Cost	Elevated Structures Annual Cost	Net Benefits	B/C Ratio
50%	13	$514	$15,825	$944	($429)	0.55
20%	674	$10,199	$144,954	$8,587	$1,612	1.19
10%	1277	$17,230	$354,871	$21,203	($3,973)	0.81
4%	3277	$25,739	$834,600	$50,058	($24,319)	0.51
2%	4934	$33,636	$1,307,482	$78,501	($44,865)	0.43

EAD = Expected Annual Damages

NED Net Benefit Computation

Table 4 shows a comparison of annual costs and annual benefits for each structure raising plan. Net National Economic Development (NED) benefits range from approximately minus $45 million in the 2% exceedance probability floodplain, to approximately $1.5 million in the 20% exceedance probability floodplain. The 20% exceedance probability plan produces the only positive net benefits. Compared to the channel components, which produce net benefits as high as $19 million, the structure raising component does not merit further consideration as anchor to a flood control plan. However, structure elevation as part of a flood control plan will be considered during plan formulation for possible mitigation of induced damages or as an added component to better performing plan components. Any further consideration of structure elevation will require a more detailed evaluation of each structure including assessing structural soundness, safety issues, and velocity of floodwater. Precision survey first floor elevation for each candidate structure will be required for a more detailed evaluation. In addition, more detailed cost estimating will be performed.

ATTACHMENT C-3

Channel Components – Component Optimization

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

Channel and Non-Structural Components - Summary

Component	Description	Capital Cost ($1,000)
Channel Components		
TG.1	Channelization of E100-00-00 within existing ROW. Earthen channel with bottom width of 45 - 50 ft.	$15,374
TG.2	Channelization of E100-00-00 from Cole Creek to Gessner. ROW acquisition required. Bottom width 50 - 60 ft.	$33,382
TG.2A	Channelization of E100-00-00 from Cole Creek to Fairbanks N. Houston. ROW acquisition required. Bottom width 50 - 60 ft.	$24,881
TG.2B	Reoptimization of TG.2 - stop channel modification at E122-00-00.	$19,766
TG.2C	Reoptimization of TG.2 - stop channel modification at Vogel Creek.	$5,853
TG.8	Channelization of E100-00-00 from Cole Creek to Gessner within existing ROW; concrete-lining. Bottom width 80 - 90 ft. SS 2:1.	$96,364
TG.8A	Reoptimization of TG.8 - stop channel lining at Fairbanks-North Houston. Earthen channel upstream of Fairbanks-North Houston to Gessner.	$83,776
TG.8B	Reoptimization of TG.8 - stop channel lining at E122-00-00. Earthen channel upstream of E122-00-00 to Gessner.	$62,106
GE200.0	Channelization of E100-00-00 within existing ROW to remove sediment buildup.	$1,478
GE200.2	Channelization of E200-00-00 and E141-00-00 within existing ROW. Lower flowline by ~5-10 ft.	$7,419
GE200.5	Combination of GE200.0 and GE200.2	$8,857
GE200.7	Component GE200.0 w/side slope stability improvements.	$1,617
E200H.2	Channelization of E100-00-00 within existing ROW from E200-00-00 to N. Eldridge. Bottom width 50 - 80 ft.	$11,111
E200H.2A	Channelization of E100-00-00 within existing ROW from E200-00-00 to FM 1960. Bottom width 50 - 80 ft.	$8,840
E200H.2B	Reoptimization of E200H.2 - stop channel modifications at Jones Rd.	$7,267
E200H.3	Channelization of E100-00-00 within existing ROW from E200-00-00 to N. Eldridge. Bottom width 60 - 100 ft.	$16,372
E200H.3A	Reoptimization of E200H.3 - stop channel modifications at FM1960.	$13,208
E200H.3B	Reoptimization of E200H.3 - stop channel modifications at Jones Rd.	$9,332
E200H.4	Channelization of E100-00-00 with ROW acquisition required. Earthen channel with bottom width of 80 - 120 ft.	$62,496
Non-Structural Components		
NSB_T8J4G2EH3T3-20%	Removal of Flooded Structures in TG8+JR4+GBW2+E200H3+TWLY3 Residual 20% Floodplain	$8,284
NSB_1	Removal of A Flooded Residential Complex with Positive Net Benefit	$3,208
ELEV_1	Elevating A Flooded Structure with Positive Net Benefit	$154

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.1 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$185,183**	**$0**
	Mobilization/Demobilization	1	LS	$185,183	$185,183	$0	0%	$185,183	
2	**Earthwork**							**$1,313,196**	**$0**
	Channel Excavation	101,159	CY	$3	$303,477	$54,626	18%	$358,103	
	Haul 4.14 Miles	418,798	CYMI	$1.50	$628,197	$94,230	15%	$722,427	
	Disposal	101,159	CY	$2.00	$202,318	$30,348	15%	$232,666	
3	**Structures**							**$116,301**	**$0**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$131,796**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	1	EA	$4,830	$4,830	$966	20%		$5,796
	Wastewater Line (60")	1	EA	$84,000	$84,000	$16,800	20%		$100,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$1,736,480**	**$300,536**
8	**Engineering Design (12%)**							**$208,378**	**$36,064**
9	**Construction Mgmt. (10%)**							**$173,648**	**$30,054**
10	**Environmental Mitigation (1/2%)**							**$8,682**	
TOTAL								**$2,127,189**	**$366,654**
GRAND TOTAL								**$2,493,843**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.1 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$379,224**	**$0**
	Mobilization/Demobilization	1	LS	$379,224	$379,224	$0	0%	$379,224	
2	**Earthwork**							**$1,800,138**	**$0**
	Channel Excavation	139,597	CY	$3	$418,791	$75,382	18%	$494,173	
	Haul 4.1 Miles	570,952	CYMI	$1.50	$856,428	$128,464	15%	$984,892	
	Disposal	139,597	CY	$2.00	$279,194	$41,879	15%	$321,073	
3	**Structures**							**$205,621**	**$0**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,198,908**
	Water Line (12" STL)	2	EA	$21,000	$42,000	$8,400	20%		$50,400
	Water Lines (16" CI)	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Wastewater Line (=<12")	3	EA	$4,830	$14,490	$2,898	20%		$17,388
	Wastewater Line (14" to 16")	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$34,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$2,596,104**	**$1,575,358**
8	**Engineering Design (12%)**							**$311,532**	**$189,043**
9	**Construction Mgmt. (10%)**							**$259,610**	**$157,536**
10	**Environmental Mitigation (1/2%)**							**$12,981**	
TOTAL								**$3,180,227**	**$1,921,937**
GRAND TOTAL								**$5,102,164**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.1 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$578,356**	**$0**
	Mobilization/Demobilization	1	LS	$578,356	$578,356	$0	0%	$578,356	
2	**Earthwork**							**$2,170,580**	**$0**
	Channel Excavation	193,125	CY	$3	$579,375	$104,288	18%	$683,663	
	Haul 3.1 Miles	604,481	CYMI	$1.50	$906,722	$136,008	15%	$1,042,730	
	Disposal	193,125	CY	$2.00	$386,250	$57,938	15%	$444,188	
3	**Structures**							**$341,561**	**$0**
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$3,349,558**	**$3,012,360**
8	**Engineering Design (12%)**							**$401,947**	**$361,483**
9	**Construction Mgmt. (10%)**							**$334,956**	**$301,236**
10	**Environmental Mitigation (1/2%)**							**$16,748**	
TOTAL								**$4,103,209**	**$3,675,079**
GRAND TOTAL								**$7,778,288**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.2 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$471,667**	**$0**
	Mobilization/Demobilization	1	LS	$214,246	$214,246	$0	0%	$214,246	
	Demolition/Removal of Buildings	48,754	SF	$4.40	$214,518	$42,904	20%	$257,421	
2	**Earthwork**							**$1,588,131**	**$0**
	Channel Excavation	122,338	CY	$3	$367,014	$66,063	18%	$433,077	
	Haul 4.14 Miles	506,479	CYMI	$1.50	$759,719	$113,958	15%	$873,677	
	Disposal	122,338	CY	$2.00	$244,676	$36,701	15%	$281,377	
3	**Structures**							**$116,301**	**$0**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$147,486**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	1	EA	$5,405	$5,405	$1,081	20%		$6,486
	Wastewater Line (60")	1	EA	$94,000	$94,000	$18,800	20%		$112,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$2,297,899**	**$316,226**
8	**Engineering Design (12%)**							**$275,748**	**$37,947**
9	**Construction Mgmt. (10%)**							**$229,790**	**$31,623**
10	**Real Estate**							**$0**	**$4,064,848**
	R.O.W. Acquisition	1	LS	$994,110	$994,110	$248,528	25%		$1,242,638
	Administrative Fees	1	LS	$68,697	$68,697	$17,174	25%		$85,871
	Building - Fair Market Value	1.5	LS	$1,250,390	$1,875,585	$468,896	25%		$2,344,481
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (businesses)	24,728	SF	$3.50	$86,548	$17,310	20%		$103,858
11	**Environmental Mitigation (1/2%)**							**$11,489**	
TOTAL								**$2,814,927**	**$4,450,643**
GRAND TOTAL								**$7,265,570**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$809,744**	**$0**
	Mobilization/Demobilization	1	LS	$632,209	$632,209	$0	0%	$632,209	
	Demolition/Removal of Buildings	33,624	SF	$4.40	$147,946	$29,589	20%	$177,535	
2	**Earthwork**							**$2,478,789**	**$0**
	Channel Excavation	192,225	CY	$3	$576,675	$103,802	18%	$680,477	
	Haul 4.1 Miles	786,200	CYMI	$1.50	$1,179,300	$176,895	15%	$1,356,195	
	Disposal	192,225	CY	$2.00	$384,450	$57,668	15%	$442,118	
3	**Structures**							**$205,621**	**$1,557,580**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	130	SF	$95	$12,350	$2,841	23%		$15,191
	Inwood C. C. Golf Cart	750	SF	$95	$71,250	$16,388	23%		$87,638
	Pipe Crossing	55	SF	$95	$5,225	$1,202	23%		$6,427
	Railway	900	SF	$105	$94,500	$21,735	23%		$116,235
	North Houston-Rosslyn	11,400	SF	$95	$1,083,000	$249,090	23%		$1,332,090
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,208,778**
	Water Line (12" STL)	2	EA	$23,500	$47,000	$9,400	20%		$56,400
	Water Lines (16" CI)	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Wastewater Line (=<12")	3	EA	$5,405	$16,215	$3,243	20%		$19,458
	Wastewater Line (14" to 16")	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
7	**General Items**							**$494,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$4,165,275**	**$3,142,808**
8	**Engineering Design (12%)**							**$499,833**	**$377,137**
9	**Construction Mgmt. (10%)**							**$416,527**	**$314,281**
10	**Real Estate**							**$0**	**$3,959,254**
	R.O.W. Acquisition	1	LS	$981,498	$981,498	$245,375	25%		$1,226,873
	Administrative Fees	1	LS	$72,548	$72,548	$18,137	25%		$90,685
	Building - Fair Market Value	1.5	LS	$1,215,530	$1,823,295	$455,824	25%		$2,279,119
	Relocation (homes)	14	EA	$20,000	$280,000	$56,000	20%		$336,000
	Relocation (businesses)	6,328	SF	$3.50	$22,148	$4,430	20%		$26,578
11	**Environmental Mitigation (1/2%)**							**$20,826**	
TOTAL								**$5,102,462**	**$7,793,479**
GRAND TOTAL								**$12,895,941**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.2 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$920,669**	**$0**
	Mobilization/Demobilization	1	LS	$723,076	$723,076	$0	0%	$723,076	
	Demolition/Removal of Buildings	37,423	SF	$4.40	$164,661	$32,932	20%	$197,593	
2	**Earthwork**							**$2,484,504**	**$0**
	Channel Excavation	221,056	CY	$3	$663,168	$119,370	18%	$782,538	
	Haul 3.1 Miles	691,905	CYMI	$1.50	$1,037,858	$155,679	15%	$1,193,537	
	Disposal	221,056	CY	$2.00	$442,112	$66,317	15%	$508,429	
3	**Structures**							**$341,561**	**$896,824**
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Bridge Modifications (Extension)								
	Golf Cart	325	SF	$95	$30,875	$7,101	23%		$37,976
	Fairbanks-North Houston	7,350	SF	$95	$698,250	$160,598	23%		$858,848
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,896,710**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	5	EA	$5,405	$27,025	$5,405	20%		$32,430
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.2 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
SUBTOTAL								**$4,235,795**	**$3,915,634**
8	**Engineering Design (12%)**							**$508,295**	**$469,876**
9	**Construction Mgmt. (10%)**							**$423,580**	**$391,563**
10	**Real Estate**							**$0**	**$3,651,814**
	R.O.W. Acquisition	1	LS	$333,100	$333,100	$83,275	25%		$416,375
	Administrative Fees	1	LS	$56,502	$56,502	$14,125	25%		$70,627
	Building - Fair Market Value	1.5	LS	$1,444,700	$2,167,050	$541,763	25%		$2,708,813
	Relocation (homes)	19	EA	$20,000	$380,000	$76,000	20%		$456,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental Mitigation (1/2%)**							**$21,179**	
TOTAL								**$5,188,849**	**$8,428,888**
GRAND TOTAL								**$13,617,736**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.3 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$757,785**	**$0**
	Mobilization/Demobilization	1	LS	$500,364	$500,364	$0	0%	$500,364	
	Demolition/Removal of Buildings	48,754	SF	$4.40	$214,518	$42,904	20%	$257,421	
2	**Earthwork**							**$2,802,290**	**$0**
	Channel Excavation	215,868	CY	$3	$647,604	$116,569	18%	$764,173	
	Haul 4.14 Miles	893,694	CYMI	$1.50	$1,340,540	$201,081	15%	$1,541,621	
	Disposal	215,868	CY	$2.00	$431,736	$64,760	15%	$496,496	
3	**Structures**							**$116,301**	**$1,413,885**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
	Bridge Modifications (Extension)								
	Tidwell	12,100	SF	$95	$1,149,500	$264,385	23%		$1,413,885
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$150,624**
	Water Line (12" STL)	1	EA	$24,000	$24,000	$4,800	20%		$28,800
	Wastewater Line (=<12")	1	EA	$5,520	$5,520	$1,104	20%		$6,624
	Wastewater Line (60")	1	EA	$96,000	$96,000	$19,200	20%		$115,200
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$252,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$4,028,177**	**$1,733,249**
8	**Engineering Design (12%)**							**$483,381**	**$207,990**
9	**Construction Mgmt. (10%)**							**$402,818**	**$173,325**
10	**Real Estate**							**$0**	**$4,186,048**
	R.O.W. Acquisition	1	LS	$1,090,110	$1,090,110	$272,528	25%		$1,362,638
	Administrative Fees	1	LS	$69,657	$69,657	$17,414	25%		$87,071
	Building - Fair Market Value	1.5	LS	$1,250,390	$1,875,585	$468,896	25%		$2,344,481
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (businesses)	24,728	SF	$3.50	$86,548	$17,310	20%		$103,858
11	**Environmental Mitigation (1/2%)**							**$20,141**	
TOTAL								**$4,934,517**	**$6,300,611**
GRAND TOTAL								**$11,235,128**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.3 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,191,842**	**$0**
	Mobilization/Demobilization	1	LS	$1,622,130	$1,622,130	$0	0%	$1,622,130	
	Demolition/Removal of Buildings	107,900	SF	$4.40	$474,760	$94,952	20%	$569,712	
2	**Earthwork**							**$8,469,012**	**$0**
	Channel Excavation	390,848	CY	$3	$1,172,544	$211,058	18%	$1,383,602	
	Haul 4.1 Miles	1,598,568	CYMI	$1.50	$2,397,852	$3,788,607	158%	$6,186,459	
	Disposal	390,848	CY	$2.00	$781,696	$117,254	15%	$898,950	
3	**Structures**							**$205,621**	**$4,368,345**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	360	SF	$95	$34,200	$7,866	23%		$42,066
	Pipe Crossing	90	SF	$95	$8,550	$1,967	23%		$10,517
	Victory Dr.	18,050	SF	$95	$1,714,750	$394,393	23%		$2,109,143
	Inwood C. C. Golf Cart	1,100	SF	$95	$104,500	$24,035	23%		$128,535
	Pipe Crossing	70	SF	$95	$6,650	$1,530	23%		$8,180
	Pipe Crossing	390	SF	$95	$37,050	$8,522	23%		$45,572
	Railway	1,560	SF	$105	$163,800	$37,674	23%		$201,474
	North Houston-Rosslyn	15,600	SF	$95	$1,482,000	$340,860	23%		$1,822,860
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,210,752**
	Water Line (12" STL)	2	EA	$24,000	$48,000	$9,600	20%		$57,600
	Water Lines (16" CI)	1	EA	$7,200	$7,200	$1,440	20%		$8,640
	Wastewater Line (=<12")	3	EA	$5,520	$16,560	$3,312	20%		$19,872
	Wastewater Line (14" to 16")	1	EA	$7,200	$7,200	$1,440	20%		$8,640
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.3 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$1,414,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	6	EA	$200,000	$1,200,000	$180,000	15%	$1,380,000	
SUBTOTAL								**$12,457,595**	**$5,955,547**
8	**Engineering Design (12%)**							**$1,494,911**	**$714,666**
9	**Construction Mgmt. (10%)**							**$1,245,760**	**$595,555**
10	**Real Estate**							**$0**	**$14,738,456**
	R.O.W. Acquisition	1	LS	$4,388,953	$4,388,953	$1,097,238	25%		$5,486,191
	Administrative Fees	1	LS	$209,005	$209,005	$52,251	25%		$261,256
	Building - Fair Market Value	1.5	LS	$4,141,030	$6,211,545	$1,552,886	25%		$7,764,431
	Relocation (homes)	50	EA	$20,000	$1,000,000	$200,000	20%		$1,200,000
	Relocation (businesses)	6,328	SF	$3.50	$22,148	$4,430	20%		$26,578
11	**Environmental Mitigation (1/2%)**							**$62,288**	
TOTAL								**$15,260,554**	**$22,004,224**
GRAND TOTAL								**$37,264,778**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.3 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,102,802**	**$0**
	Mobilization/Demobilization	1	LS	$842,229	$842,229	$0	0%	$842,229	
	Demolition/Removal of Buildings	49,351	SF	$4.40	$217,144	$43,429	20%	$260,573	
2	**Earthwork**							**$3,476,682**	**$0**
	Channel Excavation	309,334	CY	$3	$928,002	$167,040	18%	$1,095,042	
	Haul 3.1 Miles	968,215	CYMI	$1.50	$1,452,323	$217,848	15%	$1,670,172	
	Disposal	309,334	CY	$2.00	$618,668	$92,800	15%	$711,468	
3	**Structures**							**$341,561**	**$1,094,885**
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Bridge Modifications (Extension)								
	Golf Cart	550	SF	$95	$52,250	$12,018	23%		$64,268
	Fairbanks-North Houston	8,820	SF	$95	$837,900	$192,717	23%		$1,030,617
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,898,000**
	Water Line (12" STL)	1	EA	$24,000	$24,000	$4,800	20%		$28,800
	Wastewater Line (=<12")	5	EA	$5,520	$27,600	$5,520	20%		$33,120
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.3 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
SUBTOTAL								**$5,410,106**	**$4,114,985**
8	**Engineering Design (12%)**							**$649,213**	**$493,798**
9	**Construction Mgmt. (10%)**							**$541,011**	**$411,498**
10	**Real Estate**							**$0**	**$5,101,171**
	R.O.W. Acquisition	1	LS	$589,100	$589,100	$147,275	25%		$736,375
	Administrative Fees	1	LS	$77,237	$77,237	$19,309	25%		$96,546
	Building - Fair Market Value	1.5	LS	$1,956,400	$2,934,600	$733,650	25%		$3,668,250
	Relocation (homes)	25	EA	$20,000	$500,000	$100,000	20%		$600,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental Mitigation (1/2%)**							**$27,051**	
TOTAL								**$6,627,380**	**$10,121,452**
GRAND TOTAL								**$16,748,833**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.4 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,693,084**	**$0**
	Mobilization/Demobilization	1	LS	$693,876	$693,876	$0	0%	$693,876	
	Demolition/Removal of Buildings	378,638	SF	$4.40	$1,666,007	$333,201	20%	$1,999,209	
2	**Earthwork**							**$4,075,776**	**$0**
	Channel Excavation	313,968	CY	$3	$941,904	$169,543	18%	$1,111,447	
	Haul 4.14 Miles	1,299,828	CYMI	$1.50	$1,949,741	$292,461	15%	$2,242,202	
	Disposal	313,968	CY	$2.00	$627,936	$94,190	15%	$722,126	
3	**Structures**							**$116,301**	**$1,928,025**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
	Bridge Modifications (Extension)								
	Tidwell	16,500	SF	$95	$1,567,500	$360,525	23%		$1,928,025
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$298,116**
	Water Line (12" STL)	1	EA	$26,000	$26,000	$5,200	20%		$31,200
	Water Line (12" STL)	1,000	LF	$100	$100,000	$20,000	20%		$120,000
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	1	EA	$5,980	$5,980	$1,196	20%		$7,176
	Wastewater Line (=<12")	500	LF	$23	$11,500	$2,300	20%		$13,800
	Wastewater Line (60")	1	EA	$104,000	$104,000	$20,800	20%		$124,800
	Manhole (6"-24" lines)	1	EA	$2,500	$2,500	$500	20%		$3,000
	Gas/Petroleum Lines (2" IPSTL)	2,500	LF	$350	$875,000	$175,000	20%		$1,050,000
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$252,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.4 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
SUBTOTAL								**$7,236,962**	**$2,394,881**
8	**Engineering Design (12%)**							**$868,435**	**$287,386**
9	**Construction Mgmt. (10%)**							**$723,696**	**$239,488**
10	**Real Estate**							**$0**	**$21,241,094**
	R.O.W. Acquisition	1	LS	$2,562,650	$2,562,650	$640,663	25%		$3,203,313
	Administrative Fees	1	LS	$833,444	$833,444	$208,361	25%		$1,041,805
	Building - Fair Market Value	1.5	LS	$7,887,850	$11,831,775	$2,957,944	25%		$14,789,719
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (apartments)	432	EA	$3,500	$1,512,000	$302,400	20%		$1,814,400
	Relocation (businesses)	24,728	SF	$3.50	$86,548	$17,310	20%		$103,858
11	**Environmental Mitigation (1/2%)**							**$36,185**	
TOTAL								**$8,865,278**	**$24,162,849**
GRAND TOTAL								**$33,028,127**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.4 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$3,161,787**	**$0**
	Mobilization/Demobilization	1	LS	$2,217,485	$2,217,485	$0	0%	$2,217,485	
	Demolition/Removal of Buildings	178,845	SF	$4.40	$786,918	$157,384	20%	$944,302	
2	**Earthwork**							**$7,494,332**	**$0**
	Channel Excavation	581,170	CY	$3	$1,743,510	$313,832	18%	$2,057,342	
	Haul 4.1 Miles	2,376,985	CYMI	$1.50	$3,565,478	$534,822	15%	$4,100,300	
	Disposal	581,170	CY	$2.00	$1,162,340	$174,351	15%	$1,336,691	
3	**Structures**							**$205,621**	**$7,819,541**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	420	SF	$95	$39,900	$9,177	23%		$49,077
	West Little York	6,890	SF	$95	$654,550	$150,547	23%		$805,097
	Antoine	9,570	SF	$95	$909,150	$209,105	23%		$1,118,255
	Pipe Crossing	130	SF	$95	$12,350	$2,841	23%		$15,191
	Victory Dr.	19,950	SF	$95	$1,895,250	$435,908	23%		$2,331,158
	Inwood C. C. Golf Cart	1,500	SF	$95	$142,500	$32,775	23%		$175,275
	Alabonson	7,930	SF	$95	$753,350	$173,271	23%		$926,621
	Pipe Crossing	90	SF	$95	$8,550	$1,967	23%		$10,517
	Pipe Crossing	450	SF	$95	$42,750	$9,833	23%		$52,583
	Railway	1,800	SF	$105	$189,000	$43,470	23%		$232,470
	North Houston-Rosslyn	18,000	SF	$95	$1,710,000	$393,300	23%		$2,103,300
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.4 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
5	**Utility Modifications**							**$0**	**$4,687,788**
	Water Line (12" STL)	2	EA	$26,000	$52,000	$10,400	20%		$62,400
	Water Line (12" STL)	800	LF	$100	$80,000	$16,000	20%		$96,000
	Water Lines (16" CI)	1	EA	$7,800	$7,800	$1,560	20%		$9,360
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	3	EA	$5,980	$17,940	$3,588	20%		$21,528
	Wastewater Line (=<12")	7,500	LF	$23	$172,500	$34,500	20%		$207,000
	Wastewater Line (14" to 16")	1	EA	$7,800	$7,800	$1,560	20%		$9,360
	Manhole (6"-24" lines)	19	EA	$2,500	$47,500	$9,500	20%		$57,000
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (2" IPSTL)	7,400	LF	$350	$2,590,000	$518,000	20%		$3,108,000
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Telephone Lines (4 x 4")	1	EA	$45,600	$45,600	$9,120	20%		$54,720
	HL&P	2	EA	$10,000	$20,000	$4,000	20%		$24,000
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$1,414,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	6	EA	$200,000	$1,200,000	$180,000	15%	$1,380,000	
SUBTOTAL								**$12,452,861**	**$12,883,779**
8	**Engineering Design (12%)**							**$1,494,343**	**$1,546,053**
9	**Construction Mgmt. (10%)**							**$1,245,286**	**$1,288,378**
10	**Real Estate**							**$0**	**$18,722,530**
	R.O.W. Acquisition	1	LS	$5,138,265	$5,138,265	$1,284,566	25%		$6,422,831
	Administrative Fees	1	LS	$278,594	$278,594	$69,648	25%		$348,242
	Building - Fair Market Value	1.5	LS	$5,514,080	$8,271,120	$2,067,780	25%		$10,338,900
	Relocation (homes)	63	EA	$20,000	$1,260,000	$252,000	20%		$1,512,000
	Relocation (businesses)	23,942	SF	$3.50	$83,797	$16,759	20%		$100,556
11	**Environmental Mitigation (1/2%)**							**$62,264**	
TOTAL								**$15,254,755**	**$34,440,740**
GRAND TOTAL								**$49,695,494**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.4 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,978,777**	**$0**
	Mobilization/Demobilization	1	LS	$1,290,835	$1,290,835	$0	0%	$1,290,835	
	Demolition/Removal of Buildings	130,292	SF	$4.40	$573,285	$114,657	20%	$687,942	
2	**Earthwork**							**$5,613,590**	**$0**
	Channel Excavation	499,463	CY	$3	$1,498,389	$269,710	18%	$1,768,099	
	Haul 3.1 Miles	1,563,319	CYMI	$1.50	$2,344,979	$351,747	15%	$2,696,726	
	Disposal	499,463	CY	$2.00	$998,926	$149,839	15%	$1,148,765	
3	**Structures**							**$608,311**	**$1,805,333**
	Backslope Swale	37,930	LF	$2	$75,860	$7,586	10%	$83,446	
	Backslope Drain (structure)	63	EA	$3,000	$189,650	$18,965	10%	$208,615	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Sheet Piling for Transition Structure at West F	8,300	SF	$25	$207,500	$20,750	10%	$228,250	
	Bridge Modifications (Extension)								
	Golf Cart Bridge	750	SF	$95	$71,250	$16,388	23%		$87,638
	Fairbanks-North Houston	14,700	SF	$95	$1,396,500	$321,195	23%		$1,717,695
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$4,269,960**
	Water Line (12" STL)	1	EA	$26,000	$26,000	$5,200	20%		$31,200
	Wastewater Line (=<12")	5	EA	$5,980	$29,900	$5,980	20%		$35,880
	Wastewater Line (=<12")	3,000	LF	$23	$69,000	$13,800	20%		$82,800
	Manhole (6"-24" lines)	8	EA	$2,500	$20,000	$4,000	20%		$24,000
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (2" IPSTL)	3,000	LF	$350	$1,050,000	$210,000	20%		$1,260,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
	HL&P	1	EA	$10,000	$10,000	$2,000	20%		$12,000

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.4 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$8,689,739**	**$6,197,393**
8	**Engineering Design (12%)**							**$1,042,769**	**$743,687**
9	**Construction Mgmt. (10%)**							**$868,974**	**$619,739**
10	**Real Estate**							**$0**	**$14,984,381**
	R.O.W. Acquisition	1	LS	$1,442,321	$1,442,321	$360,580	25%		$1,802,901
	Administrative Fees	1	LS	$239,734	$239,734	$59,933	25%		$299,667
	Building - Fair Market Value	1.5	LS	$5,820,700	$8,731,050	$2,182,763	25%		$10,913,813
	Relocation (homes)	82	EA	$20,000	$1,640,000	$328,000	20%		$1,968,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental Mitigation (1/2%)**							**$43,449**	
TOTAL								**$10,644,930**	**$22,545,200**
GRAND TOTAL								**$33,190,130**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.5 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,910,731**	**$0**
	Mobilization/Demobilization	1	LS	$911,522	$911,522	$0	0%	$911,522	
	Demolition/Removal of Buildings	378,638	SF	$4.40	$1,666,007	$333,201	20%	$1,999,209	
2	**Earthwork**							**$5,982,615**	**$0**
	Channel Excavation	460,857	CY	$3	$1,382,571	$248,863	18%	$1,631,434	
	Haul 4.14 Miles	1,907,948	CYMI	$1.50	$2,861,922	$429,288	15%	$3,291,210	
	Disposal	460,857	CY	$2.00	$921,714	$138,257	15%	$1,059,971	
3	**Structures**							**$116,301**	**$2,185,095**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
	Bridge Modifications (Extension)								
	Tidwell	18,700	SF	$95	$1,776,500	$408,595	23%		$2,185,095
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$310,668**
	Water Line (12" STL)	1	EA	$28,000	$28,000	$5,600	20%		$33,600
	Water Line (12" STL)	1,000	LF	$100	$100,000	$20,000	20%		$120,000
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	1	EA	$6,440	$6,440	$1,288	20%		$7,728
	Wastewater Line (=<12")	500	LF	$23	$11,500	$2,300	20%		$13,800
	Wastewater Line (60")	1	EA	$112,000	$112,000	$22,400	20%		$134,400
	Manhole (6"-24" lines)	1	EA	$2,500	$2,500	$500	20%		$3,000
	Gas/Petroleum Lines (2" IP STL)	2,500	LF	$350	$875,000	$175,000	20%		$1,050,000
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$252,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$9,361,447**	**$2,664,503**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.5 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$1,123,374**	**$319,740**
9	**Construction Mgmt. (10%)**							**$936,145**	**$266,450**
10	**Real Estate**							**$0**	**$21,429,958**
	R.O.W. Acquisition	1	LS	$2,677,650	$2,677,650	$669,413	25%		$3,347,063
	Administrative Fees	1	LS	$836,235	$836,235	$209,059	25%		$1,045,294
	Building - Fair Market Value	1.5	LS	$7,897,250	$11,845,875	$2,961,469	25%		$14,807,344
	Relocation (homes)	13	EA	$20,000	$260,000	$52,000	20%		$312,000
	Relocation (apartments)	432	EA	$3,500	$1,512,000	$302,400	20%		$1,814,400
	Relocation (businesses)	24,728	SF	$3.50	$86,548	$17,310	20%		$103,858
11	**Environmental Mitigation (1/2%)**							**$46,807**	
TOTAL								**$11,467,773**	**$24,680,652**
GRAND TOTAL								**$36,148,425**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.5 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$3,870,893**	**$0**
	Mobilization/Demobilization	1	LS	$2,584,865	$2,584,865	$0	0%	$2,584,865	
	Demolition/Removal of Buildings	243,566	SF	$4.40	$1,071,690	$214,338	20%	$1,286,028	
2	**Earthwork**							**$10,117,317**	**$0**
	Channel Excavation	784,577	CY	$3	$2,353,731	$423,672	18%	$2,777,403	
	Haul 4.1 Miles	3,208,920	CYMI	$1.50	$4,813,380	$722,007	15%	$5,535,387	
	Disposal	784,577	CY	$2.00	$1,569,154	$235,373	15%	$1,804,527	
3	**Structures**							**$205,621**	**$8,862,458**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	460	SF	$95	$43,700	$10,051	23%		$53,751
	West Little York	7,950	SF	$95	$755,250	$173,708	23%		$928,958
	Antoine	11,310	SF	$95	$1,074,450	$247,124	23%		$1,321,574
	Pipe Crossing	150	SF	$95	$14,250	$3,278	23%		$17,528
	Victory Dr.	21,850	SF	$95	$2,075,750	$477,423	23%		$2,553,173
	Inwood C. C. Golf Cart	1,700	SF	$95	$161,500	$37,145	23%		$198,645
	Alabonson	9,150	SF	$95	$869,250	$199,928	23%		$1,069,178
	Pipe Crossing	110	SF	$95	$10,450	$2,404	23%		$12,854
	Pipe Crossing	510	SF	$95	$48,450	$11,144	23%		$59,594
	Railway	2,040	SF	$105	$214,200	$49,266	23%		$263,466
	North Houston-Rosslyn	20,400	SF	$95	$1,938,000	$445,740	23%		$2,383,740
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$4,695,684**
	Water Line (12" STL)	2	EA	$28,000	$56,000	$11,200	20%		$67,200
	Water Line (12" STL)	800	LF	$100	$80,000	$16,000	20%		$96,000
	Water Lines (16" CI)	1	EA	$8,400	$8,400	$1,680	20%		$10,080
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	3	EA	$6,440	$19,320	$3,864	20%		$23,184
	Wastewater Line (=<12")	7,500	LF	$23	$172,500	$34,500	20%		$207,000

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.5 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Wastewater Line (14" to 16")	1	EA	$8,400	$8,400	$1,680	20%		$10,080
	Manhole (6"-24" lines)	19	EA	$2,500	$47,500	$9,500	20%		$57,000
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (2" IP STL)	7,400	LF	$350	$2,590,000	$518,000	20%		$3,108,000
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Telephone Lines (4 x 4")	1	EA	$45,600	$45,600	$9,120	20%		$54,720
	HL&P	2	EA	$10,000	$20,000	$4,000	20%		$24,000
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$1,414,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	6	EA	$200,000	$1,200,000	$180,000	15%	$1,380,000	
SUBTOTAL								**$15,784,952**	**$13,934,592**
8	**Engineering Design (12%)**							**$1,894,194**	**$1,672,151**
9	**Construction Mgmt. (10%)**							**$1,578,495**	**$1,393,459**
10	**Real Estate**							**$0**	**$22,449,230**
	R.O.W. Acquisition	1	LS	$6,489,085	$6,489,085	$1,622,271	25%		$8,111,356
	Administrative Fees	1	LS	$313,067	$313,067	$78,267	25%		$391,334
	Building - Fair Market Value	1.5	LS	$6,378,410	$9,567,615	$2,391,904	25%		$11,959,519
	Relocation (homes)	64	EA	$20,000	$1,280,000	$256,000	20%		$1,536,000
	Relocation (businesses)	107,386	SF	$3.50	$375,851	$75,170	20%		$451,021
11	**Environmental Mitigation (1/2%)**							**$78,925**	
TOTAL								**$19,336,566**	**$39,449,432**
GRAND TOTAL								**$58,785,997**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.5 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,575,420**	**$0**
	Mobilization/Demobilization	1	LS	$1,840,438	$1,840,438	$0	0%	$1,840,438	
	Demolition/Removal of Buildings	139,201	SF	$4.40	$612,484	$122,497	20%	$734,981	
2	**Earthwork**							**$7,992,028**	**$0**
	Channel Excavation	711,082	CY	$3	$2,133,246	$383,984	18%	$2,517,230	
	Haul 3.1 Miles	2,225,687	CYMI	$1.50	$3,338,530	$500,779	15%	$3,839,309	
	Disposal	711,082	CY	$2.00	$1,422,164	$213,325	15%	$1,635,489	
3	**Structures**							**$608,311**	**$2,046,044**
	Backslope Swale	37,930	LF	$2	$75,860	$7,586	10%	$83,446	
	Backslope Drain (structure)	63	EA	$3,000	$189,650	$18,965	10%	$208,615	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Sheet Piling for Transition Structure at West F	8,300	SF	$25	$207,500	$20,750	10%	$228,250	
	Bridge Modifications (Extension)								
	Golf Cart Bridge	850	SF	$95	$80,750	$18,573	23%		$99,323
	Fairbanks-North Houston	16,660	SF	$95	$1,582,700	$364,021	23%		$1,946,721
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$7,146,840**
	Water Line (12" STL)	1	EA	$28,000	$28,000	$5,600	20%		$33,600
	Wastewater Line (=<12")	5	EA	$6,440	$32,200	$6,440	20%		$38,640
	Wastewater Line (=<12")	5,500	LF	$23	$126,500	$25,300	20%		$151,800
	Manhole (6"-24" lines)	14	EA	$2,500	$35,000	$7,000	20%		$42,000
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	3	LS	$45,600	$136,800	$27,360	20%		$164,160
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (2 IP STL")	9,500	LF	$350	$3,325,000	$665,000	20%		$3,990,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
	HL&P	2	EA	$10,000	$20,000	$4,000	20%		$24,000

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.5 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$11,664,820**	**$9,314,984**
8	**Engineering Design (12%)**							**$1,399,778**	**$1,117,798**
9	**Construction Mgmt. (10%)**							**$1,166,482**	**$931,498**
10	**Real Estate**							**$0**	**$16,250,001**
	R.O.W. Acquisition	1	LS	$1,712,867	$1,712,867	$428,217	25%		$2,141,084
	Administrative Fees	1	LS	$261,984	$261,984	$65,496	25%		$327,480
	Building - Fair Market Value	1.5	LS	$6,223,700	$9,335,550	$2,333,888	25%		$11,669,438
	Relocation (homes)	88	EA	$20,000	$1,760,000	$352,000	20%		$2,112,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental Mitigation (1/2%)**							**$58,324**	
TOTAL								**$14,289,405**	**$27,614,281**
GRAND TOTAL								**$41,903,686**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.6 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$4,697,200**	**$0**
	Mobilization/Demobilization	1	LS	$1,883,029	$1,883,029	$0	0%	$1,883,029	
	Demolition/Removal of Buildings	532,987	SF	$4.40	$2,345,143	$469,029	20%	$2,814,171	
2	**Earthwork**							**$13,653,007**	**$0**
	Channel Excavation	1,051,728	CY	$3	$3,155,184	$567,933	18%	$3,723,117	
	Haul 4.14 Miles	4,354,154	CYMI	$1.50	$6,531,231	$979,685	15%	$7,510,916	
	Disposal	1,051,728	CY	$2.00	$2,103,456	$315,518	15%	$2,418,974	
3	**Structures**							**$116,301**	**$3,084,840**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
	Bridge Modifications (Extension)								
	Tidwell	26,400	SF	$95	$2,508,000	$576,840	23%		$3,084,840
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$1,455,600**
	Water Line (12" STL)	1	EA	$35,000	$35,000	$7,000	20%		$42,000
	Water Line (12" STL)	1,400	LF	$100	$140,000	$28,000	20%		$168,000
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	1	EA	$8,050	$8,050	$1,610	20%		$9,660
	Wastewater Line (=<12")	500	LF	$23	$11,500	$2,300	20%		$13,800
	Wastewater Line (60")	1	EA	$140,000	$140,000	$28,000	20%		$168,000
	Manhole (6"-24" lines)	1	EA	$2,500	$2,500	$500	20%		$3,000
	Gas/Petroleum Lines (2" IP STL)	2,500	LF	$350	$875,000	$175,000	20%		$1,050,000
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$252,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$18,818,309**	**$4,709,180**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.6 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$2,258,197**	**$565,102**
9	**Construction Mgmt. (10%)**							**$1,881,831**	**$470,918**
10	**Real Estate**							**$0**	**$27,624,366**
	R.O.W. Acquisition	1	LS	$4,315,507	$4,315,507	$1,078,877	25%		$5,394,384
	Administrative Fees	1	LS	$910,112	$910,112	$227,528	25%		$1,137,640
	Building - Fair Market Value	1.5	LS	$9,663,800	$14,495,700	$3,623,925	25%		$18,119,625
	Relocation (homes)	20	EA	$20,000	$400,000	$80,000	20%		$480,000
	Relocation (apartments)	432	EA	$3,500	$1,512,000	$302,400	20%		$1,814,400
	Relocation (businesses)	161,504	SF	$3.50	$565,264	$113,053	20%		$678,317
11	**Environmental Mitigation (1/2%)**							**$94,092**	
TOTAL								**$23,052,428**	**$33,369,565**
GRAND TOTAL								**$56,421,994**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.6 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$5,700,985**	**$0**
	Mobilization/Demobilization	1	LS	$4,124,593	$4,124,593	$0	0%	$4,124,593	
	Demolition/Removal of Buildings	298,559	SF	$4.40	$1,313,660	$262,732	20%	$1,576,392	
2	**Earthwork**							**$21,836,752**	**$0**
	Channel Excavation	1,693,395	CY	$3	$5,080,185	$914,433	18%	$5,994,618	
	Haul 4.1 Miles	6,925,986	CYMI	$1.50	$10,388,978	$1,558,347	15%	$11,947,325	
	Disposal	1,693,395	CY	$2.00	$3,386,790	$508,019	15%	$3,894,809	
3	**Structures**							**$205,621**	**$12,512,667**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	600	SF	$95	$57,000	$13,110	23%		$70,110
	West Little York	11,660	SF	$95	$1,107,700	$254,771	23%		$1,362,471
	Antoine	17,400	SF	$95	$1,653,000	$380,190	23%		$2,033,190
	Pipe Crossing	220	SF	$95	$20,900	$4,807	23%		$25,707
	Victory Dr.	28,500	SF	$95	$2,707,500	$622,725	23%		$3,330,225
	Inwood C. C. Golf Cart	2,400	SF	$95	$228,000	$52,440	23%		$280,440
	Alabonson	13,420	SF	$95	$1,274,900	$293,227	23%		$1,568,127
	Pipe Crossing	180	SF	$95	$17,100	$3,933	23%		$21,033
	Pipe Crossing	720	SF	$95	$68,400	$15,732	23%		$84,132
	Railway	2,880	SF	$105	$302,400	$69,552	23%		$371,952
	North Houston-Rosslyn	28,800	SF	$95	$2,736,000	$629,280	23%		$3,365,280
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$4,723,320**
	Water Line (12" STL)	2	EA	$35,000	$70,000	$14,000	20%		$84,000
	Water Line (12" STL)	800	LF	$100	$80,000	$16,000	20%		$96,000
	Water Lines (16" CI)	1	EA	$10,500	$10,500	$2,100	20%		$12,600
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	3	EA	$8,050	$24,150	$4,830	20%		$28,980
	Wastewater Line (=<12")	7,500	LF	$23	$172,500	$34,500	20%		$207,000

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.6 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Wastewater Line (14" to 16")	1	EA	$10,500	$10,500	$2,100	20%		$12,600
	Manhole (6"-24" lines)	19	EA	$2,500	$47,500	$9,500	20%		$57,000
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (2" IP STL)	7,400	LF	$350	$2,590,000	$518,000	20%		$3,108,000
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Telephone Lines (4 x 4")	1	EA	$45,600	$45,600	$9,120	20%		$54,720
	HL&P	2	EA	$10,000	$20,000	$4,000	20%		$24,000
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$1,414,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	6	EA	$200,000	$1,200,000	$180,000	15%	$1,380,000	
SUBTOTAL								**$29,334,478**	**$17,612,437**
8	**Engineering Design (12%)**							**$3,520,137**	**$2,113,492**
9	**Construction Mgmt. (10%)**							**$2,933,448**	**$1,761,244**
10	**Real Estate**							**$0**	**$26,912,119**
	R.O.W. Acquisition	1	LS	$7,436,427	$7,436,427	$1,859,107	25%		$9,295,534
	Administrative Fees	1	LS	$382,592	$382,592	$95,648	25%		$478,240
	Building - Fair Market Value	1.5	LS	$7,881,840	$11,822,760	$2,955,690	25%		$14,778,450
	Relocation (homes)	73	EA	$20,000	$1,460,000	$292,000	20%		$1,752,000
	Relocation (businesses)	144,737	SF	$3.50	$506,580	$101,316	20%		$607,895
11	**Environmental Mitigation (1/2%)**							**$146,672**	
TOTAL								**$35,934,736**	**$48,399,292**
GRAND TOTAL								**$84,334,028**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.6 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$5,151,904**	**$0**
	Mobilization/Demobilization	1	LS	$3,655,784	$3,655,784	$0	0%	$3,655,784	
	Demolition/Removal of Buildings	283,356	SF	$4.40	$1,246,766	$249,353	20%	$1,496,120	
2	**Earthwork**							**$20,683,064**	**$0**
	Channel Excavation	1,840,253	CY	$3	$5,520,759	$993,737	18%	$6,514,496	
	Haul 3.1 Miles	5,759,992	CYMI	$1.50	$8,639,988	$1,295,998	15%	$9,935,986	
	Disposal	1,840,253	CY	$2.00	$3,680,506	$552,076	15%	$4,232,582	
3	**Structures**							**$608,311**	**$3,129,243**
	Backslope Swale	37,930	LF	$2	$75,860	$7,586	10%	$83,446	
	Backslope Drain (structure)	63	EA	$3,000	$189,650	$18,965	10%	$208,615	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Sheet Piling for Transition Structure at West F	8,300	SF	$25	$207,500	$20,750	10%	$228,250	
	Bridge Modifications (Extension)								
	Golf Cart Bridge	1,300	SF	$95	$123,500	$28,405	23%		$151,905
	Fairbanks-North Houston	25,480	SF	$95	$2,420,600	$556,738	23%		$2,977,338
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$11,526,060**
	Water Line (12" STL)	1	EA	$37,000	$37,000	$7,400	20%		$44,400
	Wastewater Line (=<12")	5	EA	$8,510	$42,550	$8,510	20%		$51,060
	Wastewater Line (=<12")	5,500	LF	$25	$137,500	$27,500	20%		$165,000
	Manhole (6"-24" lines)	14	EA	$2,500	$35,000	$7,000	20%		$42,000
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	3	EA	$45,600	$136,800	$27,360	20%		$164,160
	Telephone Lines (16 x 4" PVC)	1	EA	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	27	EA	$92,000	$2,484,000	$496,800	20%		$2,980,800
	Gas/Petroleum Lines (2" IP STL)	18,000	LF	$350	$6,300,000	$1,260,000	20%		$7,560,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
	HL&P	2	EA	$10,000	$20,000	$4,000	20%		$24,000

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.6 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$26,932,339**	**$14,777,403**
8	**Engineering Design (12%)**							**$3,231,881**	**$1,773,288**
9	**Construction Mgmt. (10%)**							**$2,693,234**	**$1,477,740**
10	**Real Estate**							**$0**	**$46,701,103**
	R.O.W. Acquisition	1	LS	$4,661,343	$4,661,343	$1,165,336	25%		$5,826,679
	Administrative Fees	1	LS	$611,359	$611,359	$152,840	25%		$764,199
	Building - Fair Market Value	1.5	LS	$18,649,720	$27,974,580	$6,993,645	25%		$34,968,225
	Relocation (homes)	174	EA	$20,000	$3,480,000	$696,000	20%		$4,176,000
	Relocation (mobile homes)	230	EA	$3,500	$805,000	$161,000	20%		$966,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental Mitigation (1/2%)**							**$134,662**	
TOTAL								**$32,992,115**	**$64,729,534**
GRAND TOTAL								**$97,721,650**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.7 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$937,283**	**$0**
	Mobilization/Demobilization	1	LS	$937,283	$937,283	$0	0%	$937,283	
2	**Earthwork**							**$1,006,967**	**$0**
	Channel Excavation	83,060	CY	$3	$249,180	$44,852	18%	$294,032	
	Fill and Compaction (on-site fill)	14,722	CY	$4	$58,888	$8,833	15%	$67,721	
	Haul 4.14 Miles	282,919	CYMI	$1.50	$424,379	$63,657	15%	$488,036	
	Disposal	68,338	CY	$2.00	$136,676	$20,501	15%	$157,177	
3	**Structures**							**$7,943,529**	**$0**
	Concrete Paving	177,892	SY	$40	$7,115,662	$711,566	10%	$7,827,228	
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$131,796**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	1	EA	$4,830	$4,830	$966	20%		$5,796
	Wastewater Line (60")	1	EA	$84,000	$84,000	$16,800	20%		$100,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$10,009,580**	**$300,536**
8	**Engineering Design (12%)**							**$1,201,150**	**$36,064**
9	**Construction Mgmt. (10%)**							**$1,000,958**	**$30,054**
10	**Environmental Mitigation (1/2%)**							**$50,048**	
TOTAL								**$12,261,736**	**$366,654**
GRAND TOTAL								**$12,628,390**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.7 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,716,409**	**$0**
	Mobilization/Demobilization	1	LS	$1,716,409	$1,716,409	$0	0%	$1,716,409	
2	**Earthwork**							**$1,333,384**	**$0**
	Channel Excavation	114,603	CY	$3	$343,809	$61,886	18%	$405,695	
	Fill and Compaction (on-site fill)	30,377	CY	$4	$121,508	$18,226	15%	$139,734	
	Haul 4.1 Miles	344,484	CYMI	$1.50	$516,727	$77,509	15%	$594,235	
	Disposal	84,226	CY	$2.00	$168,452	$25,268	15%	$193,720	
3	**Structures**							**$14,044,227**	**$0**
	Concrete Paving	314,514	SY	$40	$12,580,551	$1,258,055	10%	$13,838,606	
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,198,908**
	Water Line (12" STL)	2	EA	$21,000	$42,000	$8,400	20%		$50,400
	Water Lines (16" CI)	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Wastewater Line (=<12")	3	EA	$4,830	$14,490	$2,898	20%		$17,388
	Wastewater Line (14" to 16")	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$34,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$17,305,141**	**$1,575,358**
8	**Engineering Design (12%)**							**$2,076,617**	**$189,043**
9	**Construction Mgmt. (10%)**							**$1,730,514**	**$157,536**
10	**Environmental Mitigation (1/2%)**							**$86,526**	
TOTAL								**$21,198,798**	**$1,921,937**
GRAND TOTAL								**$23,120,734**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.7 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,967,383**	**$0**
	Mobilization/Demobilization	1	LS	$1,967,383	$1,967,383	$0	0%	$1,967,383	
2	**Earthwork**							**$1,813,132**	**$0**
	Channel Excavation	179,651	CY	$3	$538,953	$97,012	18%	$635,965	
	Fill and Compaction (on-site fill)	66,471	CY	$4	$265,884	$39,883	15%	$305,767	
	Haul 3.1 Miles	354,253	CYMI	$1.50	$531,380	$79,707	15%	$611,087	
	Disposal	113,180	CY	$2.00	$226,360	$33,954	15%	$260,314	
3	**Structures**							**$14,589,274**	**$0**
	Concrete Paving	323,812	SY	$40	$12,952,467	$1,295,247	10%	$14,247,713	
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$18,628,850**	**$3,012,360**
8	**Engineering Design (12%)**							**$2,235,462**	**$361,483**
9	**Construction Mgmt. (10%)**							**$1,862,885**	**$301,236**
10	**Environmental Mitigation (1/2%)**							**$93,144**	
TOTAL								**$22,820,342**	**$3,675,079**
GRAND TOTAL								**$26,495,421**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.8 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,134,051**	**$0**
	Mobilization/Demobilization	1	LS	$1,134,051	$1,134,051	$0	0%	$1,134,051	
2	**Earthwork**							**$3,306,936**	**$0**
	Channel Excavation	238,705	CY	$3	$716,115	$128,901	18%	$845,016	
	Fill and Compaction (on-site fill)	33,237	CY	$4	$132,948	$19,942	15%	$152,890	
	Fill and Compaction (on-site soil replacement	37,760	CY	$8.50	$320,960	$48,144	15%	$369,104	
	Haul 4.14 Miles	850,638	CYMI	$1.50	$1,275,956	$191,393	15%	$1,467,350	
	Disposal	205,468	CY	$2.00	$410,936	$61,640	15%	$472,576	
3	**Structures**							**$7,611,241**	**$0**
	Concrete Paving	170,340	SY	$40	$6,813,582	$681,358	10%	$7,494,940	
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$131,796**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	1	EA	$4,830	$4,830	$966	20%		$5,796
	Wastewater Line (60")	1	EA	$84,000	$84,000	$16,800	20%		$100,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$12,174,029**	**$300,536**
8	**Engineering Design (12%)**							**$1,460,884**	**$36,064**
9	**Construction Mgmt. (10%)**							**$1,217,403**	**$30,054**
10	**Environmental Mitigation (1/2%)**							**$60,870**	
TOTAL								**$14,913,186**	**$366,654**
GRAND TOTAL								**$15,279,840**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.8 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,996,877**	**$0**
	Mobilization/Demobilization	1	LS	$1,996,877	$1,996,877	$0	0%	$1,996,877	
2	**Earthwork**							**$4,725,549**	**$0**
	Channel Excavation	336,349	CY	$3	$1,009,047	$181,628	18%	$1,190,675	
	Fill and Compaction (on-site fill)	55,588	CY	$4	$222,352	$33,353	15%	$255,705	
	Fill and Compaction (on-site soil replacement)	66,760	CY	$8.50	$567,460	$85,119	15%	$652,579	
	Haul 4.1 Miles	1,148,312	CYMI	$1.50	$1,722,469	$258,370	15%	$1,980,839	
	Disposal	280,761	CY	$2.00	$561,522	$84,228	15%	$645,750	
3	**Structures**							**$13,456,739**	**$0**
	Concrete Paving	301,162	SY	$40	$12,046,471	$1,204,647	10%	$13,251,118	
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,198,908**
	Water Line (12" STL)	2	EA	$21,000	$42,000	$8,400	20%		$50,400
	Water Lines (16" CI)	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Wastewater Line (=<12")	3	EA	$4,830	$14,490	$2,898	20%		$17,388
	Wastewater Line (14" to 16")	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$34,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$20,390,285**	**$1,575,358**
8	**Engineering Design (12%)**							**$2,446,834**	**$189,043**
9	**Construction Mgmt. (10%)**							**$2,039,029**	**$157,536**
10	**Environmental Mitigation (1/2%)**							**$101,951**	
TOTAL								**$24,978,099**	**$1,921,937**
GRAND TOTAL								**$26,900,036**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.8 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,162,811**	**$0**
	Mobilization/Demobilization	1	LS	$2,162,811	$2,162,811	$0	0%	$2,162,811	
2	**Earthwork**							**$4,330,881**	**$0**
	Channel Excavation	347,600	CY	$3	$1,042,800	$187,704	18%	$1,230,504	
	Fill and Compaction (on-site fill)	122,807	CY	$4	$491,228	$73,684	15%	$564,912	
	Fill and Compaction (on-site soil replacement)	82,325	CY	$8.50	$699,763	$104,964	15%	$804,727	
	Haul 3.1 Miles	703,602	CYMI	$1.50	$1,055,403	$158,310	15%	$1,213,714	
	Disposal	224,793	CY	$2.00	$449,586	$67,438	15%	$517,024	
3	**Structures**							**$14,025,805**	**$0**
	Concrete Paving	311,006	SY	$40	$12,440,222	$1,244,022	10%	$13,684,244	
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$20,778,558**	**$3,012,360**
8	**Engineering Design (12%)**							**$2,493,427**	**$361,483**
9	**Construction Mgmt. (10%)**							**$2,077,856**	**$301,236**
10	**Environmental Mitigation (1/2%)**							**$103,893**	
TOTAL								**$25,453,733**	**$3,675,079**
GRAND TOTAL								**$29,128,812**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.9 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$489,793**	**$0**
	Mobilization/Demobilization	1	LS	$489,793	$489,793	$0	0%	$489,793	
2	**Earthwork**							**$735,881**	**$0**
	Channel Excavation	66,277	CY	$3	$198,831	$35,790	18%	$234,621	
	Fill and Compaction (on-site fill)	25,714	CY	$4	$102,856	$15,428	15%	$118,284	
	Haul 4.14 Miles	167,931	CYMI	$1.50	$251,896	$37,784	15%	$289,681	
	Disposal	40,563	CY	$2.00	$81,126	$12,169	15%	$93,295	
3	**Structures**							**$3,739,717**	**$0**
	Concrete Paving	82,350	SY	$40	$3,294,015	$329,401	10%	$3,623,416	
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$131,796**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	1	EA	$4,830	$4,830	$966	20%		$5,796
	Wastewater Line (60")	1	EA	$84,000	$84,000	$16,800	20%		$100,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$5,087,192**	**$300,536**
8	**Engineering Design (12%)**							**$610,463**	**$36,064**
9	**Construction Mgmt. (10%)**							**$508,719**	**$30,054**
10	**Environmental Mitigation (1/2%)**							**$25,436**	
TOTAL								**$6,231,810**	**$366,654**
GRAND TOTAL								**$6,598,464**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.9 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$908,421**	**$0**
	Mobilization/Demobilization	1	LS	$908,421	$908,421	$0	0%	$908,421	
2	**Earthwork**							**$685,878**	**$0**
	Channel Excavation	71,577	CY	$3	$214,731	$38,652	18%	$253,383	
	Fill and Compaction (on-site fill)	49,866	CY	$4	$199,464	$29,920	15%	$229,384	
	Haul 4.1 Miles	88,798	CYMI	$1.50	$133,197	$19,980	15%	$153,177	
	Disposal	21,711	CY	$2.00	$43,422	$6,513	15%	$49,935	
3	**Structures**							**$6,611,851**	**$0**
	Concrete Paving	145,596	SY	$40	$5,823,846	$582,385	10%	$6,406,230	
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,198,908**
	Water Line (12" STL)	2	EA	$21,000	$42,000	$8,400	20%		$50,400
	Water Lines (16" CI)	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Wastewater Line (=<12")	3	EA	$4,830	$14,490	$2,898	20%		$17,388
	Wastewater Line (14" to 16")	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$34,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$8,417,271**	**$1,575,358**
8	**Engineering Design (12%)**							**$1,010,072**	**$189,043**
9	**Construction Mgmt. (10%)**							**$841,727**	**$157,536**
10	**Environmental Mitigation (1/2%)**							**$42,086**	
TOTAL								**$10,311,157**	**$1,921,937**
GRAND TOTAL								**$12,233,093**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.9 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,237,178**	**$0**
	Mobilization/Demobilization	1	LS	$1,237,178	$1,237,178	$0	0%	$1,237,178	
2	**Earthwork**							**$1,261,445**	**$0**
	Channel Excavation	136,348	CY	$3	$409,044	$73,628	18%	$482,672	
	Fill and Compaction (on-site fill)	87,442	CY	$4	$349,768	$52,465	15%	$402,233	
	Haul 3.1 Miles	153,076	CYMI	$1.50	$229,614	$34,442	15%	$264,056	
	Disposal	48,906	CY	$2.00	$97,812	$14,672	15%	$112,484	
3	**Structures**							**$7,838,917**	**$0**
	Concrete Paving	170,394	SY	$40	$6,815,778	$681,578	10%	$7,497,356	
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$10,596,601**	**$3,012,360**
8	**Engineering Design (12%)**							**$1,271,592**	**$361,483**
9	**Construction Mgmt. (10%)**							**$1,059,660**	**$301,236**
10	**Environmental Mitigation (1/2%)**							**$52,983**	
TOTAL								**$12,980,836**	**$3,675,079**
GRAND TOTAL								**$16,655,915**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.10 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,009,968**	**$0**
	Mobilization/Demobilization	1	LS	$1,009,968	$1,009,968	$0	0%	$1,009,968	
2	**Earthwork**							**$1,955,344**	**$0**
	Channel Excavation	159,087	CY	$3	$477,261	$85,907	18%	$563,168	
	Fill and Compaction (on-site fill)	22,688	CY	$4	$90,752	$13,613	15%	$104,365	
	Haul 4.14 Miles	564,692	CYMI	$1.50	$847,038	$127,056	15%	$974,093	
	Disposal	136,399	CY	$2.00	$272,798	$40,920	15%	$313,718	
3	**Structures**							**$7,722,004**	**$0**
	Concrete Paving	172,857	SY	$40	$6,914,276	$691,428	10%	$7,605,703	
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$131,796**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	1	EA	$4,830	$4,830	$966	20%		$5,796
	Wastewater Line (60")	1	EA	$84,000	$84,000	$16,800	20%		$100,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$10,809,117**	**$300,536**
8	**Engineering Design (12%)**							**$1,297,094**	**$36,064**
9	**Construction Mgmt. (10%)**							**$1,080,912**	**$30,054**
10	**Environmental Mitigation (1/2%)**							**$54,046**	
TOTAL								**$13,241,168**	**$366,654**
GRAND TOTAL								**$13,607,822**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.10 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,816,641**	**$0**
	Mobilization/Demobilization	1	LS	$1,816,641	$1,816,641	$0	0%	$1,816,641	
2	**Earthwork**							**$2,727,361**	**$0**
	Channel Excavation	224,979	CY	$3	$674,937	$121,489	18%	$796,426	
	Fill and Compaction (on-site fill)	36,549	CY	$4	$146,196	$21,929	15%	$168,125	
	Haul 4.1 Miles	770,679	CYMI	$1.50	$1,156,018	$173,403	15%	$1,329,421	
	Disposal	188,430	CY	$2.00	$376,860	$56,529	15%	$433,389	
3	**Structures**							**$13,652,568**	**$0**
	Concrete Paving	305,612	SY	$40	$12,224,498	$1,222,450	10%	$13,446,948	
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,198,908**
	Water Line (12" STL)	2	EA	$21,000	$42,000	$8,400	20%		$50,400
	Water Lines (16" CI)	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Wastewater Line (=<12")	3	EA	$4,830	$14,490	$2,898	20%		$17,388
	Wastewater Line (14" to 16")	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$34,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$18,407,691**	**$1,575,358**
8	**Engineering Design (12%)**							**$2,208,923**	**$189,043**
9	**Construction Mgmt. (10%)**							**$1,840,769**	**$157,536**
10	**Environmental Mitigation (1/2%)**							**$92,038**	
TOTAL								**$22,549,421**	**$1,921,937**
GRAND TOTAL								**$24,471,358**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.10 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,989,213**	**$0**
	Mobilization/Demobilization	1	LS	$1,989,213	$1,989,213	$0	0%	$1,989,213	
2	**Earthwork**							**$2,594,904**	**$0**
	Channel Excavation	250,905	CY	$3	$752,715	$135,489	18%	$888,204	
	Fill and Compaction (on-site fill)	72,624	CY	$4	$290,496	$43,574	15%	$334,070	
	Haul 3.1 Miles	558,020	CYMI	$1.50	$837,029	$125,554	15%	$962,584	
	Disposal	178,281	CY	$2.00	$356,562	$53,484	15%	$410,046	
3	**Structures**							**$14,025,805**	**$0**
	Concrete Paving	311,006	SY	$40	$12,440,222	$1,244,022	10%	$13,684,244	
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$18,868,984**	**$3,012,360**
8	**Engineering Design (12%)**							**$2,264,278**	**$361,483**
9	**Construction Mgmt. (10%)**							**$1,886,898**	**$301,236**
10	**Environmental Mitigation (1/2%)**							**$94,345**	
TOTAL								**$23,114,505**	**$3,675,079**
GRAND TOTAL								**$26,789,584**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.11 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,833,635**	**$0**
	Mobilization/Demobilization	1	LS	$834,426	$834,426	$0	0%	$834,426	
	Demolition/Removal of Buildings	378,638	SF	$4.40	$1,666,007	$333,201	20%	$1,999,209	
2	**Earthwork**							**$4,428,279**	**$0**
	Channel Excavation	340,033	CY	$3	$1,020,099	$183,618	18%	$1,203,717	
	Fill and Compaction (on-site fill)	3,074	CY	$4	$12,296	$1,844	15%	$14,140	
	Haul 4.14 Miles	1,407,737	CYMI	$1.50	$2,111,605	$316,741	15%	$2,428,346	
	Disposal	340,033	CY	$2.00	$680,066	$102,010	15%	$782,076	
3	**Structures**							**$116,301**	**$1,928,025**
	Concrete Paving	196,352	SY	$40	$7,854,080	$785,408	10%	$8,639,488	
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
	Bridge Modifications (Extension)								
	Tidwell	16,500	SF	$95	$1,567,500	$360,525	23%		$1,928,025
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$1,351,116**
	Water Line (12" STL)	1	EA	$26,000	$26,000	$5,200	20%		$31,200
	Water Line (12" STL)	1,000	LF	$100	$100,000	$20,000	20%		$120,000
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	1	EA	$5,980	$5,980	$1,196	20%		$7,176
	Wastewater Line (=<12")	500	LF	$23	$11,500	$2,300	20%		$13,800
	Wastewater Line (60")	1	EA	$104,000	$104,000	$20,800	20%		$124,800
	Manhole (6"-24" lines)	1	EA	$2,500	$2,500	$500	20%		$3,000
	Gas/Petroleum Lines (2" IPSTL)	2,500	LF	$350	$875,000	$175,000	20%		$1,050,000
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$252,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.11 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+83)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
SUBTOTAL								**$7,730,015**	**$3,447,881**
8	**Engineering Design (12%)**							**$927,602**	**$413,746**
9	**Construction Mgmt. (10%)**							**$773,002**	**$344,788**
10	**Real Estate**							**$0**	**$21,241,094**
	R.O.W. Acquisition	1	LS	$2,562,650	$2,562,650	$640,663	25%		$3,203,313
	Administrative Fees	1	LS	$833,444	$833,444	$208,361	25%		$1,041,805
	Building - Fair Market Value	1.5	LS	$7,887,850	$11,831,775	$2,957,944	25%		$14,789,719
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (apartments)	432	EA	$3,500	$1,512,000	$302,400	20%		$1,814,400
	Relocation (businesses)	24,728	SF	$3.50	$86,548	$17,310	20%		$103,858
11	**Environmental Mitigation (1/2%)**							**$38,650**	
TOTAL								**$9,469,269**	**$25,447,509**
GRAND TOTAL								**$34,916,778**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.11 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$3,115,125**	**$0**
	Mobilization/Demobilization	1	LS	$2,170,823	$2,170,823	$0	0%	$2,170,823	
	Demolition/Removal of Buildings	178,845	SF	$4.40	$786,918	$157,384	20%	$944,302	
2	**Earthwork**							**$7,027,709**	**$0**
	Channel Excavation	541,751	CY	$3	$1,625,253	$292,546	18%	$1,917,799	
	Fill and Compaction (on-site fill)	9,064	CY	$4	$36,256	$5,438	15%	$41,694	
	Haul 4.1 Miles	2,215,762	CYMI	$1.50	$3,323,642	$498,546	15%	$3,822,189	
	Disposal	541,751	CY	$2.00	$1,083,502	$162,525	15%	$1,246,027	
3	**Structures**							**$205,621**	**$7,819,541**
	Concrete Paving	347,152	SY	$40	$13,886,080	$1,388,608	10%	$15,274,688	
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	420	SF	$95	$39,900	$9,177	23%		$49,077
	West Little York	6,890	SF	$95	$654,550	$150,547	23%		$805,097
	Antoine	9,570	SF	$95	$909,150	$209,105	23%		$1,118,255
	Pipe Crossing	130	SF	$95	$12,350	$2,841	23%		$15,191
	Victory Dr.	19,950	SF	$95	$1,895,250	$435,908	23%		$2,331,158
	Inwood C. C. Golf Cart	1,500	SF	$95	$142,500	$32,775	23%		$175,275
	Alabonson	7,930	SF	$95	$753,350	$173,271	23%		$926,621
	Pipe Crossing	90	SF	$95	$8,550	$1,967	23%		$10,517
	Pipe Crossing	450	SF	$95	$42,750	$9,833	23%		$52,583
	Railway	1,800	SF	$105	$189,000	$43,470	23%		$232,470
	North Houston-Rosslyn	18,000	SF	$95	$1,710,000	$393,300	23%		$2,103,300
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$4,687,788**
	Water Line (12" STL)	2	EA	$26,000	$52,000	$10,400	20%		$62,400
	Water Line (12" STL)	800	LF	$100	$80,000	$16,000	20%		$96,000
	Water Lines (16" CI)	1	EA	$7,800	$7,800	$1,560	20%		$9,360
	Gate Valve (12")	1	EA	$950	$950	$190	20%		$1,140
	Wastewater Line (=<12")	3	EA	$5,980	$17,940	$3,588	20%		$21,528

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.11 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Wastewater Line (=<12")	7,500	LF	$23	$172,500	$34,500	20%		$207,000
	Wastewater Line (14" to 16")	1	EA	$7,800	$7,800	$1,560	20%		$9,360
	Manhole (6"-24" lines)	19	EA	$2,500	$47,500	$9,500	20%		$57,000
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (2" IPSTL)	7,400	LF	$350	$2,590,000	$518,000	20%		$3,108,000
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Telephone Lines (4 x 4")	1	EA	$45,600	$45,600	$9,120	20%		$54,720
	HL&P	2	EA	$10,000	$20,000	$4,000	20%		$24,000
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$1,414,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	6	EA	$200,000	$1,200,000	$180,000	15%	$1,380,000	
SUBTOTAL								**$11,939,575**	**$12,883,779**
8	**Engineering Design (12%)**							**$1,432,749**	**$1,546,053**
9	**Construction Mgmt. (10%)**							**$1,193,958**	**$1,288,378**
10	**Real Estate**							**$0**	**$18,722,530**
	R.O.W. Acquisition	1	LS	$5,138,265	$5,138,265	$1,284,566	25%		$6,422,831
	Administrative Fees	1	LS	$278,594	$278,594	$69,648	25%		$348,242
	Building - Fair Market Value	1.5	LS	$5,514,080	$8,271,120	$2,067,780	25%		$10,338,900
	Relocation (homes)	63	EA	$20,000	$1,260,000	$252,000	20%		$1,512,000
	Relocation (businesses)	23,942	SF	$3.50	$83,797	$16,759	20%		$100,556
11	**Environmental Mitigation (1/2%)**							**$59,698**	
TOTAL								**$14,625,979**	**$34,440,740**
GRAND TOTAL								**$49,066,719**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.11 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,035,898**	**$0**
	Mobilization/Demobilization	1	LS	$1,347,956	$1,347,956	$0	0%	$1,347,956	
	Demolition/Removal of Buildings	130,292	SF	$4.40	$573,285	$114,657	20%	$687,942	
2	**Earthwork**							**$6,184,798**	**$0**
	Channel Excavation	534,203	CY	$3	$1,602,609	$288,470	18%	$1,891,079	
	Fill and Compaction (on-site fill)	39,295	CY	$4	$157,180	$23,577	15%	$180,757	
	Haul 3.1 Miles	1,672,055	CYMI	$1.50	$2,508,083	$376,212	15%	$2,884,296	
	Disposal	534,203	CY	$2.00	$1,068,406	$160,261	15%	$1,228,667	
3	**Structures**							**$608,311**	**$1,805,333**
	Concrete Paving	349,424	SY	$40	$13,976,956	$1,397,696	10%	$15,374,651	
	Backslope Swale	37,930	LF	$2	$75,860	$7,586	10%	$83,446	
	Backslope Drain (structure)	63	EA	$3,000	$189,650	$18,965	10%	$208,615	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Sheet Piling for Transition Structure at West F	8,300	SF	$25	$207,500	$20,750	10%	$228,250	
	Bridge Modifications (Extension)								
	Golf Cart Bridge	750	SF	$95	$71,250	$16,388	23%		$87,638
	Fairbanks-North Houston	14,700	SF	$95	$1,396,500	$321,195	23%		$1,717,695
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$4,269,960**
	Water Line (12" STL)	1	EA	$26,000	$26,000	$5,200	20%		$31,200
	Wastewater Line (=<12")	5	EA	$5,980	$29,900	$5,980	20%		$35,880
	Wastewater Line (=<12")	3,000	LF	$23	$69,000	$13,800	20%		$82,800
	Manhole (6"-24" lines)	8	EA	$2,500	$20,000	$4,000	20%		$24,000
	Telephone Lines (12 x 4" PVC in 24" STL	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (2" IPSTL)	3,000	LF	$350	$1,050,000	$210,000	20%		$1,260,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
	HL&P	1	EA	$10,000	$10,000	$2,000	20%		$12,000

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.11 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$9,318,068**	**$6,197,393**
8	**Engineering Design (12%)**							**$1,118,168**	**$743,687**
9	**Construction Mgmt. (10%)**							**$931,807**	**$619,739**
10	**Real Estate**							**$0**	**$14,984,381**
	R.O.W. Acquisition	1	LS	$1,442,321	$1,442,321	$360,580	25%		$1,802,901
	Administrative Fees	1	LS	$239,734	$239,734	$59,933	25%		$299,667
	Building - Fair Market Value	1.5	LS	$5,820,700	$8,731,050	$2,182,763	25%		$10,913,813
	Relocation (homes)	82	EA	$20,000	$1,640,000	$328,000	20%		$1,968,000
	Relocation (mobile homes)	0	EA	$3,500	$0	$0	20%		$0
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental Mitigation (1/2%)**							**$46,590**	
TOTAL								**$11,414,633**	**$22,545,200**
GRAND TOTAL								**$33,959,833**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(E100MIN) GE200.0 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$109,113**	**$0**
	Mobilization/Demobilization	1	LS	$109,113	$109,113	$0	0%	$109,113	
2	**Earthwork**							**$916,446**	**$0**
	Excavation within E100-00-00	90,268	CY	$3	$270,804	$48,745	18%	$319,549	
	Excavation within E141-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E200-00-00	0	CY	$3	$0	$0	18%	$0	
	Haul 2.5 Miles	225,670	CYMI	$1.50	$338,505	$50,776	15%	$389,281	
	Disposal	90,268	CY	$2.00	$180,536	$27,080	15%	$207,616	
3	**Structures**							**$0**	**$0**
	Sheet Piling for Inlet Structure	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Drop Structure	0	LS	$20,000	$0	$0	20%	$0	
	Sheet Piling for Transition Structure on E141-00-	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Inlet Structure	0	LS	$25,000	$0	$0	20%	$0	
4	**Outfall Modifications**							**$0**	**$144,980**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	29	EA	$3,700	$107,300	$10,730	10%		$118,030
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")	0	EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")	0	EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")	0	EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")	0	EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")	0	EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$0**	**$0**
	Tree Planting	0	EA	$125	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
7	**General Items**							**$29,700**	**$0**
	Stormwater Pollution Prevention	1	LS	$27,000	$27,000	$2,700	10%	$29,700	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$1,055,258**	**$144,980**
8	**Engineering Design (12%)**							**$126,631**	**$17,398**
9	**Construction Mgmt. (10%)**							**$105,526**	**$14,498**
10	**Environmental Mitigation (1/2%)**							**$5,276**	
TOTAL								**$1,292,692**	**$176,876**
GRAND TOTAL								**$1,469,567**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP1) GE200.1 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$36,583**	**$0**
	Mobilization/Demobilization	1	LS	$36,583	$36,583	$0	0%	$36,583	
2	**Earthwork**							**$101,525**	**$0**
	Excavation within E100-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E141-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E200-00-00	10,000	CY	$3	$30,000	$5,400	18%	$35,400	
	Haul 2.5 Miles	25,000	CYMI	$1.50	$37,500	$5,625	15%	$43,125	
	Disposal	10,000	CY	$2.00	$20,000	$3,000	15%	$23,000	
3	**Structures**							**$264,300**	**$0**
	Backslope Swale	0	LF	$2	$0	$0	10%	$0	
	Backslope Drain (structure)	0	EA	$3,000	$0	$0	10%	$0	
	Sheet Piling for Inlet Structure	7,010	SF	$25	$175,250	$35,050	20%	$210,300	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Sheet Piling for Transition Structure on E141-0	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	0	SF	$95	$0	$0	23%		$0
	Mauna Loa	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$0**
	6" - 21" and backslope drain	0	EA	$3,000	$0	$0	10%		$0
	24" - 36"	0	EA	$3,700	$0	$0	10%		$0
	42" - 60"	0	EA	$4,500	$0	$0	10%		$0
	66" - 84"	0	EA	$5,000	$0	$0	10%		$0
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$0**	**$0**
	Tree Planting	0	EA	$125	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
7	**General Items**							**$0**	**$0**
	Stormwater Pollution Prevention	0	LS	$29,000	$0	$0	10%	$0	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$402,408**	**$0**
8	**Engineering Design (12%)**							**$48,289**	**$0**
9	**Construction Mgmt. (10%)**							**$40,241**	**$0**
10	**Environmental Mitigation (1/2%)**							**$2,012**	
TOTAL								**$492,949**	**$0**
GRAND TOTAL								**$492,949**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP2) GE200.2 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$552,833**	**$0**
	Mobilization/Demobilization	1	LS	$552,833	$552,833	$0	0%	$552,833	
2	**Earthwork**							**$3,248,780**	**$0**
	Excavation within E100-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E141-00-00	139,415	CY	$3	$418,245	$75,284	18%	$493,529	
	Excavation within E200-00-00	180,583	CY	$3	$541,749	$97,515	18%	$639,264	
	Haul 2.5 Miles	799,995	CYMI	$1.50	$1,199,993	$179,999	15%	$1,379,991	
	Disposal	319,998	CY	$2.00	$639,996	$95,999	15%	$735,995	
3	**Structures**							**$778,650**	**$778,221**
	Backslope Swale	24,000	LF	$2	$48,000	$4,800	10%	$52,800	
	Backslope Drain (structure)	40	EA	$3,000	$120,000	$12,000	10%	$132,000	
	Sheet Piling for Inlet Structure	6,495	SF	$25	$162,375	$32,475	20%	$194,850	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Remove Existing Control Structure	1	LS	$80,000	$80,000	$16,000	20%	$96,000	
	Sheet Piling for Transition Structure on E141-00-	8,300	SF	$25	$207,500	$41,500	20%	$249,000	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	3,700	SF	$95	$351,500	$80,845	23%		$432,345
	Mauna Loa	2,960	SF	$95	$281,200	$64,676	23%		$345,876
4	**Outfall Modifications**							**$0**	**$72,380**
	6" - 21" and backslope drain	0	EA	$3,000	$0	$0	10%		$0
	24" - 36"	9	EA	$3,700	$33,300	$3,330	10%		$36,630
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$158,400**	**$0**
	Tree Planting	960	EA	$125	$120,000	$12,000	10%	$132,000	
	Shrub Planting	960	EA	$25	$24,000	$2,400	10%	$26,400	
7	**General Items**							**$491,900**	**$0**
	Stormwater Pollution Prevention	1	LS	$29,000	$29,000	$2,900	10%	$31,900	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$5,230,563**	**$850,601**
8	**Engineering Design (12%)**							**$627,668**	**$102,072**
9	**Construction Mgmt. (10%)**							**$523,056**	**$85,060**
10	**Environmental Mitigation (1/2%)**							**$26,153**	
TOTAL								**$6,407,439**	**$1,037,733**
GRAND TOTAL								**$7,445,173**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP4) GE200.3 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,273,911**	**$0**
	Mobilization/Demobilization	1	LS	$789,123	$789,123	$0	0%	$789,123	
	Demolition/Removal of Buildings	91,816	SF	$4.40	$403,990	$80,798	20%	$484,788	
2	**Earthwork**							**$5,227,065**	**$0**
	Excavation within E100-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E141-00-00	236,307	CY	$3	$708,921	$127,606	18%	$836,527	
	Excavation within E200-00-00	278,548	CY	$3	$835,644	$150,416	18%	$986,060	
	Haul 2.5 Miles	1,287,138	CYMI	$1.50	$1,930,706	$289,606	15%	$2,220,312	
	Disposal	514,855	CY	$2.00	$1,029,710	$154,457	15%	$1,184,167	
3	**Structures**							**$774,150**	**$1,167,332**
	Backslope Swale	24,000	LF	$2	$48,000	$4,800	10%	$52,800	
	Backslope Drain (structure)	40	EA	$3,000	$120,000	$12,000	10%	$132,000	
	Sheet Piling for Inlet Structure	6,345	SF	$25	$158,625	$31,725	20%	$190,350	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Remove Existing Control Structure	1	LS	$80,000	$80,000	$16,000	20%	$96,000	
	Sheet Piling for Transition Structure on E141-00-00	8,300	SF	$25	$207,500	$41,500	20%	$249,000	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	5,550	SF	$95	$527,250	$121,268	23%		$648,518
	Mauna Loa	4,440	SF	$95	$421,800	$97,014	23%		$518,814
4	**Outfall Modifications**							**$0**	**$72,380**
	6" - 21" and backslope drain	0	EA	$3,000	$0	$0	10%		$0
	24" - 36"	9	EA	$3,700	$33,300	$3,330	10%		$36,630
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP4) GE200.3 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$158,400**	**$0**
	Tree Planting	960	EA	$125	$120,000	$12,000	10%	$132,000	
	Shrub Planting	960	EA	$25	$24,000	$2,400	10%	$26,400	
7	**General Items**							**$491,900**	**$0**
	Stormwater Pollution Prevention	1	LS	$29,000	$29,000	$2,900	10%	$31,900	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$7,925,427**	**$1,239,712**
8	**Engineering Design (12%)**							**$951,051**	**$148,765**
9	**Construction Mgmt. (10%)**							**$792,543**	**$123,971**
10	**Real Estate**							**$0**	**$10,869,422**
	R.O.W. Acquisition	1	LS	$702,300	$702,300	$175,575	25%		$877,875
	Administrative Fees	1	LS	$159,188	$159,188	$39,797	25%		$198,984
	Building - Fair Market Value	1.5	LS	$4,544,300	$6,816,450	$1,704,113	25%		$8,520,563
	Relocation (homes)	53	EA	$20,000	$1,060,000	$212,000	20%		$1,272,000
11	**Environmental Mitigation (1/2%)**							**$39,627**	
TOTAL								**$9,708,648**	**$12,381,870**
GRAND TOTAL								**$22,090,517**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP1A) GE200.4 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$142,725**	**$0**
	Mobilization/Demobilization	1	LS	$142,725	$142,725	$0	0%	$142,725	
2	**Earthwork**							**$1,017,971**	**$0**
	Excavation within E100-00-00	90,268	CY	$3	$270,804	$48,745	18%	$319,549	
	Excavation within E141-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E200-00-00	10,000	CY	$3	$30,000	$5,400	18%	$35,400	
	Haul 2.5 Miles	250,670	CYMI	$1.50	$376,005	$56,401	15%	$432,406	
	Disposal	100,268	CY	$2.00	$200,536	$30,080	15%	$230,616	
3	**Structures**							**$264,300**	**$0**
	Backslope Swale	0	LF	$2	$0	$0	10%	$0	
	Backslope Drain (structure)	0	EA	$3,000	$0	$0	10%	$0	
	Sheet Piling for Inlet Structure	7,010	SF	$25	$175,250	$35,050	20%	$210,300	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Sheet Piling for Transition Structure on E141-00-00	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	0	SF	$95	$0	$0	23%		$0
	Mauna Loa	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$144,980**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	29	EA	$3,700	$107,300	$10,730	10%		$118,030
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$0**	**$0**
	Tree Planting	0	EA	$125	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
7	**General Items**							**$0**	**$0**
	Stormwater Pollution Prevention	0	LS	$29,000	$0	$0	10%	$0	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$1,424,996**	**$144,980**
8	**Engineering Design (12%)**							**$171,000**	**$17,398**
9	**Construction Mgmt. (10%)**							**$142,500**	**$14,498**
10	**Environmental Mitigation (1/2%)**							**$7,125**	
TOTAL								**$1,745,620**	**$176,876**
GRAND TOTAL								**$1,922,496**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP2A) GE200.5 --- Channelization fromGessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$658,976**	**$0**
	Mobilization/Demobilization	1	LS	$658,976	$658,976	$0	0%	$658,976	
2	**Earthwork**							**$4,165,226**	**$0**
	Excavation within E100-00-00	90,268	CY	$3	$270,804	$48,745	18%	$319,549	
	Excavation within E141-00-00	139,415	CY	$3	$418,245	$75,284	18%	$493,529	
	Excavation within E200-00-00	180,583	CY	$3	$541,749	$97,515	18%	$639,264	
	Haul 2.5 Miles	1,025,665	CYMI	$1.50	$1,538,498	$230,775	15%	$1,769,272	
	Disposal	410,266	CY	$2.00	$820,532	$123,080	15%	$943,612	
3	**Structures**							**$778,650**	**$778,221**
	Backslope Swale	24,000	LF	$2	$48,000	$4,800	10%	$52,800	
	Backslope Drain (structure)	40	EA	$3,000	$120,000	$12,000	10%	$132,000	
	Sheet Piling for Inlet Structure	6,495	SF	$25	$162,375	$32,475	20%	$194,850	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Remove Existing Control Structure	1	LS	$80,000	$80,000	$16,000	20%	$96,000	
	Sheet Piling for Transition Structure on E141-00-00	8,300	SF	$25	$207,500	$41,500	20%	$249,000	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	3,700	SF	$95	$351,500	$80,845	23%		$432,345
	Mauna Loa	2,960	SF	$95	$281,200	$64,676	23%		$345,876
4	**Outfall Modifications**							**$0**	**$217,360**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	38	EA	$3,700	$140,600	$14,060	10%		$154,660
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$158,400**	**$0**
	Tree Planting	960	EA	$125	$120,000	$12,000	10%	$132,000	
	Shrub Planting	960	EA	$25	$24,000	$2,400	10%	$26,400	
7	**General Items**							**$491,900**	**$0**
	Stormwater Pollution Prevention	1	LS	$29,000	$29,000	$2,900	10%	$31,900	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$6,253,151**	**$995,581**
8	**Engineering Design (12%)**							**$750,378**	**$119,470**
9	**Construction Mgmt. (10%)**							**$625,315**	**$99,558**
10	**Environmental Mitigation (1/2%)**							**$31,266**	
TOTAL								**$7,660,110**	**$1,214,609**
GRAND TOTAL								**$8,874,719**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP4A) GE200.6 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,380,054**	**$0**
	Mobilization/Demobilization	1	LS	$895,265	$895,265	$0	0%	$895,265	
	Demolition/Removal of Buildings	91,816	SF	$4.40	$403,990	$80,798	20%	$484,788	
2	**Earthwork**							**$6,143,511**	**$0**
	Excavation within E100-00-00	90,268	CY	$3	$270,804	$48,745	18%	$319,549	
	Excavation within E141-00-00	236,307	CY	$3	$708,921	$127,606	18%	$836,527	
	Excavation within E200-00-00	278,548	CY	$3	$835,644	$150,416	18%	$986,060	
	Haul 2.5 Miles	1,512,808	CYMI	$1.50	$2,269,211	$340,382	15%	$2,609,593	
	Disposal	605,123	CY	$2.00	$1,210,246	$181,537	15%	$1,391,783	
3	**Structures**							**$774,150**	**$1,167,332**
	Backslope Swale	24,000	LF	$2	$48,000	$4,800	10%	$52,800	
	Backslope Drain (structure)	40	EA	$3,000	$120,000	$12,000	10%	$132,000	
	Sheet Piling for Inlet Structure	6,345	SF	$25	$158,625	$31,725	20%	$190,350	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Remove Existing Control Structure	1	LS	$80,000	$80,000	$16,000	20%	$96,000	
	Sheet Piling for Transition Structure on E141-00-00	8,300	SF	$25	$207,500	$41,500	20%	$249,000	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	5,550	SF	$95	$527,250	$121,268	23%		$648,518
	Mauna Loa	4,440	SF	$95	$421,800	$97,014	23%		$518,814
4	**Outfall Modifications**							**$0**	**$217,360**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	38	EA	$3,700	$140,600	$14,060	10%		$154,660
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

(BYP4A) GE200.6 --- Channelization from Gessner to E200-00-00 (Sta. 936+00 to 1050+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
6	**Vegetation Recovery**							**$158,400**	**$0**
	Tree Planting	960	EA	$125	$120,000	$12,000	10%	$132,000	
	Shrub Planting	960	EA	$25	$24,000	$2,400	10%	$26,400	
7	**General Items**							**$491,900**	**$0**
	Stormwater Pollution Prevention	1	LS	$29,000	$29,000	$2,900	10%	$31,900	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$8,948,015**	**$1,384,692**
8	**Engineering Design (12%)**							**$1,073,762**	**$166,163**
9	**Construction Mgmt. (10%)**							**$894,802**	**$138,469**
10	**Real Estate**							**$0**	**$10,869,422**
	R.O.W. Acquisition	1	LS	$702,300	$702,300	$175,575	25%		$877,875
	Administrative Fees	1	LS	$159,188	$159,188	$39,797	25%		$198,984
	Building - Fair Market Value	1.5	LS	$4,544,300	$6,816,450	$1,704,113	25%		$8,520,563
	Relocation (homes)	53	EA	$20,000	$1,060,000	$212,000	20%		$1,272,000
11	**Environmental Mitigation (1/2%)**							**$44,740**	
TOTAL								**$10,961,318**	**$12,558,746**
GRAND TOTAL								**$23,520,064**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

E200H.1 --- Channelization from E200-00-00 to Huffmeister (Sta. 1050+00 to 1250+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$582,208**	**$0**
	Mobilization/Demobilization	1	LS	$582,208	$582,208	$0	0%	$582,208	
2	**Earthwork**							**$1,117,499**	**$0**
	Channel Excavation	86,544	CY	$3	$259,632	$46,734	18%	$306,366	
	Haul 4.1 Miles	354,830	CYMI	$1.50	$532,246	$79,837	15%	$612,082	
	Disposal	86,544	CY	$2.00	$173,088	$25,963	15%	$199,051	
3	**Structures**							**$308,000**	**$1,086,705**
	Backslope Swale	40,000	LF	$2	$80,000	$8,000	10%	$88,000	
	Backslope Drain (structure)	67	EA	$3,000	$200,000	$20,000	10%	$220,000	
	Bridge Modifications (Extension)								
	West Rd.	4,500	SF	$95	$427,500	$98,325	23%		$525,825
	FM1960	4,800	SF	$95	$456,000	$104,880	23%		$560,880
	Pipeline	150	SF	$95	$14,250	$3,278	23%		$17,528
4	**Outfall Modifications**							**$0**	**$174,900**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$264,000**	**$0**
	Tree Planting	1,600	EA	$125	$200,000	$20,000	10%	$220,000	
	Shrub Planting	1,600	EA	$25	$40,000	$4,000	10%	$44,000	
7	**General Items**							**$509,500**	**$0**
	Stormwater Pollution Prevention	1	LS	$45,000	$45,000	$4,500	10%	$49,500	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$2,781,208**	**$3,623,085**
8	**Engineering Design (12%)**							**$333,745**	**$434,770**
9	**Construction Mgmt. (10%)**							**$278,121**	**$362,309**
10	**Environmental Mitigation (1/2%)**							**$13,906**	
TOTAL								**$3,406,980**	**$4,420,164**
GRAND TOTAL								**$7,827,143**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

E200H.2 --- Channelization from E200-00-00 to Huffmeister (Sta. 1050+00 to 1250+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$826,030**	**$0**
	Mobilization/Demobilization	1	LS	$826,030	$826,030	$0	0%	$826,030	
2	**Earthwork**							**$1,878,136**	**$0**
	Channel Excavation	145,451	CY	$3	$436,353	$78,544	18%	$514,897	
	Haul 4.1 Miles	596,349	CYMI	$1.50	$894,524	$134,179	15%	$1,028,702	
	Disposal	145,451	CY	$2.00	$290,902	$43,635	15%	$334,537	
3	**Structures**							**$308,000**	**$2,304,282**
	Backslope Swale	40,000	LF	$2	$80,000	$8,000	10%	$88,000	
	Backslope Drain (structure)	67	EA	$3,000	$200,000	$20,000	10%	$220,000	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	9,600	SF	$95	$912,000	$209,760	23%		$1,121,760
	Pipeline	200	SF	$95	$19,000	$4,370	23%		$23,370
4	**Outfall Modifications**							**$0**	**$174,900**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$264,000**	**$0**
	Tree Planting	1,600	EA	$125	$200,000	$20,000	10%	$220,000	
	Shrub Planting	1,600	EA	$25	$40,000	$4,000	10%	$44,000	
7	**General Items**							**$969,500**	**$0**
	Stormwater Pollution Prevention	1	LS	$45,000	$45,000	$4,500	10%	$49,500	
	Traffic Control	4	EA	$200,000	$800,000	$120,000	15%	$920,000	
SUBTOTAL								**$4,245,666**	**$4,840,662**
8	**Engineering Design (12%)**							**$509,480**	**$580,879**
9	**Construction Mgmt. (10%)**							**$424,567**	**$484,066**
10	**Environmental Mitigation (1/2%)**							**$21,228**	
TOTAL								**$5,200,941**	**$5,905,608**
GRAND TOTAL								**$11,106,548**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.2A --- Channelization from E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$657,130**	**$0**
	Mobilization/Demobilization	1	LS	$657,130	$657,130	$0	0%	$657,130	
2	**Earthwork**							**$1,658,049**	**$0**
	Channel Excavation	128,407	CY	$3	$385,220	$69,340	18%	$454,559	
	Haul 4.1 Miles	526,467	CYMI	$1.50	$789,700	$118,455	15%	$908,155	
	Disposal	128,407	CY	$2.00	$256,813	$38,522	15%	$295,335	
3	**Structures**							**$269,500**	**$1,182,522**
	Backslope Swale	35,000	LF	$2	$70,000	$7,000	10%	$77,000	
	Backslope Drain (structure)	58	EA	$3,000	$175,000	$17,500	10%	$192,500	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$134,750**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	15	EA	$3,700	$55,500	$5,550	10%		$61,050
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$231,000**	**$0**
	Tree Planting	1,400	EA	$125	$175,000	$17,500	10%	$192,500	
	Shrub Planting	1,400	EA	$25	$35,000	$3,500	10%	$38,500	
7	**General Items**							**$734,000**	**$0**
	Stormwater Pollution Prevention	1	LS	$40,000	$40,000	$4,000	10%	$44,000	
	Traffic Control	3	EA	$200,000	$600,000	$90,000	15%	$690,000	
SUBTOTAL								**$3,549,679**	**$3,678,752**
8	**Engineering Design (12%)**							**$425,961**	**$441,450**
9	**Construction Mgmt. (10%)**							**$354,968**	**$367,875**
10	**Environmental (Wetland Impacted) Mitigation**	0.83	AC	$22,000	$18,153	$3,631	20%	**$21,783**	
TOTAL								**$4,352,391**	**$4,488,077**
GRAND TOTAL								**$8,840,469**	

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White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.2B --- Channelization from E200-00-00 to Jones Rd. (Sta. 1045+27 to 1165+49)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$540,449**	**$0**
	Mobilization/Demobilization	1	LS	$540,449	$540,449	$0	0%	$540,449	
2	**Earthwork**							**$1,195,155**	**$0**
	Channel Excavation	92,558	CY	$3	$277,674	$49,981	18%	$327,655	
	Haul 4.1 Miles	379,488	CYMI	$1.50	$569,232	$85,385	15%	$654,616	
	Disposal	92,558	CY	$2.00	$185,116	$27,767	15%	$212,883	
3	**Structures**							**$177,870**	**$1,182,522**
	Backslope Swale	23,100	LF	$2	$46,200	$4,620	10%	$50,820	
	Backslope Drain (structure)	39	EA	$3,000	$115,500	$11,550	10%	$127,050	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$90,090**
	6" - 21" and backslope drain	11	EA	$3,000	$33,000	$3,300	10%		$36,300
	24" - 36"	7	EA	$3,700	$25,900	$2,590	10%		$28,490
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$2,115,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	6	EA	$92,000	$552,000	$110,400	20%		$662,400
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	3	EA	$113,000	$339,000	$67,800	20%		$406,800
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$152,460**	**$0**
	Tree Planting	924	EA	$125	$115,500	$11,550	10%	$127,050	
	Shrub Planting	924	EA	$25	$23,100	$2,310	10%	$25,410	
7	**General Items**							**$490,910**	**$0**
	Stormwater Pollution Prevention	1	LS	$28,100	$28,100	$2,810	10%	$30,910	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$2,556,844**	**$3,388,092**
8	**Engineering Design (12%)**							**$306,821**	**$406,571**
9	**Construction Mgmt. (10%)**							**$255,684**	**$338,809**
10	**Environmental (Wetland Impacted) Mitigation**	0.55	AC	$22,000	$12,143	$2,429	20%	**$14,572**	
TOTAL								**$3,133,922**	**$4,133,472**
GRAND TOTAL								**$7,267,394**	

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White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

E200H.3 --- Channelization from E200-00-00 to Huffmeister (Sta. 1050+00 to 1250+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,218,073**	**$0**
	Mobilization/Demobilization	1	LS	$1,218,073	$1,218,073	$0	0%	$1,218,073	
2	**Earthwork**							**$3,087,650**	**$0**
	Channel Excavation	239,121	CY	$3	$717,363	$129,125	18%	$846,488	
	Haul 4.1 Miles	980,396	CYMI	$1.50	$1,470,594	$220,589	15%	$1,691,183	
	Disposal	239,121	CY	$2.00	$478,242	$71,736	15%	$549,978	
3	**Structures**							**$308,000**	**$5,015,202**
	Backslope Swale	40,000	LF	$2	$80,000	$8,000	10%	$88,000	
	Backslope Drain (structure)	67	EA	$3,000	$200,000	$20,000	10%	$220,000	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	12,180	SF	$95	$1,157,100	$266,133	23%		$1,423,233
	FM1960	14,400	SF	$95	$1,368,000	$314,640	23%		$1,682,640
	Pipeline	300	SF	$95	$28,500	$6,555	23%		$35,055
4	**Outfall Modifications**							**$0**	**$174,900**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$264,000**	**$0**
	Tree Planting	1,600	EA	$125	$200,000	$20,000	10%	$220,000	
	Shrub Planting	1,600	EA	$25	$40,000	$4,000	10%	$44,000	
7	**General Items**							**$969,500**	**$0**
	Stormwater Pollution Prevention	1	LS	$45,000	$45,000	$4,500	10%	$49,500	
	Traffic Control	4	EA	$200,000	$800,000	$120,000	15%	$920,000	
SUBTOTAL								**$5,847,223**	**$7,551,582**
8	**Engineering Design (12%)**							**$701,667**	**$906,190**
9	**Construction Mgmt. (10%)**							**$584,722**	**$755,158**
10	**Environmental Mitigation (1/2%)**							**$29,236**	
TOTAL								**$7,162,848**	**$9,212,930**
GRAND TOTAL								**$16,375,778**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.3A --- Channelization from E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$982,600**	**$0**
	Mobilization/Demobilization	1	LS	$982,600	$982,600	$0	0%	$982,600	
2	**Earthwork**							**$2,762,707**	**$0**
	Channel Excavation	213,956	CY	$3	$641,868	$115,536	18%	$757,404	
	Haul 4.1 Miles	877,220	CYMI	$1.50	$1,315,829	$197,374	15%	$1,513,204	
	Disposal	213,956	CY	$2.00	$427,912	$64,187	15%	$492,099	
3	**Structures**							**$269,500**	**$3,332,562**
	Backslope Swale	35,000	LF	$2	$70,000	$7,000	10%	$77,000	
	Backslope Drain (structure)	58	EA	$3,000	$175,000	$17,500	10%	$192,500	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	12,180	SF	$95	$1,157,100	$266,133	23%		$1,423,233
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$134,750**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	15	EA	$3,700	$55,500	$5,550	10%		$61,050
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$231,000**	**$0**
	Tree Planting	1,400	EA	$125	$175,000	$17,500	10%	$192,500	
	Shrub Planting	1,400	EA	$25	$35,000	$3,500	10%	$38,500	
7	**General Items**							**$734,000**	**$0**
	Stormwater Pollution Prevention	1	LS	$40,000	$40,000	$4,000	10%	$44,000	
	Traffic Control	3	EA	$200,000	$600,000	$90,000	15%	$690,000	
SUBTOTAL								**$4,979,807**	**$5,828,792**
8	**Engineering Design (12%)**							**$597,577**	**$699,455**
9	**Construction Mgmt. (10%)**							**$497,981**	**$582,879**
10	**Environmental (Wetland Impacted) Mitigation**	0.83	AC	$22,000	$18,153	$3,631	20%	**$21,783**	
TOTAL								**$6,097,147**	**$7,111,126**
GRAND TOTAL								**$13,208,273**	

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White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.3B --- Channelization from E200-00-00 to Jones Rd. (Sta. 1045+27 to 1165+49)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$694,313**	**$0**
	Mobilization/Demobilization	1	LS	$694,313	$694,313	$0	0%	$694,313	
2	**Earthwork**							**$2,006,990**	**$0**
	Channel Excavation	155,430	CY	$3	$466,290	$83,932	18%	$550,222	
	Haul 4.1 Miles	637,263	CYMI	$1.50	$955,895	$143,384	15%	$1,099,279	
	Disposal	155,430	CY	$2.00	$310,860	$46,629	15%	$357,489	
3	**Structures**							**$177,870**	**$1,909,329**
	Backslope Swale	23,100	LF	$2	$46,200	$4,620	10%	$50,820	
	Backslope Drain (structure)	39	EA	$3,000	$115,500	$11,550	10%	$127,050	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	0	SF	$95	$0	$0	23%		$0
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$90,090**
	6" - 21" and backslope drain	11	EA	$3,000	$33,000	$3,300	10%		$36,300
	24" - 36"	7	EA	$3,700	$25,900	$2,590	10%		$28,490
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$2,115,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	6	EA	$92,000	$552,000	$110,400	20%		$662,400
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	3	EA	$113,000	$339,000	$67,800	20%		$406,800
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$152,460**	**$0**
	Tree Planting	924	EA	$125	$115,500	$11,550	10%	$127,050	
	Shrub Planting	924	EA	$25	$23,100	$2,310	10%	$25,410	
7	**General Items**							**$490,910**	**$0**
	Stormwater Pollution Prevention	1	LS	$28,100	$28,100	$2,810	10%	$30,910	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$3,522,543**	**$4,114,899**
8	**Engineering Design (12%)**							**$422,705**	**$493,788**
9	**Construction Mgmt. (10%)**							**$352,254**	**$411,490**
10	**Environmental (Wetland Impacted) Mitigation**	0.55	AC	$22,000	$12,143	$2,429	20%	**$14,572**	
TOTAL								**$4,312,074**	**$5,020,177**
GRAND TOTAL								**$9,332,251**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

E200H.4 --- Channelization from E200-00-00 to Huffmeister (Sta. 1050+00 to 1350+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,392,830**	**$0**
	Mobilization/Demobilization	1	LS	$1,392,830	$1,392,830	$0	0%	$1,392,830	
2	**Earthwork**							**$4,835,215**	**$0**
	Channel Excavation	374,460	CY	$3	$1,123,380	$202,208	18%	$1,325,588	
	Haul 4.1 Miles	1,535,286	CYMI	$1.50	$2,302,929	$345,439	15%	$2,648,368	
	Disposal	374,460	CY	$2.00	$748,920	$112,338	15%	$861,258	
3	**Structures**							**$308,000**	**$5,015,202**
	Backslope Swale	40,000	LF	$2	$80,000	$8,000	10%	$88,000	
	Backslope Drain (structure)	67	EA	$3,000	$200,000	$20,000	10%	$220,000	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	12,180	SF	$95	$1,157,100	$266,133	23%		$1,423,233
	FM1960	14,400	SF	$95	$1,368,000	$314,640	23%		$1,682,640
	Pipeline	300	SF	$95	$28,500	$6,555	23%		$35,055
4	**Outfall Modifications**							**$0**	**$174,900**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$264,000**	**$0**
	Tree Planting	1,600	EA	$125	$200,000	$20,000	10%	$220,000	
	Shrub Planting	1,600	EA	$25	$40,000	$4,000	10%	$44,000	
7	**General Items**							**$969,500**	**$0**
	Stormwater Pollution Prevention	1	LS	$45,000	$45,000	$4,500	10%	$49,500	
	Traffic Control	4	EA	$200,000	$800,000	$120,000	15%	$920,000	
SUBTOTAL								**$7,769,544**	**$7,551,582**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

E200H.4 --- Channelization from E200-00-00 to Huffmeister (Sta. 1050+00 to 1350+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$932,345**	**$906,190**
9	**Construction Mgmt. (10%)**							**$776,954**	**$755,158**
10	**Real Estate**								**$43,764,920**
	R.O.W. Acquisition	1	LS	$6,543,140	$6,543,140	$1,635,785	25%		$8,178,925
	Administrative Fees	1	LS	$514,736	$514,736	$128,684	25%		$643,420
	Building - Fair Market Value	1.5	LS	$17,253,640	$25,880,460	$6,470,115	25%		$32,350,575
	Relocation (homes)	108	EA	$20,000	$2,160,000	$432,000	20%		$2,592,000
11	**Environmental Mitigation (1/2%)**							**$38,848**	
TOTAL								**$9,517,692**	**$52,977,850**
GRAND TOTAL								**$62,495,542**	

ATTACHMENT C-4

Detention Components – Component Optimization

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Detention Components - Summary

ID	Location	Area (ac)	Volume (ac-ft)	Description	Capital Cost ($1,000)
Detention at Tidwell - W. Little York (TWLY)					
TWLY.0	Tidwell/T.C. Jester/W. Little York; Sta. 57990-65400	15	160	Modification of facility E500-05-00; off-line facility	$3,984
TWLY.2		45	516	Expansion of E500-05-00; off-line facility	$9,340
TWLY.3		69	1032	Expansion of E500-05-00; off-line facility	$22,834
TWLY.5		123	1658	Expansion of E500-05-00; off-line facility	$52,629
Detention at North Houston-Rosslyn Road (NHR)					
NHR.0	North Houston-Rosslyn Road; Sta. 75800	37	360	Modification of E500-04-00; off-line facility	$3,021
NHR.1		37	595	Modification and expansion of E500-04-00; off-line facility	$7,956
NHR.2		87	811	Expansion of E500-04-00; off-line facility	$14,527
NHR.3		87	1069	Expansion of E500-04-00; off-line facility	$21,721
NHR.4		143	1211	Expansion of E500-04-00; off-line facility	$46,276
Detention at Hollister Road (HOL)					
HOL.1	Hollister Rd.; Sta. 80200	57	444	Excavation north of pipeline	$15,102
HOL.2		94	522	Expansion south of pipeline	$18,816
HOL.3		136	730	Expansion of facility to the west	$28,533
HOL.4		175	827	Expansion of facility to the east	$38,166
Detention at Fairbanks-North Houston (FNH)					
FNH.0	Fairbanks-North Houston; Sta. 87150 - 87489	34	360	Modification of E500-01-00; off-line facility	$4,219
FNH.1		86	843	Expansion of E500-01-00; off-line facility	$15,096
FNH.2		136	1271	Expansion of E500-01-00 & new facility E500-02-00 south of bayou	$29,438
FNH.3		177	1717	Expansion of E500-01-00, new facility E500-02-00 south of bayou, & new facility west of Fairbanks-North Houston	$45,188
FNH.4		215	2111	Expansion of E500-01-00, new facility E500-02-00 south of bayou, & new facility west of Fairbanks-North Houston	$58,684
Detention at Gessner-Beltway 8 (GBW)					
GBW.1	Gessner / Beltway 8; Sta. 94856	21	147	In-line facility north of bayou	$5,066
GBW.2		45	345	New facility (E500-10-00) located north and south of bayou.	$12,741
GBW.3		56	437	New facility located north and south of bayou, with expansion of facility to the south.	$18,271
GBW.4		56+	618	New facility located north and south of bayou, with expansion of facility to the south.	$35,251
Detention at Rio Grande (RG)					
RG.0	Rio Grande; E135-00-00 Sta. 3000	16	100	Off-line facility north of E135-00-00	$3,711
RG.1		45	277	Off-line facility north of E135-00-00	$9,900
RG.2		45	398	Expansion of facility north of E135-00-00	$14,529
RG.3		117	881	Expansion of facility south of E135-00-00	$44,883
RG.4		45	277	RG.1 + channelization of E135-00-00	$10,607
Detention at Jones Road (JR)					
JR.1	Jones Road; Sta. 114940 - 118000	23	134	Off-line facility; south of pipeline easement and east of Jones Rd.	$5,252
JR.2		39	220	Expansion of facility north of pipeline easement, east of Jones Rd.	$8,829
JR.3		54	295	Expansion of facility west of Jones Rd.	$12,422
JR.4		69	420	Expansion of facility west of Jones Rd.	$17,247
JR.5		75	470	Expansion of facility west of Jones Rd.	$29,386

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TWLY.0 --- DETENTION AT TIDWELL ROAD (160 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$297,000**	
	Mobilization/Demobilization	1	LS	$297,000	$297,000	$0	0%	$297,000	
2	**Earthwork**							**$2,757,796**	
	Clearing and Grubbing	0.0	AC	$3,500	$0	$0	15%	$0	
	Fill and Compaction (off-site fill)	198,756	CY	$12	$2,385,067	$357,760	15%	$2,742,827	
	Haul 2.57 Miles	0	CYMI	$1.50	$0	$0	15%	$0	
	Turf Establishment (dike portion)	5.2	AC	$2,500	$13,017	$1,952	15%	$14,969	
3	**Structures**							**$202,343**	
	Backslope Swale	3,000	LF	$2	$6,000	$600	10%	$6,600	
	Backslope Drains (structure)	5	EA	$3,000	$15,000	$1,500	10%	$16,500	
	Backslope Drains (24" RCP)	350	LF	$55	$19,250	$1,925	10%	$21,175	
	Sheet Piling for Inlet Structure	4,535	SF	$25	$113,375	$11,338	10%	$124,713	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$8,800**	
	Stormwater Pollution Prevention	1	LS	$8,000	$8,000	$800	10%	$8,800	
5	**Vegetation Recovery**							**$0**	
	Tree Planting	0	EA	$120	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines				$0	$0	10%		
SUBTOTAL								**$3,265,939**	
7	**Engineering Design (12%)**							**$391,913**	
8	**Construction Mgmt. (10%)**							**$326,594**	
9	**Real Estate**							**$0**	
	R.O.W. Acquisition	0	SF	$2.00	$0	$0	25%		$0
	Administrative Fees	0	LS	$1,500	$0	$0	25%		$0
TOTAL								**$3,984,445**	**$0**
GRAND TOTAL								**$3,984,445**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TWLY.2 --- DETENTION AT TIDWELL ROAD (356 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$680,332**	**$0**
	Mobilization/Demobilization	1	LS	$634,000	$634,000	$0	0%	$634,000	
	Demolition/Removal of Buildings	8,561	SF	$4.40	$37,668	$8,664	23%	$46,332	
2	**Earthwork**							**$5,792,276**	**$0**
	Clearing and Grubbing	26.8	AC	$3,500	$93,800	$14,070	15%	$107,870	
	Excavation Clean Soil	574,347	CY	$3	$1,723,040	$258,456	15%	$1,981,496	
	Excavation Contaminated Soil	0	CY	$8	$0	$0	23%	$0	
	Haul 2.78 Miles Clean Soil	1,044,142	CYMI	$1.50	$1,566,213	$234,932	15%	$1,801,145	
	Disposal Clean Soil	375,591	CY	$2.09	$784,984	$117,748	15%	$902,732	
	Turf Establishment	29.5	AC	$2,500	$73,700	$11,055	15%	$84,755	
	Fill and Compaction (on-site fill)	198,756	CY	$4	$795,024	$119,254	15%	$914,278	
	Haul, Treatment and Disposal of Contaminated Soil	0	CY	$65.00	$0	$0	23%	$0	
3	**Structures**							**$373,173**	
	Backslope Swale	3,800	LF	$2	$7,600	$760	10%	$8,360	
	Backslope Drains (structure)	7	EA	$3,000	$21,000	$2,100	10%	$23,100	
	Backslope Drains (24" RCP)	490	LF	$55	$26,950	$2,695	10%	$29,645	
	Sheet Piling for Inlet Structure	4,535	SF	$25	$113,375	$11,338	10%	$124,713	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	350	CY	$400	$140,000	$14,000	10%	$154,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$9,680**	
	Stormwater Pollution Prevention	1	LS	$8,800	$8,800	$880	10%	$9,680	
5	**Vegetation Recovery**							**$43,711**	
	Tree Planting	274	EA	$120	$32,886	$3,289	10%	$36,175	
	Shrub Planting	274	EA	$25	$6,851	$685	10%	$7,536	
6	**Remove & Replace Utilities**							**$0**	**$113,400**
	Removal of Waterline (8" CI)	1,200	LF	$10	$12,000	$2,400	20%		$14,400
	Removal of Waste Water Line (8" ESP)	600	LF	$10	$6,000	$1,200	20%		$7,200
	Removal of Waste Water Line (10" ESP)	600	LF	$10	$6,000	$1,200	20%		$7,200
	Removal of Storm Water Line (60" RCP)	300	LF	$40	$12,000	$2,400	20%		$14,400
	Removal of Storm Water Line (66" RCP)	300	LF	$45	$13,500	$2,700	20%		$16,200
	Removal of Storm Water Line (78" RCP)	300	LF	$50	$15,000	$3,000	20%		$18,000
	Removal of Other Utilities (Telephone, Cable, etc….)	1,200	LF	$25	$30,000	$6,000	20%		$36,000
SUBTOTAL								**$6,899,172**	**$113,400**
7	**Engineering Design (12%)**							**$827,901**	**$13,608**
8	**Construction Mgmt. (10%)**							**$689,917**	**$11,340**
9	**Real Estate**							**$0**	**$750,664**
	R.O.W. Acquisition	1	LS	$239,010.00	$239,010	$59,753	25%		$298,763
	Administrative Fees	1	LS	$43,305	$43,305	$10,826	25%		$54,131
	Relocation (homes)	7	EA	$20,000	$140,000	$28,000	20%		$168,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Building - Fair Market Value	1.5	LS	$127,650.00	$191,475	$38,295	20%		$229,770
10	**Environmental Mitigation (1/2%)**							**$34,496**	
TOTAL								**$8,451,485**	**$889,012**
GRAND TOTAL								**$9,340,497**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TWLY.3 --- DETENTION AT TIDWELL ROAD (1032 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,667,664**	**$0**
	Mobilization/Demobilization	1	LS	$1,575,000	$1,575,000	$0	0%	$1,575,000	
	Demolition/Removal of Buildings	17,122	SF	$4.40	$75,337	$17,327	23%	$92,664	
2	**Earthwork**							**$14,849,981**	**$0**
	Clearing and Grubbing	53.6	AC	$3,500	$187,600	$28,140	15%	$215,740	
	Excavation Clean Soil	1,406,827	CY	$3	$4,220,480	$633,072	15%	$4,853,552	
	Excavation Contaminated Soil	0	CY	$8	$0	$0	23%	$0	
	Haul 2.78 Miles Clean Soil	3,358,438	CYMI	$1.50	$5,037,657	$755,648	15%	$5,793,305	
	Disposal Clean Soil	1,208,071	CY	$2.09	$2,524,869	$378,730	15%	$2,903,599	
	Turf Establishment	59.0	AC	$2,500	$147,400	$22,110	15%	$169,510	
	Fill and Compaction (on-site fill)	198,756	CY	$4	$795,022	$119,253	15%	$914,276	
	Haul, Treatment and Disposal of Contaminated Soil	0	CY	$65.00	$0	$0	23%	$0	
3	**Structures**							**$569,743**	
	Backslope Swale	7,600	LF	$2	$15,200	$1,520	10%	$16,720	
	Backslope Drains (structure)	13	EA	$3,000	$39,000	$3,900	10%	$42,900	
	Backslope Drains (24" RCP)	910	LF	$55	$50,050	$5,005	10%	$55,055	
	Sheet Piling for Inlet Structure	4,535	SF	$25	$113,375	$11,338	10%	$124,713	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	675	CY	$400	$270,000	$27,000	10%	$297,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$13,860**	
	Stormwater Pollution Prevention	1	LS	$12,600	$12,600	$1,260	10%	$13,860	
5	**Vegetation Recovery**							**$87,422**	
	Tree Planting	548	EA	$120	$65,772	$6,577	10%	$72,349	
	Shrub Planting	548	EA	$25	$13,703	$1,370	10%	$15,073	
6	**Remove & Replace Utilities**							**$0**	**$226,800**
	Removal of Waterline (8" CI)	2,400	LF	$10	$24,000	$4,800	20%		$28,800
	Removal of Waste Water Line (8" ESP)	1,200	LF	$10	$12,000	$2,400	20%		$14,400
	Removal of Waste Water Line (10" ESP)	1,200	LF	$10	$12,000	$2,400	20%		$14,400
	Removal of Storm Water Line (60" RCP)	600	LF	$40	$24,000	$4,800	20%		$28,800
	Removal of Storm Water Line (66" RCP)	600	LF	$45	$27,000	$5,400	20%		$32,400
	Removal of Storm Water Line (78" RCP)	600	LF	$50	$30,000	$6,000	20%		$36,000
	Removal of Other Utilities (Telephone, Cable, etc….)	2,400	LF	$25	$60,000	$12,000	20%		$72,000
SUBTOTAL								**$17,188,670**	**$226,800**
7	**Engineering Design (12%)**							**$2,062,640**	**$27,216**
8	**Construction Mgmt. (10%)**							**$1,718,867**	**$22,680**
9	**Real Estate**							**$0**	**$1,501,327**
	R.O.W. Acquisition	1	LS	$478,020.00	$478,020	$119,505	25%		$597,525
	Administrative Fees	1	LS	$86,610	$86,610	$21,652	25%		$108,262
	Relocation (homes)	14	EA	$20,000	$280,000	$56,000	20%		$336,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Building - Fair Market Value	1.5	LS	$255,300.00	$382,950	$76,590	20%		$459,540
10	**Environmental Mitigation (1/2%)**							**$85,943**	
TOTAL								**$21,056,121**	**$1,778,023**
GRAND TOTAL								**$22,834,144**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TWLY.5 --- DETENTION AT TIDWELL (1658 AC-FT)

NORTHERN PORTION OF TWLY.5 --- DETENTION AT TIDWELL (626 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,089,475**	**$0**
	Mobilization/Demobilization	1	LS	$1,207,000	$1,207,000	$0	0%	$1,207,000	
	Demolition/Removal of Buildings	163,059	SF	$4.40	$717,460	$165,016	23%	$882,475	
2	**Earthwork**							**$11,098,485**	**$0**
	Clearing and Grubbing	47.8	AC	$3,500	$167,300	$25,095	15%	$192,395	
	Excavation Clean Soil	1,009,947	CY	$3	$3,029,840	$454,476	15%	$3,484,316	
	Excavation Contaminated Soil	0	CY	$8	$0	$0	23%	$0	
	Haul 2.78 Miles Clean Soil	2,807,652	CYMI	$1.50	$4,211,478	$631,722	15%	$4,843,199	
	Disposal Clean Soil	1,009,947	CY	$2.09	$2,110,789	$316,618	15%	$2,427,407	
	Turf Establishment	52.6	AC	$2,500	$131,450	$19,718	15%	$151,168	
	Fill and Compaction	0	CY	$4	$0	$0	15%	$0	
	Haul, Treatment and Disposal of Contaminated Soil	0	CY	$65.00	$0	$0	23%	$0	
3	**Structures**							**$569,743**	
	Backslope Swale	7,600	LF	$2	$15,200	$1,520	10%	$16,720	
	Backslope Drains (structure)	13	EA	$3,000	$39,000	$3,900	10%	$42,900	
	Backslope Drains (24" RCP)	910	LF	$55	$50,050	$5,005	10%	$55,055	
	Sheet Piling for Inlet Structure	4,535	SF	$25	$113,375	$11,338	10%	$124,713	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	675	CY	$400	$270,000	$27,000	10%	$297,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$13,860**	
	Stormwater Pollution Prevention	1	LS	$12,600	$12,600	$1,260	10%	$13,860	
5	**Vegetation Recovery**							**$87,422**	
	Tree Planting	548	EA	$120	$65,772	$6,577	10%	$72,349	
	Shrub Planting	548	EA	$25	$13,703	$1,370	10%	$15,073	
6	**Remove & Replace Utilities**							**$0**	**$300,000**
	Removal of Misc. Utilities	1	LS	$200,000	$250,000	$50,000	20%		$300,000
SUBTOTAL								**$13,858,985**	**$300,000**
7	**Engineering Design (12%)**							**$1,663,078**	**$36,000**
8	**Construction Mgmt. (10%)**							**$1,385,898**	**$30,000**
9	**Real Estate**							**$0**	**$12,452,087**
	R.O.W. Acquisition	1	LS	2,222,876	$2,222,876	$555,719	25%		$2,778,595
	Administrative Fees	1	LS	111,107	$111,107	$27,777	25%		$138,884
	Relocation (houses/buildings)	61	EA	20,000	$1,220,000	$244,000	20%		$1,464,000
	Relocation (businesses)	23,616	SF	4	$82,656	$16,531	20%		$99,187
	Building - Fair Market Value	1.5	LS	4,428,567	$6,642,851	$1,328,570	20%		$7,971,421
10	**Environmental Mitigation (1/2%)**							**$69,295**	
TOTAL								**$16,977,256**	**$12,818,087**
NORTHERN PORTION GRAND TOTAL								**$29,795,343**	
TWLY.3 GRAND TOTAL								**$22,834,144**	
TWLY.5 GRAND TOTAL								**$52,629,487**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NHR.0 --- DETENTION AT NORTH HOUSTON-ROSSLYN ROAD (360 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$226,000**	
	Mobilization/Demobilization	1	LS	$226,000	$226,000	$0	0%	$226,000	
2	**Earthwork**							**$2,056,144**	
	Clearing and Grubbing	0.0	AC	$3,500	$0	$0	15%	$0	
	Fill & Compaction - Dike (off-site fill)	147,911	CY	$12	$1,774,934	$266,240	15%	$2,041,175	
	Haul 2.57 Miles	0	CYMI	$1.50	$0	$0	15%	$0	
	Turf Establishment (dike portion)	5.2	AC	$2,500	$13,017	$1,952	15%	$14,969	
3	**Structures**							**$186,695**	
	Backslope Swale	2,000	LF	$2	$4,000	$400	10%	$4,400	
	Backslope Drains (structure)	4	EA	$3,000	$12,000	$1,200	10%	$13,200	
	Backslope Drains (24" RCP)	280	LF	$55	$15,400	$1,540	10%	$16,940	
	Sheet Piling for Inlet Structure	4,320	SF	$25	$108,000	$10,800	10%	$118,800	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$7,700**	
	Stormwater Pollution Prevention	1	LS	$7,000	$7,000	$700	10%	$7,700	
5	**Vegetation Recovery**							**$0**	
	Tree Planting	0	EA	$120	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines				$0	$0	10%		
SUBTOTAL								**$2,476,539**	
7	**Engineering Design (12%)**							**$297,185**	
8	**Construction Mgmt. (10%)**							**$247,654**	
9	**Real Estate**							**$0**	
	R.O.W. Acquisition	0	SF	$2.00	$0	$0	25%		$0
	Administrative Fees	0	LS	$1,500	$0	$0	25%		$0
TOTAL								**$3,021,377**	**$0**
GRAND TOTAL								**$3,021,377**	

Fill material obtained from Off-Site

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NHR.1 --- DETENTION AT NORTH HOUSTON-ROSSLYN ROAD (595 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$593,000**	
	Mobilization/Demobilization	1	LS	$593,000	$593,000	$0	0%	$593,000	
2	**Earthwork**							**$5,733,832**	
	Clearing and Grubbing	0.0	AC	$3,500	$0	$0	15%	$0	
	Fill & Compaction - Dike (off-site fill)	147,911	CY	$12	$1,774,934	$266,240	15%	$2,041,175	
	Excavation	379,133	CY	$3	$1,137,400	$170,610	15%	$1,308,010	
	Haul 2.57 Miles	974,373	CYMI	$1.50	$1,461,559	$219,234	15%	$1,680,793	
	Disposal	379,133	CY	$2	$599,031	$89,855	15%	$688,885	
	Turf Establishment (dike portion)	5.2	AC	$2,500	$13,017	$1,952	15%	$14,969	
3	**Structures**							**$186,695**	
	Backslope Swale	2,000	LF	$2	$4,000	$400	10%	$4,400	
	Backslope Drains (structure)	4	EA	$3,000	$12,000	$1,200	10%	$13,200	
	Backslope Drains (24" RCP)	280	LF	$55	$15,400	$1,540	10%	$16,940	
	Sheet Piling for Inlet Structure	4,320	SF	$25	$108,000	$10,800	10%	$118,800	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$7,700**	
	Stormwater Pollution Prevention	1	LS	$7,000	$7,000	$700	10%	$7,700	
5	**Vegetation Recovery**							**$0**	
	Tree Planting	0	EA	$120	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines				$0	$0	10%		
SUBTOTAL								**$6,521,227**	
7	**Engineering Design (12%)**							**$782,547**	
8	**Construction Mgmt. (10%)**							**$652,123**	
9	**Real Estate**							**$0**	
	R.O.W. Acquisition	0	SF	$2.00	$0	$0	25%		$0
	Administrative Fees	0	LS	$1,500	$0	$0	25%		$0
TOTAL								**$7,955,897**	**$0**
GRAND TOTAL								**$7,955,897**	

Fill material obtained from Off-Site

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NHR.2 --- DETENTION AT NORTH HOUSTON-ROSSLYN ROAD (811 AC-FT)

ADDITIONAL 216 AC-FT NORTH OF E500-04-00

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$386,000**	
	Mobilization/Demobilization	1	LS	$386,000	$386,000	$0	0%	$386,000	
2	**Earthwork**							**$3,563,938**	
	Clearing and Grubbing	25.0	AC	$3,500	$87,500	$13,125	15%	$100,625	
	Fill & Compaction	0	CY	$4	$0	$0	15%	$0	
	Excavation	348,883	CY	$3	$1,046,649	$156,997	15%	$1,203,646	
	Haul 2.57 Miles	896,629	CYMI	$1.50	$1,344,943	$201,742	15%	$1,546,685	
	Disposal	348,883	CY	$2	$551,235	$82,685	15%	$633,920	
	Turf Establishment	27.5	AC	$2,500	$68,750	$10,313	15%	$79,063	
3	**Structures**							**$202,180**	
	Backslope Swale	4,500	LF	$2	$9,000	$900	10%	$9,900	
	Backslope Drains (structure)	8	EA	$3,000	$24,000	$2,400	10%	$26,400	
	Backslope Drains (24" RCP)	560	LF	$55	$30,800	$3,080	10%	$33,880	
	Sheet Piling for Inlet Structure	0	SF	$25	$0	$0	10%	$0	
	60" RCP (outfall pipe)	0	LF	$135	$0	$0	10%	$0	
	Riprap	0	SY	$35	$0	$0	10%	$0	
	Concrete Pilot Flow Channel	300	CY	$400	$120,000	$12,000	10%	$132,000	
	Flap Gate (60")	0	EA	$9,000	$0	$0	10%	$0	
4	**General Items**							**$10,450**	
	Stormwater Pollution Prevention	1	LS	$9,500	$9,500	$950	10%	$10,450	
5	**Vegetation Recovery**							**$77,431**	
	Tree Planting	485	EA	$120	$58,255	$5,826	10%	$64,081	
	Shrub Planting	485	EA	$25	$12,137	$1,214	10%	$13,350	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$4,239,999**	
7	**Engineering Design (12%)**							**$508,800**	
8	**Construction Mgmt. (10%)**							**$424,000**	
9	**Real Estate**							**$0**	**$1,376,738**
	R.O.W. Acquisition	1,089,000	SF	$1.00	$1,089,000	$272,250	25%		$1,361,250
	Administrative Fees	1	LS	$12,390	$12,390	$3,098	25%		$15,488
10	**Environmental Mitigation (1/2%)**							**$21,200**	
TOTAL								**$5,193,999**	**$1,376,738**
ADDITIONAL 216 AC-FT GRAND TOTAL								**$6,570,737**	
NHR.1 GRAND TOTAL								**$7,955,897**	
NHR.2 GRAND TOTAL								**$14,526,633**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NHR.3 --- DETENTION AT NORTH HOUSTON-ROSSLYN ROAD (1069 AC-FT)

ADDITIONAL 474 AC-FT NORTH OF E500-04-00

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$817,000**	
	Mobilization/Demobilization	1	LS	$817,000	$817,000	$0	0%	$817,000	
2	**Earthwork**							**$7,762,975**	
	Clearing and Grubbing	48.0	AC	$3,500	$168,000	$25,200	15%	$193,200	
	Fill & Compaction - Dike	0	CY	$4	$0	$0	15%	$0	
	Excavation	764,720	CY	$3	$2,294,160	$344,124	15%	$2,638,284	
	Haul 2.57 Miles	1,965,330	CYMI	$1.50	$2,947,996	$442,199	15%	$3,390,195	
	Disposal	764,720	CY	$2	$1,208,258	$181,239	15%	$1,389,496	
	Turf Establishment	52.8	AC	$2,500	$132,000	$19,800	15%	$151,800	
3	**Structures**							**$286,550**	
	Backslope Swale	6,000	LF	$2	$12,000	$1,200	10%	$13,200	
	Backslope Drains (structure)	10	EA	$3,000	$30,000	$3,000	10%	$33,000	
	Backslope Drains (24" RCP)	700	LF	$55	$38,500	$3,850	10%	$42,350	
	Sheet Piling for Inlet Structure	0	SF	$25	$0	$0	10%	$0	
	60" CMP (outfall pipe)	0	LF	$120	$0	$0	10%	$0	
	Riprap	0	SY	$35	$0	$0	10%	$0	
	Concrete Pilot Flow Channel	450	CY	$400	$180,000	$18,000	10%	$198,000	
	Flap Gate (60")	0	EA	$9,000	$0	$0	10%	$0	
4	**General Items**							**$12,100**	
	Stormwater Pollution Prevention	1	LS	$11,000	$11,000	$1,100	10%	$12,100	
5	**Vegetation Recovery**							**$100,743**	
	Tree Planting	632	EA	$120	$75,794	$7,579	10%	$83,374	
	Shrub Planting	632	EA	$25	$15,791	$1,579	10%	$17,370	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$8,979,369**	
7	**Engineering Design (12%)**							**$1,077,524**	
8	**Construction Mgmt. (10%)**							**$897,937**	
9	**Real Estate**							**$0**	**$2,764,882**
	R.O.W. Acquisition	1	LS	$2,188,520.00	$2,188,520	$547,130	25%		$2,735,650
	Administrative Fees	1	LS	$23,385	$23,385	$5,846	25%		$29,232
10	**Environmental Mitigation (1/2%)**							**$44,897**	
TOTAL								**$10,999,726**	**$2,764,882**
ADDITIONAL 474 AC-FT GRAND TOTAL								**$13,764,608**	
NHR.1 GRAND TOTAL								**$7,955,897**	
NHR.3 GRAND TOTAL								**$21,720,505**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NHR.4 --- DETENTION AT NORTH HOUSTON-ROSSLYN ROAD (1211 AC-FT)

ADDITIONAL 142 AC-FT NORTH OF NHR.3

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,206,789**	
	Mobilization/Demobilization	1	LS	$382,000	$382,000	$0	0%	$382,000	
	Demolition/Removal of Buildings	152,400	SF	$4.40	$670,560	$154,229	23%	$824,789	
2	**Earthwork**							**$2,330,075**	
	Clearing and Grubbing	15.0	AC	$3,500	$52,500	$7,875	15%	$60,375	
	Excavation	229,093	CY	$3	$687,280	$103,092	15%	$790,372	
	Haul 2.57 Miles	588,770	CYMI	$1.50	$883,155	$132,473	15%	$1,015,628	
	Disposal	229,093	CY	$2	$361,967	$54,295	15%	$416,263	
	Turf Establishment	16.5	AC	$2,500	$41,250	$6,188	15%	$47,438	
3	**Structures**							**$158,565**	**$1,291,500**
	Backslope Swale	1,800	LF	$2	$3,600	$360	10%	$3,960	
	Backslope Drains (structure)	3	EA	$3,000	$9,000	$900	10%	$9,900	
	Backslope Drains (24" RCP)	210	LF	$55	$11,550	$1,155	10%	$12,705	
	Sheet Piling for Inlet Structure	0	SF	$25	$0	$0	10%	$0	
	60" CMP (outfall pipe)	0	LF	$120	$0	$0	10%	$0	
	Riprap	0	SY	$35	$0	$0	10%	$0	
	Concrete Pilot Flow Channel	300	CY	$400	$120,000	$12,000	10%	$132,000	
	Flap Gate (60")	0	EA	$9,000	$0	$0	10%	$0	
	Bridge Modification								
	Railway	10,000	SF	$105	$1,050,000	$241,500	23%		$1,291,500
4	**General Items**							**$7,480**	
	Stormwater Pollution Prevention	1	LS	$6,800	$6,800	$680	10%	$7,480	
5	**Vegetation Recovery**							**$27,753**	
	Tree Planting	174	EA	$120	$20,880	$2,088	10%	$22,968	
	Shrub Planting	174	EA	$25	$4,350	$435	10%	$4,785	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$3,730,662**	**$1,291,500**
7	**Engineering Design (12%)**							**$447,679**	**$154,980**
8	**Construction Mgmt. (10%)**							**$373,066**	**$129,150**
9	**Real Estate**							**$0**	**$18,409,535**
	R.O.W. Acquisition	1	LS	$737,221	$737,221	$184,305	25%		$921,526
	Administrative Fees	1	LS	$265,993	$265,993	$66,498	25%		$332,491
	Relocation (homes)	84	EA	$20,000	$1,680,000	$336,000	20%		$2,016,000
	Relocation (businesses)	1,200	SF	$3.50	$4,200	$840	20%		$5,040
	Building - Fair Market Value	1.5	LS	$8,408,043	$12,612,065	$2,522,413	20%		$15,134,477
10	**Environmental Mitigation (1/2%)**							**$18,653**	
TOTAL								**$4,570,061**	**$19,985,165**
ADDITIONAL 142 AC-FT GRAND TOTAL								**$24,555,225**	
NHR.3 GRAND TOTAL								**$21,720,505**	
NHR.4 GRAND TOTAL								**$46,275,730**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

HOL.1 --- DETENTION AT HOLLISTER ROAD (444 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$967,000**	
	Mobilization/Demobilization	1	LS	$967,000	$967,000	$0	0%	$967,000	
2	**Earthwork**							**$8,797,470**	
	Clearing and Grubbing	66.9	AC	$3,500	$234,115	$35,117	15%	$269,232	
	Excavation	716,320	CY	$3	$2,148,960	$322,344	15%	$2,471,304	
	Haul 3.52 Miles	2,521,446	CYMI	$1.50	$3,782,170	$567,325	15%	$4,349,495	
	Disposal	716,320	CY	$1.97	$1,411,150	$211,673	15%	$1,622,823	
	Turf Establishment	73.6	AC	$1,000	$73,579	$11,037	15%	$84,616	
3	**Structures**							**$507,235**	
	Backslope Swale	6,000	LF	$2	$12,000	$1,200	10%	$13,200	
	Backslope Drains (structure)	10	EA	$830	$8,300	$830	10%	$9,130	
	Backslope Drains (24" RCP)	700	LF	$40	$28,000	$2,800	10%	$30,800	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	600	CY	$400	$240,000	$24,000	10%	$264,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$12,100**	
	Stormwater Pollution Prevention	1	LS	$11,000	$11,000	$1,100	10%	$12,100	
5	**Vegetation Recovery**							**$228,675**	
	Tree Planting	1,386	EA	$125	$173,239	$17,324	10%	$190,563	
	Shrub Planting	1,386	EA	$25	$34,648	$3,465	10%	$38,113	
6	**Remove & Replace Utilities**							**$0**	**$120,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$120,000
SUBTOTAL								**$10,512,481**	**$120,000**
7	**Engineering Design (12%)**							**$1,261,498**	**$14,400**
8	**Construction Mgmt. (10%)**							**$1,051,248**	**$12,000**
9	**Real Estate**							**$0**	**$2,077,420**
	R.O.W. Acquisition	0.61	LS	$3,369,453	$2,055,366	$0	0%		$2,055,366
	Administrative Fees	1	LS	$22,054	$22,054	$0	0%		$22,054
10	**Environmental Mitigation (1/2%)**							**$52,562**	
TOTAL								**$12,877,789**	**$2,223,820**
GRAND TOTAL								**$15,101,609**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

HOL.2 --- DETENTION AT HOLLISTER ROAD (522 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,144,000**	
	Mobilization/Demobilization	1	LS	$1,144,000	$1,144,000	$0	0%	$1,144,000	
2	**Earthwork**							**$10,280,809**	
	Clearing and Grubbing	66.9	AC	$3,500	$234,115	$35,117	15%	$269,232	
	Excavation	842,160	CY	$3	$2,526,480	$378,972	15%	$2,905,452	
	Haul 3.52 Miles	2,964,403	CYMI	$1.50	$4,446,605	$666,991	15%	$5,113,596	
	Disposal	842,160	CY	$1.97	$1,659,055	$248,858	15%	$1,907,913	
	Turf Establishment	73.6	AC	$1,000	$73,579	$11,037	15%	$84,616	
3	**Structures**							**$637,048**	
	Backslope Swale	11,300	LF	$2	$22,600	$2,260	10%	$24,860	
	Backslope Drains (structure)	19	EA	$830	$15,770	$1,577	10%	$17,347	
	Backslope Drains (24" RCP)	1,330	LF	$40	$53,200	$5,320	10%	$58,520	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	230	SY	$35	$8,065	$806	10%	$8,871	
	Concrete Pilot Flow Channel	775	CY	$400	$310,000	$31,000	10%	$341,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$17,930**	
	Stormwater Pollution Prevention	1	LS	$16,300	$16,300	$1,630	10%	$17,930	
5	**Vegetation Recovery**							**$381,125**	
	Tree Planting	2,310	EA	$125	$288,731	$28,873	10%	$317,604	
	Shrub Planting	2,310	EA	$25	$57,746	$5,775	10%	$63,521	
6	**Remove & Replace Utilities**							**$0**	**$120,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$120,000
SUBTOTAL								**$12,460,913**	**$120,000**
7	**Engineering Design (12%)**							**$1,495,310**	**$14,400**
8	**Construction Mgmt. (10%)**							**$1,246,091**	**$12,000**
9	**Real Estate**							**$0**	**$3,404,648**
	R.O.W. Acquisition	1	LS	$3,369,453	$3,369,453	$0	0%		$3,369,453
	Administrative Fees	1	LS	$35,195	$35,195	$0	0%		$35,195
10	**Environmental Mitigation (1/2%)**							**$62,305**	
TOTAL								**$15,264,618**	**$3,551,048**
GRAND TOTAL								**$18,815,666**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

HOL.3 --- DETENTION AT HOLLISTER ROAD (730 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,638,000**	
	Mobilization/Demobilization	1	LS	$1,638,000	$1,638,000	$0	0%	$1,638,000	
	Demolition/Removal of Buildings	63,094	SF	$4.40	$277,614	$63,851	23%	$341,465	
2	**Earthwork**							**$14,603,222**	
	Clearing and Grubbing	100.3	AC	$3,500	$350,945	$52,642	15%	$403,587	
	Excavation	1,177,733	CY	$3	$3,533,200	$529,980	15%	$4,063,180	
	Haul 3.52 Miles	4,145,621	CYMI	$1.50	$6,218,432	$932,765	15%	$7,151,197	
	Disposal	1,177,733	CY	$1.97	$2,320,135	$348,020	15%	$2,668,155	
	Turf Establishment	110.3	AC	$2,500	$275,743	$41,361	15%	$317,104	
3	**Structures**							**$1,165,961**	
	Backslope Swale	16,300	LF	$2	$32,600	$3,260	10%	$35,860	
	Backslope Drains (structure)	28	EA	$3,000	$84,000	$8,400	10%	$92,400	
	Backslope Drains (24" RCP)	1,960	LF	$55	$107,800	$10,780	10%	$118,580	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	36" CMP	150	LF	$90	$13,500	$1,350	10%	$14,850	
	36" RCP	600	LF	$70	$42,000	$4,200	10%	$46,200	
	72" RCP	300	LF	$180	$54,000	$5,400	10%	$59,400	
	Concrete Pilot Flow Channel	1,405	CY	$400	$562,000	$56,200	10%	$618,200	
	Riprap	230	SY	$35	$8,065	$806	10%	$8,871	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$28,930**	
	Stormwater Pollution Prevention	1	LS	$26,300	$26,300	$2,630	10%	$28,930	
5	**Vegetation Recovery**							**$455,843**	
	Tree Planting	2,858	EA	$120	$342,954	$34,295	10%	$377,249	
	Shrub Planting	2,858	EA	$25	$71,449	$7,145	10%	$78,594	
6	**Remove & Replace Utilities**							**$0**	**$120,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$120,000
SUBTOTAL								**$17,891,957**	**$120,000**
7	**Engineering Design (12%)**							**$2,147,035**	**$14,400**
8	**Construction Mgmt. (10%)**							**$1,789,196**	**$12,000**
9	**Real Estate**							**$0**	**$6,469,419**
	R.O.W. Acquisition	1	LS	$3,369,453	$3,369,453				$3,369,453
	Administrative Fees	1	LS	$35,195	$35,195				$35,195
	R.O.W. Acquisition	1	LS	$1,398,700	$1,398,700	$349,675	25%		$1,748,375
	Administrative Fees	1	LS	$50,570	$50,570	$12,643	25%		$63,213
	Relocation (homes)	1	EA	$20,000	$20,000	$4,000	20%		$24,000
	Relocation (businesses)	61,710	SF	$3.50	$215,985	$43,197	20%		$259,182
	Building - Fair Market Value	1.5	LS	$538,890	$808,335	$161,667	20%		$970,002
10	**Environmental Mitigation (1/2%)**							**$89,460**	
TOTAL								**$21,917,647**	**$6,615,819**
GRAND TOTAL								**$28,533,466**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

HOL.4 --- DETENTION AT HOLLISTER ROAD (965 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,539,656**	
	Mobilization/Demobilization	1	LS	$2,130,000	$2,130,000	$0	0%	$2,130,000	
	Demolition/Removal of Buildings	75,694	SF	$4.40	$333,054	$76,602	23%	$409,656	
2	**Earthwork**							**$19,592,919**	
	Clearing and Grubbing	172.7	AC	$3,500	$604,485	$90,673	15%	$695,158	
	Excavation	1,556,867	CY	$3	$4,670,600	$700,590	15%	$5,371,190	
	Haul 3.52 Miles	5,480,171	CYMI	$1.50	$8,220,256	$1,233,038	15%	$9,453,294	
	Disposal	1,556,867	CY	$1.97	$3,067,027	$460,054	15%	$3,527,081	
	Turf Establishment	190.0	AC	$2,500	$474,953	$71,243	15%	$546,195	
3	**Structures**							**$1,087,641**	
	Backslope Swale	21,300	LF	$2	$42,600	$4,260	10%	$46,860	
	Backslope Drains (structure)	36	EA	$3,000	$108,000	$10,800	10%	$118,800	
	Backslope Drains (24" RCP)	2,520	LF	$55	$138,600	$13,860	10%	$152,460	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	36" CMP	150	LF	$90	$13,500	$1,350	10%	$14,850	
	36" RCP	600	LF	$70	$42,000	$4,200	10%	$46,200	
	72" RCP	600	LF	$180	$108,000	$10,800	10%	$118,800	
	Concrete Pilot Flow Channel	930	CY	$400	$372,000	$37,200	10%	$409,200	
	Riprap	230	SY	$35	$8,065	$806	10%	$8,871	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$34,430**	
	Stormwater Pollution Prevention	1	LS	$31,300	$31,300	$3,130	10%	$34,430	
5	**Vegetation Recovery**							**$455,843**	
	Tree Planting	2,858	EA	$120	$342,954	$34,295	10%	$377,249	
	Shrub Planting	2,858	EA	$25	$71,449	$7,145	10%	$78,594	
6	**Remove & Replace Utilities**							**$0**	**$120,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$120,000
SUBTOTAL								**$23,710,489**	**$120,000**
7	**Engineering Design (12%)**							**$2,845,259**	**$14,400**
8	**Construction Mgmt. (10%)**							**$2,371,049**	**$12,000**
9	**Real Estate**							**$0**	**$8,973,858**
	R.O.W. Acquisition	1	LS	$3,369,453.00	$3,369,453				$3,369,453
	Administrative Fees	1	LS	$35,195	$35,195				$35,195
	R.O.W. Acquisition	3,530,974	SF	$1.00	$3,530,974	$882,743	25%		$4,413,717
	Administrative Fees	1	LS	$52,393	$52,393	$13,098	25%		$65,491
	Relocation (houses/buildings)	5	EA	$20,000	$100,000	$20,000	20%		$120,000
	HCAD House Value	1.5	LS	$538,890.00	$808,335	$161,667	20%		$970,002
10	**Environmental Mitigation (1/2%)**							**$118,552**	
TOTAL								**$29,045,349**	**$9,120,258**
GRAND TOTAL								**$38,165,607**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

FNH.0 --- DETENTION AT FAIRBANKS -NORTH HOUSTON (NORTH BASIN, 360 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$315,000**	
	Mobilization/Demobilization	1	LS	$315,000	$315,000	$0	0%	$315,000	
2	**Earthwork**							**$2,757,796**	
	Clearing and Grubbing	0.0	AC	$3,500	$0	$0	15%	$0	
	Fill and Compaction (off-site fill)	198,756	CY	$12	$2,385,067	$357,760	15%	$2,742,827	
	Haul 2.57 Miles	0	CYMI	$1.50	$0	$0	15%	$0	
	Turf Establishment (dike portion)	5.2	AC	$2,500	$13,017	$1,952	15%	$14,969	
3	**Structures**							**$377,820**	
	Backslope Swale	2,000	LF	$2	$4,000	$400	10%	$4,400	
	Backslope Drains (structure)	4	EA	$3,000	$12,000	$1,200	10%	$13,200	
	Backslope Drains (24" RCP)	280	LF	$55	$15,400	$1,540	10%	$16,940	
	Sheet Piling for Inlet Structure	11,270	SF	$25	$281,750	$28,175	10%	$309,925	
	60" CMP (outfall pipe)	150	LF	$120	$18,000	$1,800	10%	$19,800	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$7,700**	
	Stormwater Pollution Prevention	1	LS	$7,000	$7,000	$700	10%	$7,700	
5	**Vegetation Recovery**							**$0**	
	Tree Planting	0	EA	$120	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines				$0	$0	10%		
SUBTOTAL								**$3,458,316**	
7	**Engineering Design (12%)**							**$414,998**	
8	**Construction Mgmt. (10%)**							**$345,832**	
9	**Real Estate**							**$0**	
	R.O.W. Acquisition	0	SF	$2.00	$0	$0	25%		$0
	Administrative Fees	0	LS	$1,500	$0	$0	25%		$0
TOTAL								**$4,219,146**	**$0**
GRAND TOTAL								**$4,219,146**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

FNH.1 --- DETENTION AT FAIRBANKS -NORTH HOUSTON (NORTH BASIN, 843 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$999,000**	
	Mobilization/Demobilization	1	LS	$999,000	$999,000	$0	0%	$999,000	
2	**Earthwork**							**$8,764,908**	
	Clearing and Grubbing (expansion)	8.0	AC	$2,100	$16,800	$2,520	15%	$19,320	
	Excavation	732,453	CY	$3	$2,197,360	$329,604	15%	$2,526,964	
	Haul 3.52 Miles	2,578,236	CYMI	$1.50	$3,867,354	$580,103	15%	$4,447,457	
	Disposal	732,453	CY	$1.97	$1,442,933	$216,440	15%	$1,659,373	
	Turf Establishment	38.9	AC	$2,500	$97,213	$14,582	15%	$111,794	
3	**Structures**							**$715,575**	
	Backslope Swale	7,000	LF	$2	$14,000	$1,400	10%	$15,400	
	Backslope Drains (structure)	12	EA	$3,000	$36,000	$3,600	10%	$39,600	
	Backslope Drains (24" RCP)	840	LF	$55	$46,200	$4,620	10%	$50,820	
	Sheet Piling for Inlet Structure	11,270	SF	$25	$281,750	$28,175	10%	$309,925	
	60" CMP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	600	CY	$400	$240,000	$24,000	10%	$264,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$13,200**	
	Stormwater Pollution Prevention	1	LS	$12,000	$12,000	$1,200	10%	$13,200	
5	**Vegetation Recovery**							**$490,534**	
	Tree Planting	3,075	EA	$120	$369,054	$36,905	10%	$405,959	
	Shrub Planting	3,075	EA	$25	$76,886	$7,689	10%	$84,575	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines						20%		
SUBTOTAL								**$10,983,218**	
7	**Engineering Design (12%)**							**$1,317,986**	
8	**Construction Mgmt. (10%)**							**$1,098,322**	
9	**Real Estate**							**$0**	**$1,641,346**
	R.O.W. Acquisition	0.54	LS	$3,006,685.00	$1,623,610	$0	0%		$1,623,610
	Administrative Fees	1	LS	$17,736	$17,736				$17,736
10	**Environmental Mitigation (1/2%)**							**$54,916**	
TOTAL								**$13,454,442**	**$1,641,346**
GRAND TOTAL								**$15,095,788**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

FNH.2 --- DETENTION AT FAIRBANKS-NORTH HOUSTON (NORTH & SOUTH BASINS, 1271 AC-FT)

ADDITION OF SOUTH BASIN TO FNH.1

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$922,000**	
	Mobilization/Demobilization	1	LS	$922,000	$922,000	$0	0%	$922,000	
2	**Earthwork**							**$8,421,389**	
	Clearing and Grubbing	45.0	AC	$2,700	$121,500	$18,225	15%	$139,725	
	Excavation	690,507	CY	$3	$2,071,521	$310,728	15%	$2,382,249	
	Haul 3.52 Miles	2,430,585	CYMI	$1.50	$3,645,877	$546,882	15%	$4,192,759	
	Disposal	690,507	CY	$1.97	$1,360,299	$204,045	15%	$1,564,344	
	Turf Establishment	49.5	AC	$2,500	$123,750	$18,563	15%	$142,313	
3	**Structures**							**$491,258**	
	Backslope Swale	5,000	LF	$2	$10,000	$1,000	10%	$11,000	
	Backslope Drains (structure)	9	EA	$3,000	$27,000	$2,700	10%	$29,700	
	Backslope Drains (24" RCP)	630	LF	$55	$34,650	$3,465	10%	$38,115	
	Sheet Piling for Inlet Structure	6,495	SF	$25	$162,375	$16,238	10%	$178,613	
	60" CMP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	450	CY	$400	$180,000	$18,000	10%	$198,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$11,000**	
	Stormwater Pollution Prevention	1	LS	$10,000	$10,000	$1,000	10%	$11,000	
5	**Vegetation Recovery**							**$291,129**	
	Tree Planting	1,825	EA	$120	$219,031	$21,903	10%	$240,934	
	Shrub Planting	1,825	EA	$25	$45,632	$4,563	10%	$50,195	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines						20%		
SUBTOTAL								**$10,136,776**	
7	**Engineering Design (12%)**							**$1,216,413**	
8	**Construction Mgmt. (10%)**							**$1,013,678**	
9	**Real Estate**							**$0**	**$1,924,635**
	R.O.W. Acquisition	1	LS	$1,904,094.00	$1,904,094	$0	0%		$1,904,094
	Administrative Fees	1	LS	$20,541	$20,541				$20,541
10	**Environmental Mitigation (1/2%)**							**$50,684**	
TOTAL								**$12,417,550**	**$1,924,635**
SOUTH BASIN GRAND TOTAL								**$14,342,185**	
FNH.1 GRAND TOTAL								**$15,095,788**	
FNH.2 GRAND TOTAL								**$29,437,972**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

FNH.3 --- DETENTION AT FAIRBANKS-NORTH HOUSTON (NORTH, SOUTH & WEST BASINS, 1717 AC-FT)

ADDITION OF WEST BASIN TO FNH.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$905,000**	
	Mobilization/Demobilization	1	LS	$905,000	$905,000	$0	0%	$905,000	
	Demolition/Removal of Buildings	18,082	SF	$4.40	$79,561	$18,299	23%	$97,860	
2	**Earthwork**							**$8,263,519**	
	Clearing and Grubbing	37.0	AC	$3,500	$129,500	$19,425	15%	$148,925	
	Excavation	719,547	CY	$3	$2,158,640	$323,796	15%	$2,482,436	
	Haul 3.13 Miles	2,252,181	CYMI	$1.50	$3,378,272	$506,741	15%	$3,885,012	
	Disposal	719,547	CY	$1.97	$1,417,507	$212,626	15%	$1,630,133	
	Turf Establishment	40.7	AC	$2,500	$101,750	$15,263	15%	$117,013	
3	**Structures**							**$479,570**	
	Backslope Swale	5,000	LF	$2	$10,000	$1,000	10%	$11,000	
	Backslope Drains (structure)	9	EA	$3,000	$27,000	$2,700	10%	$29,700	
	Backslope Drains (24" RCP)	630	LF	$55	$34,650	$3,465	10%	$38,115	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	525	CY	$400	$210,000	$21,000	10%	$231,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$11,000**	
	Stormwater Pollution Prevention	1	LS	$10,000	$10,000	$1,000	10%	$11,000	
5	**Vegetation Recovery**							**$53,841**	
	Tree Planting	338	EA	$120	$40,507	$4,051	10%	$44,558	
	Shrub Planting	338	EA	$25	$8,439	$844	10%	$9,283	
6	**Remove & Replace Utilities**							**$0**	**$240,000**
	Utility Lines	1	LS	$200,000	$200,000	$40,000	20%		$240,000
SUBTOTAL								**$9,712,930**	**$240,000**
7	**Engineering Design (12%)**							**$1,165,552**	**$28,800**
8	**Construction Mgmt. (10%)**							**$971,293**	**$24,000**
9	**Real Estate**							**$0**	**$3,558,447**
	R.O.W. Acquisition	1	LS	$1,731,136.00	$1,731,136	$432,784	25%		$2,163,920
	Administrative Fees	1	LS	$54,663	$54,663	$13,666	25%		$68,329
	Relocation (homes)	11	EA	$20,000	$220,000	$44,000	20%		$264,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Building - Fair Market Value	1.5	LS	$590,110.00	$885,165	$177,033	20%		$1,062,198
10	**Environmental Mitigation (1/2%)**							**$48,565**	
TOTAL								**$11,898,339**	**$3,851,247**
WEST BASIN GRAND TOTAL								**$15,749,586**	
FNH.2 GRAND TOTAL								**$29,437,972**	
FNH.3 GRAND TOTAL								**$45,187,558**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

FNH.4 --- DETENTION AT FAIRBANKS-NORTH HOUSTON (NORTH, SOUTH & WEST BASINS, 2111 AC-FT)

ADDITION OF WEST BASIN TO FNH.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,657,000**	
	Mobilization/Demobilization	1	LS	$1,657,000	$1,657,000	$0	0%	$1,657,000	
	Demolition/Removal of Buildings	64,065	SF	$4.40	$281,886	$64,834	23%	$346,720	
2	**Earthwork**							**$15,565,834**	
	Clearing and Grubbing	70.0	AC	$3,500	$245,000	$36,750	15%	$281,750	
	Excavation	1,355,200	CY	$3	$4,065,600	$609,840	15%	$4,675,440	
	Haul 3.13 Miles	4,241,776	CYMI	$1.50	$6,362,664	$954,400	15%	$7,317,064	
	Disposal	1,355,200	CY	$1.97	$2,669,744	$400,462	15%	$3,070,206	
	Turf Establishment	77.0	AC	$2,500	$192,500	$28,875	15%	$221,375	
3	**Structures**							**$622,845**	
	Backslope Swale	8,000	LF	$2	$16,000	$1,600	10%	$17,600	
	Backslope Drains (structure)	14	EA	$3,000	$42,000	$4,200	10%	$46,200	
	Backslope Drains (24" RCP)	980	LF	$55	$53,900	$5,390	10%	$59,290	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	750	CY	$400	$300,000	$30,000	10%	$330,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
4	**General Items**							**$14,300**	
	Stormwater Pollution Prevention	1	LS	$13,000	$13,000	$1,300	10%	$14,300	
5	**Vegetation Recovery**							**$124,889**	
	Tree Planting	783	EA	$120	$93,960	$9,396	10%	$103,356	
	Shrub Planting	783	EA	$25	$19,575	$1,958	10%	$21,533	
6	**Remove & Replace Utilities**							**$0**	**$240,000**
	Utility Lines	1	LS	$200,000	$200,000	$40,000	20%		$240,000
SUBTOTAL								**$17,984,868**	**$240,000**
7	**Engineering Design (12%)**							**$2,158,184**	**$28,800**
8	**Construction Mgmt. (10%)**							**$1,798,487**	**$24,000**
9	**Real Estate**							**$0**	**$6,921,713**
	R.O.W. Acquisition	1	LS	$2,634,006.00	$2,634,006	$658,502	25%		$3,292,508
	Administrative Fees	1	LS	$63,830	$63,830	$15,957	25%		$79,787
	Relocation (homes)	21	EA	$20,000	$420,000	$84,000	20%		$504,000
	Relocation (businesses)	25,388	SF	$3.50	$88,858	$17,772	20%		$106,630
	Building - Fair Market Value	1.5	LS	$1,632,660.00	$2,448,990	$489,798	20%		$2,938,788
10	**Environmental Mitigation (1/2%)**							**$89,924**	
TOTAL								**$22,031,463**	**$7,214,513**
WEST BASIN GRAND TOTAL								**$29,245,976**	
FNH.2 GRAND TOTAL								**$29,437,972**	
FNH.4 GRAND TOTAL								**$58,683,948**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

GBW.1 --- DETENTION AT GESSNER/BELTWAY 8 (NORTH OF BAYOU, 229 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency Percentage	Total Cost Construction	Total Cost LERRD
1	**Mobilization**						**$271,000**	
	Mobilization/Demobilization	1	LS	$271,000	$271,000	0%	$271,000	
2	**Earthwork**						**$2,454,642**	
	Clearing and Grubbing	17.5	AC	$3,500	$61,110	15%	$70,277	
	Excavation	237,160	CY	$3	$711,480	15%	$818,202	
	Haul 2.38 Miles	564,441	CYMI	$1.50	$846,661	15%	$973,660	
	Disposal	237,160	CY	$1.97	$467,205	15%	$537,286	
	Turf Establishment	19.2	AC	$2,500	$48,015	15%	$55,217	
3	**Structures**						**$143,275**	
	Backslope Swale	3,000	LF	$2	$6,000	10%	$6,600	
	Backslope Drains (structure)	5	EA	$3,000	$15,000	10%	$16,500	
	Backslope Drains (24" RCP)	350	LF	$55	$19,250	10%	$21,175	
	Concrete Pilot Flow Channel	225	CY	$400	$90,000	10%	$99,000	
4	**General Items**						**$8,800**	
	Stormwater Pollution Prevention	1	LS	$8,000	$8,000	10%	$8,800	
5	**Aesthetic Improvements**						**$41,630**	
	Tree Planting	261	EA	$120	$31,320	10%	$34,452	
	Shrub Planting	261	EA	$25	$6,525	10%	$7,178	
6	**Remove & Replace Utilities**						**$0**	**$52,920**
	Utility Lines	1	LS	$44,100	$44,100	20%		$52,920
SUBTOTAL							**$2,919,347**	**$52,920**
7	**Engineering Design (12%)**						**$350,322**	**$6,350**
8	**Construction Mgmt. (10%)**						**$291,935**	**$5,292**
9	**Real Estate**						**$0**	**$1,424,759**
	R.O.W. Acquisition	0.37	LS	$3,808,560.00	$1,409,167	0%		$1,409,167
	Administrative Fees	1	LS	$15,592	$15,592	0%		$15,592
10	**Environmental Mitigation (1/2%)**						**$14,597**	
TOTAL							**$3,576,200**	**$1,489,321**
GRAND TOTAL							**$5,065,521**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

GBW.2 --- DETENTION AT GESSNER/BELTWAY 8 (NORTH, SOUTH WEST AND SOUTH EAST BASINS, 427 AC-FT)

ADDITION OF SOUTH WEST AND SOUTH EAST BASINS TO GBW.1

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$390,000**	
	Mobilization/Demobilization	1	LS	$390,000	$390,000	$0	0%	$390,000	
2	**Earthwork**							**$3,311,158**	
	Clearing and Grubbing	24.2	AC	$3,500	$84,700	$12,705	15%	$97,405	
	Excavation	319,440	CY	$3	$958,320	$143,748	15%	$1,102,068	
	Haul 2.38 Miles	760,267	CYMI	$1.50	$1,140,401	$171,060	15%	$1,311,461	
	Disposal	319,440	CY	$1.97	$629,297	$94,395	15%	$723,691	
	Turf Establishment	26.6	AC	$2,500	$66,550	$9,983	15%	$76,533	
3	**Structures**							**$477,755**	
	Backslope Swale	6,000	LF	$2	$12,000	$1,200	10%	$13,200	
	Backslope Drains (structure)	10	EA	$3,000	$30,000	$3,000	10%	$33,000	
	Backslope Drains (24" RCP)	700	LF	$55	$38,500	$3,850	10%	$42,350	
	Sheet Piling for Inlet Structure	5,180	SF	$25	$129,500	$12,950	10%	$142,450	
	36" CMP (outfall pipe)	200	LF	$90	$18,000	$1,800	10%	$19,800	
	36" RCP	400	LF	$70	$28,000	$2,800	10%	$30,800	
	48" RCP	200	LF	$100	$20,000	$2,000	10%	$22,000	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	375	CY	$400	$150,000	$15,000	10%	$165,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$12,100**	
	Stormwater Pollution Prevention	1	LS	$11,000	$11,000	$1,100	10%	$12,100	
5	**Aesthetic Improvements**							**$95,332**	
	Tree Planting	598	EA	$120	$71,723	$7,172	10%	$78,895	
	Shrub Planting	598	EA	$25	$14,942	$1,494	10%	$16,436	
6	**Remove & Replace Utilities**							**$0**	**$0**
	Utility Lines	0	LS	$100,000	$0	$0	20%		$0
SUBTOTAL								**$4,286,345**	**$0**
7	**Engineering Design (12%)**							**$514,361**	**$0**
8	**Construction Mgmt. (10%)**							**$428,634**	**$0**
9	**Real Estate**							**$0**	**$2,424,887**
	R.O.W. Acquisition	0.63	LS	$3,808,560.00	$2,399,393	$0	0%		$2,399,393
	Administrative Fees	1	LS	$25,494	$25,494	$0	0%		$25,494
10	**Environmental Mitigation (1/2%)**							**$21,432**	
TOTAL								**$5,250,772**	**$2,424,887**
SOUTH WEST AND SOUTH EAST BASINS								**$7,675,659**	
GBW.1 GRAND TOTAL								**$5,065,521**	
GBW.2 GRAND TOTAL								**$12,741,180**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

GBW.3 --- DETENTION AT GESSNER/BELTWAY8 (N+SW+SE OF BAYOU AND SOUTH OF BROOKRIVER BASINS, 519 AC-FT)

ADDITION OF SOUTH BROOKRIVER BASIN TO GBW.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$301,917**	
	Mobilization/Demobilization	1	LS	$193,000	$193,000	$0	0%	$193,000	
	Demolition/Removal of Buildings	20,125	SF	$4.40	$88,550	$20,367	23%	$108,917	
2	**Earthwork**							**$1,511,606**	
	Clearing and Grubbing	7.5	AC	$3,500	$26,250	$3,938	15%	$30,188	
	Excavation	148,427	CY	$3	$445,281	$66,792	15%	$512,073	
	Haul 2.38 Miles	353,255	CYMI	$1.50	$529,883	$79,482	15%	$609,365	
	Disposal	148,427	CY	$1.97	$292,401	$43,860	15%	$336,261	
	Turf Establishment	8.3	AC	$2,500	$20,625	$3,094	15%	$23,719	
3	**Structures**							**$347,500**	
	Backslope Swale	3,000	LF	$2	$6,000	$600	10%	$12,000	
	Backslope Drains (structure)	5	EA	$3,000	$15,000	$1,500	10%	$30,000	
	Backslope Drains (24" RCP)	350	LF	$55	$19,250	$1,925	10%	$38,500	
	Sheet Piling for Inlet Structure	0	SF	$25	$0	$0	10%	$0	
	36" CMP (outfall pipe)	0	LF	$90	$0	$0	10%	$0	
	36" RCP	1,050	LF	$70	$73,500	$7,350	10%	$147,000	
	48" RCP	0	LF	$100	$0	$0	10%	$0	
	Concrete Pilot Flow Channel	150	CY	$400	$60,000	$6,000	10%	$120,000	
	Flap Gate (36")	0	EA	$5,000	$0	$0	10%	$0	
4	**General Items**							**$16,000**	
	Stormwater Pollution Prevention	1	LS	$8,000	$8,000	$800	10%	$16,000	
5	**Aesthetic Improvements**							**$49,123**	
	Tree Planting	308	EA	$120	$36,958	$3,696	10%	$40,653	
	Shrub Planting	308	EA	$25	$7,700	$770	10%	$8,469	
6	**Remove & Replace Utilities**							**$0**	**$0**
	Utility Lines	0	LS	$100,000	$0	$0	20%		$0
SUBTOTAL								**$2,226,145**	**$0**
7	**Engineering Design (12%)**							**$267,137**	**$0**
8	**Construction Mgmt. (10%)**							**$222,614**	**$0**
9	**Real Estate**							**$0**	**$2,803,203**
	R.O.W. Acquisition	1.00	LS	$1,367,840.00	$1,367,840	$341,960	25%		$1,709,800
	Administrative Fees	1	LS	$24,678	$24,678	$6,170	25%		$30,848
	Relocation (businesses)	20,125	SF	$3.50	$70,438	$14,088	20%		$84,525
	Building - Fair Market Value	1.5	LS	$543,350.00	$815,025	$163,005	20%		$978,030
10	**Environmental Mitigation (1/2%)**							**$11,131**	
TOTAL								**$2,727,028**	**$2,803,203**
SOUTH BROOKRIVER BASIN GRAND TOTAL								**$5,530,231**	
GBW.2 GRAND TOTAL								**$12,741,180**	
GBW.3 GRAND TOTAL								**$18,271,410**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

GBW.4 --- DETENTION AT GESSNER/BELTWAY 8 (NORTH AND SOUTH OF BAYOU, 618 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,041,000**	
	Mobilization/Demobilization	1	LS	$1,041,000	$1,041,000	$0	0%	$1,041,000	
2	**Earthwork**							**$9,089,315**	
	Clearing and Grubbing	69.0	AC	$3,500	$241,605	$36,241	15%	$241,605	
	Excavation	1,013,803	CY	$3	$3,041,409	$456,211	15%	$3,041,409	
	Haul 2.38 Miles	2,412,851	CYMI	$1.50	$3,619,277	$542,891	15%	$3,619,277	
	Disposal	1,013,803	CY	$1.97	$1,997,192	$299,579	15%	$1,997,192	
	Turf Establishment	75.9	AC	$2,500	$189,833	$28,475	15%	$189,833	
3	**Structures**							**$1,010,505**	
	Backslope Swale	18,500	LF	$2	$37,000	$3,700	10%	$37,000	
	Backslope Drains (structure)	31	EA	$3,000	$93,000	$9,300	10%	$93,000	
	Backslope Drains (24" RCP)	2,170	LF	$55	$119,350	$11,935	10%	$119,350	
	Sheet Piling for Inlet Structure	5,180	SF	$25	$129,500	$12,950	10%	$129,500	
	36" CMP (outfall pipe)	300	LF	$90	$27,000	$2,700	10%	$27,000	
	36" RCP	1,400	LF	$70	$98,000	$9,800	10%	$98,000	
	48" RCP	1,150	LF	$100	$115,000	$11,500	10%	$115,000	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	945	CY	$400	$378,000	$37,800	10%	$378,000	
	Flap Gate (36")	2	EA	$5,000	$10,000	$1,000	10%	$10,000	
4	**General Items**							**$33,500**	
	Stormwater Pollution Prevention	1	LS	$33,500	$33,500	$3,350	10%	$33,500	
5	**Aesthetic Improvements**							**$169,167**	
	Tree Planting	1,167	EA	$120	$140,000	$14,000	10%	$140,000	
	Shrub Planting	1,167	EA	$25	$29,167	$2,917	10%	$29,167	
6	**Remove & Replace Utilities**							**$0**	**$100,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$100,000
SUBTOTAL								**$11,343,487**	**$100,000**
7	**Engineering Design (12%)**							**$1,361,218**	**$12,000**
8	**Construction Mgmt. (10%)**							**$1,134,349**	**$10,000**
9	**Real Estate**							**$0**	**$21,233,300**
	R.O.W. Acquisition	1	LS	$3,808,560.00	$3,808,560	$0	0%		$3,808,560
	Administrative Fees	1	LS	$39,586	$39,586	$7,917	20%		$47,503
	R.O.W. Acquisition	2,185,588	SF	$2.50	$5,463,970	$1,365,993	25%		$6,829,963
	Administrative Fees	1	LS	$135,622	$135,622	$33,906	25%		$169,528
	HCAD Bldg. Value	1.5	LS	$5,098,840.00	$7,648,260	$1,529,652	20%		$9,177,912
	Relocation	1.0	LS	$999,862.50	$999,863	$199,973	20%		$1,199,835
10	**Environmental Mitigation (1/2%)**							**$56,717**	
TOTAL								**$13,895,772**	**$21,355,300**
GRAND TOTAL								**$35,251,072**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

RG.0 --- DETENTION AT RIO GRANDE (NORTH OF BAYOU, 100 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$235,000**	
	Mobilization/Demobilization	1	LS	$235,000	$235,000	$0	0%	$235,000	
2	**Earthwork**							**$2,056,524**	
	Clearing and Grubbing	9.5	AC	$3,500	$33,270	$4,991	15%	$38,261	
	Excavation	161,328	CY	$3	$483,985	$72,598	15%	$556,583	
	Haul 4 Miles	645,314	CYMI	$1.50	$967,971	$145,196	15%	$1,113,167	
	Disposal	161,328	CY	$1.82	$293,618	$44,043	15%	$337,661	
	Turf Establishment	3.8	AC	$2,500	$9,437	$1,416	15%	$10,852	
3	**Structures**							**$255,093**	
	Backslope Swale	1,805	LF	$2	$3,610	$361	10%	$3,971	
	Backslope Drains (structure)	4	EA	$3,000	$12,000	$1,200	10%	$13,200	
	Backslope Drains (24" RCP)	280	LF	$55	$15,400	$1,540	10%	$16,940	
	Sheet Piling for Inlet Structure	5,430	SF	$25	$135,750	$13,575	10%	$149,325	
	48" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	108	CY	$400	$43,320	$4,332	10%	$47,652	
	Flap Gate (48")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$7,486**	
	Stormwater Pollution Prevention	1	LS	$6,805	$6,805	$681	10%	$7,486	
5	**Aesthetic Improvements**							**$25,278**	
	Tree Planting	158	EA	$120	$19,018	$1,902	10%	$20,919	
	Shrub Planting	158	EA	$25	$3,962	$396	10%	$4,358	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$2,579,380**	**$0**
7	**Engineering Design (12%)**							**$309,526**	**$0**
8	**Construction Mgmt. (10%)**							**$257,938**	**$0**
9	**Real Estate**							**$0**	**$551,332**
	R.O.W. Acquisition	0.21	LS	$2,600,000.00	$544,388	$0	0%		$544,388
	Administrative Fees	1	LS	$6,944	$6,944	$0	0%		$6,944
10	**Environmental Mitigation (1/2%)**							**$12,897**	
TOTAL								**$3,159,741**	**$551,332**
GRAND TOTAL								**$3,711,073**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

RG.1 --- DETENTION AT RIO GRANDE (NORTH BASIN, 277 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$622,000**	
	Mobilization/Demobilization	1	LS	$622,000	$622,000	$0	0%	$622,000	
2	**Earthwork**							**$5,749,955**	
	Clearing and Grubbing	26.3	AC	$3,500	$92,162	$13,824	15%	$105,986	
	Excavation	446,893	CY	$3	$1,340,680	$201,102	15%	$1,541,782	
	Haul 4 Miles	1,787,573	CYMI	$1.50	$2,681,360	$402,204	15%	$3,083,564	
	Disposal	446,893	CY	$1.82	$813,346	$122,002	15%	$935,348	
	Turf Establishment	29.0	AC	$2,500	$72,413	$10,862	15%	$83,275	
3	**Structures**							**$384,145**	
	Backslope Swale	5,000	LF	$2	$10,000	$1,000	10%	$11,000	
	Backslope Drains (structure)	9	EA	$3,000	$27,000	$2,700	10%	$29,700	
	Backslope Drains (24" RCP)	630	LF	$55	$34,650	$3,465	10%	$38,115	
	Sheet Piling for Inlet Structure	5,430	SF	$25	$135,750	$13,575	10%	$149,325	
	48" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	300	CY	$400	$120,000	$12,000	10%	$132,000	
	Flap Gate (48")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$11,000**	
	Stormwater Pollution Prevention	1	LS	$10,000	$10,000	$1,000	10%	$11,000	
5	**Aesthetic Improvements**							**$70,021**	
	Tree Planting	439	EA	$120	$52,680	$5,268	10%	$57,948	
	Shrub Planting	439	EA	$25	$10,975	$1,098	10%	$12,073	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$6,837,121**	**$0**
7	**Engineering Design (12%)**							**$820,455**	**$0**
8	**Construction Mgmt. (10%)**							**$683,712**	**$0**
9	**Real Estate**							**$0**	**$1,524,580**
	R.O.W. Acquisition	0.58	LS	$2,600,000.00	$1,508,000	$0	0%		$1,508,000
	Administrative Fees	1	LS	$16,580	$16,580	$0	0%		$16,580
10	**Environmental Mitigation (1/2%)**							**$34,186**	
TOTAL								**$8,375,473**	**$1,524,580**
GRAND TOTAL								**$9,900,053**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

RG.2 --- DETENTION AT RIO GRANDE (NORTH BASIN, 398 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$884,000**	
	Mobilization/Demobilization	1	LS	$884,000	$884,000	$0	0%	$884,000	
2	**Earthwork**							**$8,316,046**	
	Clearing and Grubbing	45.4	AC	$3,500	$158,900	$23,835	15%	$182,735	
	Excavation	642,107	CY	$3	$1,926,320	$288,948	15%	$2,215,268	
	Haul 4 Miles	2,568,427	CYMI	$1.50	$3,852,640	$577,896	15%	$4,430,536	
	Disposal	642,107	CY	$1.82	$1,168,634	$175,295	15%	$1,343,929	
	Turf Establishment	49.9	AC	$2,500	$124,850	$18,728	15%	$143,578	
3	**Structures**							**$384,145**	
	Backslope Swale	5,000	LF	$2	$10,000	$1,000	10%	$11,000	
	Backslope Drains (structure)	9	EA	$3,000	$27,000	$2,700	10%	$29,700	
	Backslope Drains (24" RCP)	630	LF	$55	$34,650	$3,465	10%	$38,115	
	Sheet Piling for Inlet Structure	5,430	SF	$25	$135,750	$13,575	10%	$149,325	
	48" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	300	CY	$400	$120,000	$12,000	10%	$132,000	
	Flap Gate (48")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$11,000**	
	Stormwater Pollution Prevention	1	LS	$10,000	$10,000	$1,000	10%	$11,000	
5	**Aesthetic Improvements**							**$120,726**	
	Tree Planting	757	EA	$120	$90,828	$9,083	10%	$99,911	
	Shrub Planting	757	EA	$25	$18,923	$1,892	10%	$20,815	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$9,715,917**	**$0**
7	**Engineering Design (12%)**							**$1,165,910**	**$0**
8	**Construction Mgmt. (10%)**							**$971,592**	**$0**
9	**Real Estate**							**$0**	**$2,627,500**
	R.O.W. Acquisition	1	LS	$2,600,000.00	$2,600,000	$0	0%		$2,600,000
	Administrative Fees	1	LS	$27,500	$27,500	$0	0%		$27,500
10	**Environmental Mitigation (1/2%)**							**$48,580**	
TOTAL								**$11,901,998**	**$2,627,500**
GRAND TOTAL								**$14,529,498**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

RG.3 --- DETENTION AT RIO GRANDE (NORTH AND SOUTH BASIN, 881 AC-FT)

ADDITION OF SOUTH BASIN TO RG.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,081,000**	
	Mobilization/Demobilization	1	LS	$1,081,000	$1,081,000	$0	0%	$1,081,000	
2	**Earthwork**							**$10,033,177**	
	Clearing and Grubbing	46.9	AC	$3,500	$164,150	$24,623	15%	$188,773	
	Excavation	779,240	CY	$3	$2,337,720	$350,658	15%	$2,688,378	
	Haul 4 Miles	3,116,960	CYMI	$1.50	$4,675,440	$701,316	15%	$5,376,756	
	Disposal	779,240	CY	$1.82	$1,418,217	$212,733	15%	$1,630,949	
	Turf Establishment	51.6	AC	$2,500	$128,975	$19,346	15%	$148,321	
3	**Structures**							**$410,600**	
	Backslope Swale	7,000	LF	$2	$14,000	$1,400	10%	$15,400	
	Backslope Drains (structure)	12	EA	$3,000	$36,000	$3,600	10%	$39,600	
	Backslope Drains (24" RCP)	840	LF	$55	$46,200	$4,620	10%	$50,820	
	Sheet Piling for Inlet Structure	3,010	SF	$25	$75,250	$7,525	10%	$82,775	
	48" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	450	CY	$400	$180,000	$18,000	10%	$198,000	
	Flap Gate (48")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$13,200**	
	Stormwater Pollution Prevention	1	LS	$12,000	$12,000	$1,200	10%	$13,200	
5	**Aesthetic Improvements**							**$345,525**	
	Tree Planting	2,166	EA	$120	$259,956	$25,996	10%	$285,952	
	Shrub Planting	2,166	EA	$25	$54,158	$5,416	10%	$59,573	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$11,883,502**	**$0**
7	**Engineering Design (12%)**							**$1,426,020**	**$0**
8	**Construction Mgmt. (10%)**							**$1,188,350**	**$0**
9	**Real Estate**							**$0**	**$15,796,295**
	R.O.W. Acquisition (from similar area)	3,127,608	SF	$4.00	$12,510,432	$3,127,608	25%		$15,638,040
	Administrative Fees	1	LS	$126,604	$126,604	$31,651	25%		$158,255
10	**Environmental Mitigation (1/2%)**							**$59,418**	
TOTAL								**$14,557,290**	**$15,796,295**
SOUTH BASIN GRAND TOTAL								**$30,353,586**	
RG.2 GRAND TOTAL								**$14,529,498**	
RG.3 GRAND TOTAL								**$44,883,083**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

RG.4 --- DETENTION AT RIO GRANDE (NORTH BASIN 277 AC-FT & CHANNELIZATION)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$674,000**	
	Mobilization/Demobilization	1	LS	$674,000	$674,000	$0	0%	$674,000	
2	**Earthwork**							**$6,040,910**	
	Clearing and Grubbing	26.3	AC	$3,500	$92,162	$13,824	15%	$105,986	
	Excavation - Detention	446,893	CY	$3	$1,340,680	$201,102	15%	$1,541,782	
	Excavation - E135-00-00	23,383	CY	$3	$70,149	$10,522	15%	$80,671	
	Haul 4 Miles	1,881,105	CYMI	$1.50	$2,821,658	$423,249	15%	$3,244,907	
	Disposal	470,276	CY	$1.82	$855,903	$128,385	15%	$984,288	
	Turf Establishment	29.0	AC	$2,500	$72,413	$10,862	15%	$83,275	
3	**Structures**							**$612,395**	
	Backslope Swale	5,000	LF	$2	$10,000	$1,000	10%	$11,000	
	Backslope Drains (structure)	9	EA	$3,000	$27,000	$2,700	10%	$29,700	
	Backslope Drains (24" RCP)	630	LF	$55	$34,650	$3,465	10%	$38,115	
	Sheet Piling for Transition Structure E135	8,300	SF	$25	$207,500	$20,750	10%	$228,250	
	Sheet Piling for Inlet Structure	5,430	SF	$25	$135,750	$13,575	10%	$149,325	
	48" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	300	CY	$400	$120,000	$12,000	10%	$132,000	
	Flap Gate (48")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$16,500**	
	Stormwater Pollution Prevention	1	LS	$15,000	$15,000	$1,500	10%	$16,500	
5	**Aesthetic Improvements**							**$70,021**	
	Tree Planting	439	EA	$120	$52,680	$5,268	10%	$57,948	
	Shrub Planting	439	EA	$25	$10,975	$1,098	10%	$12,073	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$7,413,826**	**$0**
7	**Engineering Design (12%)**							**$889,659**	**$0**
8	**Construction Mgmt. (10%)**							**$741,383**	**$0**
9	**Real Estate**							**$0**	**$1,524,580**
	R.O.W. Acquisition	0.58	LS	$2,600,000.00	$1,508,000	$0	0%		$1,508,000
	Administrative Fees	1	LS	$16,580	$16,580	$0	0%		$16,580
10	**Environmental Mitigation (1/2%)**							**$37,069**	
TOTAL								**$9,081,937**	**$1,524,580**
GRAND TOTAL								**$10,606,517**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

JR.1 --- DETENTION AT JONES ROAD (SOUTH OF PIPELINE, 134 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$314,000**	
	Mobilization/Demobilization	1	LS	$314,000	$314,000	$0	0%	$314,000	
2	**Earthwork**							**$2,733,124**	
	Clearing and Grubbing	14.3	AC	$3,500	$50,050	$7,508	15%	$57,558	
	Excavation	216,187	CY	$3	$648,560	$97,284	15%	$745,844	
	Haul 3.84 Miles	830,157	CYMI	$1.50	$1,245,235	$186,785	15%	$1,432,020	
	Disposal	216,187	CY	$1.82	$393,460	$59,019	15%	$452,479	
	Turf Establishment	15.7	AC	$2,500	$39,325	$5,899	15%	$45,224	
3	**Structures**							**$273,513**	
	Backslope Swale	4,000	LF	$2	$8,000	$800	10%	$8,800	
	Backslope Drains (structure)	7	EA	$3,000	$21,000	$2,100	10%	$23,100	
	Backslope Drains (24" RCP)	490	LF	$55	$26,950	$2,695	10%	$29,645	
	Sheet Piling for Inlet Structure	3,235	SF	$25	$80,875	$8,088	10%	$88,963	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	225	CY	$400	$90,000	$9,000	10%	$99,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$9,900**	
	Stormwater Pollution Prevention	1	LS	$9,000	$9,000	$900	10%	$9,900	
5	**Aesthetic Improvements**							**$119,338**	
	Tree Planting	748	EA	$120	$89,784	$8,978	10%	$98,762	
	Shrub Planting	748	EA	$25	$18,705	$1,871	10%	$20,576	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$3,449,875**	**$0**
7	**Engineering Design (12%)**							**$413,985**	**$0**
8	**Construction Mgmt. (10%)**							**$344,988**	**$0**
9	**Real Estate**							**$0**	**$1,026,279**
	R.O.W. Acquisition	1,001,880	SF	$1.00	$1,001,880	$0	0%		$1,001,880
	Administrative Fees	1	LS	$19,519	$19,519	$4,880	25%		$24,399
10	**Environmental Mitigation (1/2%)**							**$17,249**	
TOTAL								**$4,226,097**	**$1,026,279**
GRAND TOTAL								**$5,252,375**	

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

JR.2 --- DETENTION AT JONES ROAD (NORTH AND SOUTH OF PIPELINE, 220 AC-FT)

ADDITION OF 86 AC-FT TO JR.1

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$213,000**	
	Mobilization/Demobilization	1	LS	$213,000	$213,000	$0	0%	$213,000	
2	**Earthwork**							**$1,741,488**	
	Clearing and Grubbing	10.7	AC	$3,500	$37,450	$5,618	15%	$43,068	
	Excavation	138,747	CY	$3	$416,240	$62,436	15%	$478,676	
	Haul 3.84 Miles	532,787	CYMI	$1.50	$799,181	$119,877	15%	$919,058	
	Disposal	127,454	CY	$1.82	$231,966	$34,795	15%	$266,761	
	Turf Establishment	11.8	AC	$2,500	$29,500	$4,425	15%	$33,925	
3	**Structures**							**$300,273**	
	Backslope Swale	3,500	LF	$2	$7,000	$700	10%	$7,700	
	Backslope Drains (structure)	6	EA	$3,000	$18,000	$1,800	10%	$19,800	
	Backslope Drains (24" RCP)	420	LF	$55	$23,100	$2,310	10%	$25,410	
	Sheet Piling for Inlet Structure	3,235	SF	$25	$80,875	$8,088	10%	$88,963	
	36" CMP (outfall pipe)	0	LF	$90	$0	$0	10%	$0	
	60" CMP	600	LF	$120	$72,000	$7,200	10%	$79,200	
	Riprap	0	SY	$35	$0	$0	10%	$0	
	Concrete Pilot Flow Channel	180	CY	$400	$72,000	$7,200	10%	$79,200	
	Flap Gate (36")	0	EA	$5,000	$0	$0	10%	$0	
4	**General Items**							**$9,350**	
	Stormwater Pollution Prevention	1	LS	$8,500	$8,500	$850	10%	$9,350	
5	**Aesthetic Improvements**							**$76,321**	
	Tree Planting	479	EA	$120	$57,420	$5,742	10%	$63,162	
	Shrub Planting	479	EA	$25	$11,963	$1,196	10%	$13,159	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$2,340,431**	**$0**
7	**Engineering Design (12%)**							**$280,852**	**$0**
8	**Construction Mgmt. (10%)**							**$234,043**	**$0**
9	**Real Estate**							**$0**	**$709,422**
	R.O.W. Acquisition	696,960	SF	$1.00	$696,960	$0	0%		$696,960
	Administrative Fees	1	LS	$9,970	$9,970	$2,492	25%		$12,462
10	**Environmental Mitigation (1/2%)**							**$11,702**	
TOTAL								**$2,867,028**	**$709,422**
ADDITIONAL 86 AC-FT GRAND TOTAL								**$3,576,450**	
JR.1 GRAND TOTAL								**$5,252,375**	
JR.2 GRAND TOTAL								**$8,828,825**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

JR.3 --- DETENTION AT JONES ROAD (WEST OF JONES, NORTH AND SOUTH OF PIPELINE, 295 AC-FT)

ADDITION OF 75 AC-FT TO JR.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$185,000**	
	Mobilization/Demobilization	1	LS	$185,000	$185,000	$0	0%	$185,000	
2	**Earthwork**							**$1,536,895**	
	Clearing and Grubbing	9.0	AC	$3,500	$31,500	$4,725	15%	$36,225	
	Excavation	121,000	CY	$3	$363,000	$54,450	15%	$417,450	
	Haul 3.84 Miles	464,640	CYMI	$1.50	$696,960	$104,544	15%	$801,504	
	Disposal	121,000	CY	$1.82	$220,220	$33,033	15%	$253,253	
	Turf Establishment	9.9	AC	$2,500	$24,750	$3,713	15%	$28,463	
3	**Structures**							**$228,715**	
	Backslope Swale	3,500	LF	$2	$7,000	$700	10%	$7,700	
	Backslope Drains (structure)	6	EA	$3,000	$18,000	$1,800	10%	$19,800	
	Backslope Drains (24" RCP)	420	LF	$55	$23,100	$2,310	10%	$25,410	
	Sheet Piling for Inlet Structure	3,120	SF	$25	$78,000	$7,800	10%	$85,800	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	150	CY	$400	$60,000	$6,000	10%	$66,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$9,350**	
	Stormwater Pollution Prevention	1	LS	$8,500	$8,500	$850	10%	$9,350	
5	**Aesthetic Improvements**							**$73,545**	
	Tree Planting	461	EA	$120	$55,332	$5,533	10%	$60,865	
	Shrub Planting	461	EA	$25	$11,528	$1,153	10%	$12,680	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$2,033,505**	**$0**
7	**Engineering Design (12%)**							**$244,021**	**$0**
8	**Construction Mgmt. (10%)**							**$203,351**	**$0**
9	**Real Estate**							**$0**	**$1,101,734**
	R.O.W. Acquisition	1	LS	$1,086,280.00	$1,086,280	$0	0%		$1,086,280
	Administrative Fees	1	LS	$12,363	$12,363	$3,091	25%		$15,454
10	**Environmental Mitigation (1/2%)**							**$10,168**	
TOTAL								**$2,491,044**	**$1,101,734**
ADDITIONAL 75 AC-FT GRAND TOTAL								**$3,592,777**	
JR.2 GRAND TOTAL								**$8,828,825**	
JR.3 GRAND TOTAL								**$12,421,603**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

JR.4 --- DETENTION AT JONES ROAD (WEST OF JONES, NORTH AND SOUTH OF PIPELINE, 420 AC-FT)

ADDITION OF 200 AC-FT TO JR.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$457,000**	
	Mobilization/Demobilization	1	LS	$457,000	$457,000	$0	0%	$457,000	
2	**Earthwork**							**$4,069,635**	
	Clearing and Grubbing	20.0	AC	$3,500	$70,000	$10,500	15%	$80,500	
	Excavation	322,667	CY	$3	$968,000	$145,200	15%	$1,113,200	
	Haul 3.84 Miles	1,239,040	CYMI	$1.50	$1,858,560	$278,784	15%	$2,137,344	
	Disposal	322,667	CY	$1.82	$587,253	$88,088	15%	$675,341	
	Turf Establishment	22.0	AC	$2,500	$55,000	$8,250	15%	$63,250	
3	**Structures**							**$363,355**	
	Backslope Swale	6,000	LF	$2	$12,000	$1,200	10%	$13,200	
	Backslope Drains (structure)	10	EA	$3,000	$30,000	$3,000	10%	$33,000	
	Backslope Drains (24" RCP)	700	LF	$55	$38,500	$3,850	10%	$42,350	
	Sheet Piling for Inlet Structure	3,120	SF	$25	$78,000	$7,800	10%	$85,800	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	375	CY	$400	$150,000	$15,000	10%	$165,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$12,100**	
	Stormwater Pollution Prevention	1	LS	$11,000	$11,000	$1,100	10%	$12,100	
5	**Aesthetic Improvements**							**$118,505**	
	Tree Planting	743	EA	$120	$89,158	$8,916	10%	$98,073	
	Shrub Planting	743	EA	$25	$18,575	$1,857	10%	$20,432	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$5,020,596**	**$0**
7	**Engineering Design (12%)**							**$602,472**	**$0**
8	**Construction Mgmt. (10%)**							**$502,060**	**$0**
9	**Real Estate**							**$0**	**$2,268,306**
	R.O.W. Acquisition	1	LS	$2,238,450.00	$2,238,450	$0	0%		$2,238,450
	Administrative Fees	1	LS	$23,885	$23,885	$5,971	25%		$29,856
10	**Environmental Mitigation (1/2%)**							**$25,103**	
TOTAL								**$6,150,230**	**$2,268,306**
ADDITIONAL 200 AC-FT GRAND TOTAL								**$8,418,536**	
JR.2 GRAND TOTAL								**$8,828,825**	
JR.4 GRAND TOTAL								**$17,247,361**	

WHITE OAK BAYOU (E100-00-00) 211F GRR STUDY

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

JR.5 --- DETENTION AT JONES ROAD (WEST OF JONES, NORTH AND SOUTH OF PIPELINE, 470 AC-FT)

ADDITION OF 250 AC-FT TO JR.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$956,661**	
	Mobilization/Demobilization	1	LS	$565,000	$565,000	$0	0%	$565,000	
	Demolition/Removal of Buildings	72,369	SF	$4.40	$318,424	$73,237	23%	$391,661	
2	**Earthwork**							**$5,087,044**	
	Clearing and Grubbing	25.0	AC	$3,500	$87,500	$13,125	15%	$100,625	
	Excavation	403,333	CY	$3	$1,210,000	$181,500	15%	$1,391,500	
	Haul 3.84 Miles	1,548,800	CYMI	$1.50	$2,323,200	$348,480	15%	$2,671,680	
	Disposal	403,333	CY	$1.82	$734,067	$110,110	15%	$844,177	
	Turf Establishment	27.5	AC	$2,500	$68,750	$10,313	15%	$79,063	
3	**Structures**							**$363,355**	
	Backslope Swale	6,000	LF	$2	$12,000	$1,200	10%	$13,200	
	Backslope Drains (structure)	10	EA	$3,000	$30,000	$3,000	10%	$33,000	
	Backslope Drains (24" RCP)	700	LF	$55	$38,500	$3,850	10%	$42,350	
	Sheet Piling for Inlet Structure	3,120	SF	$25	$78,000	$7,800	10%	$85,800	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	375	CY	$400	$150,000	$15,000	10%	$165,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$12,100**	
	Stormwater Pollution Prevention	1	LS	$11,000	$11,000	$1,100	10%	$12,100	
5	**Aesthetic Improvements**							**$118,505**	
	Tree Planting	743	EA	$120	$89,158	$8,916	10%	$98,073	
	Shrub Planting	743	EA	$25	$18,575	$1,857	10%	$20,432	
6	**Remove & Replace Utilities**							**$0**	**$60,000**
	Utility Lines	1	LS	$50,000	$50,000	$10,000	20%	$0	$60,000
SUBTOTAL								**$6,537,666**	**$60,000**
7	**Engineering Design (12%)**							**$784,520**	**$7,200**
8	**Construction Mgmt. (10%)**							**$653,767**	**$6,000**
9	**Real Estate**							**$0**	**$12,474,887**
	R.O.W. Acquisition	1	LS	$3,794,850.00	$3,794,850	$948,713	25%		$4,743,563
	Administrative Fees	1	LS	$106,732	$106,732	$26,683	25%		$133,414
	Relocation (businesses)	72,369	SF	$3.50	$253,292	$50,658	20%		$303,950
	Building - Fair Market Value	1.5	LS	$4,052,200.00	$6,078,300	$1,215,660	20%		$7,293,960
10	**Environmental Mitigation (1/2%)**							**$32,688**	
TOTAL								**$8,008,641**	**$12,548,087**
ADDITIONAL 250 AC-FT GRAND TOTAL								**$20,556,727**	
JR.2 GRAND TOTAL								**$8,828,825**	
JR.5 GRAND TOTAL								**$29,385,553**	

ATTACHMENT C-5

Levee Components – Component Optimization

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Levee at Inwood Forest and Arbor Oaks (LIA) - Summary

ID	Description	Inwood Forest Levee	Inwood Forest Interior Facility	Arbor Oaks Levee	Arbor Oaks Interior Facility	Total Cost
LIA3_1	Levee height at 4% protection, minimum facility	$6,074,327	$195,256	$2,788,449	$95,424	$9,153,456
LIA2_1	Levee height at 2% protection, minimum facility	$6,924,274	$195,256	$3,282,255	$95,424	$10,497,208
LIA1_1	Levee height at 1% protection, minimum facility	$7,365,223	$195,256	$3,530,282	$95,424	$11,186,184
LIA4_1	Levee height at 0.4% protection, minimum facility	$8,965,500	$195,256	$3,979,831	$95,424	$13,236,011
LIA5_1	Levee height at 0.2% protection, minimum facility	$9,753,083	$195,256	$4,576,646	$95,424	$14,620,409

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Levee at Woodland Trails (LWT) - Summary

ID	Description	Woodland Trails North Levee	Woodland Trails North Interior Facility	Woodland Trails West Levee	Woodland Trails West Interior Facility	Total Cost
LWT1_1	Levee height at 1% protection, minimum facility	$5,715,163	$87,840	$7,178,435	$49,920	$13,031,358
LWT1_2	Levee height at 1% protection, pumping capacity at 20% flood frequency	$5,715,163	$36,634,465	$7,178,435	$12,400,007	$61,928,070
LWT1_3	Levee height at 1% protection, pumping capacity at 4% flood frequency	$5,715,163	$42,991,374	$7,178,435	$14,948,231	$70,833,203
LWT1_4	Levee height at 1% protection, pumping capacity at 1% flood frequency	$5,715,163	$49,202,670	$7,178,435	$17,337,191	$79,433,459
LWT1_5	Levee height at 1% protection, detention capacity at 20% flood frequency	$5,715,163	$29,917,519	$7,178,435	$9,929,889	$52,741,006
LWT1_6	Levee height at 1% protection, detention capacity at 4% flood frequency	$5,715,163	$40,020,381	$7,178,435	$15,423,564	$68,337,543
LWT1_7	Levee height at 1% protection, detention capacity at 1% flood frequency	$5,715,163	$55,422,880	$7,178,435	$21,445,983	$89,762,461
LWT2_1	Levee height at 20% protection, minimum facility	$2,787,718	$87,840	$5,191,750	$49,920	$8,117,227
LWT2_2	Levee height at 20% protection, pumping capacity at 20% flood frequency	$2,787,718	$36,634,465	$5,191,750	$12,400,007	$57,013,939
LWT2_3	Levee height at 20% protection, pumping capacity at 4% flood frequency	$2,787,718	$42,991,374	$5,191,750	$14,948,231	$65,919,072
LWT2_4	Levee height at 20% protection, pumping capacity at 1% flood frequency	$2,787,718	$49,202,670	$5,191,750	$17,337,191	$74,519,328
LWT2_5	Levee height at 20% protection, detention capacity at 20% flood frequency	$2,787,718	$29,917,519	$5,191,750	$9,929,889	$47,826,875
LWT2_6	Levee height at 20% protection, detention capacity at 4% flood frequency	$2,787,718	$40,020,381	$5,191,750	$15,423,564	$63,423,412
LWT2_7	Levee height at 20% protection, detention capacity at 1% flood frequency	$2,787,718	$55,422,880	$5,191,750	$21,445,983	$84,848,330

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Levee at Woodland Trails (LWT) - Summary (continued)

ID	Description	Woodland Trails North Levee	Woodland Trails North Interior Facility	Woodland Trails West Levee	Woodland Trails West Interior Facility	Total Cost
LWT3_1	Levee height at 4% protection, minimum facility	$4,714,233	$87,840	$6,387,136	$49,920	$11,239,129
LWT3_2	Levee height at 4% protection, pumping capacity at 20% flood frequency	$4,714,233	$36,634,465	$6,387,136	$12,400,007	$60,135,841
LWT3_3	Levee height at 4% protection, pumping capacity at 4% flood frequency	$4,714,233	$42,991,374	$6,387,136	$14,948,231	$69,040,973
LWT3_4	Levee height at 4% protection, pumping capacity at 1% flood frequency	$4,714,233	$49,202,670	$6,387,136	$17,337,191	$77,641,229
LWT3_5	Levee height at 4% protection, detention capacity at 20% flood frequency	$4,714,233	$29,917,519	$6,387,136	$9,929,889	$50,948,776
LWT3_6	Levee height at 4% protection, detention capacity at 4% flood frequency	$4,714,233	$40,020,381	$6,387,136	$15,423,564	$66,545,313
LWT3_7	Levee height at 4% protection, detention capacity at 1% flood frequency	$4,714,233	$55,422,880	$6,387,136	$21,445,983	$87,970,231
LWT4_1	Levee height at 0.4% protection, minimum facility	$7,006,688	$87,840	$8,532,316	$49,920	$15,676,764
LWT4_2	Levee height at 0.4% protection, detention capacity at 20% flood frequency	$7,006,688	$29,917,519	$8,532,316	$9,929,889	$55,386,411
LWT4_3	Levee height at 0.4% protection, pumping capacity at 20% flood frequency	$7,006,688	$36,634,465	$8,532,316	$12,400,007	$64,573,476
LWT4_4	Levee height at 0.4% protection, pumping capacity at 1% flood frequency	$7,006,688	$49,202,670	$8,532,316	$17,337,191	$82,078,865
LWT5_1	Levee height at 0.2% protection, minimum facility	$7,465,816	$87,840	$9,019,671	$49,920	$16,623,247
LWT5_2	Levee height at 0.2% protection, detention capacity at 20% flood frequency	$7,465,816	$29,917,519	$9,019,671	$9,929,889	$56,332,895
LWT5_3	Levee height at 0.2% protection, pumping capacity at 20% flood frequency	$7,465,816	$36,634,465	$9,019,671	$12,400,007	$65,519,959
LWT5_4	Levee height at 0.2% protection, pumping capacity at 1% flood frequency	$7,465,816	$49,202,670	$9,019,671	$17,337,191	$83,025,348
LWT5_5	Levee height at 0.2% protection, pumping capacity at 0.4% flood frequency	$7,465,816	$50,901,486	$9,019,671	$19,832,327	$87,219,300
LWT5_6	Levee height at 0.2% protection, pumping capacity at 0.2% flood frequency	$7,465,816	$55,891,758	$9,019,671	$21,159,527	$93,536,772

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - Summary

Item	Levee Component	Total Cost
1	4% Flood Protection Levee	$6,074,327
2	2% Flood Protection Levee	$6,924,274
3	1% Flood Protection Levee	$7,365,223
4	0.4% Flood Protection Levee	$8,965,500
5	0.2% Flood Protection Levee	$9,753,083
6	Minimum Drainage Facility Option	$195,256
7	20% Flood Interior Detention Drainage Capacity	$16,641,256
8	4% Flood Interior Detention Drainage Capacity	$21,271,459
9	1% Flood Interior Detention Drainage Capacity	$25,551,516
10	20% Flood Interior Pump Drainage Capacity	$19,611,843
11	4% Flood Interior Pump Drainage Capacity	$23,399,672
12	1% Flood Interior Pump Drainage Capacity	$27,333,493

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 4% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$112,364**
	Clearing and Grubbing	7	AC	$3,500	$23,510	$4,702	20%	$28,212
	Turf Establishment including Hydromulching	7	AC	$2,500	$16,793	$3,359	20%	$20,152
	Fill & Compaction	4,444	CY	$4	$17,778	$3,556	20%	$21,333
	Fill Material	4,444	CY	$8	$35,556	$7,111	20%	$42,667
3	**Structures (including detention)**							**$2,590,770**
	Levee Wall	17,590	SF	$100	$1,758,975	$351,795	20%	$2,110,770
	Remove & Replace Concrete Paving for Ramp	5,333	SY	$75	$400,000	$80,000	20%	$480,000
4	**Storm sewers**							**$531,720**
	Type "C" Manhole	8	EA	$1,100	$8,800	$1,760	20%	$10,560
	48" RCP	4,300	LF	$100	$430,000	$86,000	20%	$516,000
	Trench Safety	4,300	LF	$1	$4,300	$860	20%	$5,160
5	**General Items**							**$127,728**
	Stormwater Pollution Prevention	1	LS	$46,440	$46,440	$9,288	20%	$55,728
	Traffic control	1	LS	$60,000	$60,000	$12,000	20%	$72,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$322,424**
	Utility Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
	Drainage Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
						Subtotal		**$3,685,006**
8	**Engineering Design (12%)**				$442,201	$88,440	20%	$530,641
9	**Construction Mgmt. (10%)**				$368,501	$73,700	20%	$442,201
10	**Real Estate**							**$1,404,480**
	ROW Acquisition	292,600	SF	$4	$1,170,400	$234,080	20%	$1,404,480
	Grand Total							**$6,074,327**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 2% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$112,364**
	Clearing and Grubbing	7	AC	$3,500	$23,510	$4,702	20%	$28,212
	Turf Establishment including Hydromulching	7	AC	$2,500	$16,793	$3,359	20%	$20,152
	Fill & Compaction	4,444	CY	$4	$17,778	$3,556	20%	$21,333
	Fill Material	4,444	CY	$8	$35,556	$7,111	20%	$42,667
3	**Structures (including detention)**							**$3,263,196**
	Levee Wall	23,193	SF	$100	$2,319,330	$463,866	20%	$2,783,196
	Remove & Replace Concrete Paving for Ramp	5,333	SY	$75	$400,000	$80,000	20%	$480,000
4	**Storm sewers**							**$531,720**
	Type "C" Manhole	8	EA	$1,100	$8,800	$1,760	20%	$10,560
	48" RCP	4,300	LF	$100	$430,000	$86,000	20%	$516,000
	Trench Safety	4,300	LF	$1	$4,300	$860	20%	$5,160
5	**General Items**							**$127,728**
	Stormwater Pollution Prevention	1	LS	$46,440	$46,440	$9,288	20%	$55,728
	Traffic control	1	LS	$60,000	$60,000	$12,000	20%	$72,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$322,424**
	Utility Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
	Drainage Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
						Subtotal		**$4,357,432**
8	**Engineering Design (12%)**				$522,892	$104,578	20%	$627,470
9	**Construction Mgmt. (10%)**				$435,743	$87,149	20%	$522,892
10	**Real Estate**							**$1,404,480**
	ROW Acquisition	292,600	SF	$4	$1,170,400	$234,080	20%	$1,404,480
	Grand Total							**$6,924,274**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 1% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$112,364**
	Clearing and Grubbing	7	AC	$3,500	$23,510	$4,702	20%	$28,212
	Turf Establishment including Hydromulching	7	AC	$2,500	$16,793	$3,359	20%	$20,152
	Fill & Compaction	4,444	CY	$4	$17,778	$3,556	20%	$21,333
	Fill Material	4,444	CY	$8	$35,556	$7,111	20%	$42,667
3	**Structures (including detention)**							**$3,612,048**
	Levee Wall	26,100	SF	$100	$2,610,040	$522,008	20%	$3,132,048
	Remove & Replace Concrete Paving for Ramp	5,333	SY	$75	$400,000	$80,000	20%	$480,000
4	**Storm sewers**							**$531,720**
	Type "C" Manhole	8	EA	$1,100	$8,800	$1,760	20%	$10,560
	48" RCP	4,300	LF	$100	$430,000	$86,000	20%	$516,000
	Trench Safety	4,300	LF	$1	$4,300	$860	20%	$5,160
5	**General Items**							**$127,728**
	Stormwater Pollution Prevention	1	LS	$46,440	$46,440	$9,288	20%	$55,728
	Traffic control	1	LS	$60,000	$60,000	$12,000	20%	$72,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$322,424**
	Utility Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
	Drainage Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
						Subtotal		**$4,706,284**
8	**Engineering Design (12%)**				$564,754	$112,951	20%	$677,705
9	**Construction Mgmt. (10%)**				$470,628	$94,126	20%	$564,754
10	**Real Estate**							**$1,404,480**
	ROW Acquisition	292,600	SF	$4	$1,170,400	$234,080	20%	$1,404,480
	Grand Total							**$7,365,223**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 0.4% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$112,364**
	Clearing and Grubbing	7	AC	$3,500	$23,510	$4,702	20%	$28,212
	Turf Establishment including Hydromulching	7	AC	$2,500	$16,793	$3,359	20%	$20,152
	Fill & Compaction	4,444	CY	$4	$17,778	$3,556	20%	$21,333
	Fill Material	4,444	CY	$8	$35,556	$7,111	20%	$42,667
3	**Structures (including detention)**							**$4,878,090**
	Levee Wall	36,651	SF	$100	$3,665,075	$733,015	20%	$4,398,090
	Remove & Replace Concrete Paving for Ramp	5,333	SY	$75	$400,000	$80,000	20%	$480,000
4	**Storm sewers**							**$531,720**
	Type "C" Manhole	8	EA	$1,100	$8,800	$1,760	20%	$10,560
	48" RCP	4,300	LF	$100	$430,000	$86,000	20%	$516,000
	Trench Safety	4,300	LF	$1	$4,300	$860	20%	$5,160
5	**General Items**							**$127,728**
	Stormwater Pollution Prevention	1	LS	$46,440	$46,440	$9,288	20%	$55,728
	Traffic control	1	LS	$60,000	$60,000	$12,000	20%	$72,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$322,424**
	Utility Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
	Drainage Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
						Subtotal		**$5,972,326**
8	**Engineering Design (12%)**				$716,679	$143,336	20%	$860,015
9	**Construction Mgmt. (10%)**				$597,233	$119,447	20%	$716,679
10	**Real Estate**							**$1,404,480**
	ROW Acquisition	292,600	SF	$4	$1,170,400	$234,080	20%	$1,404,480
	Grand Total							**$8,965,500**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 0.2% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$112,364**
	Clearing and Grubbing	7	AC	$3,500	$23,510	$4,702	20%	$28,212
	Turf Establishment including Hydromulching	7	AC	$2,500	$16,793	$3,359	20%	$20,152
	Fill & Compaction	4,444	CY	$4	$17,778	$3,556	20%	$21,333
	Fill Material	4,444	CY	$8	$35,556	$7,111	20%	$42,667
3	**Structures (including detention)**							**$5,501,178**
	Levee Wall	41,843	SF	$100	$4,184,315	$836,863	20%	$5,021,178
	Remove & Replace Concrete Paving for Ramp	5,333	SY	$75	$400,000	$80,000	20%	$480,000
4	**Storm sewers**							**$531,720**
	Type "C" Manhole	8	EA	$1,100	$8,800	$1,760	20%	$10,560
	48" RCP	4,300	LF	$100	$430,000	$86,000	20%	$516,000
	Trench Safety	4,300	LF	$1	$4,300	$860	20%	$5,160
5	**General Items**							**$127,728**
	Stormwater Pollution Prevention	1	LS	$46,440	$46,440	$9,288	20%	$55,728
	Traffic control	1	LS	$60,000	$60,000	$12,000	20%	$72,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$322,424**
	Utility Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
	Drainage Modifications	7	AC	$20,000	$134,343	$26,869	20%	$161,212
						Subtotal		**$6,595,414**
8	**Engineering Design (12%)**				$791,450	$158,290	20%	$949,740
9	**Construction Mgmt. (10%)**				$659,541	$131,908	20%	$791,450
10	**Real Estate**							**$1,404,480**
	ROW Acquisition	292,600	SF	$4	$1,170,400	$234,080	20%	$1,404,480
	Grand Total							**$9,753,083**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - Mininum Drainage Facility Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$14,215**
	Clearing and Grubbing	2	AC	$3,500	$6,910	$1,382	20%	$8,292
	Excavation		CY	$3	$0	$0	20%	$0
	Haul of Excavated Material	0	CY	$3	$0	$0	20%	$0
	Turf Establishment including Hydromulching	2	AC	$2,500	$4,936	$987	20%	$5,923
3	**Structures (including detention)**							**$36,000**
	Outlet Structure with Flood Gate		LS	$100,000	$0	$0	20%	$0
4	**General Items**							**$0**
	Stormwater Pollution Prevention		LS	$500	$0	$0	20%	$0
	Traffic control		LS	$1,000	$0	$0	20%	$0
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$94,766**
	Utility Modifications	2	AC	$20,000	$39,486	$7,897	20%	$47,383
	Drainage Modifications	2	AC	$20,000	$39,486	$7,897	20%	$47,383
						Subtotal		**$144,981**
7	**Engineering Design (12%)**				$17,398	$3,480	20%	$20,877
8	**Construction Mgmt. (10%)**				$14,498	$2,900	20%	$17,398
9	**Real Estate**							**$0**
	House Buyout (houses)		EA	$110,000	$0	$0	20%	$0
	Administrative Fees		LS	$1,500	$0	$0	20%	$0
	Relocation		EA	$20,000	$0	$0	20%	$0
	Demolition / Removal of Buildings		SF	$15	$0	$0	20%	$0
	Grand Total							**$195,256**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 20% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$1,334,052**
	Clearing and Grubbing	2	AC	$3,500	$6,910	$1,382	20%	$8,292
	Excavation	163,300	CY	$3	$489,900	$97,980	20%	$587,880
	Haul of Excavated Material (Includes spreading)	163,300	CY	$3	$489,900	$97,980	20%	$587,880
	Turf Establishment including Hydromulching	50	AC	$2,500	$125,000	$25,000	20%	$150,000
3	**Structures (including detention)**							**$36,000**
	Equip existing Storm Sewer outfalls with Flapgates	6	EA	$5,000	$30,000	$6,000	20%	$36,000
4	**General Items**							**$420,678**
	Stormwater Pollution Prevention	234	LS	$500	$116,855	$23,371	20%	$140,226
	Traffic control	234	LS	$1,000	$233,710	$46,742	20%	$280,452
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$11,218,080**
	Utility Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
	Drainage Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
						Subtotal		**$13,008,810**
7	**Engineering Design (12%)**				$1,561,057	$312,211	20%	$1,873,269
8	**Construction Mgmt. (10%)**				$1,300,881	$260,176	20%	$1,561,057
9	**Real Estate**							**$186,120**
	House Buyout (houses)	1	EA	$110,000	$110,000	$22,000	20%	$132,000
	Administrative Fees	1	LS	$2,600	$2,600	$520	20%	$3,120
	Relocation	1	EA	$20,000	$20,000	$4,000	20%	$24,000
	Demolition / Removal of Buildings	1,500	SF	$15	$22,500	$4,500	20%	$27,000
	Grand Total							**$16,641,256**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 4% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$2,518,200**
	Clearing and Grubbing	2	AC	$3,500	$7,000	$1,400	20%	$8,400
	Excavation	327,750	CY	$3	$983,250	$196,650	20%	$1,179,900
	Haul of Excavated Material	327,750	CY	$3	$983,250	$196,650	20%	$1,179,900
	Turf Establishment including Hydromulching	50	AC	$2,500	$125,000	$25,000	20%	$150,000
3	**Structures (including detention)**							**$36,000**
	Equip existing Storm Sewer outfalls with Flapgates	6	EA	$5,000	$30,000	$6,000	20%	$36,000
4	**General Items**							**$420,678**
	Stormwater Pollution Prevention	234	LS	$500	$116,855	$23,371	20%	$140,226
	Traffic control	234	LS	$1,000	$233,710	$46,742	20%	$280,452
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$11,218,080**
	Utility Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
	Drainage Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
						Subtotal		**$14,192,958**
7	**Engineering Design (12%)**				$1,703,155	$340,631	20%	$2,043,786
8	**Construction Mgmt. (10%)**				$1,419,296	$283,859	20%	$1,703,155
9	**Real Estate**							**$3,319,560**
	House Buyout (houses)	18	EA	$110,000	$1,980,000	$396,000	20%	$2,376,000
	Administrative Fees	1	LS	$21,300	$21,300	$4,260	20%	$25,560
	Relocation	18	EA	$20,000	$360,000	$72,000	20%	$432,000
	Demolition / Removal of Buildings	27,000	SF	$15	$405,000	$81,000	20%	$486,000
	Grand Total							**$21,271,459**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 1% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$2,696,220**
	Clearing and Grubbing	2	AC	$3,500	$7,000	$1,400	20%	$8,400
	Excavation	352,475	CY	$3	$1,057,425	$211,485	20%	$1,268,910
	Haul of Excavated Material	352,475	CY	$3	$1,057,425	$211,485	20%	$1,268,910
	Turf Establishment including Hydromulching	50	AC	$2,500	$125,000	$25,000	20%	$150,000
3	**Structures (including detention)**							**$36,000**
	Equip existing Storm Sewer outfalls with Flapgates	6	EA	$5,000	$30,000	$6,000	20%	$36,000
4	**General Items**							**$420,678**
	Stormwater Pollution Prevention	234	LS	$500	$116,855	$23,371	20%	$140,226
	Traffic control	234	LS	$1,000	$233,710	$46,742	20%	$280,452
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$11,218,080**
	Utility Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
	Drainage Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
						Subtotal		**$14,370,978**
7	**Engineering Design (12%)**				$1,724,517	$344,903	20%	$2,069,421
8	**Construction Mgmt. (10%)**				$1,437,098	$287,420	20%	$1,724,517
9	**Real Estate**							**$7,374,600**
	House Buyout (houses)	40	EA	$110,000	$4,400,000	$880,000	20%	$5,280,000
	Administrative Fees	1	LS	$45,500	$45,500	$9,100	20%	$54,600
	Relocation	40	EA	$20,000	$800,000	$160,000	20%	$960,000
	Demolition / Removal of Buildings	60,000	SF	$15	$900,000	$180,000	20%	$1,080,000
	Grand Total							**$25,551,516**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Levee Height at 4% Flood Protection

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$129,213**
	Clearing and Grubbing	2	AC	$3,500	$8,212	$1,642	20%	$9,854
	Turf Establishment including Hydromulching	2	AC	$2,500	$5,865	$1,173	20%	$7,039
	Fill & Compaction	7,800	CY	$4	$31,200	$6,240	20%	$37,440
	Fill Material	7,800	CY	$8	$62,400	$12,480	20%	$74,880
3	**Structures (including detention)**							**$1,510,980**
	Levee Wall	10,717	SF	$100	$1,071,650	$214,330	20%	$1,285,980
	Remove & Replace Concrete Paving for Ramp	2,500	SY	$75	$187,500	$37,500	20%	$225,000
4	**Storm sewers**							**$0**
5	**General Items**							**$72,264**
	Stormwater Pollution Prevention	1	LS	$20,220	$20,220	$4,044	20%	$24,264
	Traffic control	1	LS	$40,000	$40,000	$8,000	20%	$48,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$96,000**
	Utility Modifications	2	AC	$20,000	$40,000	$8,000	20%	$48,000
	Drainage Modifications	2	AC	$20,000	$40,000	$8,000	20%	$48,000
						Subtotal		**$1,808,457**
8	**Engineering Design (12%)**				$217,015	$43,403	20%	$260,418
9	**Construction Mgmt. (10%)**				$180,846	$36,169	20%	$217,015
10	**Real Estate**							**$490,560**
	ROW Acquisition	102,200	SF	$4	$408,800	$81,760	20%	$490,560
	Grand Total							**$2,788,449**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 20% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$23,232**
	Excavation	3,227	CY	$3	$9,680	$1,936	20%	$11,616
	Haul of Excavated Material	3,227	CY	$3	$9,680	$1,936	20%	$11,616
3	**Structures (including detention)**							**$3,259,500**
	Equip existing Storm Sewer outfalls with Flapgates	6	EA	$5,000	$30,000	$6,000	20%	$36,000
	Pumping Station	76,750	Gal/Min	$35	$2,686,250	$537,250	20%	$3,223,500
4	**General Items**							**$420,678**
	Stormwater Pollution Prevention	234	LS	$500	$116,855	$23,371	20%	$140,226
	Traffic control	234	LS	$1,000	$233,710	$46,742	20%	$280,452
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$11,218,080**
	Utility Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
	Drainage Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
						Subtotal		**$14,921,490**
7	**Engineering Design (12%)**				$1,790,579	$358,116	20%	$2,148,695
8	**Construction Mgmt. (10%)**				$1,492,149	$298,430	20%	$1,790,579
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$19,611,843**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 4% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$23,232**
	Excavation	3,227	CY	$3	$9,680	$1,936	20%	$11,616
	Haul of Excavated Material	3,227	CY	$3	$9,680	$1,936	20%	$11,616
3	**Structures (including detention)**							**$6,256,200**
	Equip existing Storm Sewer outfalls with Flapgates	6	EA	$5,000	$30,000	$6,000	20%	$36,000
	Pumping Station	148,100	Gal/Min	$35	$5,183,500	$1,036,700	20%	$6,220,200
4	**General Items**							**$420,678**
	Stormwater Pollution Prevention	234	LS	$500	$116,855	$23,371	20%	$140,226
	Traffic control	234	LS	$1,000	$233,710	$46,742	20%	$280,452
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$11,218,080**
	Utility Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
	Drainage Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
						Subtotal		**$17,918,190**
7	**Engineering Design (12%)**				$2,150,183	$430,037	20%	$2,580,219
8	**Construction Mgmt. (10%)**				$1,791,819	$358,364	20%	$2,150,183
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$23,399,672**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Inwood Forest Levee - 1% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$23,232**
	Excavation	3,227	CY	$3	$9,680	$1,936	20%	$11,616
	Haul of Excavated Material	3,227	CY	$3	$9,680	$1,936	20%	$11,616
3	**Structures (including detention)**							**$9,368,400**
	Equip existing Storm Sewer outfalls with Flapgates	6	EA	$5,000	$30,000	$6,000	20%	$36,000
	Pumping Station	222,200	Gal/Min	$35	$7,777,000	$1,555,400	20%	$9,332,400
4	**General Items**							**$420,678**
	Stormwater Pollution Prevention	234	LS	$500	$116,855	$23,371	20%	$140,226
	Traffic control	234	LS	$1,000	$233,710	$46,742	20%	$280,452
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$11,218,080**
	Utility Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
	Drainage Modifications	234	AC	$20,000	$4,674,200	$934,840	20%	$5,609,040
						Subtotal		**$21,030,390**
7	**Engineering Design (12%)**				$2,523,647	$504,729	20%	$3,028,376
8	**Construction Mgmt. (10%)**				$2,103,039	$420,608	20%	$2,523,647
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$27,333,493**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Summary

Item	Levee Component	Total Cost
1	20% Flood Protection Levee	$2,788,449
2	4% Flood Protection Levee	$3,282,255
3	1% Flood Protection Levee	$3,530,282
4	0.4% Flood Protection Levee	$3,979,831
5	0.2% Flood Protection Levee	$4,576,646
6	Minimum Drainage Facility Option	$95,424
7	20% Flood Interior Detention Drainage Capacity	$3,656,813
8	4% Flood Interior Detention Drainage Capacity	$4,676,363
9	1% Flood Interior Detention Drainage Capacity	$5,539,234
10	20% Flood Interior Pump Drainage Capacity	$4,279,597
11	4% Flood Interior Pump Drainage Capacity	$5,139,622
12	1% Flood Interior Pump Drainage Capacity	$6,068,662

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Levee Height at 4% Flood Protection

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$129,213**
	Clearing and Grubbing	2	AC	$3,500	$8,212	$1,642	20%	$9,854
	Turf Establishment including Hydromulching	2	AC	$2,500	$5,865	$1,173	20%	$7,039
	Fill & Compaction	7,800	CY	$4	$31,200	$6,240	20%	$37,440
	Fill Material	7,800	CY	$8	$62,400	$12,480	20%	$74,880
3	**Structures (including detention)**							**$1,510,980**
	Levee Wall	10,717	SF	$100	$1,071,650	$214,330	20%	$1,285,980
	Remove & Replace Concrete Paving for Ramp	2,500	SY	$75	$187,500	$37,500	20%	$225,000
4	**Storm sewers**							**$0**
5	**General Items**							**$72,264**
	Stormwater Pollution Prevention	1	LS	$20,220	$20,220	$4,044	20%	$24,264
	Traffic control	1	LS	$40,000	$40,000	$8,000	20%	$48,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$96,000**
	Utility Modifications	2	AC	$20,000	$40,000	$8,000	20%	$48,000
	Drainage Modifications	2	AC	$20,000	$40,000	$8,000	20%	$48,000
						Subtotal		**$1,808,457**
8	**Engineering Design (12%)**				$217,015	$43,403	20%	$260,418
9	**Construction Mgmt. (10%)**				$180,846	$36,169	20%	$217,015
10	**Real Estate**							**$490,560**
	ROW Acquisition	102,200	SF	$4	$408,800	$81,760	20%	$490,560
	Grand Total							**$2,788,449**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Levee Height at 2% Flood Protection

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$129,213**
	Clearing and Grubbing	2	AC	$3,500	$8,212	$1,642	20%	$9,854
	Turf Establishment including Hydromulching	2	AC	$2,500	$5,865	$1,173	20%	$7,039
	Fill & Compaction	7,800	CY	$4	$31,200	$6,240	20%	$37,440
	Fill Material	7,800	CY	$8	$62,400	$12,480	20%	$74,880
3	**Structures (including detention)**							**$1,885,032**
	Levee Wall	13,834	SF	$100	$1,383,360	$276,672	20%	$1,660,032
	Remove & Replace Concrete Paving for Ramp	2,500	SY	$75	$187,500	$37,500	20%	$225,000
4	**Storm sewers**							**$0**
5	**General Items**							**$72,264**
	Stormwater Pollution Prevention	1	LS	$20,220	$20,220	$4,044	20%	$24,264
	Traffic control	1	LS	$40,000	$40,000	$8,000	20%	$48,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$112,617**
	Utility Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
	Drainage Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
						Subtotal		**$2,199,126**
8	**Engineering Design (12%)**				$263,895	$52,779	20%	$316,674
9	**Construction Mgmt. (10%)**				$219,913	$43,983	20%	$263,895
10	**Real Estate**							**$490,560**
	ROW Acquisition	102,200	SF	$4	$408,800	$81,760	20%	$490,560
	Grand Total							**$3,282,255**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Levee Height at 1% Flood Protection

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$129,213**
	Clearing and Grubbing	2	AC	$3,500	$8,212	$1,642	20%	$9,854
	Turf Establishment including Hydromulching	2	AC	$2,500	$5,865	$1,173	20%	$7,039
	Fill & Compaction	7,800	CY	$4	$31,200	$6,240	20%	$37,440
	Fill Material	7,800	CY	$8	$62,400	$12,480	20%	$74,880
3	**Structures (including detention)**							**$2,081,256**
	Levee Wall	15,469	SF	$100	$1,546,880	$309,376	20%	$1,856,256
	Remove & Replace Concrete Paving for Ramp	2,500	SY	$75	$187,500	$37,500	20%	$225,000
4	**Storm sewers**							**$0**
5	**General Items**							**$72,264**
	Stormwater Pollution Prevention	1	LS	$20,220	$20,220	$4,044	20%	$24,264
	Traffic control	1	LS	$40,000	$40,000	$8,000	20%	$48,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$112,617**
	Utility Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
	Drainage Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
						Subtotal		**$2,395,350**
8	**Engineering Design (12%)**				$287,442	$57,488	20%	$344,930
9	**Construction Mgmt. (10%)**				$239,535	$47,907	20%	$287,442
10	**Real Estate**							**$490,560**
	ROW Acquisition	102,200	SF	$4	$408,800	$81,760	20%	$490,560
	Grand Total							**$3,530,282**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Levee Height at 0.4% Flood Protection

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$129,213**
	Clearing and Grubbing	2	AC	$3,500	$8,212	$1,642	20%	$9,854
	Turf Establishment including Hydromulching	2	AC	$2,500	$5,865	$1,173	20%	$7,039
	Fill & Compaction	7,800	CY	$4	$31,200	$6,240	20%	$37,440
	Fill Material	7,800	CY	$8	$62,400	$12,480	20%	$74,880
3	**Structures (including detention)**							**$2,436,912**
	Levee Wall	18,433	SF	$100	$1,843,260	$368,652	20%	$2,211,912
	Remove & Replace Concrete Paving for Ramp	2,500	SY	$75	$187,500	$37,500	20%	$225,000
4	**Storm sewers**							**$0**
5	**General Items**							**$72,264**
	Stormwater Pollution Prevention	1	LS	$20,220	$20,220	$4,044	20%	$24,264
	Traffic control	1	LS	$40,000	$40,000	$8,000	20%	$48,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$112,617**
	Utility Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
	Drainage Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
						Subtotal		**$2,751,006**
8	**Engineering Design (12%)**				$330,121	$66,024	20%	$396,145
9	**Construction Mgmt. (10%)**				$275,101	$55,020	20%	$330,121
10	**Real Estate**							**$490,560**
	ROW Acquisition	102,200	SF	$4	$408,800	$81,760	20%	$490,560
	Grand Total							**$3,979,831**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Levee Height at 0.2% Flood Protection

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$129,213**
	Clearing and Grubbing	2	AC	$3,500	$8,212	$1,642	20%	$9,854
	Turf Establishment including Hydromulching	2	AC	$2,500	$5,865	$1,173	20%	$7,039
	Fill & Compaction	7,800	CY	$4	$31,200	$6,240	20%	$37,440
	Fill Material	7,800	CY	$8	$62,400	$12,480	20%	$74,880
3	**Structures (including detention)**							**$2,909,076**
	Levee Wall	22,367	SF	$100	$2,236,730	$447,346	20%	$2,684,076
	Remove & Replace Concrete Paving for Ramp	2,500	SY	$75	$187,500	$37,500	20%	$225,000
4	**Storm sewers**							**$0**
5	**General Items**							**$72,264**
	Stormwater Pollution Prevention	1	LS	$20,220	$20,220	$4,044	20%	$24,264
	Traffic control	1	LS	$40,000	$40,000	$8,000	20%	$48,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$112,617**
	Utility Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
	Drainage Modifications	2	AC	$20,000	$46,924	$9,385	20%	$56,309
						Subtotal		**$3,223,170**
8	**Engineering Design (12%)**				$386,780	$77,356	20%	$464,136
9	**Construction Mgmt. (10%)**				$322,317	$64,463	20%	$386,780
10	**Real Estate**							**$490,560**
	ROW Acquisition	102,200	SF	$4	$408,800	$81,760	20%	$490,560
	Grand Total							**$4,576,646**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - Mininum Drainage Facility Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$0**
	Clearing and Grubbing		AC	$3,500	$0	$0	20%	$0
	Excavation		CY	$3	$0	$0	20%	$0
	Haul of Excavated Material	0	CY	$3	$0	$0	20%	$0
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$18,000**
	Outlet Structure with Flood Gate		LS	$100,000	$0	$0	20%	$0
4	**General Items**							**$0**
	Stormwater Pollution Prevention		AC	$500	$0	$0	20%	$0
	Traffic control		AC	$1,000	$0	$0	20%	$0
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$48,000**
	Utility Modifications	1	AC	$20,000	$20,000	$4,000	20%	$24,000
	Drainage Modifications	1	AC	$20,000	$20,000	$4,000	20%	$24,000
						Subtotal		**$66,000**
7	**Engineering Design (12%)**				$7,920	$1,584	20%	$9,504
8	**Construction Mgmt. (10%)**				$6,600	$1,320	20%	$7,920
9	**Real Estate**							**$0**
	House Buyout (houses)		EA	$110,000	$0	$0	20%	$0
	Administrative Fees		LS	$1,500	$0	$0	20%	$0
	Relocation		EA	$20,000	$0	$0	20%	$0
	Demolition / Removal of Buildings		SF	$15	$0	$0	20%	$0
	Grand Total							**$95,424**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Interior Detention Capacity at 50% Flood Frequency

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$223,342**
	Clearing and Grubbing	1	AC	$3,500	$4,218	$844	20%	$5,062
	Excavation	29,900	CY	$3	$89,700	$17,940	20%	$107,640
	Haul of Excavated Material (Includes spreading)	29,900	CY	$3	$89,700	$17,940	20%	$107,640
	Turf Establishment including Hydromulching	1	AC	$2,500	$2,500	$500	20%	$3,000
3	**Structures (including detention)**							**$120,000**
	Outlet Structure with Flood Gate	1	LS	$100,000	$100,000	$20,000	20%	$120,000
4	**General Items**							**$74,016**
	Stormwater Pollution Prevention	41	AC	$500	$20,560	$4,112	20%	$24,672
	Traffic control	41	AC	$1,000	$41,120	$8,224	20%	$49,344
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$1,973,760**
	Utility Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
	Drainage Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
						Subtotal		**$2,391,118**
7	**Engineering Design (12%)**				$286,934	$57,387	20%	$344,321
8	**Construction Mgmt. (10%)**				$239,112	$47,822	20%	$286,934
9	**Real Estate**							**$622,440**
	House Buyout (houses)	2	EA	$110,000	$220,000	$44,000	20%	$264,000
	Administrative Fees	1	LS	$3,700	$3,700	$740	20%	$4,440
	Relocation	2	EA	$20,000	$40,000	$8,000	20%	$48,000
	Demolition / Removal of Buildings	3,000	SF	$15	$45,000	$9,000	20%	$54,000
	Grand Total							**$3,656,813**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Interior Detention Capacity at 4% Flood Frequency

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$418,935**
	Clearing and Grubbing	2	AC	$3,500	$8,437	$1,687	20%	$10,124
	Excavation	55,775	CY	$3	$167,325	$33,465	20%	$200,790
	Haul of Excavated Material	55,775	CY	$3	$167,325	$33,465	20%	$200,790
	Turf Establishment including Hydromulching	2	AC	$2,500	$6,026	$1,205	20%	$7,231
3	**Structures (including detention)**							**$240,000**
	Outlet Structure with Flood Gate	2	LS	$100,000	$200,000	$40,000	20%	$240,000
4	**General Items**							**$74,016**
	Stormwater Pollution Prevention	41	AC	$500	$20,560	$4,112	20%	$24,672
	Traffic control	41	AC	$1,000	$41,120	$8,224	20%	$49,344
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$1,973,760**
	Utility Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
	Drainage Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
						Subtotal		**$2,706,711**
7	**Engineering Design (12%)**				$324,805	$64,961	20%	$389,766
8	**Construction Mgmt. (10%)**				$270,671	$54,134	20%	$324,805
9	**Real Estate**							**$1,243,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$4,676,363**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Interior Detention Capacity at 1% Flood Frequency

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$518,295**
	Clearing and Grubbing	2	AC	$3,500	$8,437	$1,687	20%	$10,124
	Excavation	69,575	CY	$3	$208,725	$41,745	20%	$250,470
	Haul of Excavated Material	69,575	CY	$3	$208,725	$41,745	20%	$250,470
	Turf Establishment including Hydromulching	2	AC	$2,500	$6,026	$1,205	20%	$7,231
3	**Structures (including detention)**							**$240,000**
	Outlet Structure with Flood Gate	2	LS	$100,000	$200,000	$40,000	20%	$240,000
4	**General Items**							**$74,016**
	Stormwater Pollution Prevention	41	AC	$500	$20,560	$4,112	20%	$24,672
	Traffic control	41	AC	$1,000	$41,120	$8,224	20%	$49,344
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$1,973,760**
	Utility Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
	Drainage Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
						Subtotal		**$2,806,071**
7	**Engineering Design (12%)**				$336,729	$67,346	20%	$404,074
8	**Construction Mgmt. (10%)**				$280,607	$56,121	20%	$336,729
9	**Real Estate**							**$1,980,360**
	House Buyout (houses)	8	EA	$110,000	$880,000	$176,000	20%	$1,056,000
	Administrative Fees	1	LS	$10,300	$10,300	$2,060	20%	$12,360
	Relocation	8	EA	$20,000	$160,000	$32,000	20%	$192,000
	Demolition / Removal of Buildings	12,000	SF	$15	$180,000	$36,000	20%	$216,000
	Grand Total							**$5,539,234**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Interior Pumping Drainage Capacity at 50% Flood Frequency

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$21,600**
	Clearing and Grubbing	1	AC	$3,500	$3,500	$700	20%	$4,200
	Excavation	2,000	CY	$3	$6,000	$1,200	20%	$7,200
	Haul of Excavated Material	2,000	CY	$3	$6,000	$1,200	20%	$7,200
	Turf Establishment including Hydromulching	1	AC	$2,500	$2,500	$500	20%	$3,000
3	**Structures (including detention)**							**$848,400**
	Pumping Station	20,200	Gal/Min	$35	$707,000	$141,400	20%	$848,400
4	**General Items**							**$74,016**
	Stormwater Pollution Prevention	41	AC	$500	$20,560	$4,112	20%	$24,672
	Traffic control	41	AC	$1,000	$41,120	$8,224	20%	$49,344
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$1,973,760**
	Utility Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
	Drainage Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
						Subtotal		**$2,917,776**
7	**Engineering Design (12%)**				$350,133	$70,027	20%	$420,160
8	**Construction Mgmt. (10%)**				$291,778	$58,356	20%	$350,133
9	**Real Estate**							**$579,528**
	House Buyout (houses)	2	EA	$110,000	$220,000	$44,000	20%	$264,000
	Administrative Fees	1	LS	$3,700	$3,700	$740	20%	$4,440
	Relocation	2	EA	$20,000	$40,000	$8,000	20%	$48,000
	Demolition / Removal of Buildings	3,000	SF	$15	$45,000	$9,000	20%	$54,000
	Grand Total							**$4,279,597**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Interior Pumping Drainage Capacity at 4% Flood Frequency

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$21,600**
	Clearing and Grubbing	1	AC	$3,500	$3,500	$700	20%	$4,200
	Excavation	2,000	CY	$3	$6,000	$1,200	20%	$7,200
	Haul of Excavated Material	2,000	CY	$3	$6,000	$1,200	20%	$7,200
	Turf Establishment including Hydromulching	1	AC	$2,500	$2,500	$500	20%	$3,000
3	**Structures (including detention)**							**$1,528,800**
	Pumping Station	36,400	Gal/Min	$35	$1,274,000	$254,800	20%	$1,528,800
4	**General Items**							**$74,016**
	Stormwater Pollution Prevention	41	AC	$500	$20,560	$4,112	20%	$24,672
	Traffic control	41	AC	$1,000	$41,120	$8,224	20%	$49,344
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$1,973,760**
	Utility Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
	Drainage Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
						Subtotal		**$3,598,176**
7	**Engineering Design (12%)**				$431,781	$86,356	20%	$518,137
8	**Construction Mgmt. (10%)**				$359,818	$71,964	20%	$431,781
9	**Real Estate**							**$579,528**
	House Buyout (houses)	2	EA	$110,000	$220,000	$44,000	20%	$264,000
	Administrative Fees	1	LS	$3,700	$3,700	$740	20%	$4,440
	Relocation	2	EA	$20,000	$40,000	$8,000	20%	$48,000
	Demolition / Removal of Buildings	3,000	SF	$15	$45,000	$9,000	20%	$54,000
	Grand Total							**$5,139,622**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Arbor Oaks Levee - Interior Pumping Drainage Capacity at 1% Flood Frequency

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$21,600**
	Clearing and Grubbing	1	AC	$3,500	$3,500	$700	20%	$4,200
	Excavation	2,000	CY	$3	$6,000	$1,200	20%	$7,200
	Haul of Excavated Material	2,000	CY	$3	$6,000	$1,200	20%	$7,200
	Turf Establishment including Hydromulching	1	AC	$2,500	$2,500	$500	20%	$3,000
3	**Structures (including detention)**							**$2,263,800**
	Pumping Station	53,900	Gal/Min	$35	$1,886,500	$377,300	20%	$2,263,800
4	**General Items**							**$74,016**
	Stormwater Pollution Prevention	41	AC	$500	$20,560	$4,112	20%	$24,672
	Traffic control	41	AC	$1,000	$41,120	$8,224	20%	$49,344
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$1,973,760**
	Utility Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
	Drainage Modifications	41	AC	$20,000	$822,400	$164,480	20%	$986,880
						Subtotal		**$4,333,176**
7	**Engineering Design (12%)**				$519,981	$103,996	20%	$623,977
8	**Construction Mgmt. (10%)**				$433,318	$86,664	20%	$519,981
9	**Real Estate**							**$579,528**
	House Buyout (houses)	2	EA	$110,000	$220,000	$44,000	20%	$264,000
	Administrative Fees	1	LS	$3,700	$3,700	$740	20%	$4,440
	Relocation	2	EA	$20,000	$40,000	$8,000	20%	$48,000
	Demolition / Removal of Buildings	3,000	SF	$15	$45,000	$9,000	20%	$54,000
	Grand Total							**$6,068,662**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - Summary

Item	Levee Component	Total Cost
1	20% Flood Protection Levee	$2,787,718
2	4% Flood Protection Levee	$4,714,233
3	1% Flood Protection Levee	$5,715,163
4	0.4% Flood Protection Levee	$7,006,688
5	0.2% Flood Protection Levee	$7,465,816
6	Minimum Drainage Facility Option	$87,840
7	20% Flood Interior Detention Drainage Capacity	$29,917,519
8	4% Flood Interior Detention Drainage Capacity	$40,020,381
9	1% Flood Interior Detention Drainage Capacity	$55,422,880
10	20% Flood Interior Pump Drainage Capacity	$36,634,465
11	4% Flood Interior Pump Drainage Capacity	$42,991,374
12	1% Flood Interior Pump Drainage Capacity	$49,202,670
13	0.4% Flood Interior Pump Drainage Capacity	$50,901,486
14	0.2% Flood Interior Pump Drainage Capacity	$55,891,758

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 20% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$150,774**
	Clearing and Grubbing	2	AC	$3,500	$5,640	$1,128	20%	$6,769
	Fill & Compaction	10,000	CY	$4	$40,000	$8,000	20%	$48,000
	Fill Material	10,000	CY	$8	$80,000	$16,000	20%	$96,000
3	**Structures (including detention)**							**$1,543,395**
	Levee Wall	3,862	SF	$100	$386,163	$77,233	20%	$463,395
	Remove & Replace Concrete Paving for Ramp	12,000	SY	$75	$900,000	$180,000	20%	$1,080,000
4	**Storm sewers**							**$0**
5	**General Items**							**$157,872**
	Stormwater Pollution Prevention	1	LS	$41,560	$41,560	$8,312	20%	$49,872
	Traffic control	1	LS	$90,000	$90,000	$18,000	20%	$108,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$77,355**
	Utility Modifications	2	AC	$20,000	$32,231	$6,446	20%	$38,678
	Drainage Modifications	2	AC	$20,000	$32,231	$6,446	20%	$38,678
						Subtotal		**$1,929,397**
8	**Engineering Design (12%)**				$231,528	$46,306	20%	$277,833
9	**Construction Mgmt. (10%)**				$192,940	$38,588	20%	$231,528
10	**Real Estate**							**$336,960**
	ROW Acquisition	70,200	SF	$4	$280,800	$56,160	20%	$336,960
	Grand Total							**$2,787,718**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 4% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$160,521**
	Clearing and Grubbing	4	AC	$3,500	$13,756	$2,751	20%	$16,507
	Fill & Compaction	10,000	CY	$4	$40,000	$8,000	20%	$48,000
	Fill Material	10,000	CY	$8	$80,000	$16,000	20%	$96,000
3	**Structures (including detention)**							**$2,562,951**
	Levee Wall	12,358	SF	$100	$1,235,793	$247,159	20%	$1,482,951
	Remove & Replace Concrete Paving for Ramp	12,000	SY	$75	$900,000	$180,000	20%	$1,080,000
4	**Storm sewers**							**$0**
5	**General Items**							**$157,872**
	Stormwater Pollution Prevention	1	LS	$41,560	$41,560	$8,312	20%	$49,872
	Traffic control	1	LS	$90,000	$90,000	$18,000	20%	$108,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$188,650**
	Utility Modifications	4	AC	$20,000	$78,604	$15,721	20%	$94,325
	Drainage Modifications	4	AC	$20,000	$78,604	$15,721	20%	$94,325
						Subtotal		**$3,069,994**
8	**Engineering Design (12%)**				$368,399	$73,680	20%	$442,079
9	**Construction Mgmt. (10%)**				$306,999	$61,400	20%	$368,399
10	**Real Estate**							**$821,760**
	ROW Acquisition	171,200	SF	$4	$684,800	$136,960	20%	$821,760
	Grand Total							**$4,714,233**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 1% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$163,899**
	Clearing and Grubbing	5	AC	$3,500	$16,568	$3,314	20%	$19,882
	Fill & Compaction	10,000	CY	$4	$40,000	$8,000	20%	$48,000
	Fill Material	10,000	CY	$8	$80,000	$16,000	20%	$96,000
3	**Structures (including detention)**							**$3,179,970**
	Levee Wall	17,500	SF	$100	$1,749,975	$349,995	20%	$2,099,970
	Remove & Replace Concrete Paving for Ramp	12,000	SY	$75	$900,000	$180,000	20%	$1,080,000
4	**Storm sewers**							**$0**
5	**General Items**							**$157,872**
	Stormwater Pollution Prevention	1	LS	$41,560	$41,560	$8,312	20%	$49,872
	Traffic control	1	LS	$90,000	$90,000	$18,000	20%	$108,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$227,218**
	Utility Modifications	5	AC	$20,000	$94,674	$18,935	20%	$113,609
	Drainage Modifications	5	AC	$20,000	$94,674	$18,935	20%	$113,609
						Subtotal		**$3,728,958**
8	**Engineering Design (12%)**				$447,475	$89,495	20%	$536,970
9	**Construction Mgmt. (10%)**				$372,896	$74,579	20%	$447,475
10	**Real Estate**							**$989,760**
	ROW Acquisition	206,200	SF	$4	$824,800	$164,960	20%	$989,760
	Grand Total							**$5,715,163**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 0.4% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$163,899**
	Clearing and Grubbing	5	AC	$3,500	$16,568	$3,314	20%	$19,882
	Fill & Compaction	10,000	CY	$4	$40,000	$8,000	20%	$48,000
	Fill Material	10,000	CY	$8	$80,000	$16,000	20%	$96,000
3	**Structures (including detention)**							**$4,201,746**
	Levee Wall	26,015	SF	$100	$2,601,455	$520,291	20%	$3,121,746
	Remove & Replace Concrete Paving for Ramp	12,000	SY	$75	$900,000	$180,000	20%	$1,080,000
4	**Storm sewers**							**$0**
5	**General Items**							**$157,872**
	Stormwater Pollution Prevention	1	LS	$41,560	$41,560	$8,312	20%	$49,872
	Traffic control	1	LS	$90,000	$90,000	$18,000	20%	$108,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$227,218**
	Utility Modifications	5	AC	$20,000	$94,674	$18,935	20%	$113,609
	Drainage Modifications	5	AC	$20,000	$94,674	$18,935	20%	$113,609
						Subtotal		**$4,750,734**
8	**Engineering Design (12%)**				$570,088	$114,018	20%	$684,106
9	**Construction Mgmt. (10%)**				$475,073	$95,015	20%	$570,088
10	**Real Estate**							**$989,760**
	ROW Acquisition	206,200	SF	$4	$824,800	$164,960	20%	$989,760
	Grand Total							**$7,006,688**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 0.2% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$163,899**
	Clearing and Grubbing	5	AC	$3,500	$16,568	$3,314	20%	$19,882
	Fill & Compaction	10,000	CY	$4	$40,000	$8,000	20%	$48,000
	Fill Material	10,000	CY	$8	$80,000	$16,000	20%	$96,000
3	**Structures (including detention)**							**$4,564,980**
	Levee Wall	29,042	SF	$100	$2,904,150	$580,830	20%	$3,484,980
	Remove & Replace Concrete Paving for Ramp	12,000	SY	$75	$900,000	$180,000	20%	$1,080,000
4	**Storm sewers**							**$0**
5	**General Items**							**$157,872**
	Stormwater Pollution Prevention	1	LS	$41,560	$41,560	$8,312	20%	$49,872
	Traffic control	1	LS	$90,000	$90,000	$18,000	20%	$108,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$227,218**
	Utility Modifications	5	AC	$20,000	$94,674	$18,935	20%	$113,609
	Drainage Modifications	5	AC	$20,000	$94,674	$18,935	20%	$113,609
						Subtotal		**$5,113,968**
8	**Engineering Design (12%)**				$613,676	$122,735	20%	$736,411
9	**Construction Mgmt. (10%)**				$511,397	$102,279	20%	$613,676
10	**Real Estate**							**$989,760**
	ROW Acquisition	206,200	SF	$4	$824,800	$164,960	20%	$989,760
	Grand Total							**$7,465,816**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - Mininum Drainage Facility

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$0**
	Clearing and Grubbing		AC	$3,500	$0	$0	20%	$0
	Excavation		CY	$3	$0	$0	20%	$0
	Haul of Excavated Material	0	CY	$3	$0	$0	20%	$0
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$60,000**
	Outlet Structure with Flood Gate		LS	$100,000	$0	$0	20%	$0
4	**General Items**							**$0**
	Stormwater Pollution Prevention		LS	$500	$0	$0	20%	$0
	Traffic control		LS	$1,000	$0	$0	20%	$0
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$0**
	Utility Modifications		AC	$20,000	$0	$0	20%	$0
	Drainage Modifications		AC	$20,000	$0	$0	20%	$0
						Subtotal		**$60,000**
7	**Engineering Design (12%)**				$7,200	$1,440	20%	$8,640
8	**Construction Mgmt. (10%)**				$6,000	$1,200	20%	$7,200
9	**Real Estate**							**$0**
	House Buyout (houses)		EA	$110,000	$0	$0	20%	$0
	Administrative Fees		LS	$1,500	$0	$0	20%	$0
	Relocation		EA	$20,000	$0	$0	20%	$0
	Demolition / Removal of Buildings		SF	$15	$0	$0	20%	$0
	Grand Total							**$87,840**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 20% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$3,928,274**
	Clearing and Grubbing	29	AC	$3,500	$102,847	$20,569	20%	$123,416
	Excavation	507,619	CY	$3	$1,522,858	$304,572	20%	$1,827,429
	Haul of Excavated Material (Includes spreading)	507,619	CY	$3	$1,522,858	$304,572	20%	$1,827,429
	Turf Establishment including Hydromulching	50	AC	$2,500	$125,000	$25,000	20%	$150,000
3	**Structures (including detention)**							**$240,000**
	Outlet Structure with Flood Gate	2	LS	$100,000	$200,000	$40,000	20%	$240,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$22,312,904**
7	**Engineering Design (12%)**				$2,677,549	$535,510	20%	$3,213,058
8	**Construction Mgmt. (10%)**				$2,231,290	$446,258	20%	$2,677,549
9	**Real Estate**							**$1,702,008**
	House Buyout (houses)	1	EA	$110,000	$110,000	$22,000	20%	$132,000
	Administrative Fees	1	LS	$2,600	$2,600	$520	20%	$3,120
	Relocation	1	EA	$20,000	$20,000	$4,000	20%	$24,000
	Demolition / Removal of Buildings	1,500	SF	$15	$22,500	$4,500	20%	$27,000
	Detention Area Acquisition	29	AC	$43,560	$1,263,240	$252,648	20%	$1,515,888
	Grand Total							**$29,917,519**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 4% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$4,655,728**
	Clearing and Grubbing	35	AC	$3,500	$120,784	$24,157	20%	$144,940
	Excavation	601,498	CY	$3	$1,804,495	$360,899	20%	$2,165,394
	Haul of Excavated Material	601,498	CY	$3	$1,804,495	$360,899	20%	$2,165,394
	Turf Establishment including Hydromulching	60	AC	$2,500	$150,000	$30,000	20%	$180,000
3	**Structures (including detention)**							**$360,000**
	Outlet Structure with Flood Gate	3	LS	$100,000	$300,000	$60,000	20%	$360,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$23,160,358**
7	**Engineering Design (12%)**				$2,779,243	$555,849	20%	$3,335,092
8	**Construction Mgmt. (10%)**				$2,316,036	$463,207	20%	$2,779,243
9	**Real Estate**							**$10,733,688**
	House Buyout (houses)	50	EA	$110,000	$5,500,000	$1,100,000	20%	$6,600,000
	Administrative Fees	1	LS	$56,500	$56,500	$11,300	20%	$67,800
	Relocation	50	EA	$20,000	$1,000,000	$200,000	20%	$1,200,000
	Demolition / Removal of Buildings	75,000	SF	$15	$1,125,000	$225,000	20%	$1,350,000
	Detetnion Area Acquisition	29	AC	$43,560	$1,263,240	$252,648	20%	$1,515,888
	Grand Total							**$40,020,381**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 1% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$6,633,655**
	Clearing and Grubbing	51	AC	$3,500	$178,635	$35,727	20%	$214,362
	Excavation	860,318	CY	$3	$2,580,955	$516,191	20%	$3,097,146
	Haul of Excavated Material	860,318	CY	$3	$2,580,955	$516,191	20%	$3,097,146
	Turf Establishment including Hydromulching	75	AC	$2,500	$187,500	$37,500	20%	$225,000
3	**Structures (including detention)**							**$360,000**
	Outlet Structure with Flood Gate	3	LS	$100,000	$300,000	$60,000	20%	$360,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$25,138,285**
7	**Engineering Design (12%)**				$3,016,594	$603,319	20%	$3,619,913
8	**Construction Mgmt. (10%)**				$2,513,828	$502,766	20%	$3,016,594
9	**Real Estate**							**$23,636,088**
	House Buyout (houses)	120	EA	$110,000	$13,200,000	$2,640,000	20%	$15,840,000
	Administrative Fees	1	LS	$133,500	$133,500	$26,700	20%	$160,200
	Relocation	120	EA	$20,000	$2,400,000	$480,000	20%	$2,880,000
	Demolition / Removal of Buildings	180,000	SF	$15	$2,700,000	$540,000	20%	$3,240,000
	Detetnion Area Acquisition	29	AC	$43,560	$1,263,240	$252,648	20%	$1,515,888
	Grand Total							**$55,422,880**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 20% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$63,324**
	Excavation	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Haul of Excavated Material	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Turf Establishment including Hydromulching	5	AC	$2,500	$12,500	$2,500	20%	$15,000
3	**Structures (including detention)**							**$10,180,800**
	Pumping Station	242,400	Gal/Min	$35	$8,484,000	$1,696,800	20%	$10,180,800
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$28,388,754**
7	**Engineering Design (12%)**				$3,406,650	$681,330	20%	$4,087,981
8	**Construction Mgmt. (10%)**				$2,838,875	$567,775	20%	$3,406,650
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$36,634,465**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 4% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$27,324**
	Excavation	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Haul of Excavated Material	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$15,246,000**
	Pumping Station	363,000	Gal/Min	$35	$12,705,000	$2,541,000	20%	$15,246,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$33,417,954**
7	**Engineering Design (12%)**				$4,010,154	$802,031	20%	$4,812,185
8	**Construction Mgmt. (10%)**				$3,341,795	$668,359	20%	$4,010,154
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$42,991,374**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 1% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$27,324**
	Excavation	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Haul of Excavated Material	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$20,160,000**
	Pumping Station	480,000	Gal/Min	$35	$16,800,000	$3,360,000	20%	$20,160,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$38,331,954**
7	**Engineering Design (12%)**				$4,599,834	$919,967	20%	$5,519,801
8	**Construction Mgmt. (10%)**				$3,833,195	$766,639	20%	$4,599,834
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$49,202,670**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 0.4% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$27,324**
	Excavation	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Haul of Excavated Material	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$21,504,000**
	Pumping Station	512,000	Gal/Min	$35	$17,920,000	$3,584,000	20%	$21,504,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$39,675,954**
7	**Engineering Design (12%)**				$4,761,114	$952,223	20%	$5,713,337
8	**Construction Mgmt. (10%)**				$3,967,595	$793,519	20%	$4,761,114
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$50,901,486**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails North Levee - 0.2% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization (10%)	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$27,324**
	Excavation	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Haul of Excavated Material	3,795	CY	$3	$11,385	$2,277	20%	$13,662
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$25,452,000**
	Pumping Station	606,000	Gal/Min	$35	$21,210,000	$4,242,000	20%	$25,452,000
4	**General Items**							**$655,830**
	Stormwater Pollution Prevention	364	LS	$500	$182,175	$36,435	20%	$218,610
	Traffic control	364	LS	$1,000	$364,350	$72,870	20%	$437,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$17,488,800**
	Utility Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
	Drainage Modifications	364	AC	$20,000	$7,287,000	$1,457,400	20%	$8,744,400
						Subtotal		**$43,623,954**
7	**Engineering Design (12%)**				$5,234,874	$1,046,975	20%	$6,281,849
8	**Construction Mgmt. (10%)**				$4,362,395	$872,479	20%	$5,234,874
9	**Real Estate**							**$739,080**
	House Buyout (houses)	4	EA	$110,000	$440,000	$88,000	20%	$528,000
	Administrative Fees	1	LS	$5,900	$5,900	$1,180	20%	$7,080
	Relocation	4	EA	$20,000	$80,000	$16,000	20%	$96,000
	Demolition / Removal of Buildings	6,000	SF	$15	$90,000	$18,000	20%	$108,000
	Grand Total							**$55,891,758**

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PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - Summary

Item	Levee Component	Total Cost
1	20% Flood Protection Levee	$5,191,750
2	4% Flood Protection Levee	$6,387,136
3	1% Flood Protection Levee	$7,178,435
4	0.4% Flood Protection Levee	$8,532,316
5	0.2% Flood Protection Levee	$9,019,671
6	Minimum Drainage Facility Option	$49,920
7	20% Flood Interior Detention Drainage Capacity	$9,929,889
8	4% Flood Interior Detention Drainage Capacity	$15,423,564
9	1% Flood Interior Detention Drainage Capacity	$21,445,983
10	20% Flood Interior Pump Drainage Capacity	$12,400,007
11	4% Flood Interior Pump Drainage Capacity	$14,948,231
12	1% Flood Interior Pump Drainage Capacity	$17,337,191
13	0.4% Flood Interior Pump Drainage Capacity	$19,832,327
14	0.2% Flood Interior Pump Drainage Capacity	$21,159,527

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 20% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$101,656**
	Clearing and Grubbing	5	AC	$3,500	$18,046	$3,609	20%	$21,656
	Fill & Compaction	5,556	CY	$4	$22,222	$4,444	20%	$26,667
	Fill Material	5,556	CY	$8	$44,444	$8,889	20%	$53,333
3	**Structures (including detention)**							**$2,796,891**
	Levee Wall	18,307	SF	$100	$1,830,743	$366,149	20%	$2,196,891
	Remove & Replace Concrete Paving for Ramp	6,667	SY	$75	$500,000	$100,000	20%	$600,000
4	**Storm sewers**							**$0**
5	**General Items**							**$98,952**
	Stormwater Pollution Prevention	1	LS	$32,460	$32,460	$6,492	20%	$38,952
	Traffic control	1	LS	$50,000	$50,000	$10,000	20%	$60,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$247,493**
	Utility Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
	Drainage Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
						Subtotal		**$3,244,992**
8	**Engineering Design (12%)**				$389,399	$77,880	20%	$467,279
9	**Construction Mgmt. (10%)**				$324,499	$64,900	20%	$389,399
10	**Real Estate**							**$1,078,080**
	ROW Acquisition	224,600	SF	$4	$898,400	$179,680	20%	$1,078,080
	Grand Total							**$5,191,750**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 4% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$101,656**
	Clearing and Grubbing	5	AC	$3,500	$18,046	$3,609	20%	$21,656
	Fill & Compaction	5,556	CY	$4	$22,222	$4,444	20%	$26,667
	Fill Material	5,556	CY	$8	$44,444	$8,889	20%	$53,333
3	**Structures (including detention)**							**$3,742,608**
	Levee Wall	26,188	SF	$100	$2,618,840	$523,768	20%	$3,142,608
	Remove & Replace Concrete Paving for Ramp	6,667	SY	$75	$500,000	$100,000	20%	$600,000
4	**Storm sewers**							**$0**
5	**General Items**							**$98,952**
	Stormwater Pollution Prevention	1	LS	$32,460	$32,460	$6,492	20%	$38,952
	Traffic control	1	LS	$50,000	$50,000	$10,000	20%	$60,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$247,493**
	Utility Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
	Drainage Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
						Subtotal		**$4,190,709**
8	**Engineering Design (12%)**				$502,885	$100,577	20%	$603,462
9	**Construction Mgmt. (10%)**				$419,071	$83,814	20%	$502,885
10	**Real Estate**							**$1,078,080**
	ROW Acquisition	224,600	SF	$4	$898,400	$179,680	20%	$1,078,080
	Grand Total							**$6,387,136**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 1% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$101,656**
	Clearing and Grubbing	5	AC	$3,500	$18,046	$3,609	20%	$21,656
	Fill & Compaction	5,556	CY	$4	$22,222	$4,444	20%	$26,667
	Fill Material	5,556	CY	$8	$44,444	$8,889	20%	$53,333
3	**Structures (including detention)**							**$4,368,636**
	Levee Wall	31,405	SF	$100	$3,140,530	$628,106	20%	$3,768,636
	Remove & Replace Concrete Paving for Ramp	6,667	SY	$75	$500,000	$100,000	20%	$600,000
4	**Storm sewers**							**$0**
5	**General Items**							**$98,952**
	Stormwater Pollution Prevention	1	LS	$32,460	$32,460	$6,492	20%	$38,952
	Traffic control	1	LS	$50,000	$50,000	$10,000	20%	$60,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$247,493**
	Utility Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
	Drainage Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
						Subtotal		**$4,816,737**
8	**Engineering Design (12%)**				$578,008	$115,602	20%	$693,610
9	**Construction Mgmt. (10%)**				$481,674	$96,335	20%	$578,008
10	**Real Estate**							**$1,078,080**
	ROW Acquisition	224,600	SF	$4	$898,400	$179,680	20%	$1,078,080
	Grand Total							**$7,178,435**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 0.4% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$101,656**
	Clearing and Grubbing	5	AC	$3,500	$18,046	$3,609	20%	$21,656
	Fill & Compaction	5,556	CY	$4	$22,222	$4,444	20%	$26,667
	Fill Material	5,556	CY	$8	$44,444	$8,889	20%	$53,333
3	**Structures (including detention)**							**$5,439,744**
	Levee Wall	40,331	SF	$100	$4,033,120	$806,624	20%	$4,839,744
	Remove & Replace Concrete Paving for Ramp	6,667	SY	$75	$500,000	$100,000	20%	$600,000
4	**Storm sewers**							**$0**
5	**General Items**							**$98,952**
	Stormwater Pollution Prevention	1	LS	$32,460	$32,460	$6,492	20%	$38,952
	Traffic control	1	LS	$50,000	$50,000	$10,000	20%	$60,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$247,493**
	Utility Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
	Drainage Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
						Subtotal		**$5,887,845**
8	**Engineering Design (12%)**				$706,541	$141,308	20%	$847,850
9	**Construction Mgmt. (10%)**				$588,784	$117,757	20%	$706,541
10	**Real Estate**							**$1,078,080**
	ROW Acquisition	224,600	SF	$4	$898,400	$179,680	20%	$1,078,080
	Grand Total							**$8,532,316**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 0.2% Flood Protection Levee Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$101,656**
	Clearing and Grubbing	5	AC	$3,500	$18,046	$3,609	20%	$21,656
	Fill & Compaction	5,556	CY	$4	$22,222	$4,444	20%	$26,667
	Fill Material	5,556	CY	$8	$44,444	$8,889	20%	$53,333
3	**Structures (including detention)**							**$5,825,310**
	Levee Wall	43,544	SF	$100	$4,354,425	$870,885	20%	$5,225,310
	Remove & Replace Concrete Paving for Ramp	6,667	SY	$75	$500,000	$100,000	20%	$600,000
4	**Storm sewers**							**$0**
5	**General Items**							**$98,952**
	Stormwater Pollution Prevention	1	LS	$32,460	$32,460	$6,492	20%	$38,952
	Traffic control	1	LS	$50,000	$50,000	$10,000	20%	$60,000
6	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
7	**Remove & Replace Utilities**							**$247,493**
	Utility Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
	Drainage Modifications	5	AC	$20,000	$103,122	$20,624	20%	$123,747
						Subtotal		**$6,273,411**
8	**Engineering Design (12%)**				$752,809	$150,562	20%	$903,371
9	**Construction Mgmt. (10%)**				$627,341	$125,468	20%	$752,809
10	**Real Estate**							**$1,078,080**
	ROW Acquisition	224,600	SF	$4	$898,400	$179,680	20%	$1,078,080
	Grand Total							**$9,019,671**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - Mininum Drainage Facility Cost

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$0**
	Clearing and Grubbing		AC	$3,500	$0	$0	20%	$0
	Excavation		CY	$3	$0	$0	20%	$0
	Haul of Excavated Material	0	CY	$3	$0	$0	20%	$0
	Turf Establishment including Hydromulching		AC	$2,500	$0	$0	20%	$0
3	**Structures (including detention)**							**$30,000**
	Outlet Structure with Flood Gate		LS	$100,000	$0	$0	20%	$0
4	**General Items**							**$0**
	Stormwater Pollution Prevention		LS	$500	$0	$0	20%	$0
	Traffic control		LS	$1,000	$0	$0	20%	$0
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$0**
	Utility Modifications		AC	$20,000	$0	$0	20%	$0
	Drainage Modifications		AC	$20,000	$0	$0	20%	$0
						Subtotal		**$30,000**
7	**Engineering Design (12%)**				$3,600	$720	20%	$4,320
8	**Construction Mgmt. (10%)**				$3,000	$600	20%	$3,600
9	**Real Estate**							**$0**
	House Buyout (houses)		EA	$110,000	$0	$0	20%	$0
	Administrative Fees		LS	$1,500	$0	$0	20%	$0
	Relocation		EA	$20,000	$0	$0	20%	$0
	Demolition / Removal of Buildings		SF	$15	$0	$0	20%	$0
	Grand Total							**$49,920**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 20% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$704,529**
	Clearing and Grubbing	5	AC	$3,500	$17,500	$3,500	20%	$21,000
	Excavation	88,685	CY	$3	$266,054	$53,211	20%	$319,264
	Haul of Excavated Material (Includes spreading)	88,685	CY	$3	$266,054	$53,211	20%	$319,264
	Turf Establishment including Hydromulching	15	AC	$2,500	$37,500	$7,500	20%	$45,000
3	**Structures (including detention)**							**$120,000**
	Outlet Structure with Flood Gate	1	LS	$100,000	$100,000	$20,000	20%	$120,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$7,639,659**
7	**Engineering Design (12%)**				$916,759	$183,352	20%	$1,100,111
8	**Construction Mgmt. (10%)**				$763,966	$152,793	20%	$916,759
9	**Real Estate**							**$261,360**
	House Buyout (houses)		EA	$110,000	$0	$0	20%	$0
	Administrative Fees		LS	$1,500	$0	$0	20%	$0
	Relocation		EA	$20,000	$0	$0	20%	$0
	Demolition / Removal of Buildings		SF	$15	$0	$0	20%	$0
	Detention Area Acquisition	5	AC	$43,560	$217,800	$43,560	20%	$261,360
	Grand Total							**$9,929,889**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 4% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$1,429,620**
	Clearing and Grubbing	12	AC	$3,500	$41,605	$8,321	20%	$49,926
	Excavation	174,958	CY	$3	$524,873	$104,975	20%	$629,847
	Haul of Excavated Material	174,958	CY	$3	$524,873	$104,975	20%	$629,847
	Turf Establishment including Hydromulching	40	AC	$2,500	$100,000	$20,000	20%	$120,000
3	**Structures (including detention)**							**$240,000**
	Outlet Structure with Flood Gate	2	LS	$100,000	$200,000	$40,000	20%	$240,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$8,484,750**
7	**Engineering Design (12%)**				$1,018,170	$203,634	20%	$1,221,804
8	**Construction Mgmt. (10%)**				$848,475	$169,695	20%	$1,018,170
9	**Real Estate**							**$4,686,840**
	House Buyout (houses)	24	EA	$110,000	$2,640,000	$528,000	20%	$3,168,000
	Administrative Fees	1	LS	$27,900	$27,900	$5,580	20%	$33,480
	Relocation	24	EA	$20,000	$480,000	$96,000	20%	$576,000
	Demolition / Removal of Buildings	36,000	SF	$15	$540,000	$108,000	20%	$648,000
	Detention Area Acquisition	5	AC	$43,560	$217,800	$43,560	20%	$261,360
	Grand Total							**$15,423,564**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 1% Flood Interior Detention Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$2,256,977**
	Clearing and Grubbing	12	AC	$3,500	$42,000	$8,400	20%	$50,400
	Excavation	289,802	CY	$3	$869,407	$173,881	20%	$1,043,288
	Haul of Excavated Material	289,802	CY	$3	$869,407	$173,881	20%	$1,043,288
	Turf Establishment including Hydromulching	40	AC	$2,500	$100,000	$20,000	20%	$120,000
3	**Structures (including detention)**							**$240,000**
	Outlet Structure with Flood Gate	2	LS	$100,000	$200,000	$40,000	20%	$240,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$9,312,107**
7	**Engineering Design (12%)**				$1,117,453	$223,491	20%	$1,340,943
8	**Construction Mgmt. (10%)**				$931,211	$186,242	20%	$1,117,453
9	**Real Estate**							**$9,663,480**
	House Buyout (houses)	51	EA	$110,000	$5,610,000	$1,122,000	20%	$6,732,000
	Administrative Fees	1	LS	$57,600	$57,600	$11,520	20%	$69,120
	Relocation	51	EA	$20,000	$1,020,000	$204,000	20%	$1,224,000
	Demolition / Removal of Buildings	76,500	SF	$15	$1,147,500	$229,500	20%	$1,377,000
	Detention Area Acquisition	5	AC	$43,560	$217,800	$43,560	20%	$261,360
	Grand Total							**$21,445,983**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 20% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$26,616**
	Excavation	1,613	CY	$3	$4,840	$968	20%	$5,808
	Haul of Excavated Material	1,613	CY	$3	$4,840	$968	20%	$5,808
	Turf Establishment including Hydromulching	5	AC	$2,500	$12,500	$2,500	20%	$15,000
3	**Structures (including detention)**							**$2,520,000**
	Pumping Station	60,000	Gal/Min	$35	$2,100,000	$420,000	20%	$2,520,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$9,361,746**
7	**Engineering Design (12%)**				$1,123,410	$224,682	20%	$1,348,091
8	**Construction Mgmt. (10%)**				$936,175	$187,235	20%	$1,123,410
9	**Real Estate**							**$554,760**
	House Buyout (houses)	3	EA	$110,000	$330,000	$66,000	20%	$396,000
	Administrative Fees	1	LS	$4,800	$4,800	$960	20%	$5,760
	Relocation	3	EA	$20,000	$60,000	$12,000	20%	$72,000
	Demolition / Removal of Buildings	4,500	SF	$15	$67,500	$13,500	20%	$81,000
	Grand Total							**$12,400,007**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 4% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$26,616**
	Excavation	1,613	CY	$3	$4,840	$968	20%	$5,808
	Haul of Excavated Material	1,613	CY	$3	$4,840	$968	20%	$5,808
	Turf Establishment including Hydromulching	5	AC	$2,500	$12,500	$2,500	20%	$15,000
3	**Structures (including detention)**							**$4,536,000**
	Pumping Station	108,000	Gal/Min	$35	$3,780,000	$756,000	20%	$4,536,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$11,377,746**
7	**Engineering Design (12%)**				$1,365,330	$273,066	20%	$1,638,395
8	**Construction Mgmt. (10%)**				$1,137,775	$227,555	20%	$1,365,330
9	**Real Estate**							**$554,760**
	House Buyout (houses)	3	EA	$110,000	$330,000	$66,000	20%	$396,000
	Administrative Fees	1	LS	$4,800	$4,800	$960	20%	$5,760
	Relocation	3	EA	$20,000	$60,000	$12,000	20%	$72,000
	Demolition / Removal of Buildings	4,500	SF	$15	$67,500	$13,500	20%	$81,000
	Grand Total							**$14,948,231**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 1% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$26,616**
	Excavation	1,613	CY	$3	$4,840	$968	20%	$5,808
	Haul of Excavated Material	1,613	CY	$3	$4,840	$968	20%	$5,808
	Turf Establishment including Hydromulching	5	AC	$2,500	$12,500	$2,500	20%	$15,000
3	**Structures (including detention)**							**$6,426,000**
	Pumping Station	153,000	Gal/Min	$35	$5,355,000	$1,071,000	20%	$6,426,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$13,267,746**
7	**Engineering Design (12%)**				$1,592,130	$318,426	20%	$1,910,555
8	**Construction Mgmt. (10%)**				$1,326,775	$265,355	20%	$1,592,130
9	**Real Estate**							**$554,760**
	House Buyout (houses)	3	EA	$110,000	$330,000	$66,000	20%	$396,000
	Administrative Fees	1	LS	$4,800	$4,800	$960	20%	$5,760
	Relocation	3	EA	$20,000	$60,000	$12,000	20%	$72,000
	Demolition / Removal of Buildings	4,500	SF	$15	$67,500	$13,500	20%	$81,000
	Grand Total							**$17,337,191**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 0.4% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$26,616**
	Excavation	1,613	CY	$3	$4,840	$968	20%	$5,808
	Haul of Excavated Material	1,613	CY	$3	$4,840	$968	20%	$5,808
	Turf Establishment including Hydromulching	5	AC	$2,500	$12,500	$2,500	20%	$15,000
3	**Structures (including detention)**							**$8,400,000**
	Pumping Station	200,000	Gal/Min	$35	$7,000,000	$1,400,000	20%	$8,400,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$15,241,746**
7	**Engineering Design (12%)**				$1,829,010	$365,802	20%	$2,194,811
8	**Construction Mgmt. (10%)**				$1,524,175	$304,835	20%	$1,829,010
9	**Real Estate**							**$554,760**
	House Buyout (houses)	3	EA	$110,000	$330,000	$66,000	20%	$396,000
	Administrative Fees	1	LS	$4,800	$4,800	$960	20%	$5,760
	Relocation	3	EA	$20,000	$60,000	$12,000	20%	$72,000
	Demolition / Removal of Buildings	4,500	SF	$15	$67,500	$13,500	20%	$81,000
	Grand Total							**$19,832,327**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

Woodland Trails West Levee - 0.2% Flood Interior Pump Drainage Capacity

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost
						Amount	Percentage	
1	**Mobilization**							**$12,000**
	Mobilization/Demobilization	1	LS	$10,000	$10,000	$2,000	20%	$12,000
2	**Earthwork**							**$26,616**
	Excavation	1,613	CY	$3	$4,840	$968	20%	$5,808
	Haul of Excavated Material	1,613	CY	$3	$4,840	$968	20%	$5,808
	Turf Establishment including Hydromulching	5	AC	$2,500	$12,500	$2,500	20%	$15,000
3	**Structures (including detention)**							**$9,450,000**
	Pumping Station	225,000	Gal/Min	$35	$7,875,000	$1,575,000	20%	$9,450,000
4	**General Items**							**$246,330**
	Stormwater Pollution Prevention	137	LS	$500	$68,425	$13,685	20%	$82,110
	Traffic control	137	LS	$1,000	$136,850	$27,370	20%	$164,220
5	**Vegetation Recovery**							**$0**
	Tree Planting		EA	$120	$0	$0	20%	$0
	Shrub Planting		EA	$25	$0	$0	20%	$0
6	**Remove & Replace Utilities**							**$6,568,800**
	Utility Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
	Drainage Modifications	137	AC	$20,000	$2,737,000	$547,400	20%	$3,284,400
						Subtotal		**$16,291,746**
7	**Engineering Design (12%)**				$1,955,010	$391,002	20%	$2,346,011
8	**Construction Mgmt. (10%)**				$1,629,175	$325,835	20%	$1,955,010
9	**Real Estate**							**$554,760**
	House Buyout (houses)	3	EA	$110,000	$330,000	$66,000	20%	$396,000
	Administrative Fees	1	LS	$4,800	$4,800	$960	20%	$5,760
	Relocation	3	EA	$20,000	$60,000	$12,000	20%	$72,000
	Demolition / Removal of Buildings	4,500	SF	$15	$67,500	$13,500	20%	$81,000
	Grand Total							**$21,159,527**

ATTACHMENT C-6

Non-structural Components – Component Optimization

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NON-STRUCTURAL COMPONENTS - SUMMARY

ID	Description	Capital Cost ($1,000)	Capital Cost
NSB-50%	Removal of 5 structures within 50% floodplain	$5,898	$5,898,077
NSB-20%	Removal of 651 structures within 20% floodplain	$157,773	$157,772,618
NSB-10%	Removal of 1,195 structures within 10% floodplain	$321,071	$321,071,075
NSB-4%	Removal of 3,121 structures within 4% floodplain	$833,410	$833,410,109
NSB-2%	Removal of 4,476 structures within 2% floodplain	$1,378,881	$1,378,881,180
ELEV-50%	Elevating structures within 50% floodplain	$12,953	$12,952,771
ELEV-20%	Elevating structures within 20% floodplain	$117,878	$117,877,856
ELEV-10%	Elevating structures within 10% floodplain	$291,068	$291,068,033
ELEV-4%	Elevating structures within 4% floodplain	$687,174	$687,174,310
ELEV-2%	Elevating structures within 2% floodplain	$1,077,628	$1,077,628,144

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NSB - NON-STRUCTURAL BUYOUTS

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Removal of Flooded Structures in 50% Floodplain								
	Demolition/Removal of Buildings	163,318	SF	$4.40	$718,599	$143,720	20%	$862,319	
	ROW Acquisition	1	LS	$299,620	$299,620	$74,905	25%		$374,525
	Building - Fair Market Value	1.5	LS	$2,054,330	$3,081,495	$770,374	25%		$3,851,869
	Administrative Fees	1	LS	$47,811	$47,811	$11,953	25%		$59,764
	Relocation (homes)	4	EA	$20,000	$80,000	$16,000	20%		$96,000
	Relocation (businesses)	155,619	SF	$3.50	$544,667	$108,933	20%		$653,600
	Total							**$862,319**	**$5,035,757**
GRAND TOTAL								**$5,898,077**	

	Removal of Flooded Structures in 20% Floodplain								
	Demolition/Removal of Buildings	1,435,293	SF	$4.40	$6,315,289	$1,263,058	20%	$7,578,347	
	ROW Acquisition	1	LS	$18,622,444	$18,622,444	$4,655,611	25%		$23,278,055
	Building - Fair Market Value	1.5	LS	$57,261,120	$85,891,680	$21,472,920	25%		$107,364,600
	Administrative Fees	1	LS	$2,067,141	$2,067,141	$516,785	25%		$2,583,927
	Relocation (homes)	644	EA	$20,000	$12,880,000	$2,576,000	20%		$15,456,000
	Relocation (businesses)	359,926	SF	$3.50	$1,259,741	$251,948	20%		$1,511,689
	Total							**$7,578,347**	**$150,194,271**
GRAND TOTAL								**$157,772,618**	

	Removal of Flooded Structures in 10% Floodplain								
	Demolition/Removal of Buildings	3,492,570	SF	$4.40	$15,367,308	$3,073,462	20%	$18,440,770	
	ROW Acquisition	1	LS	$43,054,877	$43,054,877	$10,763,719	25%		$53,818,596
	Building - Fair Market Value	1.5	LS	$112,853,890	$169,280,835	$42,320,209	25%		$211,601,044
	Administrative Fees	1	LS	$4,058,857	$4,058,857	$1,014,714	25%		$5,073,571
	Relocation (homes)	1,173	EA	$20,000	$23,460,000	$4,692,000	20%		$28,152,000
	Relocation (businesses)	948,832	SF	$3.50	$3,320,912	$664,182	20%		$3,985,094
	Total							**$18,440,770**	**$302,630,306**
GRAND TOTAL								**$321,071,075**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NSB - NON-STRUCTURAL BUYOUTS

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Removal of Flooded Structures in 4% Floodplain								
	Demolition/Removal of Buildings	7,901,542	SF	$4.40	$34,766,785	$6,953,357	20%	$41,720,142	
	ROW Acquisition	1	LS	$129,007,547	$129,007,547	$32,251,887	25%		$161,259,434
	Building - Fair Market Value	1.5	LS	$285,510,800	$428,266,200	$107,066,550	25%		$535,332,750
	Administrative Fees	1	LS	$10,917,237	$10,917,237	$2,729,309	25%		$13,646,547
	Relocation (homes)	3,019	EA	$20,000	$60,380,000	$12,076,000	20%		$72,456,000
	Relocation (businesses)	2,141,723	SF	$3.50	$7,496,031	$1,499,206	20%		$8,995,237
	Total							**$41,720,142**	**$791,689,967**
GRAND TOTAL								**$833,410,109**	

	Removal of Flooded Structures in 2% Floodplain								
	Demolition/Removal of Buildings	12,850,574	SF	$4.40	$56,542,526	$11,308,505	20%	$67,851,031	
	ROW Acquisition	1	LS	$189,643,903	$189,643,903	$47,410,976	25%		$237,054,879
	Building - Fair Market Value	1.5	LS	$495,841,190	$743,761,785	$185,940,446	25%		$929,702,231
	Administrative Fees	1	LS	$17,341,557	$17,341,557	$4,335,389	25%		$21,676,946
	Relocation (homes)	4,277	EA	$20,000	$85,540,000	$17,108,000	20%		$102,648,000
	Relocation (businesses)	4,749,546	SF	$3.50	$16,623,411	$3,324,682	20%		$19,948,093
	Total							**$67,851,031**	**$1,311,030,149**
GRAND TOTAL								**$1,378,881,180**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NSBR - NON-STRUCTURAL BUYOUTS - RESIDENTIAL ONLY

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Removal of Flooded Structures in 50% Floodplain								
	Demolition/Removal of Buildings	7,699	SF	$4.40	$33,876	$6,775	20%	$40,651	
	ROW Acquisition	1	LS	$62,100	$62,100	$15,525	25%		$77,625
	Building - Fair Market Value	1.5	LS	$325,800	$488,700	$122,175	25%		$610,875
	Administrative Fees	1	LS	$11,508	$11,508	$2,877	25%		$14,385
	Relocation (homes)	4	EA	$20,000	$80,000	$16,000	20%		$96,000
	Relocation (businesses)		SF	$3.50	$0	$0	20%		$0
	Total							**$40,651**	**$798,885**
GRAND TOTAL								**$839,536**	

	Removal of Flooded Structures in 20% Floodplain								
	Demolition/Removal of Buildings	1,075,367	SF	$4.40	$4,731,615	$946,323	20%	$5,677,938	
	ROW Acquisition	1	LS	$10,942,020	$10,942,020	$2,735,505	25%		$13,677,525
	Building - Fair Market Value	1.5	LS	$50,247,330	$75,370,995	$18,842,749	25%		$94,213,744
	Administrative Fees	1	LS	$1,829,130	$1,829,130	$457,283	25%		$2,286,413
	Relocation (homes)	644	EA	$20,000	$12,880,000	$2,576,000	20%		$15,456,000
	Relocation (businesses)		SF	$3.50	$0	$0	20%		$0
	Total							**$5,677,938**	**$125,633,681**
GRAND TOTAL								**$131,311,619**	

	Removal of Flooded Structures in 10% Floodplain								
	Demolition/Removal of Buildings	2,543,738	SF	$4.40	$11,192,447	$2,238,489	20%	$13,430,937	
	ROW Acquisition	1	LS	$26,466,927	$26,466,927	$6,616,732	25%		$33,083,659
	Building - Fair Market Value	1.5	LS	$96,171,290	$144,256,935	$36,064,234	25%		$180,321,169
	Administrative Fees	1	LS	$3,466,739	$3,466,739	$866,685	25%		$4,333,423
	Relocation (homes)	1,173	EA	$20,000	$23,460,000	$4,692,000	20%		$28,152,000
	Relocation (businesses)		SF	$3.50	$0	$0	20%		$0
	Total							**$13,430,937**	**$245,890,251**
GRAND TOTAL								**$259,321,187**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

NSBR - NON-STRUCTURAL BUYOUTS - RESIDENTIAL ONLY

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Removal of Flooded Structures in 4% Floodplain								
	Demolition/Removal of Buildings	5,759,819	SF	$4.40	$25,343,204	$5,068,641	20%	$30,411,844	
	ROW Acquisition	1	LS	$81,405,280	$81,405,280	$20,351,320	25%		$101,756,600
	Building - Fair Market Value	1.5	LS	$232,696,630	$349,044,945	$87,261,236	25%		$436,306,181
	Administrative Fees	1	LS	$8,833,002	$8,833,002	$2,208,251	25%		$11,041,253
	Relocation (homes)	3,019	EA	$20,000	$60,380,000	$12,076,000	20%		$72,456,000
	Relocation (businesses)		SF	$3.50	$0	$0	20%		$0
	Total							**$30,411,844**	**$621,560,034**
GRAND TOTAL								**$651,971,878**	

	Removal of Flooded Structures in 2% Floodplain								
	Demolition/Removal of Buildings	8,101,028	SF	$4.40	$35,644,523	$7,128,905	20%	$42,773,428	
	ROW Acquisition	1	LS	$119,322,109	$119,322,109	$29,830,527	25%		$149,152,636
	Building - Fair Market Value	1.5	LS	$322,909,280	$484,363,920	$121,090,980	25%		$605,454,900
	Administrative Fees	1	LS	$12,452,360	$12,452,360	$3,113,090	25%		$15,565,450
	Relocation (homes)	4,277	EA	$20,000	$85,540,000	$17,108,000	20%		$102,648,000
	Relocation (businesses)		SF	$3.50	$0	$0	20%		$0
	Total							**$42,773,428**	**$872,820,987**
GRAND TOTAL								**$915,594,414**	

ATTACHMENT C-7

Channel and Buyout Components – Plan Re-optimization

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

Channel and Non-Structural Components - Summary

Component	Description	Capital Cost ($1,000)
Channel Components		
TG.2	Channelization of E100-00-00 from Cole Creek to Gessner. ROW acquisition required. Bottom width 50 - 60 ft.	$33,382
TG.2A	Channelization of E100-00-00 from Cole Creek to Fairbanks N. Houston. ROW acquisition required. Bottom width 50 - 60 ft.	$24,881
TG.2B	Reoptimization of TG.2 - stop channel modification at E122-00-00.	$19,766
TG.2C	Reoptimization of TG.2 - stop channel modification at Vogel Creek.	$5,853
TG.8	Channelization of E100-00-00 from Cole Creek to Gessner within existing ROW; concrete-lining. Bottom width 80 - 90 ft. SS 2:1.	$96,364
TG.8A	Reoptimization of TG.8 - stop channel lining at Fairbanks-North Houston. Earthen channel upstream of Fairbanks-North Houston to Gessner.	$83,776
TG.8B	Reoptimization of TG.8 - stop channel lining at E122-00-00. Earthen channel upstream of E122-00-00 to Gessner.	$62,106
GE200.0	Channelization of E100-00-00 within existing ROW to remove sediment buildup.	$1,478
GE200.2	Channelization of E200-00-00 and E141-00-00 within existing ROW. Lower flowline by ~5-10 ft.	$7,419
GE200.5	Combination of GE200.0 and GE200.2	$8,857
GE200.7	Component GE200.0 w/side slope stability improvements.	$1,617
E200H.2	Channelization of E100-00-00 within existing ROW from E200-00-00 to N. Eldridge. Bottom width 50 - 80 ft.	$11,111
E200H.2A	Channelization of E100-00-00 within existing ROW from E200-00-00 to FM 1960. Bottom width 50 - 80 ft.	$8,840
E200H.2B	Reoptimization of E200H.2 - stop channel modifications at Jones Rd.	$7,267
E200H.3	Channelization of E100-00-00 within existing ROW from E200-00-00 to N. Eldridge. Bottom width 60 - 100 ft.	$16,372
E200H.3A	Reoptimization of E200H.3 - stop channel modifications at FM1960.	$13,208
E200H.3B	Reoptimization of E200H.3 - stop channel modifications at Jones Rd.	$9,332
Non-Structural Components		
NSB_T8J4G2 EH3T3-20%	Removal of Flooded Structures in TG8+JR4+GBW2+E200H3+TWLY3 Residual 20% Floodplain	$8,284
NSB_1	Removal of A Flooded Residential Complex with Positive Net Benefit	$3,208
ELEV_1	Elevating A Flooded Structure with Positive Net Benefit	$154

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.2 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+80)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$357,835**	**$0**
	Mobilization/Demobilization	1	LS	$230,978	$230,978	$0	0%	$230,978	
	Demolition/Removal of Buildings	24,026	SF	$4.40	$105,714	$21,143	20%	$126,857	
2	**Earthwork**							**$1,755,449**	**$0**
	Channel Excavation & Slope Stability	135,227	CY	$3	$405,681	$73,023	18%	$478,704	
	Haul 4.14 Miles	559,840	CYMI	$1.50	$839,760	$125,964	15%	$965,724	
	Disposal	135,227	CY	$2.00	$270,454	$40,568	15%	$311,022	
3	**Structures**							**$116,301**	**$0**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$147,486**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	1	EA	$5,405	$5,405	$1,081	20%		$6,486
	Wastewater Line (60")	1	EA	$94,000	$94,000	$18,800	20%		$112,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$2,351,386**	**$316,226**
8	**Engineering Design (12%)**							**$282,166**	**$37,947**
9	**Construction Mgmt. (10%)**							**$235,139**	**$31,623**
10	**Real Estate**							**$0**	**$2,589,677**
	R.O.W. Acquisition	1	LS	$218,123	$218,123	$54,531	25%		$272,654
	Administrative Fees	1	LS	$40,508	$40,508	$10,127	25%		$50,635
	Building - Fair Market Value	1.5	LS	$1,055,140	$1,582,710	$395,678	25%		$1,978,388
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.35	AC	$22,000	$7,625	$1,525	20%	**$9,150**	
TOTAL								**$2,877,841**	**$2,975,472**
GRAND TOTAL								**$5,853,313**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+80 to 771+29)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$943,315**	**$0**
	Mobilization/Demobilization	1	LS	$765,257	$765,257	$0	0%	$765,257	
	Demolition/Removal of Buildings	33,723	SF	$4.40	$148,381	$29,676	20%	$178,057	
2	**Earthwork**							**$3,809,270**	**$0**
	Channel Excavation & Slope Stability	295,401	CY	$3	$886,203	$159,517	18%	$1,045,720	
	Haul 4.1 Miles	1,208,190	CYMI	$1.50	$1,812,285	$271,843	15%	$2,084,128	
	Disposal	295,401	CY	$2.00	$590,802	$88,620	15%	$679,422	
3	**Structures**							**$205,621**	**$1,557,580**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	130	SF	$95	$12,350	$2,841	23%		$15,191
	Inwood C. C. Golf Cart	750	SF	$95	$71,250	$16,388	23%		$87,638
	Pipe Crossing	55	SF	$95	$5,225	$1,202	23%		$6,427
	Railway	900	SF	$105	$94,500	$21,735	23%		$116,235
	North Houston-Rosslyn	11,400	SF	$95	$1,083,000	$249,090	23%		$1,332,090
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,208,778**
	Water Line (12" STL)	2	EA	$23,500	$47,000	$9,400	20%		$56,400
	Water Lines (16" CI)	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Wastewater Line (=<12")	3	EA	$5,405	$16,215	$3,243	20%		$19,458
	Wastewater Line (14" to 16")	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$494,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$5,629,326**	**$3,142,808**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+80 to 771+29)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$675,519**	**$377,137**
9	**Construction Mgmt. (10%)**							**$562,933**	**$314,281**
10	**Real Estate**							**$0**	**$3,194,189**
	R.O.W. Acquisition	1	LS	$296,208	$296,208	$74,052	25%		$370,260
	Administrative Fees	1	LS	$69,594	$69,594	$17,398	25%		$86,992
	Building - Fair Market Value	1.5	LS	$1,242,100	$1,863,150	$465,788	25%		$2,328,938
	Relocation (homes)	17	EA	$20,000	$340,000	$68,000	20%		$408,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.61	AC	$22,000	$13,484	$2,697	20%	**$16,181**	
TOTAL								**$6,883,958**	**$7,028,415**
GRAND TOTAL								**$13,912,373**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.2 --- Channelization from E122-00-00 to E141-00-00 (771+29 to 935+34)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$920,669**	**$0**
	Mobilization/Demobilization	1	LS	$723,076	$723,076	$0	0%	$723,076	
	Demolition/Removal of Buildings	37,423	SF	$4.40	$164,661	$32,932	20%	$197,593	
2	**Earthwork**							**$2,484,504**	**$0**
	Channel Excavation	221,056	CY	$3	$663,168	$119,370	18%	$782,538	
	Haul 3.1 Miles	691,905	CYMI	$1.50	$1,037,858	$155,679	15%	$1,193,537	
	Disposal	221,056	CY	$2.00	$442,112	$66,317	15%	$508,429	
3	**Structures**							**$341,561**	**$896,824**
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Bridge Modifications (Extension)								
	Golf Cart	325	SF	$95	$30,875	$7,101	23%		$37,976
	Fairbanks-North Houston	7,350	SF	$95	$698,250	$160,598	23%		$858,848
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,896,710**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	5	EA	$5,405	$27,025	$5,405	20%		$32,430
	Telephone Lines (12 x 4" PVC in 24" STL pipe)	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$271,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	1	EA	$200,000	$200,000	$30,000	15%	$230,000	
SUBTOTAL								**$4,235,795**	**$3,915,634**
8	**Engineering Design (12%)**							**$508,295**	**$469,876**
9	**Construction Mgmt. (10%)**							**$423,580**	**$391,563**
10	**Real Estate**							**$0**	**$3,651,814**
	R.O.W. Acquisition	1	LS	$333,100	$333,100	$83,275	25%		$416,375
	Administrative Fees	1	LS	$56,502	$56,502	$14,125	25%		$70,627
	Building - Fair Market Value	1.5	LS	$1,444,700	$2,167,050	$541,763	25%		$2,708,813
	Relocation (homes)	19	EA	$20,000	$380,000	$76,000	20%		$456,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.75	AC	$22,000	$16,571	$3,314	20%	**$19,885**	
TOTAL								**$5,187,555**	**$8,428,888**
GRAND TOTAL								**$13,616,442**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.2A --- Channelization from E122-00-00 to Fairbanks N. Houston (771+29 to 87390)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$376,695**	**$0**
	Mobilization/Demobilization	1	LS	$376,695	$376,695	$0	0%	$376,695	
	Demolition/Removal of Buildings	0	SF	$4.40	$0	$0	20%	$0	
2	**Earthwork**							**$1,817,443**	**$0**
	Channel Excavation	161,705	CY	$3	$485,115	$87,321	18%	$572,436	
	Haul 3.1 Miles	506,137	CYMI	$1.50	$759,205	$113,881	15%	$873,086	
	Disposal	161,705	CY	$2.00	$323,410	$48,512	15%	$371,922	
3	**Structures**							**$234,084**	**$37,976**
	Backslope Swale	18,972	LF	$2	$37,944	$3,794	10%	$41,738	
	Backslope Drain (structure)	32	EA	$3,000	$94,860	$9,486	10%	$104,346	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	Bridge Modifications (Extension)								
	Golf Cart	325	SF	$95	$30,875	$7,101	23%		$37,976
	Fairbanks-North Houston	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$109,010**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	18	EA	$3,700	$66,600	$6,660	10%		$73,260
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$1,416,852**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	2	EA	$5,405	$10,810	$2,162	20%		$12,972
	Telephone Lines (12 x 4" PVC in 24" STL pipe)	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	8	EA	$92,000	$736,000	$147,200	20%		$883,200
	Gas/Petroleum Lines (8"-12")	0	EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$125,215**	**$0**
	Tree Planting	759	EA	$125	$94,860	$9,486	10%	$104,346	
	Shrub Planting	759	EA	$25	$18,972	$1,897	10%	$20,869	
7	**General Items**							**$26,369**	**$0**
	Stormwater Pollution Prevention	1	LS	$23,972	$23,972	$2,397	10%	$26,369	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$2,579,807**	**$1,563,838**
8	**Engineering Design (12%)**							**$309,577**	**$187,661**
9	**Construction Mgmt. (10%)**							**$257,981**	**$156,384**
10	**Real Estate**							**$0**	**$48,085**
	R.O.W. Acquisition	1	LS	$33,632	$33,632	$8,408	25%		$42,040
	Administrative Fees	1	LS	$4,836	$4,836	$1,209	25%		$6,045
11	**Environmental (Wetland Impacted) Mitigation**	0.47	AC	$22,000	$10,365	$2,073	20%	**$12,438**	
TOTAL								**$3,159,802**	**$1,955,968**
GRAND TOTAL								**$5,115,770**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.8 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+80)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,134,051**	**$0**
	Mobilization/Demobilization	1	LS	$1,134,051	$1,134,051	$0	0%	$1,134,051	
2	**Earthwork**							**$3,306,936**	**$0**
	Channel Excavation	238,705	CY	$3	$716,115	$128,901	18%	$845,016	
	Fill and Compaction (on-site fill)	33,237	CY	$4	$132,948	$19,942	15%	$152,890	
	Fill and Compaction (on-site soil replacement)	37,760	CY	$8.50	$320,960	$48,144	15%	$369,104	
	Haul 4.14 Miles	850,638	CYMI	$1.50	$1,275,956	$191,393	15%	$1,467,350	
	Disposal	205,468	CY	$2.00	$410,936	$61,640	15%	$472,576	
3	**Structures**							**$7,611,241**	**$0**
	Concrete Paving	170,340	SY	$40	$6,813,582	$681,358	10%	$7,494,940	
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$131,796**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	1	EA	$4,830	$4,830	$966	20%		$5,796
	Wastewater Line (60")	1	EA	$84,000	$84,000	$16,800	20%		$100,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$12,174,029**	**$300,536**
8	**Engineering Design (12%)**							**$1,460,884**	**$36,064**
9	**Construction Mgmt. (10%)**							**$1,217,403**	**$30,054**
10	**Environmental (Wetland Impacted) Mitigation**	211.08	AC	$22,000	$4,643,779	$928,756	20%	**$5,572,535**	
TOTAL								**$20,424,851**	**$366,654**
GRAND TOTAL								**$20,791,504**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.8 --- Channelization from Vogel Creek to E122-00-00 (637+83 to 771+35)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,996,877**	**$0**
	Mobilization/Demobilization	1	LS	$1,996,877	$1,996,877	$0	0%	$1,996,877	
2	**Earthwork**							**$4,725,549**	**$0**
	Channel Excavation	336,349	CY	$3	$1,009,047	$181,628	18%	$1,190,675	
	Fill and Compaction (on-site fill)	55,588	CY	$4	$222,352	$33,353	15%	$255,705	
	Fill and Compaction (on-site soil replacement)	66,760	CY	$8.50	$567,460	$85,119	15%	$652,579	
	Haul 4.1 Miles	1,148,312	CYMI	$1.50	$1,722,469	$258,370	15%	$1,980,839	
	Disposal	280,761	CY	$2.00	$561,522	$84,228	15%	$645,750	
3	**Structures**							**$13,456,739**	**$0**
	Concrete Paving	301,162	SY	$40	$12,046,471	$1,204,647	10%	$13,251,118	
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,198,908**
	Water Line (12" STL)	2	EA	$21,000	$42,000	$8,400	20%		$50,400
	Water Lines (16" CI)	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Wastewater Line (=<12")	3	EA	$4,830	$14,490	$2,898	20%		$17,388
	Wastewater Line (14" to 16")	1	EA	$6,300	$6,300	$1,260	20%		$7,560
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$34,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$20,390,285**	**$1,575,358**
8	**Engineering Design (12%)**							**$2,446,834**	**$189,043**
9	**Construction Mgmt. (10%)**							**$2,039,029**	**$157,536**
10	**Environmental (Wetland Impacted) Mitigation**	356.10	AC	$22,000	$7,834,110	$1,566,822	20%	**$9,400,932**	
TOTAL								**$34,277,080**	**$1,921,937**
GRAND TOTAL								**$36,199,017**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

TG.8 --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,162,811**	**$0**
	Mobilization/Demobilization	1	LS	$2,162,811	$2,162,811	$0	0%	$2,162,811	
2	**Earthwork**							**$4,330,881**	**$0**
	Channel Excavation	347,600	CY	$3	$1,042,800	$187,704	18%	$1,230,504	
	Fill and Compaction (on-site fill)	122,807	CY	$4	$491,228	$73,684	15%	$564,912	
	Fill and Compaction (on-site soil replacement)	82,325	CY	$8.50	$699,763	$104,964	15%	$804,727	
	Haul 3.1 Miles	703,602	CYMI	$1.50	$1,055,403	$158,310	15%	$1,213,714	
	Disposal	224,793	CY	$2.00	$449,586	$67,438	15%	$517,024	
3	**Structures**							**$14,025,805**	**$0**
	Concrete Paving	311,006	SY	$40	$12,440,222	$1,244,022	10%	$13,684,244	
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL pipe)	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$20,778,558**	**$3,012,360**
8	**Engineering Design (12%)**							**$2,493,427**	**$361,483**
9	**Construction Mgmt. (10%)**							**$2,077,856**	**$301,236**
10	**Environmental (Wetland Impacted) Mitigation**	392.00	AC	$22,000	$8,623,929	$1,724,786	20%	**$10,348,715**	
TOTAL								**$35,698,556**	**$3,675,079**
GRAND TOTAL								**$39,373,635**	

WHITE OAK BAYOU (E100-00-00) 211F GRR STUDY

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.8A --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,512,171**	**$0**
	Mobilization/Demobilization	1	LS	$1,512,171	$1,512,171	$0	0%	$1,512,171	
2	**Earthwork**							**$3,625,642**	**$0**
	Channel Excavation	286,285	CY	$3	$858,855	$154,594	18%	$1,013,449	
	Fill and Compaction (on-site fill)	17,929	CY	$4	$71,716	$10,757	15%	$82,473	
	Fill and Compaction (on-site soil replacement)	47,425	CY	$8.50	$403,113	$60,467	15%	$463,579	
	Haul 3.1 Miles	839,954	CYMI	$1.50	$1,259,931	$188,990	15%	$1,448,921	
	Disposal	268,356	CY	$2.00	$536,712	$80,507	15%	$617,219	
3	**Structures**							**$8,224,650**	**$0**
	Concrete Paving	179,161	SY	$40	$7,166,444	$716,644	10%	$7,883,089	
	Backslope Swale	32,930	LF	$2	$65,860	$6,586	10%	$72,446	
	Backslope Drain (structure)	55	EA	$3,000	$164,650	$16,465	10%	$181,115	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
4	**Outfall Modifications**							**$0**	**$122,100**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
5	**Utility Modifications**							**$0**	**$2,890,260**
	Water Line (12" STL)	1	EA	$21,000	$21,000	$4,200	20%		$25,200
	Wastewater Line (=<12")	5	EA	$4,830	$24,150	$4,830	20%		$28,980
	Telephone Lines (12 x 4" PVC in 24" STL pipe)	1	EA	$136,800	$136,800	$27,360	20%		$164,160
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	1	LS	$182,400	$182,400	$36,480	20%		$218,880
	Gas/Petroleum Lines (=<6")	20	EA	$92,000	$1,840,000	$368,000	20%		$2,208,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$217,338**	**$0**
	Tree Planting	1,317	EA	$125	$164,650	$16,465	10%	$181,115	
	Shrub Planting	1,317	EA	$25	$32,930	$3,293	10%	$36,223	
7	**General Items**							**$41,723**	**$0**
	Stormwater Pollution Prevention	1	LS	$37,930	$37,930	$3,793	10%	$41,723	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$13,621,524**	**$3,012,360**

WHITE OAK BAYOU (E100-00-00) 211F GRR STUDY

PRELIMINARY COST ESTIMATE FOR COMPONENT OPTIMIZATION

TG.8A --- Channelization from E122-00-00 to E141-00-00 (771+35 to 936+00)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$1,634,583**	**$361,483**
9	**Construction Mgmt. (10%)**							**$1,362,152**	**$301,236**
10	**Real Estate**							**$0**	**$42,460**
	R.O.W. Acquisition	1	LS	$33,632	$33,632	$8,408	25%		$42,040
	Administrative Fees	1	LS	$336	$336	$84	25%		$420
10	**Environmental (Wetland Impacted) Mitigation**	244.32	AC	$22,000	$5,375,093	$1,075,019	20%	**$6,450,112**	
TOTAL								**$23,068,370**	**$3,717,540**
GRAND TOTAL								**$26,785,910**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

(E100MIN) GE200.0 --- Channelization from Gessner to E200-00-00 (Sta. 935+34 to 1045+27)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$109,113**	**$0**
	Mobilization/Demobilization	1	LS	$109,113	$109,113	$0	0%	$109,113	
2	**Earthwork**							**$916,446**	**$0**
	Excavation within E100-00-00	90,268	CY	$3	$270,804	$48,745	18%	$319,549	
	Excavation within E141-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E200-00-00	0	CY	$3	$0	$0	18%	$0	
	Haul 2.5 Miles	225,670	CYMI	$1.50	$338,505	$50,776	15%	$389,281	
	Disposal	90,268	CY	$2.00	$180,536	$27,080	15%	$207,616	
3	**Structures**							**$0**	**$0**
	Sheet Piling for Inlet Structure	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Drop Structure	0	LS	$20,000	$0	$0	20%	$0	
	Sheet Piling for Transition Structure on E141-00-00	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Inlet Structure	0	LS	$25,000	$0	$0	20%	$0	
4	**Outfall Modifications**							**$0**	**$144,980**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	29	EA	$3,700	$107,300	$10,730	10%		$118,030
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")	0	EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")	0	EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")	0	EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")	0	EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")	0	EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$0**	**$0**
	Tree Planting	0	EA	$125	$0	$0	10%	$0	
	Shrub Planting	0	EA	$25	$0	$0	10%	$0	
7	**General Items**							**$29,700**	**$0**
	Stormwater Pollution Prevention	1	LS	$27,000	$27,000	$2,700	10%	$29,700	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$1,055,258**	**$144,980**
8	**Engineering Design (12%)**							**$126,631**	**$17,398**
9	**Construction Mgmt. (10%)**							**$105,526**	**$14,498**
10	**Environmental (Wetland Impacted) Mitigation**	0.50	AC	$22,000	$11,104	$2,221	20%	**$13,325**	
TOTAL								**$1,300,740**	**$176,876**
GRAND TOTAL								**$1,477,616**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

(BYP2) GE200.2 --- Channelization from Gessner to E200-00-00 (Sta. 935+34 to 1045+27)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$552,833**	**$0**
	Mobilization/Demobilization	1	LS	$552,833	$552,833	$0	0%	$552,833	
2	**Earthwork**							**$3,248,780**	**$0**
	Excavation within E100-00-00	0	CY	$3	$0	$0	18%	$0	
	Excavation within E141-00-00	139,415	CY	$3	$418,245	$75,284	18%	$493,529	
	Excavation within E200-00-00	180,583	CY	$3	$541,749	$97,515	18%	$639,264	
	Haul 2.5 Miles	799,995	CYMI	$1.50	$1,199,993	$179,999	15%	$1,379,991	
	Disposal	319,998	CY	$2.00	$639,996	$95,999	15%	$735,995	
3	**Structures**							**$778,650**	**$778,221**
	Backslope Swale	24,000	LF	$2	$48,000	$4,800	10%	$52,800	
	Backslope Drain (structure)	40	EA	$3,000	$120,000	$12,000	10%	$132,000	
	Sheet Piling for Inlet Structure	6,495	SF	$25	$162,375	$32,475	20%	$194,850	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Remove Existing Control Structure	1	LS	$80,000	$80,000	$16,000	20%	$96,000	
	Sheet Piling for Transition Structure on E141-00-00	8,300	SF	$25	$207,500	$41,500	20%	$249,000	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	3,700	SF	$95	$351,500	$80,845	23%		$432,345
	Mauna Loa	2,960	SF	$95	$281,200	$64,676	23%		$345,876
4	**Outfall Modifications**							**$0**	**$72,380**
	6" - 21" and backslope drain	0	EA	$3,000	$0	$0	10%		$0
	24" - 36"	9	EA	$3,700	$33,300	$3,330	10%		$36,630
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$158,400**	**$0**
	Tree Planting	960	EA	$125	$120,000	$12,000	10%	$132,000	
	Shrub Planting	960	EA	$25	$24,000	$2,400	10%	$26,400	
7	**General Items**							**$491,900**	**$0**
	Stormwater Pollution Prevention	1	LS	$29,000	$29,000	$2,900	10%	$31,900	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$5,230,563**	**$850,601**
8	**Engineering Design (12%)**							**$627,668**	**$102,072**
9	**Construction Mgmt. (10%)**							**$523,056**	**$85,060**
10	**Environmental Mitigation**							**$0**	
TOTAL								**$6,381,287**	**$1,037,733**
GRAND TOTAL								**$7,419,020**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

(BYP2A) GE200.5 --- Channelization fromGessner to E200-00-00 (Sta. 935+34 to 1045+27)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$658,976**	**$0**
	Mobilization/Demobilization	1	LS	$658,976	$658,976	$0	0%	$658,976	
2	**Earthwork**							**$4,165,226**	**$0**
	Excavation within E100-00-00	90,268	CY	$3	$270,804	$48,745	18%	$319,549	
	Excavation within E141-00-00	139,415	CY	$3	$418,245	$75,284	18%	$493,529	
	Excavation within E200-00-00	180,583	CY	$3	$541,749	$97,515	18%	$639,264	
	Haul 2.5 Miles	1,025,665	CYMI	$1.50	$1,538,498	$230,775	15%	$1,769,272	
	Disposal	410,266	CY	$2.00	$820,532	$123,080	15%	$943,612	
3	**Structures**							**$778,650**	**$778,221**
	Backslope Swale	24,000	LF	$2	$48,000	$4,800	10%	$52,800	
	Backslope Drain (structure)	40	EA	$3,000	$120,000	$12,000	10%	$132,000	
	Sheet Piling for Inlet Structure	6,495	SF	$25	$162,375	$32,475	20%	$194,850	
	Remove Existing Drop Structure	1	LS	$20,000	$20,000	$4,000	20%	$24,000	
	Remove Existing Control Structure	1	LS	$80,000	$80,000	$16,000	20%	$96,000	
	Sheet Piling for Transition Structure on E141-00-00	8,300	SF	$25	$207,500	$41,500	20%	$249,000	
	Remove Existing Inlet Structure	1	LS	$25,000	$25,000	$5,000	20%	$30,000	
	Bridge Modifications (Extension)								
	Philippine Street	3,700	SF	$95	$351,500	$80,845	23%		$432,345
	Mauna Loa	2,960	SF	$95	$281,200	$64,676	23%		$345,876
4	**Outfall Modifications**							**$0**	**$217,360**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	38	EA	$3,700	$140,600	$14,060	10%		$154,660
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")		EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")		EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")		EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")		EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")		EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$158,400**	**$0**
	Tree Planting	960	EA	$125	$120,000	$12,000	10%	$132,000	
	Shrub Planting	960	EA	$25	$24,000	$2,400	10%	$26,400	
7	**General Items**							**$491,900**	**$0**
	Stormwater Pollution Prevention	1	LS	$29,000	$29,000	$2,900	10%	$31,900	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$6,253,151**	**$995,581**
8	**Engineering Design (12%)**							**$750,378**	**$119,470**
9	**Construction Mgmt. (10%)**							**$625,315**	**$99,558**
10	**Environmental (Wetland Impacted) Mitigation**	0.50	AC	$22,000	$11,104	$2,221	20%	**$13,325**	
TOTAL								**$7,642,169**	**$1,214,609**
GRAND TOTAL								**$8,856,778**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

(E100MIN) GE200.0 --- Channelization from Gessner to E200-00-00 (Sta. 935+44 to 1045+27)

Analysis 4 Revised Cost Estimate for improvements between 1045+27 to 935+44;

Raised flow line between Sta. 104527 to Sta. 97546 and channel cleanout from Sta. 97546 to Sta. 93534

Item	Description	Fed (F)/ Non-Fed (N	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
							Amount	Percentage	Construction	LERRD
1	**Mobilization**								**$119,504**	**$0**
	Mobilization/Demobilization	F	1	LS	$119,504	$119,504	$0	0%	$119,504	
2	**Earthwork**								**$456,358**	**$0**
	Excavation within E100-00-00	F	56,300	CY	$3	$168,900	$30,402	18%	$199,302	
	Fill in eroded channel	F	35,000	CY	$4	$140,000	$25,200	18%	$165,200	
	Excavation within E141-00-00	F	0	CY	$3	$0	$0	18%	$0	
	Excavation within E200-00-00	F	0	CY	$3	$0	$0	18%	$0	
	Haul 2.5 Miles	F	53,250	CYMI	$1.50	$79,875	$11,981	15%	$91,856	
	Additional Fill	F		CY	$8.00	$0	$0	15%	$0	
3	**Structures**								**$564,000**	**$0**
	Sheet Piling for Inlet Structure	F	0	SF	$25	$0	$0	20%	$0	
	2-foot Gabion Walls	F	7,000	LF	$30	$210,000	$42,000	20%	$252,000	
	5-foot Gabion Walls	F	0	LF	$54	$0	$0	20%	$0	
	9" Gabion Mattress	F	16,000	SY	$16	$260,000	$52,000	20%	$312,000	
	Remove Existing Drop Structure	F	0	LS	$20,000	$0	$0	20%	$0	
	Sheet Piling for Transition Structure on	F	0	SF	$25	$0	$0	20%	$0	
	Remove Existing Inlet Structure	F	0	LS	$25,000	$0	$0	20%	$0	
4	**Outfall Modifications**								**$0**	**$144,980**
	6" - 21" and backslope drain	N	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	N	29	EA	$3,700	$107,300	$10,730	10%		$118,030
	42" - 60"	N	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	N	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**								**$0**	**$0**
	Wastewater Line (=<12")	N	0	EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")	N	0	EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")	N	0	EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")	N	0	EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")	N	0	EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**								**$0**	**$0**
	Tree Planting	F	0	EA	$125	$0	$0	10%	$0	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

(E100MIN) GE200.0 --- Channelization from Gessner to E200-00-00 (Sta. 935+44 to 1045+27)

Analysis 4 Revised Cost Estimate for improvements between 1045+27 to 935+44;

Raised flow line between Sta. 104527 to Sta. 97546 and channel cleanout from Sta. 97546 to Sta. 93534

Item	Description	Fed (F)/ Non-Fed (N	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
							Amount	Percentage	Construction	LERRD
	Shrub Planting	F	0	EA	$25	$0	$0	10%	$0	
7	**General Items**								**$29,700**	**$0**
	Stormwater Pollution Prevention	F	1	LS	$27,000	$27,000	$2,700	10%	$29,700	
	Traffic Control	F	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL									**$1,169,562**	**$144,980**
8	**Engineering Design (12%)**								**$140,347**	**$17,398**
9	**Construction Mgmt. (10%)**								**$116,956**	**$14,498**
10	**Environmental (Wetland Impacted) Mitigation**		0.50	AC	$22,000	$11,104	$2,221	20%	**$13,325**	
TOTAL									**$1,440,191**	**$176,876**
GRAND TOTAL									**$1,617,066**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.2 --- Channelization from E200-00-00 to Huffmeister (Sta. 1045+27 to 1253+44)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$826,030**	**$0**
	Mobilization/Demobilization	1	LS	$826,030	$826,030	$0	0%	$826,030	
2	**Earthwork**							**$1,878,136**	**$0**
	Channel Excavation	145,451	CY	$3	$436,353	$78,544	18%	$514,897	
	Haul 4.1 Miles	596,349	CYMI	$1.50	$894,524	$134,179	15%	$1,028,702	
	Disposal	145,451	CY	$2.00	$290,902	$43,635	15%	$334,537	
3	**Structures**							**$308,000**	**$2,304,282**
	Backslope Swale	40,000	LF	$2	$80,000	$8,000	10%	$88,000	
	Backslope Drain (structure)	67	EA	$3,000	$200,000	$20,000	10%	$220,000	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	9,600	SF	$95	$912,000	$209,760	23%		$1,121,760
	Pipeline	200	SF	$95	$19,000	$4,370	23%		$23,370
4	**Outfall Modifications**							**$0**	**$174,900**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$264,000**	**$0**
	Tree Planting	1,600	EA	$125	$200,000	$20,000	10%	$220,000	
	Shrub Planting	1,600	EA	$25	$40,000	$4,000	10%	$44,000	
7	**General Items**							**$969,500**	**$0**
	Stormwater Pollution Prevention	1	LS	$45,000	$45,000	$4,500	10%	$49,500	
	Traffic Control	4	EA	$200,000	$800,000	$120,000	15%	$920,000	
SUBTOTAL								**$4,245,666**	**$4,840,662**
8	**Engineering Design (12%)**							**$509,480**	**$580,879**
9	**Construction Mgmt. (10%)**							**$424,567**	**$484,066**
10	**Environmental (Wetland Impacted) Mitigation**	0.96	AC	$22,000	$21,027	$4,205	20%	**$25,233**	
TOTAL								**$5,204,945**	**$5,905,608**
GRAND TOTAL								**$11,110,553**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.2A --- Channelization from E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$657,130**	**$0**
	Mobilization/Demobilization	1	LS	$657,130	$657,130	$0	0%	$657,130	
2	**Earthwork**							**$1,658,049**	**$0**
	Channel Excavation	128,407	CY	$3	$385,220	$69,340	18%	$454,559	
	Haul 4.1 Miles	526,467	CYMI	$1.50	$789,700	$118,455	15%	$908,155	
	Disposal	128,407	CY	$2.00	$256,813	$38,522	15%	$295,335	
3	**Structures**							**$269,500**	**$1,182,522**
	Backslope Swale	35,000	LF	$2	$70,000	$7,000	10%	$77,000	
	Backslope Drain (structure)	58	EA	$3,000	$175,000	$17,500	10%	$192,500	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$134,750**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	15	EA	$3,700	$55,500	$5,550	10%		$61,050
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$231,000**	**$0**
	Tree Planting	1,400	EA	$125	$175,000	$17,500	10%	$192,500	
	Shrub Planting	1,400	EA	$25	$35,000	$3,500	10%	$38,500	
7	**General Items**							**$734,000**	**$0**
	Stormwater Pollution Prevention	1	LS	$40,000	$40,000	$4,000	10%	$44,000	
	Traffic Control	3	EA	$200,000	$600,000	$90,000	15%	$690,000	
SUBTOTAL								**$3,549,679**	**$3,678,752**
8	**Engineering Design (12%)**							**$425,961**	**$441,450**
9	**Construction Mgmt. (10%)**							**$354,968**	**$367,875**
10	**Environmental (Wetland Impacted) Mitigation**	0.83	AC	$22,000	$18,153	$3,631	20%	**$21,783**	
TOTAL								**$4,352,391**	**$4,488,077**
GRAND TOTAL								**$8,840,469**	

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White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.2B --- Channelization from E200-00-00 to Jones Rd. (Sta. 1045+27 to 1165+49)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$540,449**	**$0**
	Mobilization/Demobilization	1	LS	$540,449	$540,449	$0	0%	$540,449	
2	**Earthwork**							**$1,195,155**	**$0**
	Channel Excavation	92,558	CY	$3	$277,674	$49,981	18%	$327,655	
	Haul 4.1 Miles	379,488	CYMI	$1.50	$569,232	$85,385	15%	$654,616	
	Disposal	92,558	CY	$2.00	$185,116	$27,767	15%	$212,883	
3	**Structures**							**$177,870**	**$1,182,522**
	Backslope Swale	23,100	LF	$2	$46,200	$4,620	10%	$50,820	
	Backslope Drain (structure)	39	EA	$3,000	$115,500	$11,550	10%	$127,050	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$90,090**
	6" - 21" and backslope drain	11	EA	$3,000	$33,000	$3,300	10%		$36,300
	24" - 36"	7	EA	$3,700	$25,900	$2,590	10%		$28,490
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$2,115,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	6	EA	$92,000	$552,000	$110,400	20%		$662,400
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	3	EA	$113,000	$339,000	$67,800	20%		$406,800
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$152,460**	**$0**
	Tree Planting	924	EA	$125	$115,500	$11,550	10%	$127,050	
	Shrub Planting	924	EA	$25	$23,100	$2,310	10%	$25,410	
7	**General Items**							**$490,910**	**$0**
	Stormwater Pollution Prevention	1	LS	$28,100	$28,100	$2,810	10%	$30,910	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$2,556,844**	**$3,388,092**
8	**Engineering Design (12%)**							**$306,821**	**$406,571**
9	**Construction Mgmt. (10%)**							**$255,684**	**$338,809**
10	**Environmental (Wetland Impacted) Mitigation**	0.55	AC	$22,000	$12,143	$2,429	20%	**$14,572**	
TOTAL								**$3,133,922**	**$4,133,472**
GRAND TOTAL								**$7,267,394**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.3 --- Channelization from E200-00-00 to Huffmeister (Sta. 1045+27 to 1253+44)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,218,073**	**$0**
	Mobilization/Demobilization	1	LS	$1,218,073	$1,218,073	$0	0%	$1,218,073	
2	**Earthwork**							**$3,087,650**	**$0**
	Channel Excavation	239,121	CY	$3	$717,363	$129,125	18%	$846,488	
	Haul 4.1 Miles	980,396	CYMI	$1.50	$1,470,594	$220,589	15%	$1,691,183	
	Disposal	239,121	CY	$2.00	$478,242	$71,736	15%	$549,978	
3	**Structures**							**$308,000**	**$5,015,202**
	Backslope Swale	40,000	LF	$2	$80,000	$8,000	10%	$88,000	
	Backslope Drain (structure)	67	EA	$3,000	$200,000	$20,000	10%	$220,000	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	12,180	SF	$95	$1,157,100	$266,133	23%		$1,423,233
	FM1960	14,400	SF	$95	$1,368,000	$314,640	23%		$1,682,640
	Pipeline	300	SF	$95	$28,500	$6,555	23%		$35,055
4	**Outfall Modifications**							**$0**	**$174,900**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	20	EA	$3,700	$74,000	$7,400	10%		$81,400
	42" - 60"	8	EA	$4,500	$36,000	$3,600	10%		$39,600
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$264,000**	**$0**
	Tree Planting	1,600	EA	$125	$200,000	$20,000	10%	$220,000	
	Shrub Planting	1,600	EA	$25	$40,000	$4,000	10%	$44,000	
7	**General Items**							**$969,500**	**$0**
	Stormwater Pollution Prevention	1	LS	$45,000	$45,000	$4,500	10%	$49,500	
	Traffic Control	4	EA	$200,000	$800,000	$120,000	15%	$920,000	
SUBTOTAL								**$5,847,223**	**$7,551,582**
8	**Engineering Design (12%)**							**$701,667**	**$906,190**
9	**Construction Mgmt. (10%)**							**$584,722**	**$755,158**
10	**Environmental (Wetland Impacted) Mitigation**	0.96	AC	$22,000	$21,027	$4,205	20%	**$25,233**	
TOTAL								**$7,158,845**	**$9,212,930**
GRAND TOTAL								**$16,371,775**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.3A --- Channelization from E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$982,600**	**$0**
	Mobilization/Demobilization	1	LS	$982,600	$982,600	$0	0%	$982,600	
2	**Earthwork**							**$2,762,707**	**$0**
	Channel Excavation	213,956	CY	$3	$641,868	$115,536	18%	$757,404	
	Haul 4.1 Miles	877,220	CYMI	$1.50	$1,315,829	$197,374	15%	$1,513,204	
	Disposal	213,956	CY	$2.00	$427,912	$64,187	15%	$492,099	
3	**Structures**							**$269,500**	**$3,332,562**
	Backslope Swale	35,000	LF	$2	$70,000	$7,000	10%	$77,000	
	Backslope Drain (structure)	58	EA	$3,000	$175,000	$17,500	10%	$192,500	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	12,180	SF	$95	$1,157,100	$266,133	23%		$1,423,233
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$134,750**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	15	EA	$3,700	$55,500	$5,550	10%		$61,050
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$231,000**	**$0**
	Tree Planting	1,400	EA	$125	$175,000	$17,500	10%	$192,500	
	Shrub Planting	1,400	EA	$25	$35,000	$3,500	10%	$38,500	
7	**General Items**							**$734,000**	**$0**
	Stormwater Pollution Prevention	1	LS	$40,000	$40,000	$4,000	10%	$44,000	
	Traffic Control	3	EA	$200,000	$600,000	$90,000	15%	$690,000	
SUBTOTAL								**$4,979,807**	**$5,828,792**
8	**Engineering Design (12%)**							**$597,577**	**$699,455**
9	**Construction Mgmt. (10%)**							**$497,981**	**$582,879**
10	**Environmental (Wetland Impacted) Mitigation**	0.83	AC	$22,000	$18,153	$3,631	20%	**$21,783**	
TOTAL								**$6,097,147**	**$7,111,126**
GRAND TOTAL								**$13,208,273**	

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White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

E200H.3B --- Channelization from E200-00-00 to Jones Rd. (Sta. 1045+27 to 1165+49)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$694,313**	**$0**
	Mobilization/Demobilization	1	LS	$694,313	$694,313	$0	0%	$694,313	
2	**Earthwork**							**$2,006,990**	**$0**
	Channel Excavation	155,430	CY	$3	$466,290	$83,932	18%	$550,222	
	Haul 4.1 Miles	637,263	CYMI	$1.50	$955,895	$143,384	15%	$1,099,279	
	Disposal	155,430	CY	$2.00	$310,860	$46,629	15%	$357,489	
3	**Structures**							**$177,870**	**$1,909,329**
	Backslope Swale	23,100	LF	$2	$46,200	$4,620	10%	$50,820	
	Backslope Drain (structure)	39	EA	$3,000	$115,500	$11,550	10%	$127,050	
	Bridge Modifications (Extension)								
	West Rd.	9,900	SF	$95	$940,500	$216,315	23%		$1,156,815
	Rio Grande	4,200	SF	$95	$399,000	$91,770	23%		$490,770
	HL&P	2,240	SF	$95	$212,800	$48,944	23%		$261,744
	Jones	0	SF	$95	$0	$0	23%		$0
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$90,090**
	6" - 21" and backslope drain	11	EA	$3,000	$33,000	$3,300	10%		$36,300
	24" - 36"	7	EA	$3,700	$25,900	$2,590	10%		$28,490
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$2,115,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	6	EA	$92,000	$552,000	$110,400	20%		$662,400
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	3	EA	$113,000	$339,000	$67,800	20%		$406,800
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$152,460**	**$0**
	Tree Planting	924	EA	$125	$115,500	$11,550	10%	$127,050	
	Shrub Planting	924	EA	$25	$23,100	$2,310	10%	$25,410	
7	**General Items**							**$490,910**	**$0**
	Stormwater Pollution Prevention	1	LS	$28,100	$28,100	$2,810	10%	$30,910	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$3,522,543**	**$4,114,899**
8	**Engineering Design (12%)**							**$422,705**	**$493,788**
9	**Construction Mgmt. (10%)**							**$352,254**	**$411,490**
10	**Environmental (Wetland Impacted) Mitigation**	0.55	AC	$22,000	$12,143	$2,429	20%	**$14,572**	
TOTAL								**$4,312,074**	**$5,020,177**
GRAND TOTAL								**$9,332,251**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

NSB_T8J4G2EH3T3-20% - RESIDUAL NON-STRUCTURAL BUYOUTS

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Removal of Flooded Structures in TG8+JR4+GBW2+E200H3+TWLY3 Residual 20% Floodplain								
	Demolition/Removal of Buildings	88,186	SF	$4.40	$388,018	$77,604	20%	$465,622	
	ROW Acquisition	1	LS	$1,108,000	$1,108,000	$277,000	25%		$1,385,000
	Building - Fair Market Value	1.5	LS	$2,883,570	$4,325,355	$1,081,339	25%		$5,406,694
	Administrative Fees	1	LS	$91,834	$91,834	$22,958	25%		$114,792
	Relocation (homes)	24	EA	$20,000	$480,000	$96,000	20%		$576,000
	Relocation (apartments)	80	EA	$3,500	$280,000	$56,000	20%		$336,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Total							**$465,622**	**$7,818,486**
GRAND TOTAL								**$8,284,108**	

ATTACHMENT C-8

Detention Components – Plan Re-optimization

SUMMARY OF COMPONENT COSTS FOR PLAN TG.2-RF29 (2002 Unit Prices)

COMPONENT	COST
TG.2A1	$31,044,596.98
GE200.7A	$7,821,466.55
E200H2A	$8,840,468.88
JR.4	$17,193,306.44
HOL.3B	$23,672,745.34
GBW.3	$20,037,529.89
FNH.3	$45,224,055.74
RG.1	$9,865,867.72
NSB	$3,208,000.00
TOTAL COST	$166,908,037.53

Note 1 : A description of each component is contained in Section 5.1 of Vol. 1 White Oak Bayou GRR Main Report

Note 2 : All costs are based on year 2002 unit costs. More information on the unit costs and basis for the quantities, etc., are described in Section 3 of Appendix C- Cost Estimates for the White Oak Bayou GRR.

Note 3 : Component TG.2A1 consists of the 3 channel segments TG.2(CC), TG.2(VC) and TG.2A1

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+80)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$357,835**	**$0**
	Mobilization/Demobilization	1	LS	$230,978	$230,978	$0	0%	$230,978	
	Demolition/Removal of Buildings	24,026	SF	$4.40	$105,714	$21,143	20%	$126,857	
2	**Earthwork**							**$1,755,449**	**$0**
	Channel Excavation & Slope Stability	135,227	CY	$3	$405,681	$73,023	18%	$478,704	
	Haul 4.14 Miles	559,840	CYMI	$1.50	$839,760	$125,964	15%	$965,724	
	Disposal	135,227	CY	$2.00	$270,454	$40,568	15%	$311,022	
3	**Structures**							**$116,301**	**$0**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$147,486**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	1	EA	$5,405	$5,405	$1,081	20%		$6,486
	Wastewater Line (60")	1	EA	$94,000	$94,000	$18,800	20%		$112,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$2,351,386**	**$316,226**
8	**Engineering Design (12%)**							**$282,166**	**$37,947**
9	**Construction Mgmt. (10%)**							**$235,139**	**$31,623**
10	**Real Estate**							**$0**	**$2,589,677**
	R.O.W. Acquisition	1	LS	$218,123	$218,123	$54,531	25%		$272,654
	Administrative Fees	1	LS	$40,508	$40,508	$10,127	25%		$50,635
	Building - Fair Market Value	1.5	LS	$1,055,140	$1,582,710	$395,678	25%		$1,978,388
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.35	AC	$22,000	$7,625	$1,525	20%	**$9,150**	
TOTAL								**$2,877,841**	**$2,975,472**
GRAND TOTAL								**$5,853,313**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+80 to 771+29)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$943,315**	**$0**
	Mobilization/Demobilization	1	LS	$765,257	$765,257	$0	0%	$765,257	
	Demolition/Removal of Buildings	33,723	SF	$4.40	$148,381	$29,676	20%	$178,057	
2	**Earthwork**							**$3,809,270**	**$0**
	Channel Excavation & Slope Stability	295,401	CY	$3	$886,203	$159,517	18%	$1,045,720	
	Haul 4.1 Miles	1,208,190	CYMI	$1.50	$1,812,285	$271,843	15%	$2,084,128	
	Disposal	295,401	CY	$2.00	$590,802	$88,620	15%	$679,422	
3	**Structures**							**$205,621**	**$1,557,580**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	130	SF	$95	$12,350	$2,841	23%		$15,191
	Inwood C. C. Golf Cart	750	SF	$95	$71,250	$16,388	23%		$87,638
	Pipe Crossing	55	SF	$95	$5,225	$1,202	23%		$6,427
	Railway	900	SF	$105	$94,500	$21,735	23%		$116,235
	North Houston-Rosslyn	11,400	SF	$95	$1,083,000	$249,090	23%		$1,332,090
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,208,778**
	Water Line (12" STL)	2	EA	$23,500	$47,000	$9,400	20%		$56,400
	Water Lines (16" CI)	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Wastewater Line (=<12")	3	EA	$5,405	$16,215	$3,243	20%		$19,458
	Wastewater Line (14" to 16")	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$494,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$5,629,326**	**$3,142,808**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+80 to 771+29)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$675,519**	**$377,137**
9	**Construction Mgmt. (10%)**							**$562,933**	**$314,281**
10	**Real Estate**							**$0**	**$3,194,189**
	R.O.W. Acquisition	1	LS	$296,208	$296,208	$74,052	25%		$370,260
	Administrative Fees	1	LS	$69,594	$69,594	$17,398	25%		$86,992
	Building - Fair Market Value	1.5	LS	$1,242,100	$1,863,150	$465,788	25%		$2,328,938
	Relocation (homes)	17	EA	$20,000	$340,000	$68,000	20%		$408,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.61	AC	$22,000	$13,484	$2,697	20%	**$16,181**	
TOTAL								**$6,883,958**	**$7,028,415**
GRAND TOTAL								**$13,912,373**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2A --- Channelization from E122-00-00 to Fairbanks N. Houston (771+29 to 87390)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$831,435**	**$0**
	Mobilization/Demobilization	1	LS	$831,435	$831,435	$0	0%	$831,435	
	Demolition/Removal of Buildings	0	SF	$4.40	$0	$0	20%	$0	
2	**Earthwork**							**$4,670,092**	**$0**
	Channel Excavation	419,838	CY	$3	$1,259,514	$226,713	18%	$1,486,227	
	Haul 3.1 Miles	1,274,190	CYMI	$1.50	$1,911,285	$286,693	15%	$2,197,978	
	Disposal	411,029	CY	$2.00	$822,058	$123,309	15%	$945,367	
	Fill Placement & Compaction; Complete In Place	8,809	C.Y.	$4.00	$35,236	$5,285.40	15%	$40,521	
3	**Structures**							**$646,518**	**$37,976**
	Backslope Swale	53,032	LF	$2	$106,064	$10,606	10%	$116,670	
	Backslope Drain (structure)	88	EA	$3,000	$265,160	$26,516	10%	$291,676	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	5" Slope Paving	$3,413	SY	$40.00	$136,520	$13,652	10%	$150,172	
	Bridge Modifications (Extension)								
	Golf Cart	325	SF	$95	$30,875	$7,101	23%		$37,976
	Fairbanks-North Houston	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$150,260**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	18	EA	$3,700	$66,600	$6,660	10%		$73,260
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	Reconstruct 18" CMP Outfall Pipe	2	EA.	$3,700	$7,400	$740	10%		$8,140
	Reconstruct 24" CMP Outfall Pipe	3	EA.	$3,700	$11,100	$1,110	10%		$12,210
	Reconstruct 48" CMP Outfall Pipe	1	EA.	$4,500	$4,500	$450	10%		$4,950
	Reconstruct 60" CMP Outfall Pipe	1	EA.	$4,500	$4,500	$450	10%		$4,950
	Reconstruct 66" CMP Outfall Pipe	1	EA.	$5,000	$5,000	$500	10%		$5,500
	Reconstruct 72" CMP Outfall Pipe	1	EA.	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$2,409,776**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	2	EA	$5,405	$10,810	$2,162	20%		$12,972
	Wastewater Line (<=12")	5,880	L.F.	$23.00	$135,240	$13,524	10%		$148,764
	Wastewater Line (14" to 16")	100	L.F.	$30.00	$3,000	$300	10%		$3,300
	Wastewater Line (18" to 21")	2,130	L.F.	$40.00	$85,200	$8,520	10%		$93,720
	Wastewater Line (24" to 27")	140	L.F.	$50.00	$7,000	$700	10%		$7,700
	Telephone Lines (12 x 4" PVC in 24" STL pipe)	2	EA	$136,800	$273,600	$54,720	20%		$328,320
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	2	LS	$182,400	$364,800	$72,960	20%		$437,760
	Gas/Petroleum Lines (=<6")	10	EA	$92,000	$920,000	$184,000	20%		$1,104,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$342,540**	**$0**
	Tree Planting	2,067	EA	$125	$258,375	$25,838	10%	$284,213	
	Shrub Planting	2,121	EA	$25	$53,025	$5,303	10%	$58,328	
7	**General Items**							**$106,801**	**$0**
	Stormwater Pollution Prevention	1	LS	$97,092	$97,092	$9,709	10%	$106,801	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$6,597,387**	**$2,598,012**
8	**Engineering Design (12%)**							**$791,686**	**$311,761**
9	**Construction Mgmt. (10%)**							**$659,739**	**$259,801**
10	**Real Estate**							**$0**	**$48,085**
	R.O.W. Acquisition	1	LS	$33,632	$33,632	$8,408	25%		$42,040
	Administrative Fees	1	LS	$4,836	$4,836	$1,209	25%		$6,045
11	**Environmental (Wetland Impacted) Mitigation**	0.47	AC	$22,000	$10,365	$2,073	20%	**$12,438**	
TOTAL								**$8,061,250**	**$3,217,660**
GRAND TOTAL								**$11,278,910**	

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PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

RG.1 --- DETENTION AT RIO GRANDE (NORTH BASIN, 277 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$622,000**	
	Mobilization/Demobilization	1	LS	$622,000	$622,000	$0	0%	$622,000	
2	**Earthwork**							**$5,749,955**	
	Clearing and Grubbing	26.3	AC	$3,500	$92,162	$13,824	15%	$105,986	
	Excavation	446,893	CY	$3	$1,340,680	$201,102	15%	$1,541,782	
	Haul 4 Miles	1,787,573	CYMI	$1.50	$2,681,360	$402,204	15%	$3,083,564	
	Disposal	446,893	CY	$1.82	$813,346	$122,002	15%	$935,348	
	Turf Establishment	29.0	AC	$2,500	$72,413	$10,862	15%	$83,275	
3	**Structures**							**$384,145**	
	Backslope Swale	5,000	LF	$2	$10,000	$1,000	10%	$11,000	
	Backslope Drains (structure)	9	EA	$3,000	$27,000	$2,700	10%	$29,700	
	Backslope Drains (24" RCP)	630	LF	$55	$34,650	$3,465	10%	$38,115	
	Sheet Piling for Inlet Structure	5,430	SF	$25	$135,750	$13,575	10%	$149,325	
	48" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	300	CY	$400	$120,000	$12,000	10%	$132,000	
	Flap Gate (48")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$11,000**	
	Stormwater Pollution Prevention	1	LS	$10,000	$10,000	$1,000	10%	$11,000	
5	**Aesthetic Improvements**							**$70,021**	
	Tree Planting	439	EA	$120	$52,680	$5,268	10%	$57,948	
	Shrub Planting	439	EA	$25	$10,975	$1,098	10%	$12,073	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$6,837,121**	**$0**
7	**Engineering Design (12%)**							**$820,455**	**$0**
8	**Construction Mgmt. (10%)**							**$683,712**	**$0**
9	**Real Estate**							**$0**	**$1,524,580**
	R.O.W. Acquisition	0.58	LS	$2,600,000	$1,508,000	$0	0%		$1,508,000
	Administrative Fees	1	LS	$16,580	$16,580	$0	0%		$16,580
10	**Environmental Mitigation**							**$0**	
TOTAL								**$8,341,288**	**$1,524,580**
GRAND TOTAL								**$9,865,868**	

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PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

FNH.3 --- DETENTION AT FAIRBANKS-NORTH HOUSTON (NORTH, SOUTH & WEST BASINS, 1717 AC-FT)

ADDITION OF WEST BASIN TO FNH.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,923,860**	
	Mobilization/Demobilization	1	LS	$2,826,000	$2,826,000	$0	0%	$2,826,000	
	Demolition/Removal of Buildings	18,082	SF	$4.40	$79,561	$18,299	23%	$97,860	
2	**Earthwork**							**$25,449,816**	
	Clearing and Grubbing	90.0	AC	$2,976	$267,800	$40,170	15%	$307,970	
	Excavation	2,142,507	CY	$3	$6,427,521	$964,128	15%	$7,391,649	
	Haul 3.13 Miles	2,252,181	CYMI	$1.50	$3,378,272	$506,741	15%	$3,885,012	
	Haul 3.52 Miles	5,008,820	CYMI	$1.50	$7,513,231	$1,126,985	15%	$8,640,215	
	Disposal	2,142,507	CY	$1.97	$4,220,739	$633,111	15%	$4,853,850	
	Turf Establishment	129.1	AC	$2,500	$322,713	$48,407	15%	$371,119	
3	**Structures**							**$1,686,403**	
	Backslope Swale	17,000	LF	$2	$34,000	$3,400	10%	$37,400	
	Backslope Drains (structure)	30	EA	$3,000	$90,000	$9,000	10%	$99,000	
	Backslope Drains (24" RCP)	2,100	LF	$55	$115,500	$11,550	10%	$127,050	
	Sheet Piling for Inlet Structure	22,635	SF	$25	$565,875	$56,588	10%	$622,463	
	60" RCP (outfall pipe)	450	LF	$135	$60,750	$6,075	10%	$66,825	
	Riprap	285	SY	$35	$9,969	$997	10%	$10,966	
	Concrete Pilot Flow Channel	1,575	CY	$400	$630,000	$63,000	10%	$693,000	
	Flap Gate (60")	3	EA	$9,000	$27,000	$2,700	10%	$29,700	
4	**General Items**							**$35,200**	
	Stormwater Pollution Prevention	1	LS	$32,000	$32,000	$3,200	10%	$35,200	
5	**Vegetation Recovery**							**$835,504**	
	Tree Planting	5,238	EA	$120	$628,592	$62,859	10%	$691,452	
	Shrub Planting	5,238	EA	$25	$130,957	$13,096	10%	$144,052	
6	**Remove & Replace Utilities**							**$0**	**$240,000**
	Utility Lines	1	LS	$200,000	$200,000	$40,000	20%		$240,000
SUBTOTAL								**$30,930,783**	**$240,000**
7	**Engineering Design (12%)**							**$3,711,694**	**$28,800**
8	**Construction Mgmt. (10%)**							**$3,093,078**	**$24,000**
9	**Real Estate**							**$0**	**$7,124,420**
	R.O.W. Acquisition	1	LS	$5,258,839.90	$5,258,840	$432,784	25%		$5,691,624
	Administrative Fees	1	LS	$92,940	$92,940	$13,658	25%		$106,598
	Relocation (homes)	11	EA	$20,000	$220,000	$44,000	20%		$264,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Building - Fair Market Value	1.5	LS	$590,110.00	$885,165	$177,033	20%		$1,062,198
10	**Environmental (Wetland Impacted) Mitigation**	3	AC	$22,000	$59,400	$11,880	20%	**$71,280**	
TOTAL								**$37,806,836**	**$7,417,220**
FNH.3 GRAND TOTAL								**$45,224,056**	

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PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

GBW.3 --- DETENTION AT GESSNER/BELTWAY8 (N+SW+SE OF BAYOU AND SOUTH OF BROOKRIVER BASINS, 437 AC-FT)

ADDITION OF SOUTH BROOKRIVER BASIN TO GBW.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,074,917**	
	Mobilization/Demobilization	1	LS	$966,000	$966,000	$0	0%	$966,000	
	Demolition/Removal of Buildings	20,125	SF	$4.40	$88,550	$20,367	23%	$108,917	
2	**Earthwork**							**$8,576,660**	
	Clearing and Grubbing	49.2	AC	$3,500	$172,060	$25,809	15%	$197,869	
	Excavation	837,320	CY	$3	$2,511,961	$376,794	15%	$2,888,755	
	Haul 2.38 Miles	1,992,822	CYMI	$1.50	$2,989,234	$448,385	15%	$3,437,619	
	Disposal	837,320	CY	$1.97	$1,649,521	$247,428	15%	$1,896,949	
	Turf Establishment	54.1	AC	$2,500	$135,190	$20,279	15%	$155,469	
3	**Structures**							**$812,155**	
	Backslope Swale	12,000	LF	$2	$24,000	$2,400	10%	$26,400	
	Backslope Drains (structure)	20	EA	$3,000	$60,000	$6,000	10%	$66,000	
	Backslope Drains (24" RCP)	1,400	LF	$55	$77,000	$7,700	10%	$84,700	
	Sheet Piling for Inlet Structure	5,180	SF	$25	$129,500	$12,950	10%	$142,450	
	36" CMP (outfall pipe)	200	LF	$90	$18,000	$1,800	10%	$19,800	
	36" RCP	1,450	LF	$70	$101,500	$10,150	10%	$111,650	
	48" RCP	200	LF	$100	$20,000	$2,000	10%	$22,000	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	750	CY	$400	$300,000	$30,000	10%	$330,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$29,700**	
	Stormwater Pollution Prevention	1	LS	$27,000	$27,000	$2,700	10%	$29,700	
5	**Aesthetic Improvements**							**$186,084**	
	Tree Planting	1,167	EA	$120	$140,000	$14,000	10%	$154,000	
	Shrub Planting	1,167	EA	$25	$29,167	$2,917	10%	$32,083	
6	**Remove & Replace Utilities**							**$0**	**$52,920**
	Utility Lines	1	LS	$44,100	$44,100	$8,820	20%		$52,920
SUBTOTAL								**$10,679,516**	**$52,920**
7	**Engineering Design (12%)**							**$1,281,542**	**$6,350**
8	**Construction Mgmt. (10%)**							**$1,067,952**	**$5,292**
9	**Real Estate**							**$0**	**$6,884,558**
	R.O.W. Acquisition	1.00	LS	$5,176,400	$5,176,400	$553,210	10%		$5,729,610
	Administrative Fees	1	LS	$73,914	$73,914	$18,479	25%		$92,393
	Relocation (businesses)	20,125	SF	$3.50	$70,438	$14,088	20%		$84,525
	Building - Fair Market Value	1.5	LS	$543,350.00	$815,025	$163,005	20%		$978,030
10	**Environmental (Wetland Impacted) Mitigation**	2.25	AC	$22,000	$49,500	$9,900	20%	**$59,400**	
TOTAL								**$13,088,410**	**$6,949,120**
SOUTH BROOKRIVER BASIN GRAND TOTAL								**$20,037,530**	

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PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

HOL.3b --- DETENTION AT HOLLISTER ROAD (522 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,144,000**	
	Mobilization/Demobilization	1	LS	$1,144,000	$1,144,000	$0	0%	$1,144,000	
2	**Earthwork**							**$14,236,380**	
	Clearing and Grubbing	66.9	AC	$3,500	$234,115	$35,117	15%	$269,232	
	Excavation	1,177,733	CY	$3	$3,533,200	$529,980	15%	$4,063,180	
	Haul 3.52 Miles	4,145,621	CYMI	$1.50	$6,218,432	$932,765	15%	$7,151,197	
	Disposal	1,177,733	CY	$1.97	$2,320,135	$348,020	15%	$2,668,155	
	Turf Establishment	73.6	AC	$1,000	$73,579	$11,037	15%	$84,616	
3	**Structures**							**$637,048**	
	Backslope Swale	11,300	LF	$2	$22,600	$2,260	10%	$24,860	
	Backslope Drains (structure)	19	EA	$830	$15,770	$1,577	10%	$17,347	
	Backslope Drains (24" RCP)	1,330	LF	$40	$53,200	$5,320	10%	$58,520	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	230	SY	$35	$8,065	$806	10%	$8,871	
	Concrete Pilot Flow Channel	775	CY	$400	$310,000	$31,000	10%	$341,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$17,930**	
	Stormwater Pollution Prevention	1	LS	$16,300	$16,300	$1,630	10%	$17,930	
5	**Vegetation Recovery**							**$381,125**	
	Tree Planting	2,310	EA	$125	$288,731	$28,873	10%	$317,604	
	Shrub Planting	2,310	EA	$25	$57,746	$5,775	10%	$63,521	
6	**Remove & Replace Utilities**							**$0**	**$120,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$120,000
SUBTOTAL								**$16,416,483**	**$120,000**
7	**Engineering Design (12%)**							**$1,969,978**	**$14,400**
8	**Construction Mgmt. (10%)**							**$1,641,648**	**$12,000**
9	**Real Estate**							**$0**	**$3,404,648**
	R.O.W. Acquisition	1	LS	$3,369,453	$3,369,453	$0	0%		$3,369,453
	Administrative Fees	1	LS	$35,195	$35,195	$0	0%		$35,195
10	**Environmental (Wetland Impacted) Mitigation**	3.545	AC	$22,000	$77,990	$15,598	20%	**$93,588**	
TOTAL								**$20,121,698**	**$3,551,048**
GRAND TOTAL								**$23,672,745**	

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PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

JR.4 --- DETENTION AT JONES ROAD (WEST OF JONES, NORTH AND SOUTH OF PIPELINE, 420 AC-FT)

ADDITION OF 200 AC-FT TO JR.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$984,000**	
	Mobilization/Demobilization	1	LS	$984,000	$984,000	$0	0%	$984,000	
2	**Earthwork**							**$8,544,247**	
	Clearing and Grubbing	45.0	AC	$3,500	$157,500	$23,625	15%	$181,125	
	Excavation	677,600	CY	$3	$2,032,800	$304,920	15%	$2,337,720	
	Haul 3.84 Miles	2,601,984	CYMI	$1.50	$3,902,976	$585,446	15%	$4,488,422	
	Disposal	666,307	CY	$1.82	$1,212,679	$181,902	15%	$1,394,581	
	Turf Establishment	49.5	AC	$2,500	$123,750	$18,563	15%	$142,399	
3	**Structures**							**$937,141**	
	Backslope Swale	13,500	LF	$2	$27,000	$2,700	10%	$29,700	
	Backslope Drains (structure)	23	EA	$3,000	$69,000	$6,900	10%	$75,900	
	Backslope Drains (24" RCP)	1,610	LF	$55	$88,550	$8,855	10%	$97,405	
	Sheet Piling for Inlet Structure	9,590	SF	$25	$239,750	$23,975	10%	$263,725	
	36" CMP (outfall pipe)	300	LF	$90	$27,000	$2,700	10%	$29,700	
	60" CMP	600	LF	$120	$72,000	$7,200	10%	$79,200	
	Riprap	190	SY	$35	$6,646	$665	10%	$7,311	
	Concrete Pilot Flow Channel	780	CY	$400	$312,000	$31,200	10%	$343,200	
	Flap Gate (36")	2	EA	$5,000	$10,000	$1,000	10%	$11,000	
4	**General Items**							**$31,350**	
	Stormwater Pollution Prevention	1	LS	$28,500	$28,500	$2,850	10%	$31,350	
5	**Aesthetic Improvements**							**$314,164**	
	Tree Planting	1,970	EA	$120	$236,362	$23,636	10%	$259,998	
	Shrub Planting	1,970	EA	$25	$49,242	$4,924	10%	$54,166	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$10,810,902**	**$0**
7	**Engineering Design (12%)**							**$1,297,308**	**$0**
8	**Construction Mgmt. (10%)**							**$1,081,090**	**$0**
9	**Real Estate**							**$0**	**$4,004,006**
	R.O.W. Acquisition	1	LS	$3,937,290.00	$3,937,290	$0	0%		$3,937,290
	Administrative Fees	1	LS	$53,373	$53,373	$13,343	25%		$66,716
10	**Environmental Mitigation**							**$0**	
TOTAL								**$13,189,300**	**$4,004,006**
JR4 GRAND TOTAL								**$17,193,306**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

E200H.2A --- Channelization from E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$657,130**	**$0**
	Mobilization/Demobilization	1	LS	$657,130	$657,130	$0	0%	$657,130	
2	**Earthwork**							**$1,658,049**	**$0**
	Channel Excavation	128,407	CY	$3	$385,220	$69,340	18%	$454,559	
	Haul 4.1 Miles	526,467	CYMI	$1.50	$789,700	$118,455	15%	$908,155	
	Disposal	128,407	CY	$2.00	$256,813	$38,522	15%	$295,335	
3	**Structures**							**$269,500**	**$1,182,522**
	Backslope Swale	35,000	LF	$2	$70,000	$7,000	10%	$77,000	
	Backslope Drain (structure)	58	EA	$3,000	$175,000	$17,500	10%	$192,500	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$134,750**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	15	EA	$3,700	$55,500	$5,550	10%		$61,050
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$231,000**	**$0**
	Tree Planting	1,400	EA	$125	$175,000	$17,500	10%	$192,500	
	Shrub Planting	1,400	EA	$25	$35,000	$3,500	10%	$38,500	
7	**General Items**							**$734,000**	**$0**
	Stormwater Pollution Prevention	1	LS	$40,000	$40,000	$4,000	10%	$44,000	
	Traffic Control	3	EA	$200,000	$600,000	$90,000	15%	$690,000	
SUBTOTAL								**$3,549,679**	**$3,678,752**
8	**Engineering Design (12%)**							**$425,961**	**$441,450**
9	**Construction Mgmt. (10%)**							**$354,968**	**$367,875**
10	**Environmental (Wetland Impacted) Mitigation**	0.83	AC	$22,000	$18,153	$3,631	20%	**$21,783**	
TOTAL								**$4,352,391**	**$4,488,077**
GRAND TOTAL								**$8,840,469**	

5/27/2010
E200H.2AAttachment C-8 new2010.xls

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

(E100MIN) GE200.7 --- Channelization from Gessner to E200-00-00 (Sta. 935+44 to 1045+27)

Analysis 4 Revised Cost Estimate for improvements between 1045+27 to 935+44;

Raised flow line between Sta. 104527 to Sta. 97546 and channel cleanout from Sta. 97546 to Sta. 93534

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$581,829**	**$0**
	Mobilization/Demobilization	1	LS	$581,829	$581,829	$0	0%	$581,829	
2	**Earthwork**							**$4,676,919**	**$0**
	Excavation within E100-00-00	56,300	CY	$3	$168,900	$30,402	18%	$199,302	
	Fill in eroded channel	35,000	CY	$4	$140,000	$25,200	18%	$165,200	
	Excavation within E141-00-00 and E200	344,257	CY	$3	$1,032,771	$185,899	18%	$1,218,670	
	Fill Placement & Compaction; Complete	37,750	C.Y.	$4.00	$151,000	$22,650.00	15%	$173,650	
	Disposal of Excavated material	327,807	C.Y.	$2.00	$655,614	$98,342.10	15%	$753,956	
	Haul 2.5 Miles	140,750	CYMI	$1.50	$211,125	$31,669	15%	$242,794	
	Haul 3.5 Miles	1,114,984	CYMI	$1.50	$1,672,476	$250,871	15%	$1,923,348	
3	**Structures**							**$749,339**	**$0**
	Backslope Interceptor Structures; Comp	40	EA.	$3,000.00	$120,350	$12,035.00	10%	$132,385.00	
	Backslope Swales; Complete In Place	24,070	L.F.	$2.00	$48,140	$4,814.00	10%	$52,954.00	
	2-foot Gabion Walls	7,000	LF	$30	$210,000	$42,000	20%	$252,000	
	9" Gabion Mattress	16,000	SY	$16	$260,000	$52,000	20%	$312,000	
4	**Outfall Modifications**							**$0**	**$144,980**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	29	EA	$3,700	$107,300	$10,730	10%		$118,030
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")	0	EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")	0	EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")	0	EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")	0	EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")	0	EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$158,895**	**$0**
	Tree Planting	963	EA	$125	$120,375	$12,038	10%	$132,413	
	Shrub Planting	963	EA	$25	$24,075	$2,408	10%	$26,483	
7	**General Items**							**$88,154**	**$0**
	Stormwater Pollution Prevention	1	LS	$80,140	$80,140	$8,014	10%	$88,154	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$6,255,136**	**$144,980**
8	**Engineering Design (12%)**							**$750,616**	**$17,398**
9	**Construction Mgmt. (10%)**							**$625,514**	**$14,498**
10	**Environmental (Wetland Impacted) Mitigation**	0.50	AC	$22,000	$11,104	$2,221	20%	**$13,325**	
TOTAL								**$7,644,591**	**$176,876**
GRAND TOTAL								**$7,821,467**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

NSB_T8J4G2EH3T3-20% - RESIDUAL NON-STRUCTURAL BUYOUTS

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
	Removal of Flooded Structures in TG8+JR4+GBW2+E200H3+TWLY3 Residual 20% Floodplain								
	Demolition/Removal of Buildings	88,186	SF	$4.40	$388,018	$77,604	20%	$465,622	
	ROW Acquisition	1	LS	$1,108,000	$1,108,000	$277,000	25%		$1,385,000
	Building - Fair Market Value	1.5	LS	$2,883,570	$4,325,355	$1,081,339	25%		$5,406,694
	Administrative Fees	1	LS	$91,834	$91,834	$22,958	25%		$114,792
	Relocation (homes)	24	EA	$20,000	$480,000	$96,000	20%		$576,000
	Relocation (apartments)	80	EA	$3,500	$280,000	$56,000	20%		$336,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Total							**$465,622**	**$7,818,486**
GRAND TOTAL								**$8,284,108**	

ATTACHMENT C-8.a

Cost Estimate – Unit Price Estimate RF-30 LA NSB1

SUMMARY OF COMPONENT COSTS FOR PLAN TG.2-RF30 LANSBI (2002 Unit Prices)

COMPONENT	COST
TG.2A1	$31,044,596.98
GE200.7A	$7,821,466.55
E200H2A	$8,840,468.88
JR.4	$17,193,306.44
HOL.3B	$23,672,745.34
GBW.3	$20,037,529.89
FNH.3	$45,224,055.74
TOTAL COST	$153,834,169.81

Note 1 : A description of each component is contained in Section 5.1 of Vol. 1 White Oak Bayou GRR Main Report

Note 2 : All costs are based on year 2002 unit costs. More information on the unit costs and basis for the quantities, etc., are described in Section 3 of Appendix C- Cost Estimates for the White Oak Bayou GRR.

Note 3 : Component TG.2A1 consists of the 3 channel segments TG.2(CC), TG.2(VC) and TG.2A1

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2 --- Channelization from Cole Creek to Vogel Creek (562+31 to 637+80)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$357,835**	**$0**
	Mobilization/Demobilization	1	LS	$230,978	$230,978	$0	0%	$230,978	
	Demolition/Removal of Buildings	24,026	SF	$4.40	$105,714	$21,143	20%	$126,857	
2	**Earthwork**							**$1,755,449**	**$0**
	Channel Excavation & Slope Stability	135,227	CY	$3	$405,681	$73,023	18%	$478,704	
	Haul 4.14 Miles	559,840	CYMI	$1.50	$839,760	$125,964	15%	$965,724	
	Disposal	135,227	CY	$2.00	$270,454	$40,568	15%	$311,022	
3	**Structures**							**$116,301**	**$0**
	Backslope Swale	15,104	LF	$2	$30,208	$3,021	10%	$33,229	
	Backslope Drain (structure)	25	EA	$3,000	$75,520	$7,552	10%	$83,072	
4	**Outfall Modifications**							**$0**	**$168,740**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	27	EA	$3,700	$99,900	$9,990	10%		$109,890
	42" - 60"	5	EA	$4,500	$22,500	$2,250	10%		$24,750
	66" - 84"	5	EA	$5,000	$25,000	$2,500	10%		$27,500
5	**Utility Modifications**							**$0**	**$147,486**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	1	EA	$5,405	$5,405	$1,081	20%		$6,486
	Wastewater Line (60")	1	EA	$94,000	$94,000	$18,800	20%		$112,800
6	**Vegetation Recovery**							**$99,686**	**$0**
	Tree Planting	604	EA	$125	$75,520	$7,552	10%	$83,072	
	Shrub Planting	604	EA	$25	$15,104	$1,510	10%	$16,614	
7	**General Items**							**$22,114**	**$0**
	Stormwater Pollution Prevention	1	LS	$20,104	$20,104	$2,010	10%	$22,114	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$2,351,386**	**$316,226**
8	**Engineering Design (12%)**							**$282,166**	**$37,947**
9	**Construction Mgmt. (10%)**							**$235,139**	**$31,623**
10	**Real Estate**							**$0**	**$2,589,677**
	R.O.W. Acquisition	1	LS	$218,123	$218,123	$54,531	25%		$272,654
	Administrative Fees	1	LS	$40,508	$40,508	$10,127	25%		$50,635
	Building - Fair Market Value	1.5	LS	$1,055,140	$1,582,710	$395,678	25%		$1,978,388
	Relocation (homes)	12	EA	$20,000	$240,000	$48,000	20%		$288,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.35	AC	$22,000	$7,625	$1,525	20%	**$9,150**	
TOTAL								**$2,877,841**	**$2,975,472**
GRAND TOTAL								**$5,853,313**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+80 to 771+29)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$943,315**	**$0**
	Mobilization/Demobilization	1	LS	$765,257	$765,257	$0	0%	$765,257	
	Demolition/Removal of Buildings	33,723	SF	$4.40	$148,381	$29,676	20%	$178,057	
2	**Earthwork**							**$3,809,270**	**$0**
	Channel Excavation & Slope Stability	295,401	CY	$3	$886,203	$159,517	18%	$1,045,720	
	Haul 4.1 Miles	1,208,190	CYMI	$1.50	$1,812,285	$271,843	15%	$2,084,128	
	Disposal	295,401	CY	$2.00	$590,802	$88,620	15%	$679,422	
3	**Structures**							**$205,621**	**$1,557,580**
	Backslope Swale	26,704	LF	$2	$53,408	$5,341	10%	$58,749	
	Backslope Drain (structure)	45	EA	$3,000	$133,520	$13,352	10%	$146,872	
	Bridge Modifications (Extension)								
	Pipe Crossing	130	SF	$95	$12,350	$2,841	23%		$15,191
	Inwood C. C. Golf Cart	750	SF	$95	$71,250	$16,388	23%		$87,638
	Pipe Crossing	55	SF	$95	$5,225	$1,202	23%		$6,427
	Railway	900	SF	$105	$94,500	$21,735	23%		$116,235
	North Houston-Rosslyn	11,400	SF	$95	$1,083,000	$249,090	23%		$1,332,090
4	**Outfall Modifications**							**$0**	**$376,450**
	6" - 21" and backslope drain	5	EA	$3,000	$15,000	$1,500	10%		$16,500
	24" - 36"	60	EA	$3,700	$222,000	$22,200	10%		$244,200
	42" - 60"	15	EA	$4,500	$67,500	$6,750	10%		$74,250
	66" - 84"	3	EA	$5,000	$15,000	$1,500	10%		$16,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	120'x120' Box	1	EA	$13,500	$13,500	$2,700	20%		$16,200
5	**Utility Modifications**							**$0**	**$1,208,778**
	Water Line (12" STL)	2	EA	$23,500	$47,000	$9,400	20%		$56,400
	Water Lines (16" CI)	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Wastewater Line (=<12")	3	EA	$5,405	$16,215	$3,243	20%		$19,458
	Wastewater Line (14" to 16")	1	EA	$7,050	$7,050	$1,410	20%		$8,460
	Gas/Petroleum Lines (=<6")	2	EA	$92,000	$184,000	$36,800	20%		$220,800
	Gas/Petroleum Lines (8"-12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Gas/Petroleum Lines (8"-12") (On Bridge)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
	Gas/Petroleum Lines (>12" or in group)	1	EA	$147,000	$147,000	$29,400	20%		$176,400
6	**Vegetation Recovery**							**$176,246**	**$0**
	Tree Planting	1,068	EA	$125	$133,520	$13,352	10%	$146,872	
	Shrub Planting	1,068	EA	$25	$26,704	$2,670	10%	$29,374	
7	**General Items**							**$494,874**	**$0**
	Stormwater Pollution Prevention	1	LS	$31,704	$31,704	$3,170	10%	$34,874	
	Traffic Control	2	EA	$200,000	$400,000	$60,000	15%	$460,000	
SUBTOTAL								**$5,629,326**	**$3,142,808**

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2 --- Channelization from Vogel Creek to E122-00-00 (637+80 to 771+29)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
8	**Engineering Design (12%)**							**$675,519**	**$377,137**
9	**Construction Mgmt. (10%)**							**$562,933**	**$314,281**
10	**Real Estate**							**$0**	**$3,194,189**
	R.O.W. Acquisition	1	LS	$296,208	$296,208	$74,052	25%		$370,260
	Administrative Fees	1	LS	$69,594	$69,594	$17,398	25%		$86,992
	Building - Fair Market Value	1.5	LS	$1,242,100	$1,863,150	$465,788	25%		$2,328,938
	Relocation (homes)	17	EA	$20,000	$340,000	$68,000	20%		$408,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
11	**Environmental (Wetland Impacted) Mitigation**	0.61	AC	$22,000	$13,484	$2,697	20%	**$16,181**	
TOTAL								**$6,883,958**	**$7,028,415**
GRAND TOTAL								**$13,912,373**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

TG.2A --- Channelization from E122-00-00 to Fairbanks N. Houston (771+29 to 87390)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$831,435**	**$0**
	Mobilization/Demobilization	1	LS	$831,435	$831,435	$0	0%	$831,435	
	Demolition/Removal of Buildings	0	SF	$4.40	$0	$0	20%	$0	
2	**Earthwork**							**$4,670,092**	**$0**
	Channel Excavation	419,838	CY	$3	$1,259,514	$226,713	18%	$1,486,227	
	Haul 3.1 Miles	1,274,190	CYMI	$1.50	$1,911,285	$286,693	15%	$2,197,978	
	Disposal	411,029	CY	$2.00	$822,058	$123,309	15%	$945,367	
	Fill Placement & Compaction; Complete In Place	8,809	C.Y.	$4.00	$35,236	$5,285.40	15%	$40,521	
3	**Structures**							**$646,518**	**$37,976**
	Backslope Swale	53,032	LF	$2	$106,064	$10,606	10%	$116,670	
	Backslope Drain (structure)	88	EA	$3,000	$265,160	$26,516	10%	$291,676	
	Remove Control Structure	1	LS	$80,000	$80,000	$8,000	10%	$88,000	
	5" Slope Paving	$3,413	SY	$40.00	$136,520	$13,652	10%	$150,172	
	Bridge Modifications (Extension)								
	Golf Cart	325	SF	$95	$30,875	$7,101	23%		$37,976
	Fairbanks-North Houston	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$150,260**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	18	EA	$3,700	$66,600	$6,660	10%		$73,260
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
	90" - 120"	1	EA	$8,000	$8,000	$800	10%		$8,800
	Reconstruct 18" CMP Outfall Pipe	2	EA.	$3,700	$7,400	$740	10%		$8,140
	Reconstruct 24" CMP Outfall Pipe	3	EA.	$3,700	$11,100	$1,110	10%		$12,210
	Reconstruct 48" CMP Outfall Pipe	1	EA.	$4,500	$4,500	$450	10%		$4,950
	Reconstruct 60" CMP Outfall Pipe	1	EA.	$4,500	$4,500	$450	10%		$4,950
	Reconstruct 66" CMP Outfall Pipe	1	EA.	$5,000	$5,000	$500	10%		$5,500
	Reconstruct 72" CMP Outfall Pipe	1	EA.	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$2,409,776**
	Water Line (12" STL)	1	EA	$23,500	$23,500	$4,700	20%		$28,200
	Wastewater Line (=<12")	2	EA	$5,405	$10,810	$2,162	20%		$12,972
	Wastewater Line (<=12")	5,880	L.F.	$23.00	$135,240	$13,524	10%		$148,764
	Wastewater Line (14" to 16")	100	L.F.	$30.00	$3,000	$300	10%		$3,300
	Wastewater Line (18" to 21")	2,130	L.F.	$40.00	$85,200	$8,520	10%		$93,720
	Wastewater Line (24" to 27")	140	L.F.	$50.00	$7,000	$700	10%		$7,700
	Telephone Lines (12 x 4" PVC in 24" STL pipe)	2	EA	$136,800	$273,600	$54,720	20%		$328,320
	Telephone Lines (4 x 4")	2	LS	$45,600	$91,200	$18,240	20%		$109,440
	Telephone Lines (16 x 4" PVC)	2	LS	$182,400	$364,800	$72,960	20%		$437,760
	Gas/Petroleum Lines (=<6")	10	EA	$92,000	$920,000	$184,000	20%		$1,104,000
	Gas/Petroleum Lines (8"-12")	1	EA	$113,000	$113,000	$22,600	20%		$135,600
6	**Vegetation Recovery**							**$342,540**	**$0**
	Tree Planting	2,067	EA	$125	$258,375	$25,838	10%	$284,213	
	Shrub Planting	2,121	EA	$25	$53,025	$5,303	10%	$58,328	
7	**General Items**							**$106,801**	**$0**
	Stormwater Pollution Prevention	1	LS	$97,092	$97,092	$9,709	10%	$106,801	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$6,597,387**	**$2,598,012**
8	**Engineering Design (12%)**							**$791,686**	**$311,761**
9	**Construction Mgmt. (10%)**							**$659,739**	**$259,801**
10	**Real Estate**							**$0**	**$48,085**
	R.O.W. Acquisition	1	LS	$33,632	$33,632	$8,408	25%		$42,040
	Administrative Fees	1	LS	$4,836	$4,836	$1,209	25%		$6,045
11	**Environmental (Wetland Impacted) Mitigation**	0.47	AC	$22,000	$10,365	$2,073	20%	**$12,438**	
TOTAL								**$8,061,250**	**$3,217,660**
GRAND TOTAL								**$11,278,910**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

FNH.3 --- DETENTION AT FAIRBANKS-NORTH HOUSTON (NORTH, SOUTH & WEST BASINS, 1717 AC-FT)

ADDITION OF WEST BASIN TO FNH.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$2,923,860**	
	Mobilization/Demobilization	1	LS	$2,826,000	$2,826,000	$0	0%	$2,826,000	
	Demolition/Removal of Buildings	18,082	SF	$4.40	$79,561	$18,299	23%	$97,860	
2	**Earthwork**							**$25,449,816**	
	Clearing and Grubbing	90.0	AC	$2,976	$267,800	$40,170	15%	$307,970	
	Excavation	2,142,507	CY	$3	$6,427,521	$964,128	15%	$7,391,649	
	Haul 3.13 Miles	2,252,181	CYMI	$1.50	$3,378,272	$506,741	15%	$3,885,012	
	Haul 3.52 Miles	5,008,820	CYMI	$1.50	$7,513,231	$1,126,985	15%	$8,640,215	
	Disposal	2,142,507	CY	$1.97	$4,220,739	$633,111	15%	$4,853,850	
	Turf Establishment	129.1	AC	$2,500	$322,713	$48,407	15%	$371,119	
3	**Structures**							**$1,686,403**	
	Backslope Swale	17,000	LF	$2	$34,000	$3,400	10%	$37,400	
	Backslope Drains (structure)	30	EA	$3,000	$90,000	$9,000	10%	$99,000	
	Backslope Drains (24" RCP)	2,100	LF	$55	$115,500	$11,550	10%	$127,050	
	Sheet Piling for Inlet Structure	22,635	SF	$25	$565,875	$56,588	10%	$622,463	
	60" RCP (outfall pipe)	450	LF	$135	$60,750	$6,075	10%	$66,825	
	Riprap	285	SY	$35	$9,969	$997	10%	$10,966	
	Concrete Pilot Flow Channel	1,575	CY	$400	$630,000	$63,000	10%	$693,000	
	Flap Gate (60")	3	EA	$9,000	$27,000	$2,700	10%	$29,700	
4	**General Items**							**$35,200**	
	Stormwater Pollution Prevention	1	LS	$32,000	$32,000	$3,200	10%	$35,200	
5	**Vegetation Recovery**							**$835,504**	
	Tree Planting	5,238	EA	$120	$628,592	$62,859	10%	$691,452	
	Shrub Planting	5,238	EA	$25	$130,957	$13,096	10%	$144,052	
6	**Remove & Replace Utilities**							**$0**	**$240,000**
	Utility Lines	1	LS	$200,000	$200,000	$40,000	20%		$240,000
SUBTOTAL								**$30,930,783**	**$240,000**
7	**Engineering Design (12%)**							**$3,711,694**	**$28,800**
8	**Construction Mgmt. (10%)**							**$3,093,078**	**$24,000**
9	**Real Estate**							**$0**	**$7,124,420**
	R.O.W. Acquisition	1	LS	$5,258,839.90	$5,258,840	$432,784	25%		$5,691,624
	Administrative Fees	1	LS	$92,940	$92,940	$13,658	25%		$106,598
	Relocation (homes)	11	EA	$20,000	$220,000	$44,000	20%		$264,000
	Relocation (businesses)	0	SF	$3.50	$0	$0	20%		$0
	Building - Fair Market Value	1.5	LS	$590,110.00	$885,165	$177,033	20%		$1,062,198
10	**Environmental (Wetland Impacted) Mitigation**	3	AC	$22,000	$59,400	$11,880	20%	**$71,280**	
TOTAL								**$37,806,836**	**$7,417,220**
FNH.3 GRAND TOTAL								**$45,224,056**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

GBW.3 --- DETENTION AT GESSNER/BELTWAY8 (N+SW+SE OF BAYOU AND SOUTH OF BROOKRIVER BASINS, 437 AC-FT)

ADDITION OF SOUTH BROOKRIVER BASIN TO GBW.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,074,917**	
	Mobilization/Demobilization	1	LS	$966,000	$966,000	$0	0%	$966,000	
	Demolition/Removal of Buildings	20,125	SF	$4.40	$88,550	$20,367	23%	$108,917	
2	**Earthwork**							**$8,576,660**	
	Clearing and Grubbing	49.2	AC	$3,500	$172,060	$25,809	15%	$197,869	
	Excavation	837,320	CY	$3	$2,511,961	$376,794	15%	$2,888,755	
	Haul 2.38 Miles	1,992,822	CYMI	$1.50	$2,989,234	$448,385	15%	$3,437,619	
	Disposal	837,320	CY	$1.97	$1,649,521	$247,428	15%	$1,896,949	
	Turf Establishment	54.1	AC	$2,500	$135,190	$20,279	15%	$155,469	
3	**Structures**							**$812,155**	
	Backslope Swale	12,000	LF	$2	$24,000	$2,400	10%	$26,400	
	Backslope Drains (structure)	20	EA	$3,000	$60,000	$6,000	10%	$66,000	
	Backslope Drains (24" RCP)	1,400	LF	$55	$77,000	$7,700	10%	$84,700	
	Sheet Piling for Inlet Structure	5,180	SF	$25	$129,500	$12,950	10%	$142,450	
	36" CMP (outfall pipe)	200	LF	$90	$18,000	$1,800	10%	$19,800	
	36" RCP	1,450	LF	$70	$101,500	$10,150	10%	$111,650	
	48" RCP	200	LF	$100	$20,000	$2,000	10%	$22,000	
	Riprap	95	SY	$35	$3,323	$332	10%	$3,655	
	Concrete Pilot Flow Channel	750	CY	$400	$300,000	$30,000	10%	$330,000	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$29,700**	
	Stormwater Pollution Prevention	1	LS	$27,000	$27,000	$2,700	10%	$29,700	
5	**Aesthetic Improvements**							**$186,084**	
	Tree Planting	1,167	EA	$120	$140,000	$14,000	10%	$154,000	
	Shrub Planting	1,167	EA	$25	$29,167	$2,917	10%	$32,083	
6	**Remove & Replace Utilities**							**$0**	**$52,920**
	Utility Lines	1	LS	$44,100	$44,100	$8,820	20%		$52,920
SUBTOTAL								**$10,679,516**	**$52,920**
7	**Engineering Design (12%)**							**$1,281,542**	**$6,350**
8	**Construction Mgmt. (10%)**							**$1,067,952**	**$5,292**
9	**Real Estate**							**$0**	**$6,884,558**
	R.O.W. Acquisition	1.00	LS	$5,176,400	$5,176,400	$553,210	10%		$5,729,610
	Administrative Fees	1	LS	$73,914	$73,914	$18,479	25%		$92,393
	Relocation (businesses)	20,125	SF	$3.50	$70,438	$14,088	20%		$84,525
	Building - Fair Market Value	1.5	LS	$543,350.00	$815,025	$163,005	20%		$978,030
10	**Environmental (Wetland Impacted) Mitigation**	2.25	AC	$22,000	$49,500	$9,900	20%	**$59,400**	
TOTAL								**$13,088,410**	**$6,949,120**
SOUTH BROOKRIVER BASIN GRAND TOTAL								**$20,037,530**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

HOL.3b --- DETENTION AT HOLLISTER ROAD (522 AC-FT)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$1,144,000**	
	Mobilization/Demobilization	1	LS	$1,144,000	$1,144,000	$0	0%	$1,144,000	
2	**Earthwork**							**$14,236,380**	
	Clearing and Grubbing	66.9	AC	$3,500	$234,115	$35,117	15%	$269,232	
	Excavation	1,177,733	CY	$3	$3,533,200	$529,980	15%	$4,063,180	
	Haul 3.52 Miles	4,145,621	CYMI	$1.50	$6,218,432	$932,765	15%	$7,151,197	
	Disposal	1,177,733	CY	$1.97	$2,320,135	$348,020	15%	$2,668,155	
	Turf Establishment	73.6	AC	$1,000	$73,579	$11,037	15%	$84,616	
3	**Structures**							**$637,048**	
	Backslope Swale	11,300	LF	$2	$22,600	$2,260	10%	$24,860	
	Backslope Drains (structure)	19	EA	$830	$15,770	$1,577	10%	$17,347	
	Backslope Drains (24" RCP)	1,330	LF	$40	$53,200	$5,320	10%	$58,520	
	Sheet Piling for Inlet Structure	4,870	SF	$25	$121,750	$12,175	10%	$133,925	
	60" RCP (outfall pipe)	150	LF	$135	$20,250	$2,025	10%	$22,275	
	36" CMP (outfall pipe)	150	LF	$90	$13,500	$1,350	10%	$14,850	
	Riprap	230	SY	$35	$8,065	$806	10%	$8,871	
	Concrete Pilot Flow Channel	775	CY	$400	$310,000	$31,000	10%	$341,000	
	Flap Gate (60")	1	EA	$9,000	$9,000	$900	10%	$9,900	
	Flap Gate (36")	1	EA	$5,000	$5,000	$500	10%	$5,500	
4	**General Items**							**$17,930**	
	Stormwater Pollution Prevention	1	LS	$16,300	$16,300	$1,630	10%	$17,930	
5	**Vegetation Recovery**							**$381,125**	
	Tree Planting	2,310	EA	$125	$288,731	$28,873	10%	$317,604	
	Shrub Planting	2,310	EA	$25	$57,746	$5,775	10%	$63,521	
6	**Remove & Replace Utilities**							**$0**	**$120,000**
	Utility Lines	1	LS	$100,000	$100,000	$20,000	20%		$120,000
SUBTOTAL								**$16,416,483**	**$120,000**
7	**Engineering Design (12%)**							**$1,969,978**	**$14,400**
8	**Construction Mgmt. (10%)**							**$1,641,648**	**$12,000**
9	**Real Estate**							**$0**	**$3,404,648**
	R.O.W. Acquisition	1	LS	$3,369,453	$3,369,453	$0	0%		$3,369,453
	Administrative Fees	1	LS	$35,195	$35,195	$0	0%		$35,195
10	**Environmental (Wetland Impacted) Mitigation**	3.545	AC	$22,000	$77,990	$15,598	20%	**$93,588**	
TOTAL								**$20,121,698**	**$3,551,048**
GRAND TOTAL								**$23,672,745**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

JR.4 --- DETENTION AT JONES ROAD (WEST OF JONES, NORTH AND SOUTH OF PIPELINE, 420 AC-FT)

ADDITION OF 200 AC-FT TO JR.2

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$984,000**	
	Mobilization/Demobilization	1	LS	$984,000	$984,000	$0	0%	$984,000	
2	**Earthwork**							**$8,544,247**	
	Clearing and Grubbing	45.0	AC	$3,500	$157,500	$23,625	15%	$181,125	
	Excavation	677,600	CY	$3	$2,032,800	$304,920	15%	$2,337,720	
	Haul 3.84 Miles	2,601,984	CYMI	$1.50	$3,902,976	$585,446	15%	$4,488,422	
	Disposal	666,307	CY	$1.82	$1,212,679	$181,902	15%	$1,394,581	
	Turf Establishment	49.5	AC	$2,500	$123,750	$18,563	15%	$142,399	
3	**Structures**							**$937,141**	
	Backslope Swale	13,500	LF	$2	$27,000	$2,700	10%	$29,700	
	Backslope Drains (structure)	23	EA	$3,000	$69,000	$6,900	10%	$75,900	
	Backslope Drains (24" RCP)	1,610	LF	$55	$88,550	$8,855	10%	$97,405	
	Sheet Piling for Inlet Structure	9,590	SF	$25	$239,750	$23,975	10%	$263,725	
	36" CMP (outfall pipe)	300	LF	$90	$27,000	$2,700	10%	$29,700	
	60" CMP	600	LF	$120	$72,000	$7,200	10%	$79,200	
	Riprap	190	SY	$35	$6,646	$665	10%	$7,311	
	Concrete Pilot Flow Channel	780	CY	$400	$312,000	$31,200	10%	$343,200	
	Flap Gate (36")	2	EA	$5,000	$10,000	$1,000	10%	$11,000	
4	**General Items**							**$31,350**	
	Stormwater Pollution Prevention	1	LS	$28,500	$28,500	$2,850	10%	$31,350	
5	**Aesthetic Improvements**							**$314,164**	
	Tree Planting	1,970	EA	$120	$236,362	$23,636	10%	$259,998	
	Shrub Planting	1,970	EA	$25	$49,242	$4,924	10%	$54,166	
6	**Remove & Replace Utilities**							**$0**	
	Utility Lines								
SUBTOTAL								**$10,810,902**	**$0**
7	**Engineering Design (12%)**							**$1,297,308**	**$0**
8	**Construction Mgmt. (10%)**							**$1,081,090**	**$0**
9	**Real Estate**							**$0**	**$4,004,006**
	R.O.W. Acquisition	1	LS	$3,937,290.00	$3,937,290	$0	0%		$3,937,290
	Administrative Fees	1	LS	$53,373	$53,373	$13,343	25%		$66,716
10	**Environmental Mitigation**							**$0**	
TOTAL								**$13,189,300**	**$4,004,006**
JR4 GRAND TOTAL								**$17,193,306**	

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

E200H.2A --- Channelization from E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$657,130**	**$0**
	Mobilization/Demobilization	1	LS	$657,130	$657,130	$0	0%	$657,130	
2	**Earthwork**							**$1,658,049**	**$0**
	Channel Excavation	128,407	CY	$3	$385,220	$69,340	18%	$454,559	
	Haul 4.1 Miles	526,467	CYMI	$1.50	$789,700	$118,455	15%	$908,155	
	Disposal	128,407	CY	$2.00	$256,813	$38,522	15%	$295,335	
3	**Structures**							**$269,500**	**$1,182,522**
	Backslope Swale	35,000	LF	$2	$70,000	$7,000	10%	$77,000	
	Backslope Drain (structure)	58	EA	$3,000	$175,000	$17,500	10%	$192,500	
	Bridge Modifications (Extension)								
	West Rd.	5,400	SF	$95	$513,000	$117,990	23%		$630,990
	Rio Grande	2,800	SF	$95	$266,000	$61,180	23%		$327,180
	HL&P	1,920	SF	$95	$182,400	$41,952	23%		$224,352
	FM1960	0	SF	$95	$0	$0	23%		$0
	Pipeline	0	SF	$95	$0	$0	23%		$0
4	**Outfall Modifications**							**$0**	**$134,750**
	6" - 21" and backslope drain	13	EA	$3,000	$39,000	$3,900	10%		$42,900
	24" - 36"	15	EA	$3,700	$55,500	$5,550	10%		$61,050
	42" - 60"	4	EA	$4,500	$18,000	$1,800	10%		$19,800
	66" - 84"	2	EA	$5,000	$10,000	$1,000	10%		$11,000
5	**Utility Modifications**							**$0**	**$2,361,480**
	Water Line (16" CI)	1	EA	$7,500	$7,500	$1,500	20%		$9,000
	Gas/Petroleum Lines (=<6")	7	EA	$92,000	$644,000	$128,800	20%		$772,800
	Gas/Petroleum Lines (8"-12")	2	EA	$113,000	$226,000	$45,200	20%		$271,200
	Gas/Petroleum Lines (>12")	4	EA	$113,000	$452,000	$90,400	20%		$542,400
	Telephone Lines (24 x 4" PVC in 24" STL pipe)	1	EA	$273,600	$273,600	$54,720	20%		$328,320
	Telephone Lines (32 x 4" PVC in 36" STL pipe)	1	EA	$364,800	$364,800	$72,960	20%		$437,760
6	**Vegetation Recovery**							**$231,000**	**$0**
	Tree Planting	1,400	EA	$125	$175,000	$17,500	10%	$192,500	
	Shrub Planting	1,400	EA	$25	$35,000	$3,500	10%	$38,500	
7	**General Items**							**$734,000**	**$0**
	Stormwater Pollution Prevention	1	LS	$40,000	$40,000	$4,000	10%	$44,000	
	Traffic Control	3	EA	$200,000	$600,000	$90,000	15%	$690,000	
SUBTOTAL								**$3,549,679**	**$3,678,752**
8	**Engineering Design (12%)**							**$425,961**	**$441,450**
9	**Construction Mgmt. (10%)**							**$354,968**	**$367,875**
10	**Environmental (Wetland Impacted) Mitigation**	0.83	AC	$22,000	$18,153	$3,631	20%	**$21,783**	
TOTAL								**$4,352,391**	**$4,488,077**
GRAND TOTAL								**$8,840,469**	

5/27/2010
E200H.2AAttachment C-8 new2010.xls

White Oak Bayou (E100-00-00) 211(f) GRR Study

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION (2003 Prices)

(E100MIN) GE200.7 --- Channelization from Gessner to E200-00-00 (Sta. 935+44 to 1045+27)

Analysis 4 Revised Cost Estimate for improvements between 1045+27 to 935+44;

Raised flow line between Sta. 104527 to Sta. 97546 and channel cleanout from Sta. 97546 to Sta. 93534

Item	Description	Quantity	Unit	Unit Price	Amount	Contingency		Total Cost	
						Amount	Percentage	Construction	LERRD
1	**Mobilization**							**$581,829**	**$0**
	Mobilization/Demobilization	1	LS	$581,829	$581,829	$0	0%	$581,829	
2	**Earthwork**							**$4,676,919**	**$0**
	Excavation within E100-00-00	56,300	CY	$3	$168,900	$30,402	18%	$199,302	
	Fill in eroded channel	35,000	CY	$4	$140,000	$25,200	18%	$165,200	
	Excavation within E141-00-00 and E200	344,257	CY	$3	$1,032,771	$185,899	18%	$1,218,670	
	Fill Placement & Compaction; Complete	37,750	C.Y.	$4.00	$151,000	$22,650.00	15%	$173,650	
	Disposal of Excavated material	327,807	C.Y.	$2.00	$655,614	$98,342.10	15%	$753,956	
	Haul 2.5 Miles	140,750	CYMI	$1.50	$211,125	$31,669	15%	$242,794	
	Haul 3.5 Miles	1,114,984	CYMI	$1.50	$1,672,476	$250,871	15%	$1,923,348	
3	**Structures**							**$749,339**	**$0**
	Backslope Interceptor Structures; Comp	40	EA.	$3,000.00	$120,350	$12,035.00	10%	$132,385.00	
	Backslope Swales; Complete In Place	24,070	L.F.	$2.00	$48,140	$4,814.00	10%	$52,954.00	
	2-foot Gabion Walls	7,000	LF	$30	$210,000	$42,000	20%	$252,000	
	9" Gabion Mattress	16,000	SY	$16	$260,000	$52,000	20%	$312,000	
4	**Outfall Modifications**							**$0**	**$144,980**
	6" - 21" and backslope drain	2	EA	$3,000	$6,000	$600	10%		$6,600
	24" - 36"	29	EA	$3,700	$107,300	$10,730	10%		$118,030
	42" - 60"	3	EA	$4,500	$13,500	$1,350	10%		$14,850
	66" - 84"	1	EA	$5,000	$5,000	$500	10%		$5,500
5	**Utility Modifications**							**$0**	**$0**
	Wastewater Line (=<12")	0	EA	$6,900	$0	$0	20%		$0
	Wastewater Line (14" to 16")	0	EA	$9,000	$0	$0	20%		$0
	Wastewater Line (24" to 27")	0	EA	$15,000	$0	$0	20%		$0
	Petroleum Lines (=<6")	0	EA	$92,000	$0	$0	20%		$0
	Petroleum Lines (8"-12")	0	EA	$113,000	$0	$0	20%		$0
6	**Vegetation Recovery**							**$158,895**	**$0**
	Tree Planting	963	EA	$125	$120,375	$12,038	10%	$132,413	
	Shrub Planting	963	EA	$25	$24,075	$2,408	10%	$26,483	
7	**General Items**							**$88,154**	**$0**
	Stormwater Pollution Prevention	1	LS	$80,140	$80,140	$8,014	10%	$88,154	
	Traffic Control	0	EA	$200,000	$0	$0	15%	$0	
SUBTOTAL								**$6,255,136**	**$144,980**
8	**Engineering Design (12%)**							**$750,616**	**$17,398**
9	**Construction Mgmt. (10%)**							**$625,514**	**$14,498**
10	**Environmental (Wetland Impacted) Mitigation**	0.50	AC	$22,000	$11,104	$2,221	20%	**$13,325**	
TOTAL								**$7,644,591**	**$176,876**
GRAND TOTAL								**$7,821,467**	

ATTACHMENT C-9

MCACES Cost Estimate – Recommended Plan

PRELIMINARY COST ESTIMATE FOR PLAN RE-OPTIMIZATION

August 6, 2013 – Deleted Holister Mitigation, Added Greens Bayou Mitigation Bank

June 11, 2013 - Revised Environmental Mitigation

May 24, 2013 Revised Recreation, Deletion of FNH Cell

April 2013 adjusted Quantities for FHN3 and GBW3 Basins per D WInslow.

May 9, 2012 ATR Comment Resolution and Backcheck Estimate

Updated September 2012 for Lands & Damages per LJA

ALL COSTS ASSOCIATED WITH THE FNH3 BASIN ARE REMOVED

Estimated by William Stevenson
Designed by LJA Engineering
Prepared by William Stevenson, Atkins North Amaerica
Preparation Date 6/11/2013
Effective Date of Pricing 9/19/2012
Estimated Construction Time Days

Designed by
LJA Engineering

Estimated by
William Stevenson

Prepared by
William Stevenson, Atkins North Amaerica

Design Document	GRR/NED Alternative Report
Document Date	7/2/2012
District	SWG - Galveston
Contact	William Stevenson 985-710-2320
Budget Year	2014
UOM System	Original

Direct Costs

LaborCost
EQCost
MatlCost
SubBidCost
CTD-ROW
CTD-Constructn
UserCost3
PED-12%
CM-10%

Timeline/Currency

Preparation Date	6/11/2013
Escalation Date	7/2/2012
Eff. Pricing Date	9/19/2012
Estimated Duration	0 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB10EB: MII English Cost Book 2010

Labor HOU2010: Houston Area US Census Labor Survey

Labor Rates

LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP09R06: MII Equipment Region 6 2009

Note: Fuel Pricing Updated to Current EIA Published Fuel Pricing as of 19 March 2012

06 SOUTHWEST

Sales Tax	8.25
Working Hours per Year	1,590
Labor Adjustment Factor	0.86
Cost of Money	3.13
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.092
Gas	3.700
Diesel Off-Road	3.850
Diesel On-Road	4.050

Shipping Rates

Over 0 CWT	16.78
Over 240 CWT	15.67
Over 300 CWT	14.08
Over 400 CWT	12.63
Over 500 CWT	6.60
Over 700 CWT	6.08
Over 800 CWT	4.72

Date	Author	Note
3/7/2012	William Stevenson	

HARRIS COUNTY FLOOD CONTROL DISTRICT
WHITE OAK BAYOU FLOOD RISK REDUCTION PROJECT
GRR Study Estimate Assumptions and History

Revised based on Walla Walla Review Comments February 10, 2009

12/7/2009 BASE ESTIMATE

This GRR study was conducted following the published procedure, methodology and guidance of the U.S, Army Corps of Engineers (USACE). The USACE HEC-HMS, HEC-RAS, and HEC-FDA computer models were utilized to determine the flood damages for the without project condition and to evaluate the effectiveness of the alternative flood damage reduction plans. The average annual flood damage under without project condition is estimated to be $54.4 million along the main stem of White Oak Bayou. Over 90 different configurations of structural and non-structural components were evaluated, including channel modification, detention, bypass channels, flood protection levees, replacement or modification of existing bridges, elevating structures, and permanent relocation. Over 300 different combinations were considered. The National Economic Development (NED) plan is the plan that is supported by the HCFCD, the Local Sponsor. This plan consists of the following components: (1) Earthen channel modifications along 15.4 miles from Cole Creek to FM 1960. (2) Five detention basins along White Oak Bayou providing approximately 3,663 acre-feet storage. (3) Permanent relocation of one structure within the residual 20 percent floodplain This Cost Estimate was prepared by PBS&J Construction Consulting - Cost Estimating and is based upon an original estimate prepared by US Cost and submitted to Walla Wall on September 8, 2009.

Quantities have been assumed based on the best information available and provided by LJA and contained in the 2008 GRR Report, however no final construction drawings were available at the time of preparation, only Draft GRR Report.

PLANS and SPECIFICATIONS
Project Specification Requirements are based on the 2005 Standard Specifications Guide for Harris County Flood Control District. Preliminary Design Documents contained in the GRR Draft Report dated August 2008 have been provided for review and consideration. Detailed Final Construction Plans were not provided for verification of Quantities.

Harris County Flood Control District 2005 Standard Construction Specification Guide has been utilized for construction standards and plans to supplement the Alternatives Report as written.

DURATION
Non-Constructed components are assumed to being construction in May 2011 with completion in approximate 300-450 Days. Mid Point of Construction is assumed equal for all components and is based on 450 Day Duration, with Mid-Point of construction set at December 2012 for all components.

Recreation components will be constructed following Channel and Relocations, with Completion assumed at 630 days (average) from the start of construction (May 2011). Mid Point of construction for Recreation Components is assumed June 2012 for all Recreation Components.

FEDERAL vs NON-FEDERAL COSTS
5.8.3 Cost Sharing Section 103 of WRDA 86 (Public Law 99-662) specifies the cost sharing requirements for this project. The requirements are summarized below. The following is a summary of cost sharing for flood control components:
1) The local sponsor will contribute a minimum of 5 percent of the flood control features in cash.
2) The local sponsor will provide all lands, easements, rights-of-way, relocations, and material disposal (LERRD) necessary for the project.
3) OMRR&R costs will be the sole responsibility of the local sponsor.
4) If the local sponsor's contribution from cash and LERRD is less than 25 percent of the total project cost, the local sponsor will contribute the additional amount in cash to make the total contribution equal to 25 percent.
5) The maximum non-Federal contribution will not exceed 50 percent of the total project cost.
6) If the value of LERRD exceeds 45 percent of the total project cost, the Federal government will reimburse the local sponsor the value in excess of 45 percent of the total project cost.

Date	Author	Note

The Cost Estimate has been developed as if a well equipment, reasonably capable contractors will be performing all work.

EARTHWORK DISPOSAL
Earthwork spoils are assumed to be disposed of, at a cost, in nearby commercial landfills based on information provided by LJA and HCFCD. Costs for the disposal are limited to dumping and minimal placement and compaction activities. Actual disposal costs may vary, but are believed to represent a fair and reasonable cost this activity.
PRODUCTION RATES
Production has been compared to historical production rates from Tx DOT for Similar Work Products as well as local production rate for similar types of work in the New Orleans Area.

HAULING
Hauling has been considered based on local market conditions and trucking availability as well as traffic considerations. Area is considered to be Urban Metro with moderate congestion and well maintained roadways.

Assume 4 Mile Round Trip from Project Location to Dump Site, Urban Area, Moderate Traffic Congestion, 20 MPH Average. Load Time is based on Excavation Crew at 90 BCY per Hour (100 LCY) or 8 Minutes to Load each Truck. Travel Time Assumed at 12 minutes (60/20 = 3 minutes per Mile). Add 5 Minutes for unloading. Total Cycle Time equals 25 minutes. 2.4 cycles per hour. 12 CY X 2.4 = 28.8 LCY Per Hour/Per Truck.

SHRINK / SWELL
Earthwork Calculations are based on BCY (Excavated) x 1.20 = LCY (Loose in Truck) for all Earthwork Calculations, based on advisement from LJA. LCY (Loose in Truck) / 1.5 = ECY (In-Place/Compacted)

EARTHWORK CALCULATIONS
Trenching and Earthwork Calculations for Utility Replacements at Piping are calculated based on original excavation quantities. Backfill and Compaction are figured less expected Borrow Quantities, also from the original estimate. Hauling rates have been adjusted based on swell factor of 1.20 (BCY - LCY)

Compaction has been adjusted from LCY to ECY, which is based on the RSM Cost Book UOM and cost for the related Project Item.

POND CONSTRUCTION (Non-Federal)
Assumes that earthwork spoils will be used on site for construction of related levees and structures. Hauling and Disposal Costs are primarily captured in the Federal Cost Section. Allocation of Project Items (Federal vs Non-Federal) is assumed from original September 8 Estimate.

BEDDING CALCULATIONS
Are assumed based on 12" Over dig plus 12" Compacted Base. A 20% Swell factor has been applied to all bedding. Bedding and Pipe Volume have been removed from backfill and replacement fill.

ENGINEERING & DESIGN / CONSTRUCTION MANAGEMENT
PED Cost have been provided by at 12% of Contract Costs for Construction Activities as previously estimated. These costs are represented as USER COST 1 - PED (30) and assigned to E&D Contractor - No Markup
CM Cost have been provided at 10% of Contract Costs for Construction Activities as previously estimated. These costs are represented as USER COST 2 - CM (31) and assigned to CM Contractor - No Markup

MOBILIZATION / DEMOBILIZATION
Mobilization/Demobilization Costs are assumed at 3%=4% of Feature Contract Costs for Construction Costs based on historical information available to estimators based on the New Orleans Market and discussion with local HCFCD Teams as well as previous project experience discussed among the estimating team. Based on this information, cost for mobilization will cover costs for local contractors to mobilize to the project from a 50 mile area and will cover all necessary equipment and temporary facilities.

SITE ACCESS
Site Access has been considered based on limited access to project locations at specific locations along project reach. No special considerations or construction have been considered in the estimate or considered to be necessary for project access.

Date	Author	Note

DIRECT MARKUPS
Productivity is assumed at 100%
Overtime is considered based on a 5 Day / 8 Hour Day (40-Hour Week)
Sale Tax is calculated on Material Costs Only at 8.25%
(www.window.state.tx.us/taxinfo/local/city.html <http://www.window.state.tx.us/taxinfo/local/city.html>)

CONTRACTOR OVERHEAD
JOOH/FOOH Is calculated based on Running % at 12%, plus 2% for Small Tools. This is consistent with current Overhead rates experienced in the New Orleans Market for current projects of similar size. Overhead model could not be developed due to unrefined project duration and level of preliminary design.
HOOH is set at Running 8% based on historical experience and actual G&A rates from the New Orleans Market for large contractors capable of performing this work.

CONTRACTOR PROFITS

Sub Contractor Profits have been developed by PWG based on Contractor Allocation of Costs and assumed duration for specific work activities (aggregate total of activity duration) as estimated to the best of the

estimator's ability at the present time.
--Prime Contractor = 8.75% based on Over $10,000,000 Value, 24 + Month Duration
----Site Utility = 8.57% based on $5,000,000 to $10,000,000 Value, 18 Month Duration
----Site Work = 7.90% based on Over $10,000,000 Value, 24+ Month Duration
----Landscaping = 7.67% based on $4,500,000 - $4,600,000 Value, 6 Month Duration
----Demolition = 8.75% based on $450,000 - $500,000 Value, 3 Month Duration

BOND
Bond is set at 1.25% based on previous submittals

COST LIBRARIES
Cost Libraries utilized include 2008 English Cost Book, 2009 National Labor, 2007 Region 6 Equipment Library. Labor has been verified with local Dept of Labor Wage Determinations and Davis Bacon TX20080052 and TX20080080, Harris County
(http://www.gpo.gov/davisbacon/tx.html)

COMPACTION WATER RATES
Water for compaction is assumed to be applied at a rate for 150 Gallons per LCY. Water Costs are derived from Houston Water Department published Commercial Water Rates of $0.0032844 per Gallon, or $0.49 per LCY (http://www.publicworks.houstontx.gov/resource/ucs/rates_old.htm)

1/21/2010 ESTIMATE UPDATES

ROW Acquisition & Building Costs are based on March 2009 values, provided in the Gross Appraisal by Cervenka & Associates, dated March 12, 2009
Administrative Fees are based on 1% of the ROW acquisition & Building costs plus $2,000 per single-family residence plus $10,000 per commercial building and apartment project
Relocation costs are based on $28,000 per single-family residence, $7,350 per apartment unit & $6 per square foot of commercial building area
There are no contingencies or escalation included in these costs

Real Estate Costs have been updated based on Revised Estimates provided January 2009

Estimate has been prepared based on 2009 Dollars.

Escalation for Non-Construction components has been determined by CWCCIS, Published 30 September 2009.

Date	Author	Note

Construction Start for ALL Non-Constructed components is estimated at 3rd Qtr 2011.
Mid-Point of Construction Components for Non-Constructed components is estimated at 3rd Qtr 2012

Recreation Components are assumed to be constructed following Main Construction Effort and have been escalated based on Mid-Point of Construction being 1st Qtr 2013.
02 - Relocations 3Q11 = 720.65 / 1Q12 = 726.95 = .87%
09 - Channels 3Q11 = 737.10 / 1Q12 =743.55 = .88%
14 - Recreation 3Q11 = 710.34 / 1Q12 = 722.68 = 1.87%

Non Construction Components consist of E200H2A, GE200.7A, HOL.3B, FHN.3, GBW.3, RG.1, and NSB.

Material Price Sources:

Gabion Baskets & Containers = HESCO Bastions, Hammond, LA
Sheet Pile = LB Foster, Baton Rouge, LA
Borrow = Sprint Sand & Clay / Martin Marietta Materials / HPO & MVN Historical
Bedding Material = Martin Marietta Materials
Rip Rap = Martin Marietta Materials / Means Costworks Online, 2010 Data, Houston, TX
Concrete = Metro Ready Mix, Houston, TX
Hydro Seed/Silt Fence = New line Environmental, New Orleans, LA
Corrugated Pipe = Means Costworks Online, 2010 Data, Houston, TX
RCP Pipe = Means Costworks Online, 2010 Data, Houston, TX
Ductile Iron Pipe = Means Costworks Online, 2010 Data, Houston, TX
Disposal Costs = WMI, Houston, TX

2/11/2010 ESTIMATE UPDATES

Escalation has been removed from all Project Items and will be added via Total Project Cost Summary

ROW Acquisition & Building Costs are based on March 2009 values, provided in the Gross Appraisal by Cervenka & Associates, dated March 12, 2009Administrative Fees are based on 1% of the ROW acquisition & Building costs plus $2,000 per single-family residence plus $10,000 per commercial building and apartment project Relocation costs are based on $28,000 per single-family residence, $7,350 per apartment unit & $6 per square foot of commercial building area There are no contingencies or escalation included in these costs Real Estate Costs have been updated based on Revised Estimates provided January 2009

PED and S&A Percentages are the same as were used for the Brays GRR which was endorsed by USACE HQ and approved by ASA(CW) in April 2009. This information was originally provided by the Galveston District USACE.

Mitigation Bank The Greens Bayou mitigation is a constructed wetlands mitigation bank from which credits can be purchased to mitigate wetlands impacts. More information on the GBWMB credits are discussed in the draft EA. For the purposes of the federal study a relationship was developed relating the costs for environmental mitigation to GBWMB credits which are sold at a cost that includes land acquisition, creation, operation, and maintenance. The local sponsor has purchased credits at this bank which will be used to partially mitigate the loss of wetlands resulting from construction of the project.

5/2011 ESTIMATE UPDATES

Updated to current MCACES 2010 Cost Book from 2008 Cost Book
Updated Cost of Fuel - Diesel (Off Road) - $3.25
Updated Cost of Fuel - Diesel (On Road) - $3.15
Updated Cost of Fuel - Unleaded - $3.25
Updated Cost of Money = 3.125% per Treasury Direct Website (Dec 2010)

Date	Author	Note

8/2011 ESTIMATE UPDATES

August 2011 Updates Remove Goal post and Backstops from

2/2012 ESTIMATE UPDATES

GE200 Cost split to accurately devcelop cost for the Constructed and Unconstruction portions of the work.

3/24/2012 through 4/15/2012 ESTIMATE UPDATES

A fourth WBS level added to the Folder Structure to group like work items. This grouping will be based on the structure of the file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

The revised folder structure more closely matches the Summary Cost Tables provided in file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls" Folder structrue reviewed and discussed with reviewer prior to data entry.

Quantitiesadded to the folder level, where applicable, with appropriate UOM.

Detailed Cost for relocations replaced with Unit Cost from the file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

Detailed Cost for Headwalls and Drainage Structures replaced with Unit Cost from the file {"TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

Detailed cost for Bridge Modifications moved to 02-Relocations, and replaced with unit cost from the file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

01- Lands & Damages cost have remained in the MCACES esdtimate as provided by HCFCD, due to these cost being lump sum and varied by project area.

Management will be removed from the MCACES and added in the TCPS. (HCFCD will provide actual Costs for these folders for the constructed work to date)

Excavation crews reconstructed to utilize Excavators rather than scrappers. This will be balanced with the trucking crew.

Mobilization Costs have been updated based on the file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

Compaction and Watering for Compaction removed from all disposal cost.

TG2 and GE200H Quantities have been updated based on the file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

Labor Rates updated to 2010 US Census Data Rates

Fuel Pricing updated to curretn EIA Published rates as of 3/19/12

Unused contractors removed from estimate.

Lump Sum Unit Cost Based on file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

RS Means for cost of the lower 80% of the estimate is an acceptable source of cost information, providing current RS Means pricing is utilized.

01 Lands & Damages cost corrected based on direcation from Dave Winslow. Cost based on updated file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls"

Date	Author	Note
5/23/2013	William Stevenson	Hello Bill - per our conversation , we need to reduce the recreation plan costs so the 50 % Federal share is no more than 10 % of the current Federal flood control share.This means we need to reduce the total Recreation Plan costs to approximately $11.9 million, including contingencies, engr, and const. management. To do that I proposing to do the following: 1. Delete all the FNH3-W recreation items and costs, as this cell is no longer in the plan. 2. Delete the JR.4 - S recreation items and costs. The JR.4-N area would remain in the plan. 3. Reduce all trail widths by 30 %, from 10 to 7 feet, including the ones in the detention basins.This reduction will reduce all the concrete trail areas by 30 %. I think this should be presented this way, but could actually be a change to asphalt or other acceptable trail material that is less costly than concrete while maintaining the 10-foot wide trail. I believe these reductions will get us where we need to be. Another issue, I didn't notice that when you took out the FNH3- W basin, you also took out the code 18 Cultural Preservation/Mitigation item costing $372,000. This should stay in the plan. It has been erroneously called FNH. It should just be called Greens Bayou Mitigation Bank. I hope all this is clear. If you have any questions, etc., please call me. I would like to get the results as soon as possible, as I have to make the Rec plan cost-benefit changes in the GRR and in Rec Plan along with other changes so Wayne has them for review by Tuesday morning. Thanks for your help and patience.

Direct Cost Markups

	Category	Method
Productivity	Productivity	Productivity
Overtime	Overtime	Overtime

	Days/Week	Hours/Shift	Shifts/Day	1st Shift	2nd Shift	3rd Shift
Standard	5.00	8.00	1.00	8.00	0.00	0.00
Actual	5.00	8.00	1.00	8.00	0.00	0.00

Day	OT Factor	Working	OT Percent	FCCM Percent
Monday	1.50	Yes	0.00	0.00
Tuesday	1.50	Yes		
Wednesday	1.50	Yes		
Thursday	1.50	Yes		
Friday	1.50	Yes		
Saturday	1.50	No		
Sunday	2.00	No		

Sales Tax	TaxAdj	Running % on Selected Costs
MatlCost		

Contractor Markups

	Category	Method
JOOH (Small Tools)	Allowance	% of Labor
JOOH	JOOH	JOOH (Calculated)
JOOH Prj Office	JOOH	Direct %
HOOH	HOOH	Running %
Profit	Profit	Direct %
Bond	Bond	Running %
Excise Tax	Excise	Running %

Owner Markups

	Category	Method
Escalation	Escalation	Escalation

	StartDate	StartIndex	EndDate	EndIndex	Escalation

Contingency	Contingency	Running %
SIOH	SIOH	Running %

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
Project Cost Summary Report			96,039,575	96,039,575	0	1,708,138	4,529,157	5,046,861	17,084,801	21,010,000	40,382,000	103,148
CONSTRUCTED Work Thru October 2011	1.00	LS	61,392,000	61,392,000	0	0	0	0	0	21,010,000	40,382,000	0
Flood Control Componenents	1.00	LS	61,392,000	61,392,000	0	0	0	0	0	21,010,000	40,382,000	0
Construction Phase A (Prior to October 2011)	1.00	LS	61,392,000	61,392,000	0	0	0	0	0	21,010,000	40,382,000	0
01 Lands & Damages - CTD	1.00	EA	21,010,000	21,010,000	0	0	0	0	0	21,010,000	0	0
JR Detention at Jones Road (STA 118000 TO STA 113000)	1.00	LS	9,879,000	9,879,000	0	0	0	0	0	9,879,000	0	0
GBW Detention at Gessner BW8 (STA 95900 to STA 93300)	1.00	LS	4,095,000	4,095,000	0	0	0	0	0	4,095,000	0	0
FNH Detention at Fairbanks North Houston (STA 89000 to STA 85000)	1.00	LS	5,569,000	5,569,000	0	0	0	0	0	5,569,000	0	0
HOL Detention at Hollister Road (STA 81600 to STA 79000)	1.00	LS	1,011,000	1,011,000	0	0	0	0	0	1,011,000	0	0
TG2 Channelization Cole Creek to Gessner (STA 93544 to STA 77129)	1.00	LS	456,000	456,000	0	0	0	0	0	456,000	0	0
02 Relocations - CTD	1.00	LS	103,000	103,000	0	0	0	0	0	0	103,000	0
HOL Detention at Hollister Road (STA 81600 to STA 79000)	730.00	ACR	103,000	103,000	0	0	0	0	0	0	103,000	0
09 Channels & Canals - CTD	1.00	LS	40,279,000	40,279,000	0	0	0	0	0	0	40,279,000	0
JR Detention at Jones Road (STA 118000 TO STA 113000)	420.00	ACR	8,003,000	8,003,000	0	0	0	0	0	0	8,003,000	0
GBW Detention at Gessner BW8 (STA 95900 to STA 93300)	427.00	ACR	2,821,000	2,821,000	0	0	0	0	0	0	2,821,000	0
FNH Detention at Fairbanks North Houston (STA 89000 to STA 85000)	1,271.00	ACR	5,578,000	5,578,000	0	0	0	0	0	0	5,578,000	0
GE200 Gessner to E200 (STA 93544 to STA 104527)	10,983.00	LF	8,965,000	8,965,000	0	0	0	0	0	0	8,965,000	0
HOL Detention at Hollister Road (STA 81600 to STA 79000)	730.00	ACR	7,504,000	7,504,000	0	0	0	0	0	0	7,504,000	0
TG2 Channelization Cole Creek to Gessner (STA 93544 to STA 77129)	16,415.00	LF	7,408,000	7,408,000	0	0	0	0	0	0	7,408,000	0
UNCONSTRUCTED Work After October 2011	1.00	LS	34,647,575	34,647,575	0	1,708,138	4,529,157	5,046,861	17,084,801	0	0	103,148
Flood Control Reaches	1.00	LS	27,033,540	27,033,540	0	702,555	4,500,836	1,667,290	17,007,544	0	0	103,148
Construction Phase A (Year 2012 through 2014)	1.00	LS	8,811,056	8,811,056	0	277,336	1,239,593	1,261,061	4,553,272	0	0	103,148
02 Relocations	1.00	LS	3,747,776	3,747,776	0	0	0	0	3,747,776	0	0	0
E200 CHANNELIZATION FROM E200 to FM 1960 (Sta 1224+98 to Sta 1045+27)	1.00	LS	3,747,776	3,747,776	0	0	0	0	3,747,776	0	0	0
Traffic Control	1.00	EA	248,430	248,430	0	0	0	0	248,430	0	0	0
Traffic Control at Project Site	1.00	LS	248,430	248,430	0	0	0	0	248,430	0	0	0
Telephone / Communication Lines	1.00	LS	252,430	252,430	0	0	0	0	252,430	0	0	0
Telephone LInes - 4" PVC Conduit	1.00	LS	252,430	252,430	0	0	0	0	252,430	0	0	0
Gas / Petroleum Lines	1.00	LS	1,753,750	1,753,750	0	0	0	0	1,753,750	0	0	0

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
Gas/Petroleum Pipelines, <6"	1.00	EA	85,000	85,000	0	0	0	0	85,000	0	0	0
Gas/Petroleum Pipelines, 8" - 12"	3.00	EA	318,750	318,750	0	0	0	0	318,750	0	0	0
Gas/Petroleum Pipelines, > 12"	5.00	EA	1,350,000	1,350,000	0	0	0	0	1,350,000	0	0	0
Bridge Modifications	10,120.00	SF	1,394,000	1,394,000	0	0	0	0	1,394,000	0	0	0
West Road Bridge Extension	5,400.00	SF	918,000	918,000	0	0	0	0	918,000	0	0	0
Rio Grande Bridge Extension	2,800.00	SF	476,000	476,000	0	0	0	0	476,000	0	0	0
Water / Waste Water Lines	1.00	LS	99,166	99,166	0	0	0	0	99,166	0	0	0
Water Line, 16" Cast Iron	1.00	EA	48,266	48,266	0	0	0	0	48,266	0	0	0
Water Line 12" STL	1.00	EA	50,900	50,900	0	0	0	0	50,900	0	0	0
09 Channels & Canals	1.00	LS	4,960,132	4,960,132	0	277,336	1,239,593	1,261,061	805,496	0	0	0
GE200 CHANNELIZATION FROM GESSNER TO E200-00-00 (Sta. 935+44 to 1045+27) - Remainng Construction	10,923.00	LF	2,801,119	2,801,119	0	155,721	450,654	1,051,061	215,392	0	0	0
090101 Mob, Demob & Preparatory Work	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Mob/Demob	1.00	EA	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Project Mobilization	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
090102 Drainage and Channel Structures	1.00	LS	1,918,799	1,918,799	0	86,622	58,205	938,783	140,097	0	0	0
Drain Pipe Modifications - Outfall Drains	35.00	EA	140,097	140,097	0	0	0	0	140,097	0	0	0
6" - 21" Outfall and Backslop Drain	2.00	EA	6,290	6,290	0	0	0	0	6,290	0	0	0
24 - 36" Outfall and Backslop Drain	23.00	EA	98,969	98,969	0	0	0	0	98,969	0	0	0
42" - 60" Outfall and Backslop Drain	4.00	EA	25,536	25,536	0	0	0	0	25,536	0	0	0
66" - 84" Outfall and Backslop Drain	1.00	EA	9,302	9,302	0	0	0	0	9,302	0	0	0
Gabion Strucutres	1.00	LS	1,778,702	1,778,702	0	86,622	58,205	938,783	0	0	0	0
090199 Associated General Work Items	1.00	LS	862,028	862,028	0	64,374	382,800	112,278	75,295	0	0	0
Site Preparation	1.00	LS	75,296	75,296	0	0	0	0	75,295	0	0	0
SWPPP and Erosion Control	1.00	LS	75,296	75,296	0	0	0	0	75,295	0	0	0
Excavate / Load / Haul (Channels)	56,300.00	BCY	494,806	494,806	0	34,314	333,579	0	0	0	0	0
Excavate Haul to Waste Crew	153.55	HR	430,029	430,029	0	16,890	305,537	0	0	0	0	0
Waste Area Crew	153.55	HR	34,523	34,523	0	7,806	16,737	0	0	0	0	0
Haul Road Maint and Flagging Crew	153.55	HR	30,254	30,254	0	9,617	11,305	0	0	0	0	0
Channel FIII and Compaction	35,000.00	CY	64,304	64,304	0	10,685	30,861	4,953	0	0	0	0
Landscaping and Turf Establishment	1.00	LS	227,623	227,623	0	19,375	18,359	107,325	0	0	0	0
Turf Establishment	45.00	ACR	95,578	95,578	0	7,233	12,540	41,325	0	0	0	0
Landscaping & Vegetation Recovery	880.00	EA	132,045	132,045	0	12,142	5,819	66,000	0	0	0	0
E200 CHANNELIZATION FROM E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)	17,971.00	LF	2,159,013	2,159,013	0	121,615	788,939	210,000	590,104	0	0	0
090101 Mob, Demob & Preparatory Work	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Mob/Demob	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Project Mobilization	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
090102 Drainage and Channel Structures	1.00	LS	550,104	550,104	0	0	0	0	550,104	0	0	0
Drain Pipe Modifications - Outfall Drains	34.00	EA	175,170	175,170	0	0	0	0	175,170	0	0	0
24 - 36" Outfall and Backslop Drain	26.00	EA	111,878	111,878	0	0	0	0	111,878	0	0	0

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
42" - 60" Outfall and Backslop Drain	7.00	EA	44,688	44,688	0	0	0	0	44,688	0	0	0
66" - 84" Outfall and Backslop Drain	2.00	EA	18,604	18,604	0	0	0	0	18,604	0	0	0
Backslope Drain Swales and Interceptor Drains	35,000.00	LF	374,934	374,934	0	0	0	0	374,934	0	0	0
Earthern Backslope Drain Swales	35,000.00	LF	166,250	166,250	0	0	0	0	166,250	0	0	0
Concrete Drain Structures	30.00	EA	5,684	5,684	0	0	0	0	5,684	0	0	0
Backslope Drains Piping, 24" RCP	4,060.00	LF	203,000	203,000	0	0	0	0	203,000	0	0	0
090199 Associated General Work Items	1.00	LS	1,588,617	1,588,617	0	116,891	779,290	210,000	40,000	0	0	0
Site Preparation	1.00	LS	40,000	40,000	0	0	0	0	40,000	0	0	0
SWPPP and Erosion Control	1.00	LS	40,000	40,000	0	0	0	0	40,000	0	0	0
Excavate / Load / Haul (Channels)	128,400.00	BCY	1,128,474	1,128,474	0	78,257	760,774	0	0	0	0	0
Excavate Haul to Waste Crew	350.18	HR	980,741	980,741	0	38,520	696,821	0	0	0	0	0
Waste Area Crew	350.18	HR	78,734	78,734	0	17,803	38,171	0	0	0	0	0
Haul Road Maint and Flagging Crew	350.18	HR	68,998	68,998	0	21,934	25,782	0	0	0	0	0
Landscaping and Turf Establishment	1.00	LS	420,144	420,144	0	38,634	18,516	210,000	0	0	0	0
Turf Establishment	59.00	ACR	0	0	0	0	0	0	0	0	0	0
Landscaping & Vegetation Recovery	2,800.00	EA	420,144	420,144	0	38,634	18,516	210,000	0	0	0	0
18 Cutlural Preservation / Mitigation - CTC	3.00	ACR	103,148	103,148	0	0	0	0	0	0	0	103,148
Greens Bayou Mitigation Bank Cos	1.00	LS	103,148	103,148	0	0	0	0	0	0	0	103,148
Environmental Mitigation - Cost to Complete	1.00	ACR	103,148	103,148	0	0	0	0	0	0	0	103,148
Environmental Mitigation - Cost to Complete	1.00	LS	103,148	103,148	0	0	0	0	0	0	0	103,148
Construction Phase B (Year 2014 through 2016)	1.00	LS	18,222,484	18,222,484	0	425,219	3,261,243	406,228	12,454,272	0	0	0
01 Land & Damages	1.00	LS	3,438,928	3,438,928	0	0	0	0	3,438,928	0	0	0
GBW3 DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	1.00	LS	2,813,337	2,813,337	0	0	0	0	2,813,337	0	0	0
Land & Damages	1.00	LS	2,813,337	2,813,337	0	0	0	0	2,813,337	0	0	0
ROW Acquisition	1.00	LS	2,764,860	2,764,860	0	0	0	0	2,764,860	0	0	0
Adminstrative Fees	1.00	EA	48,477	48,477	0	0	0	0	48,477	0	0	0
TG2-VC CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	1.00	LS	431,632	431,632	0	0	0	0	431,632	0	0	0
Land & Damages	1.00	LS	431,632	431,632	0	0	0	0	431,632	0	0	0
ROW Acquisition	1.00	LS	405,712	405,712	0	0	0	0	405,712	0	0	0
Adminstrative Fees	1.00	EA	25,920	25,920	0	0	0	0	25,920	0	0	0
TG2-CC CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	1.00	LS	193,959	193,959	0	0	0	0	193,959	0	0	0
Land & Damages	1.00	LS	193,959	193,959	0	0	0	0	193,959	0	0	0
ROW Acquisition	1.00	LS	148,220	148,220	0	0	0	0	148,220	0	0	0
Adminstrative Fees	1.00	EA	45,739	45,739	0	0	0	0	45,739	0	0	0
02 Relocations	1.00	LS	7,918,169	7,918,169	0	0	0	0	7,779,540	0	0	0

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
GBW DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	1.00	LS	1,446,600	1,446,600	0	0	0	0	1,392,127	0	0	0
Utility Line Modification - Unidentified	1.00	LS	100,000	100,000	0	0	0	0	100,000	0	0	0
Lump Sum Utility Line Replacement	1.00	LS	100,000	100,000	0	0	0	0	100,000	0	0	0
Real Estate (Commercial)	1.00	EA	1,346,600	1,346,600	0	0	0	0	1,292,127	0	0	0
Building (Fair Market Value)	20,125.00	SF	1,082,827	1,082,827	0	0	0	0	1,082,827	0	0	0
Relocation (business)	20,125.00	SF	120,750	120,750	0	0	0	0	120,750	0	0	0
Demolition and Removal of Buildings	20,125.00	SF	143,023	143,023	0	0	0	0	88,550	0	0	0
TG2-VC CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	1.00	LS	4,544,150	4,544,150	0	0	0	0	4,520,897	0	0	0
Gas / Petroleum Lines	8.00	EA	996,250	996,250	0	0	0	0	996,250	0	0	0
Gas/Petroleum Pipelines, <6"	2.00	EA	170,000	170,000	0	0	0	0	170,000	0	0	0
Gas/Petroleum Pipelines, 8" - 12"	4.00	EA	425,000	425,000	0	0	0	0	425,000	0	0	0
Gas/Petroleum Pipelines, 8" - 12" On Bridge	1.00	EA	131,250	131,250	0	0	0	0	131,250	0	0	0
Gas/Petroleum Pipelines, > 12" or Grouped	1.00	EA	270,000	270,000	0	0	0	0	270,000	0	0	0
Traffic Control	2.00	LS	165,620	165,620	0	0	0	0	165,620	0	0	0
Traffic Control	2.00	LS	165,620	165,620	0	0	0	0	165,620	0	0	0
Water / Waste Water Lines	7.00	EA	225,436	225,436	0	0	0	0	225,436	0	0	0
WasteWater Line < 12"	3.00	EA	53,646	53,646	0	0	0	0	53,646	0	0	0
WasteWater Line 14" - 16"	1.00	EA	21,724	21,724	0	0	0	0	21,724	0	0	0
Water Line 12" STL	2.00	EA	101,800	101,800	0	0	0	0	101,800	0	0	0
Water Line 16" CI	1.00	EA	48,266	48,266	0	0	0	0	48,266	0	0	0
Bridge Modifications	13,145.00	SF	2,113,500	2,113,500	0	0	0	0	2,113,500	0	0	0
Railway Bridge Extension	900.00	SF	175,500	175,500	0	0	0	0	175,500	0	0	0
North Houston-Rossyln Bridge Extension	11,400.00	SF	1,938,000	1,938,000	0	0	0	0	1,938,000	0	0	0
Real Estate (residential)	7.00	EA	1,043,344	1,043,344	0	0	0	0	1,020,091	0	0	0
Building (Fair Market Value)	7.00	EA	786,291	786,291	0	0	0	0	786,291	0	0	0
Relocation (home)	7.00	EA	196,000	196,000	0	0	0	0	196,000	0	0	0
Demolition and Removal of Buildings	12,600.00	SF	61,053	61,053	0	0	0	0	37,800	0	0	0
TG2-CC CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	1.00	LS	1,927,418	1,927,418	0	0	0	0	1,866,516	0	0	0
Water / Waste Water Lines	1.00	LS	179,854	179,854	0	0	0	0	179,854	0	0	0
WasteWater Line 60"	1.00	EA	94,000	94,000	0	0	0	0	94,000	0	0	0
WasteWater Line 12"	2.00	EA	35,764	35,764	0	0	0	0	35,764	0	0	0
Water Line 12" STL	1.00	EA	50,090	50,090	0	0	0	0	50,090	0	0	0
Real Estate (residential and commerical)	12.00	EA	1,747,564	1,747,564	0	0	0	0	1,686,662	0	0	0
Building (Fair Market Value)	12.00	EA	1,225,662	1,225,662	0	0	0	0	1,225,662	0	0	0
Relocations (home and business)	12.00	EA	362,000	362,000	0	0	0	0	362,000	0	0	0
Demolition and Removal of Buildings	28,800.00	SF	159,902	159,902	0	0	0	0	99,000	0	0	0

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
09 Channels & Canals	1.00	LS	6,865,388	6,865,388	0	425,219	3,261,243	406,228	1,235,804	0	0	0
GBW3 DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	92.00	ACR	1,224,188	1,224,188	0	92,705	643,267	72,778	112,790	0	0	0
090101 Mob, Demob & Preparatory Work	1.00	LS	15,529	15,529	0	4,725	9,649	0	0	0	0	0
Mob/Demob	1.00	LS	15,529	15,529	0	4,725	9,649	0	0	0	0	0
Project Mobilization	1.00	LS	15,529	15,529	0	4,725	9,649	0	0	0	0	0
090102 Drainage and Channel Structures	1.00	LS	153,356	153,356	0	7,175	1,183	18,956	106,790	0	0	0
Drain Pipe Modifications	84.00	EA	74,550	74,550	0	0	0	0	74,550	0	0	0
36" Outfall Drains, RCP	1,050.00	LF	74,550	74,550	0	0	0	0	74,550	0	0	0
Concrete and Paving	150.00	CY	46,566	46,566	0	7,175	1,183	18,956	0	0	0	0
Concrete Pilot Flow Channel - Assmue 6" concrete depth, Trapezoidal Detail	900.00	SY	46,566	46,566	0	7,175	1,183	18,956	0	0	0	0
Backslope Drain Swales and Interceptor Drains	3,000.00	LF	32,240	32,240	0	0	0	0	32,240	0	0	0
Earthern Backslope Drain Swales	3,000.00	LF	14,250	14,250	0	0	0	0	14,250	0	0	0
Concrete Drain Structures	5.00	EA	490	490	0	0	0	0	490	0	0	0
Backslope Drains Piping, 24" RCP	350.00	LF	17,500	17,500	0	0	0	0	17,500	0	0	0
090199 Associated General Work Items	1.00	LS	1,055,303	1,055,303	0	80,806	632,436	53,822	6,000	0	0	0
Site Preparation	1.00	LS	35,126	35,126	0	10,079	9,871	0	6,000	0	0	0
SWPPP and Erosion Control	1.00	LS	6,000	6,000	0	0	0	0	6,000	0	0	0
Clearing & Grubbing	7.50	ACR	29,126	29,126	0	10,079	9,871	0	0	0	0	0
Excavate / Load / Haul (Basins)	148,427.00	BCY	910,117	910,117	0	60,893	616,179	0	0	0	0	0
Excavate Haul to Waste Crew	362.02	HR	757,839	757,839	0	20,092	550,064	0	0	0	0	0
Waste Area Crew	362.02	HR	80,948	80,948	0	18,126	39,461	0	0	0	0	0
Haul Road Maint and Flagging Crew	362.02	HR	71,330	71,330	0	22,675	26,653	0	0	0	0	0
Landscaping and Turf Establishment	8.30	ACR	110,060	110,060	0	9,834	6,386	53,822	0	0	0	0
Turf Establishment	8.30	ACR	17,629	17,629	0	1,334	2,313	7,622	0	0	0	0
Landscaping & Vegetation Recovery	616.00	EA	92,432	92,432	0	8,499	4,073	46,200	0	0	0	0
TG2-VC CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	13,349.00	LF	3,779,266	3,779,266	0	223,078	1,789,361	210,708	725,446	0	0	0
090101 Mob, Demob & Preparatory Work	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Mob/Demob	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Project Mobilization	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
090102 Drainage and Channel Structures	1.00	LS	693,742	693,742	0	0	0	0	693,742	0	0	0
Drain Pipe Modifications - Outfall Drains	84.00	EA	404,988	404,988	0	0	0	0	404,988	0	0	0
6" - 21" Outfall and Backslop Drain	5.00	EA	15,725	15,725	0	0	0	0	15,725	0	0	0
24 - 36" Outfall and Backslop Drain	55.00	EA	236,665	236,665	0	0	0	0	236,665	0	0	0
42" - 60" Outfall and Backslop Drain	14.00	EA	89,376	89,376	0	0	0	0	89,376	0	0	0
66" - 84" Outfall and Backslop Drain	3.00	EA	27,906	27,906	0	0	0	0	27,906	0	0	0

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
90" - 120" Outfall and Backslop Drain	1.00	EA	15,543	15,543	0	0	0	0	15,543	0	0	0
Outfall Drain Structure, 120" X 120" Box	1.00	EA	19,773	19,773	0	0	0	0	19,773	0	0	0
Backslope Drain Swales and Interceptor Drains	26,704.00	LF	288,754	288,754	0	0	0	0	288,754	0	0	0
Earthern Backslope Drain Swales	26,704.00	LF	126,844	126,844	0	0	0	0	126,844	0	0	0
Concrete Drain Structures	45.00	EA	4,410	4,410	0	0	0	0	4,410	0	0	0
Backslope Drains Piping, 24" RCP	3,150.00	LF	157,500	157,500	0	0	0	0	157,500	0	0	0
090199 Associated General Work Items	1.00	LS	3,065,232	3,065,232	0	218,353	1,779,711	210,708	31,704	0	0	0
Site Preparation	1.00	LS	31,704	31,704	0	0	0	0	31,704	0	0	0
SWPPP and Erosion Control	1.00	LS	31,704	31,704	0	0	0	0	31,704	0	0	0
Excavate / Load / Haul (Channels)	295,401.00	BCY	2,596,201	2,596,201	0	180,040	1,750,260	0	0	0	0	0
Excavate Haul to Waste Crew	805.64	HR	2,256,324	2,256,324	0	88,620	1,603,127	0	0	0	0	0
Waste Area Crew	805.64	HR	181,138	181,138	0	40,959	87,817	0	0	0	0	0
Haul Road Maint and Flagging Crew	805.64	HR	158,739	158,739	0	50,461	59,315	0	0	0	0	0
Landscaping and Turf Establishment	0.10	ACR	437,327	437,327	0	38,313	29,452	210,708	0	0	0	0
Landscaping & Vegetation Recovery	2,136.00	EA	320,510	320,510	0	29,472	14,125	160,200	0	0	0	0
Turf Establishment	55.00	ACR	116,817	116,817	0	8,841	15,327	50,508	0	0	0	0
TG2-CC CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	7,549.00	LF	1,861,934	1,861,934	0	109,436	828,615	122,742	397,568	0	0	0
090101 Mob, Demob & Preparatory Work	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Mob/Demob	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
Project Mobilization	1.00	LS	20,291	20,291	0	4,725	9,649	0	0	0	0	0
090102 Drainage and Channel Structures	1.00	LS	377,464	377,464	0	0	0	0	377,464	0	0	0
Drain Pipe Modifications - Outfall Drains	39.00	EA	213,810	213,810	0	0	0	0	213,810	0	0	0
6" - 21" Outfall and Backslop Drain	2.00	EA	6,290	6,290	0	0	0	0	6,290	0	0	0
24 - 36" Outfall and Backslop Drain	30.00	EA	129,090	129,090	0	0	0	0	129,090	0	0	0
42" - 60" Outfall and Backslop Drain	5.00	EA	31,920	31,920	0	0	0	0	31,920	0	0	0
66" - 84" Outfall and Backslop Drain	5.00	EA	46,510	46,510	0	0	0	0	46,510	0	0	0
Backslope Drain Swales and Interceptor Drains	15,104.00	LF	163,654	163,654	0	0	0	0	163,654	0	0	0
Earthern Backslope Drain Swales	15,104.00	LF	71,744	71,744	0	0	0	0	71,744	0	0	0
Concrete Drain Structures	25.00	EA	4,410	4,410	0	0	0	0	4,410	0	0	0
Backslope Drains Piping, 24" RCP	1,750.00	LF	87,500	87,500	0	0	0	0	87,500	0	0	0
090199 Associated General Work Items	1.00	LS	1,464,179	1,464,179	0	104,711	818,966	122,742	20,104	0	0	0
Site Preparation	1.00	LS	20,104	20,104	0	0	0	0	20,104	0	0	0
SWPPP and Erosion Control Wally revise cost to $20,104	1.00	LS	20,104	20,104	0	0	0	0	20,104	0	0	0
Excavate / Load / Haul (Channels)	135,227.00	BCY	1,188,474	1,188,474	0	82,418	801,224	0	0	0	0	0
Excavate Haul to Waste Crew	368.80	HR	1,032,887	1,032,887	0	40,568	733,871	0	0	0	0	0
Waste Area Crew	368.80	HR	82,921	82,921	0	18,750	40,200	0	0	0	0	0
Haul Road Maint and Flagging Crew	368.80	HR	72,667	72,667	0	23,100	27,153	0	0	0	0	0
Landscaping and Turf Establishment	0.10	ACR	255,600	255,600	0	22,294	17,742	122,742	0	0	0	0

Description	Quantity	UOM	ProjectCost	ContractCost	Escalation	LaborCost	EQCost	MatlCost	SubBidCost	CTD-ROW	CTD-Constructn	UserCost3
Landscaping & Vegetation Recovery	1,208.00	EA	181,262	181,262	0	16,668	7,988	90,600	0	0	0	0
Turf Establishment	35.00	ACR	74,338	74,338	0	5,626	9,753	32,142	0	0	0	0
Recreation Components	1.00	LS	7,614,035	7,614,035	0	1,005,582	28,321	3,379,572	77,257	0	0	0
Construction Phase A (Year 2012 through 2013)	1.00	LS	908,601	908,601	0	112,661	4,142	414,062	6,768	0	0	0
14 Recreation	1.00	LS	908,601	908,601	0	112,661	4,142	414,062	6,768	0	0	0
HOL.3-B Recreation and Day Use Areas	1.00	LS	908,601	908,601	0	112,661	4,142	414,062	6,768	0	0	0
Parking Lots and Service Roads	8,000.00	SF	43,869	43,869	0	4,027	43	22,212	0	0	0	0
Concrete Pathways	69,300.00	SF	566,788	566,788	0	88,584	0	242,550	0	0	0	0
Activity Guides, Controls and Signage	1.00	LS	61,272	61,272	0	9,099	0	20,000	6,768	0	0	0
Day Use Areas	1.00	LS	236,672	236,672	0	10,950	4,098	129,300	0	0	0	0
Construction Phase B (Year 2013 through 2015)	1.00	LS	1,583,965	1,583,965	0	152,361	8,283	743,440	42,980	0	0	0
14 Recreation	1.00	LS	1,583,965	1,583,965	0	152,361	8,283	743,440	42,980	0	0	0
FNH.3-N Recreation and Day Use Areas	1.00	LS	691,658	691,658	0	62,222	4,142	305,272	42,980	0	0	0
Parking Lots and Service Roads	8,000.00	SF	43,869	43,869	0	4,027	43	22,212	0	0	0	0
Concrete Pathways	36,960.00	SF	302,287	302,287	0	47,245	0	129,360	0	0	0	0
Activity Guides, Controls and Signage	1.00	LS	33,919	33,919	0	0	0	21,000	0	0	0	0
Day Use Areas	1.00	LS	242,163	242,163	0	10,950	4,098	132,700	0	0	0	0
Field Preparation	5.00	EA	69,420	69,420	0	0	0	0	42,980	0	0	0
FNH.3-S Recreation and Day Use Areas	1.00	LS	892,307	892,307	0	90,139	4,142	438,168	0	0	0	0
Parking Lots and Service Roads	8,000.00	SF	43,869	43,869	0	4,027	43	22,212	0	0	0	0
Concrete Pathways	43,400.00	SF	354,958	354,958	0	55,477	0	151,900	0	0	0	0
Activity Guides, Controls and Signage	1.00	LS	164,617	164,617	0	22,748	0	74,000	0	0	0	0
Day Use Areas	1.00	LS	328,864	328,864	0	7,887	4,098	190,056	0	0	0	0
Construction Phase C (Year 2014 through 2016)	1.00	LS	1,469,197	1,469,197	0	168,896	6,247	669,750	27,509	0	0	0
14 Recreation	1.00	LS	1,469,197	1,469,197	0	168,896	6,247	669,750	27,509	0	0	0
GBW.3-N Recreation and Day Use Areas	1.00	LS	954,386	954,386	0	108,325	4,142	426,987	27,509	0	0	0
Parking Lots and Service Roads	8,000.00	SF	43,869	43,869	0	4,027	43	22,212	0	0	0	0
Concrete Pathways	68,950.00	SF	563,925	563,925	0	88,137	0	241,325	0	0	0	0
Activity Guides, Controls and Signage	1.00	LS	62,419	62,419	0	5,211	0	32,250	0	0	0	0
Day Use Areas	1.00	LS	239,741	239,741	0	10,950	4,098	131,200	0	0	0	0
Field Preparation	5.00	EA	44,432	44,432	0	0	0	0	27,509	0	0	0
JR.4-N Recreation and Day Use Areas	1.00	LS	514,811	514,811	0	60,570	2,105	242,763	0	0	0	0
Parking Lots and Service Roads	10,400.00	SF	56,951	56,951	0	5,234	56	28,828	0	0	0	0
Concrete Pathways	36,610.00	SF	299,424	299,424	0	46,798	0	128,135	0	0	0	0
Activity Guides, Controls and Signage	1.00	LS	22,612	22,612	0	0	0	14,000	0	0	0	0
Day Use Areas	1.00	LS	135,824	135,824	0	8,538	2,049	71,800	0	0	0	0
Construction Phase D (Year 2013 through 2016)	1.00	LS	3,652,273	3,652,273	0	571,665	9,649	1,552,320	0	0	0	0
14 Recreation	1.00	LS	3,652,273	3,652,273	0	571,665	9,649	1,552,320	0	0	0	0
RLP Recreation and Day Use Areas	1.00	LS	3,652,273	3,652,273	0	571,665	9,649	1,552,320	0	0	0	0
Mobilization/Demobilization	1.00	LS	24,833	24,833	0	4,725	9,649	0	0	0	0	0
Concrete Pathways	443,520.00	SF	3,627,440	3,627,440	0	566,940	0	1,552,320	0	0	0	0

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Contract Cost Summary Report				90,232,121	91,739,389	4,300,186	96,039,575	96,039,575
CONSTRUCTED Work Thru October 2011	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	61,392,000	61,392,000	0	61,392,000	61,392,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" Cost are Escalated to 4th Quarter 2011)								
Flood Control Componenents	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	61,392,000	61,392,000	0	61,392,000	61,392,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls")								
Construction Phase A (Prior to October 2011)	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	61,392,000	61,392,000	0	61,392,000	61,392,000
(Note: Lump Sum Unit Cost and Cost to Date (CTD) Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls")								
				21,010,000.00	*21,010,000.00*		*21,010,000.00*	*21,010,000.00*
01 Lands & Damages - CTD	1.00	EA	Completed Work - Bid Item Unit Cost, No Markups	21,010,000	21,010,000	0	21,010,000	21,010,000
JR Detention at Jones Road (STA 118000 TO STA 113000)	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	9,879,000	9,879,000	0	9,879,000	9,879,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" Work completed 2002-2011)								
GBW Detention at Gessner BW8 (STA 95900 to STA 93300)	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	4,095,000	4,095,000	0	4,095,000	4,095,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
FNH Detention at Fairbanks North Houston (STA 89000 to STA 85000)	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	5,569,000	5,569,000	0	5,569,000	5,569,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" Work completed 2002-2011, Cells 1 and 2)								
HOL Detention at Hollister Road (STA 81600 to STA 79000)	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	1,011,000	1,011,000	0	1,011,000	1,011,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
TG2 Channelization Cole Creek to Gessner (STA 93544 to STA 77129)	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	456,000	456,000	0	456,000	456,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
02 Relocations - CTD	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	103,000	103,000	0	103,000	103,000
				141.10	*141.10*		*141.10*	*141.10*
HOL Detention at Hollister Road (STA 81600 to STA 79000)	730.00	ACR	Completed Work - Bid	103,000	103,000	0	103,000	103,000

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)			Item Unit Cost, No Markups					
09 Channels & Canals - CTD	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	40,279,000	40,279,000	0	40,279,000	40,279,000
				19,054.76	*19,054.76*		*19,054.76*	*19,054.76*
JR Detention at Jones Road (STA 118000 TO STA 113000)	420.00	ACR	Completed Work - Bid Item Unit Cost, No Markups	8,003,000	8,003,000	0	8,003,000	8,003,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
				6,606.56	*6,606.56*		*6,606.56*	*6,606.56*
GBW Detention at Gessner BW8 (STA 95900 to STA 93300)	427.00	ACR	Completed Work - Bid Item Unit Cost, No Markups	2,821,000	2,821,000	0	2,821,000	2,821,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" Work completed 2002-2011, Cells 1 and 2)								
				4,388.67	*4,388.67*		*4,388.67*	*4,388.67*
FNH Detention at Fairbanks North Houston (STA 89000 to STA 85000)	1,271.00	ACR	Completed Work - Bid Item Unit Cost, No Markups	5,578,000	5,578,000	0	5,578,000	5,578,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011, Cells 1 and 2)								
				816.26	*816.26*		*816.26*	*816.26*
GE200 Gessner to E200 (STA 93544 to STA 104527)	10,983.00	LF	Completed Work - Bid Item Unit Cost, No Markups	8,965,000	8,965,000	0	8,965,000	8,965,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
				10,279.45	*10,279.45*		*10,279.45*	*10,279.45*
HOL Detention at Hollister Road (STA 81600 to STA 79000)	730.00	ACR	Completed Work - Bid Item Unit Cost, No Markups	7,504,000	7,504,000	0	7,504,000	7,504,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
				451.29	*451.29*		*451.29*	*451.29*
TG2 Channelization Cole Creek to Gessner (STA 93544 to STA 77129)	16,415.00	LF	Completed Work - Bid Item Unit Cost, No Markups	7,408,000	7,408,000	0	7,408,000	7,408,000
(Note: Lump Sum Unit Cost Based on file "CTDvCTC_RF30_LA_NSB1_v_Actual_Construction_24Apr12.xls" . Work completed 2002-2011)								
UNCONSTRUCTED Work After October 2011	1.00	LS		28,840,121	30,347,389	4,300,186	34,647,575	34,647,575
Flood Control Reaches	1.00	LS		24,126,045	24,578,303	2,455,237	27,033,540	27,033,540
Construction Phase A (Year 2012 through 2014)	1.00	LS		7,491,401	7,804,350	1,006,706	8,811,056	8,811,056
(Note: `)								
02 Relocations	1.00	LS	Bid Item Historical Cost,	3,747,776	3,747,776	0	3,747,776	3,747,776

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
E200 CHANNELIZATION FROM E200 to FM 1960 (Sta 1224+98 to Sta 1045+27)	1.00	LS	Bid Item Historical Cost, Includes Markups	3,747,776	3,747,776	0	3,747,776	3,747,776
(Note: Lump Sum Unit Cost Based on file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls" Overall Stationing Sta 1224+98 to Sta 1045+27)								
				248,430.00	*248,430.00*		*248,430.00*	*248,430.00*
Traffic Control	1.00	EA	Bid Item Historical Cost, Includes Markups	248,430	248,430	0	248,430	248,430
Traffic Control at Project Site	1.00	LS	Bid Item Historical Cost, Includes Markups	248,430	248,430	0	248,430	248,430
Telephone / Communication Lines	1.00	LS	Bid Item Historical Cost, Includes Markups	252,430	252,430	0	252,430	252,430
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
Telephone LInes - 4" PVC Conduit	1.00	LS	Bid Item Historical Cost, Includes Markups	252,430	252,430	0	252,430	252,430
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects.. QUANTITY REVISED PER D WINSLOW NOVEMBER 2012)								
Gas / Petroleum Lines	1.00	LS	Bid Item Historical Cost, Includes Markups	1,753,750	1,753,750	0	1,753,750	1,753,750
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				85,000.00	*85,000.00*		*85,000.00*	*85,000.00*
Gas/Petroleum Pipelines, <6"	1.00	EA	Bid Item Historical Cost, Includes Markups	85,000	85,000	0	85,000	85,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects.. QUANTITY REVISED PER D WINSLOW NOVEMBER 2012)								
				106,250.00	*106,250.00*		*106,250.00*	*106,250.00*
Gas/Petroleum Pipelines, 8" - 12"	3.00	EA	Bid Item Historical Cost, Includes Markups	318,750	318,750	0	318,750	318,750
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available.)								
				270,000.00	*270,000.00*		*270,000.00*	*270,000.00*
Gas/Petroleum Pipelines, > 12"	5.00	EA	Bid Item Historical Cost, Includes Markups	1,350,000	1,350,000	0	1,350,000	1,350,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available.)								
				137.75	*137.75*		*137.75*	*137.75*
Bridge Modifications	10,120.00	SF	Bid Item Historical Cost, Includes Markups	1,394,000	1,394,000	0	1,394,000	1,394,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				170.00	*170.00*		*170.00*	*170.00*
West Road Bridge Extension	5,400.00	SF	Bid Item Historical Cost, Includes Markups	918,000	918,000	0	918,000	918,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				170.00	*170.00*		*170.00*	*170.00*
Rio Grande Bridge Extension	2,800.00	SF	Bid Item Historical Cost, Includes Markups	476,000	476,000	0	476,000	476,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Water / Waste Water Lines	1.00	LS	Bid Item Historical Cost, Includes Markups	99,166	99,166	0	99,166	99,166
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				48,266.00	*48,266.00*		*48,266.00*	*48,266.00*
Water Line, 16" Cast Iron	1.00	EA	Bid Item Historical Cost, Includes Markups	48,266	48,266	0	48,266	48,266
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				50,900.00	*50,900.00*		*50,900.00*	*50,900.00*
Water Line 12" STL	1.00	EA	Bid Item Historical Cost, Includes Markups	50,900	50,900	0	50,900	50,900
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
09 Channels & Canals	1.00	LS	Prime Future Work	3,640,477	3,953,426	1,006,706	4,960,132	4,960,132
				174.38	*199.08*		*256.44*	*256.44*
GE200 CHANNELIZATION FROM GESSNER TO E200-00-00 (Sta. 935+44 to 1045+27) - Remainng Construction	10,923.00	LF	Prime Future Work	1,904,751	2,174,574	626,545	2,801,119	2,801,119
(Note: Lump Sum Unit Cost Based on file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls" Overall Stationing 935+00 to 1045+27 Analysis 4 Revised Cost Estimate for improvements between 1045+27 to 935+44; Raised flow line between Sta. 104527 to Sta. 97546 and channel cleanout from Sta. 97546 to Sta. 93534)								
090101 Mob, Demob & Preparatory Work	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
				15,374.64	*15,374.64*		*20,291.43*	*20,291.43*
Mob/Demob	1.00	EA	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Project Mobilization	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
090102 Drainage and Channel Structures	1.00	LS	Prime Future Work	1,241,345	1,487,804	430,996	1,918,799	1,918,799
				4,002.77	*4,002.77*		*4,002.77*	*4,002.77*
Drain Pipe Modifications - Outfall Drains	35.00	EA	Bid Item Historical Cost, Includes Markups	140,097	140,097	0	140,097	140,097
				3,145.00	*3,145.00*		*3,145.00*	*3,145.00*
6" - 21" Outfall and Backslop Drain	2.00	EA	Bid Item Historical Cost, Includes Markups	6,290	6,290	0	6,290	6,290
				4,303.00	*4,303.00*		*4,303.00*	*4,303.00*
24 - 36" Outfall and Backslop Drain	23.00	EA	Bid Item Historical Cost, Includes Markups	98,969	98,969	0	98,969	98,969
				6,384.00	*6,384.00*		*6,384.00*	*6,384.00*
42" - 60" Outfall and Backslop Drain	4.00	EA	Bid Item Historical Cost, Includes Markups	25,536	25,536	0	25,536	25,536
				9,302.00	*9,302.00*		*9,302.00*	*9,302.00*
66" - 84" Outfall and Backslop Drain	1.00	EA	Bid Item Historical Cost, Includes Markups	9,302	9,302	0	9,302	9,302
Gabion Strucutres	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	1,101,248	1,347,707	430,996	1,778,702	1,778,702
090199 Associated General Work Items	1.00	LS	Prime Future Work	648,031	671,396	190,632	862,028	862,028
Site Preparation	1.00	LS	Bid Item Historical Cost,	75,296	75,296	0	75,296	75,296

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			Includes Markups					
SWPPP and Erosion Control	1.00	LS	Bid Item Historical Cost, Includes Markups	75,296	75,296	0	75,296	75,296
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				6.66	*6.66*		*8.79*	*8.79*
Excavate / Load / Haul (Channels)	56,300.00	BCY	Prime Future Work	374,910	374,910	119,896	494,806	494,806
(Note: See Excal work sheet for development of crew size nd production rate. Crew hours = 150 hours)								
				2,122.04	*2,122.04*		*2,800.66*	*2,800.66*
Excavate Haul to Waste Crew	153.55	HR	Prime Future Work	325,829	325,829	104,200	430,029	430,029
				170.36	*170.36*		*224.84*	*224.84*
Waste Area Crew	153.55	HR	Prime Future Work	26,158	26,158	8,365	34,523	34,523
				149.29	*149.29*		*197.03*	*197.03*
Haul Road Maint and Flagging Crew	153.55	HR	Prime Future Work	22,923	22,923	7,331	30,254	30,254
				1.39	*1.39*		*1.84*	*1.84*
Channel FIll and Compaction	35,000.00	CY	Prime Future Work	48,722	48,722	15,581	64,304	64,304
(Note: Quantity and Pricing based on HCFCD Summary Cost Table. Pricing per Summary Cost Table)								
Landscaping and Turf Establishment	1.00	LS	Landscaping	149,103	172,468	55,155	227,623	227,623
(Note: Acreage to be provided by HCFCD)								
				1,391.28	*1,609.30*		*2,123.95*	*2,123.95*
Turf Establishment	45.00	ACR	Landscaping	62,608	72,418	23,159	95,578	95,578
(Note: Quantity not provided by HCFCD, Seeding is assumed to be required based on construction methologies and similar WOB reaches.)								
				98.29	*113.69*		*150.05*	*150.05*
Landscaping & Vegetation Recovery	880.00	EA	Landscaping	86,496	100,049	31,996	132,045	132,045
(Note: Quantity based on HCFCD Summary Cost Table. No additional informaiton available)								
				96.58	*98.98*		*120.14*	*120.14*
E200 CHANNELIZATION FROM E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)	17,971.00	LF	Prime Future Work	1,735,726	1,778,852	380,161	2,159,013	2,159,013
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 1045+27 TO 1224+98)								
090101 Mob, Demob & Preparatory Work	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Mob/Demob	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Project Mobilization	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
090102 Drainage and Channel Structures	1.00	LS	Prime Future Work	550,104	550,104	0	550,104	550,104
				5,152.06	*5,152.06*		*5,152.06*	*5,152.06*
Drain Pipe Modifications - Outfall Drains	34.00	EA	Bid Item Historical Cost, Includes Markups	175,170	175,170	0	175,170	175,170
(Note: Quantity and Pricing based on HCFCD Summary Cost Table)								
				4,303.00	*4,303.00*		*4,303.00*	*4,303.00*
24 - 36" Outfall and Backslop Drain	26.00	EA	Bid Item Historical Cost, Includes Markups	111,878	111,878	0	111,878	111,878
				6,384.00	*6,384.00*		*6,384.00*	*6,384.00*
42" - 60" Outfall and Backslop Drain	7.00	EA	Bid Item Historical Cost, Includes Markups	44,688	44,688	0	44,688	44,688

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
				9,302.00	*9,302.00*		*9,302.00*	*9,302.00*
66" - 84" Outfall and Backslop Drain	2.00	EA	Bid Item Historical Cost, Includes Markups	18,604	18,604	0	18,604	18,604
				10.71	*10.71*		*10.71*	*10.71*
Backslope Drain Swales and Interceptor Drains	35,000.00	LF	Prime Future Work	374,934	374,934	0	374,934	374,934
(Note: Spacing of Interceptor Drains stands at approximately 550 LF at 30 Structures)								
				4.75	*4.75*		*4.75*	*4.75*
Earthern Backslope Drain Swales	35,000.00	LF	Bid Item Historical Cost, Includes Markups	166,250	166,250	0	166,250	166,250
(Note: Item 2315-06 $4.27/lf plus 118.3% = say $4.75/LF)								
				189.47	*189.47*		*189.47*	*189.47*
Concrete Drain Structures	30.00	EA	Bid Item Historical Cost, Includes Markups	5,684	5,684	0	5,684	5,684
				50.00	*50.00*		*50.00*	*50.00*
Backslope Drains Piping, 24" RCP	4,060.00	LF	Bid Item Historical Cost, Includes Markups	203,000	203,000	0	203,000	203,000
(Note: Average Length of piping per Backslope Drain stands at 70 LF. 58 Structures x 70 LF = 4060 LF Total 2642-02 cost of 39.36/LF plus 118. esc = say $50/LF to allow for bend and coupling)								
090199 Associated General Work Items	1.00	LS	Prime Future Work	1,170,248	1,213,373	375,244	1,588,617	1,588,617
Site Preparation	1.00	LS	Bid Item Historical Cost, Includes Markups	40,000	40,000	0	40,000	40,000
(Note: Clearing & Grubbing Quantity Removed per D Winslow email of 3/26/12)								
SWPPP and Erosion Control	1.00	LS	Bid Item Historical Cost, Includes Markups	40,000	40,000	0	40,000	40,000
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12")								
				6.66	*6.66*		*8.79*	*8.79*
Excavate / Load / Haul (Channels)	128,400.00	BCY	Prime Future Work	855,034	855,034	273,439	1,128,474	1,128,474
(Note: See Excal work sheet for development of crew size nd production rate. Crew hours = 350 hours)								
				2,122.04	*2,122.04*		*2,800.66*	*2,800.66*
Excavate Haul to Waste Crew	350.18	HR	Prime Future Work	743,099	743,099	237,642	980,741	980,741
				170.36	*170.36*		*224.84*	*224.84*
Waste Area Crew	350.18	HR	Prime Future Work	59,656	59,656	19,078	78,734	78,734
				149.29	*149.29*		*197.03*	*197.03*
Haul Road Maint and Flagging Crew	350.18	HR	Prime Future Work	52,279	52,279	16,719	68,998	68,998
Landscaping and Turf Establishment	1.00	LS	Landscaping	275,213	318,339	101,805	420,144	420,144
(Note: Acreage to be provided by HCFCD)								
				0.00	*0.00*		*0.00*	*0.00*
Turf Establishment	59.00	ACR	Landscaping	0	0	0	0	0
(Note: Quantity not provided by HCFCD, Seeding is assumed to be required based on construction methologies and similar WOB reaches. Refer to Email from D WInslow 3/26/12)								
				98.29	*113.69*		*150.05*	*150.05*
Landscaping & Vegetation Recovery	2,800.00	EA	Landscaping	275,213	318,339	101,805	420,144	420,144
(Note: Quantity based on HCFCD Summary Cost Table. No additional informaiton available)								

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
				34,382.67	*34,382.67*		*34,382.67*	*34,382.67*
18 Cutlural Preservation / Mitigation - CTC	3.00	ACR	Completed Work - Bid Item Unit Cost, No Markups	103,148	103,148	0	103,148	103,148
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12")								
Greens Bayou Mitigation Bank Cos	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	103,148	103,148	0	103,148	103,148
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Another issue, I didn't notice that when you took out the FNH3- W basin, you also took out the code 18 Cultural Preservation/Mitigation item costing $372,000. This should stay in the plan. It has been erroneously called FNH. It should just be called Greens Bayou Mitigation Bank. 5/24/13 - Hello Bill - looks good. Only change as follows: Account 18 change description - delete FNH3 etc. and put in description Wetlands at HOL3 Basin. Dave 8/6/13 - Per D Winslow - Remove Holister cost of $479,156 and add Greens Bayou Mitigation Bank Cost of $103,148)								
				103,148.00	*103,148.00*		*103,148.00*	*103,148.00*
Environmental Mitigation - Cost to Complete	1.00	ACR	Completed Work - Bid Item Unit Cost, No Markups	103,148	103,148	0	103,148	103,148
Environmental Mitigation - Cost to Complete	1.00	LS	Completed Work - Bid Item Unit Cost, No Markups	103,148	103,148	0	103,148	103,148
Construction Phase B (Year 2014 through 2016)	1.00	LS		16,634,644	16,773,953	1,448,531	18,222,484	18,222,484
01 Land & Damages	1.00	LS	Bid Item Historical Cost, Includes Markups	3,438,928	3,438,928	0	3,438,928	3,438,928
(Note: Lump Sum and Unit Pricing provided b y HCFCD and aqre based on Histirocal Cost from similar Flood Risk Reduction Projects)								
GBW3 DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	1.00	LS	Bid Item Historical Cost, Includes Markups	2,813,337	2,813,337	0	2,813,337	2,813,337
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 959+00 TO 933+00)								
Land & Damages	1.00	LS	Bid Item Historical Cost, Includes Markups	2,813,337	2,813,337	0	2,813,337	2,813,337
ROW Acquisition	1.00	LS	Bid Item Historical Cost, Includes Markups	2,764,860	2,764,860	0	2,764,860	2,764,860
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				48,477.00	*48,477.00*		*48,477.00*	*48,477.00*
Adminstrative Fees	1.00	EA	Bid Item Historical Cost, Includes Markups	48,477	48,477	0	48,477	48,477
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
TG2-VC CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	1.00	LS	Bid Item Historical Cost, Includes Markups	431,632	431,632	0	431,632	431,632
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 637+90 to 771+29)								
Land & Damages	1.00	LS	Bid Item Historical Cost, Includes Markups	431,632	431,632	0	431,632	431,632
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
ROW Acquisition	1.00	LS	Bid Item Historical Cost, Includes Markups	405,712	405,712	0	405,712	405,712

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				25,920.00	*25,920.00*		*25,920.00*	*25,920.00*
Adminstrative Fees	1.00	EA	Bid Item Historical Cost, Includes Markups	25,920	25,920	0	25,920	25,920
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
TG2-CC CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	1.00	LS	Bid Item Historical Cost, Includes Markups	193,959	193,959	0	193,959	193,959
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 637+90 to 771+29)								
Land & Damages	1.00	LS	Bid Item Historical Cost, Includes Markups	193,959	193,959	0	193,959	193,959
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
ROW Acquisition	1.00	LS	Bid Item Historical Cost, Includes Markups	148,220	148,220	0	148,220	148,220
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				45,739.00	*45,739.00*		*45,739.00*	*45,739.00*
Adminstrative Fees	1.00	EA	Bid Item Historical Cost, Includes Markups	45,739	45,739	0	45,739	45,739
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
02 Relocations	1.00	LS	Bid Item Historical Cost, Includes Markups	7,779,540	7,829,973	88,195	7,918,169	7,918,169
GBW DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	1.00	LS	Bid Item Historical Cost, Includes Markups	1,392,127	1,411,944	34,656	1,446,600	1,446,600
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 959+00 TO 933+00)								
Utility Line Modification - Unidentified	1.00	LS	Bid Item Historical Cost, Includes Markups	100,000	100,000	0	100,000	100,000
Lump Sum Utility Line Replacement	1.00	LS	Bid Item Historical Cost, Includes Markups	100,000	100,000	0	100,000	100,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				1,292,127.00	*1,311,944.49*		*1,346,600.33*	*1,346,600.33*
Real Estate (Commercial)	1.00	EA	Bid Item Historical Cost, Includes Markups	1,292,127	1,311,944	34,656	1,346,600	1,346,600
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				53.81	*53.81*		*53.81*	*53.81*
Building (Fair Market Value)	20,125.00	SF	Bid Item Historical Cost, Includes Markups	1,082,827	1,082,827	0	1,082,827	1,082,827
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				6.00	*6.00*		*6.00*	*6.00*
Relocation (business)	20,125.00	SF	Bid Item Historical Cost, Includes Markups	120,750	120,750	0	120,750	120,750
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				4.40	*5.38*		*7.11*	*7.11*
Demolition and Removal of Buildings	20,125.00	SF	Bid Item Historical Cost,	88,550	108,367	34,656	143,023	143,023

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			Includes Markups					
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
TG2-VC CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	1.00	LS	Bid Item Historical Cost, Includes Markups	4,520,897	4,529,357	14,794	4,544,150	4,544,150
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 637+90 to 771+29)								
				124,531.25	*124,531.25*		*124,531.25*	*124,531.25*
Gas / Petroleum Lines	8.00	EA	Bid Item Historical Cost, Includes Markups	996,250	996,250	0	996,250	996,250
				85,000.00	*85,000.00*		*85,000.00*	*85,000.00*
Gas/Petroleum Pipelines, <6"	2.00	EA	Bid Item Historical Cost, Includes Markups	170,000	170,000	0	170,000	170,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				106,250.00	*106,250.00*		*106,250.00*	*106,250.00*
Gas/Petroleum Pipelines, 8" - 12"	4.00	EA	Bid Item Historical Cost, Includes Markups	425,000	425,000	0	425,000	425,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				131,250.00	*131,250.00*		*131,250.00*	*131,250.00*
Gas/Petroleum Pipelines, 8" - 12" On Bridge	1.00	EA	Bid Item Historical Cost, Includes Markups	131,250	131,250	0	131,250	131,250
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				270,000.00	*270,000.00*		*270,000.00*	*270,000.00*
Gas/Petroleum Pipelines, > 12" or Grouped	1.00	EA	Bid Item Historical Cost, Includes Markups	270,000	270,000	0	270,000	270,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
Traffic Control	2.00	LS	Bid Item Historical Cost, Includes Markups	165,620	165,620	0	165,620	165,620
Traffic Control	2.00	LS	Bid Item Historical Cost, Includes Markups	165,620	165,620	0	165,620	165,620
				32,205.14	*32,205.14*		*32,205.14*	*32,205.14*
Water / Waste Water Lines	7.00	EA	Bid Item Historical Cost, Includes Markups	225,436	225,436	0	225,436	225,436
				17,882.00	*17,882.00*		*17,882.00*	*17,882.00*
WasteWater Line < 12"	3.00	EA	Bid Item Historical Cost, Includes Markups	53,646	53,646	0	53,646	53,646
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				21,724.00	*21,724.00*		*21,724.00*	*21,724.00*
WasteWater Line 14" - 16"	1.00	EA	Bid Item Historical Cost, Includes Markups	21,724	21,724	0	21,724	21,724
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				50,900.00	*50,900.00*		*50,900.00*	*50,900.00*
Water Line 12" STL	2.00	EA	Bid Item Historical Cost,	101,800	101,800	0	101,800	101,800

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			Includes Markups					
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				48,266.00	*48,266.00*		*48,266.00*	*48,266.00*
Water Line 16" CI	1.00	EA	Bid Item Historical Cost, Includes Markups	48,266	48,266	0	48,266	48,266
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				160.78	*160.78*		*160.78*	*160.78*
Bridge Modifications	13,145.00	SF	Bid Item Historical Cost, Includes Markups	2,113,500	2,113,500	0	2,113,500	2,113,500
				195.00	*195.00*		*195.00*	*195.00*
Railway Bridge Extension	900.00	SF	Bid Item Historical Cost, Includes Markups	175,500	175,500	0	175,500	175,500
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				170.00	*170.00*		*170.00*	*170.00*
North Houston-Rossyln Bridge Extension	11,400.00	SF	Bid Item Historical Cost, Includes Markups	1,938,000	1,938,000	0	1,938,000	1,938,000
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				145,727.29	*146,935.81*		*149,049.21*	*149,049.21*
Real Estate (residential)	7.00	EA	Bid Item Historical Cost, Includes Markups	1,020,091	1,028,551	14,794	1,043,344	1,043,344
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				112,327.29	*112,327.29*		*112,327.29*	*112,327.29*
Building (Fair Market Value)	7.00	EA	Bid Item Historical Cost, Includes Markups	786,291	786,291	0	786,291	786,291
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				28,000.00	*28,000.00*		*28,000.00*	*28,000.00*
Relocation (home)	7.00	EA	Bid Item Historical Cost, Includes Markups	196,000	196,000	0	196,000	196,000
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				3.00	*3.67*		*4.85*	*4.85*
Demolition and Removal of Buildings	12,600.00	SF	Bid Item Historical Cost, Includes Markups	37,800	46,260	14,794	61,053	61,053
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12. Assum 1800 SF per residential structure.)								
TG2-CC CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	1.00	LS	Bid Item Historical Cost, Includes Markups	1,866,516	1,888,672	38,746	1,927,418	1,927,418
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 562+31 to 637+90)								
Water / Waste Water Lines	1.00	LS	Bid Item Historical Cost, Includes Markups	179,854	179,854	0	179,854	179,854
				94,000.00	*94,000.00*		*94,000.00*	*94,000.00*
WasteWater Line 60"	1.00	EA	Bid Item Historical Cost, Includes Markups	94,000	94,000	0	94,000	94,000

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				17,882.00	*17,882.00*		*17,882.00*	*17,882.00*
WasteWater Line 12"	2.00	EA	Bid Item Historical Cost, Includes Markups	35,764	35,764	0	35,764	35,764
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				50,090.00	*50,090.00*		*50,090.00*	*50,090.00*
Water Line 12" STL	1.00	EA	Bid Item Historical Cost, Includes Markups	50,090	50,090	0	50,090	50,090
(Note: Quantity and Cost per HCFCD SUmmary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				140,555.17	*142,401.52*		*145,630.32*	*145,630.32*
Real Estate (residential and commerical)	12.00	EA	Bid Item Historical Cost, Includes Markups	1,686,662	1,708,818	38,746	1,747,564	1,747,564
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				102,138.50	*102,138.50*		*102,138.50*	*102,138.50*
Building (Fair Market Value)	12.00	EA	Bid Item Historical Cost, Includes Markups	1,225,662	1,225,662	0	1,225,662	1,225,662
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				30,166.67	*30,166.67*		*30,166.67*	*30,166.67*
Relocations (home and business)	12.00	EA	Bid Item Historical Cost, Includes Markups	362,000	362,000	0	362,000	362,000
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12)								
				3.44	*4.21*		*5.55*	*5.55*
Demolition and Removal of Buildings	28,800.00	SF	Site Work||Note||(Note: Pile Driving and Concrete)	99,000	121,156	38,746	159,902	159,902
(Note: Per 2011 Gross Appraisal Report provided by D Winslow 5-22-12. Assume 1800 SF per residential home x 11 = 19,800 SF + 9000 SF commerical = 28,800 Total)								
09 Channels & Canals	1.00	LS	Prime Future Work	5,416,176	5,505,052	1,360,336	6,865,388	6,865,388
				10,227.17	*10,420.10*		*13,306.39*	*13,306.39*
GBW3 DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	92.00	ACR	Prime Future Work	940,899	958,649	265,539	1,224,188	1,224,188
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 959+00 TO 933+00)								
090101 Mob, Demob & Preparatory Work	1.00	LS	Prime Future Work	15,529	15,529	0	15,529	15,529
Mob/Demob	1.00	LS	Prime Future Work	15,529	15,529	0	15,529	15,529
Project Mobilization	1.00	LS	Bid Item Historical Cost, Includes Markups	15,529	15,529	0	15,529	15,529
090102 Drainage and Channel Structures	1.00	LS	Prime Future Work	135,621	142,073	11,283	153,356	153,356
				887.50	*887.50*		*887.50*	*887.50*
Drain Pipe Modifications	84.00	EA	Bid Item Historical Cost, Includes Markups	74,550	74,550	0	74,550	74,550
(Note: Quantity and Pricing based on HCFCD Summary Cost Table)								
				71.00	*71.00*		*71.00*	*71.00*
36" Outfall Drains, RCP	1,050.00	LF	Bid Item Historical Cost,	74,550	74,550	0	74,550	74,550

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
			Includes Markups					
				192.20	*235.22*		*310.44*	*310.44*
Concrete and Paving	150.00	CY	Site Work‖Note‖(Note: Pile Driving and Concrete)	28,831	35,283	11,283	46,566	46,566
(Note: 6" thick 1 CY = 54 SF = 6 SY)								
				32.03	*39.20*		*51.74*	*51.74*
Concrete Pilot Flow Channel - Assmue 6" concrete depth, Trapezoidal Detail	900.00	SY	Site Work‖Note‖(Note: Pile Driving and Concrete)	28,831	35,283	11,283	46,566	46,566
				10.75	*10.75*		*10.75*	*10.75*
Backslope Drain Swales and Interceptor Drains	3,000.00	LF	Prime Future Work	32,240	32,240	0	32,240	32,240
(Note: Spacing of Interceptor Drains stands at approximately 550 LF at 5 Structures)								
				4.75	*4.75*		*4.75*	*4.75*
Earthern Backslope Drain Swales	3,000.00	LF	Bid Item Historical Cost, Includes Markups	14,250	14,250	0	14,250	14,250
(Note: Item 2315-06 $4.27/lf plus 118.3% = say $4.75/LF)								
				98.00	*98.00*		*98.00*	*98.00*
Concrete Drain Structures	5.00	EA	Bid Item Historical Cost, Includes Markups	490	490	0	490	490
				50.00	*50.00*		*50.00*	*50.00*
Backslope Drains Piping, 24" RCP	350.00	LF	Bid Item Historical Cost, Includes Markups	17,500	17,500	0	17,500	17,500
(Note: Average Length of piping per Backslope Drain stands at 70 LF. 5 Structures x 70 LF = 350 LF Total 2642-02 cost of 39.36/LF plus 118. esc = say $50/LF to allow for bend and coupling)								
090199 Associated General Work Items	1.00	LS	Prime Future Work	789,750	801,047	254,256	1,055,303	1,055,303
Site Preparation	1.00	LS	Prime Future Work	28,068	28,068	7,057	35,126	35,126
SWPPP and Erosion Control	1.00	LS	Bid Item Historical Cost, Includes Markups	6,000	6,000	0	6,000	6,000
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				2,942.44	*2,942.44*		*3,883.44*	*3,883.44*
Clearing & Grubbing	7.50	ACR	Prime Future Work	22,068	22,068	7,057	29,126	29,126
(Note: Quantity not provided by HCFCD, Seeding is assumed to be required based on construction methologies and similar WOB reaches.)								
				4.65	*4.65*		*6.13*	*6.13*
Excavate / Load / Haul (Basins)	148,427.00	BCY	Prime Future Work	689,587	689,587	220,530	910,117	910,117
(Note: See Excel backup for crew development and production rate.)								
				1,586.13	*1,586.13*		*2,093.38*	*2,093.38*
Excavate Haul to Waste Crew	362.02	HR	Prime Future Work	574,208	574,208	183,631	757,839	757,839
				169.42	*169.42*		*223.60*	*223.60*
Waste Area Crew	362.02	HR	Prime Future Work	61,334	61,334	19,614	80,948	80,948
				149.29	*149.29*		*197.03*	*197.03*
Haul Road Maint and Flagging Crew	362.02	HR	Prime Future Work	54,046	54,046	17,284	71,330	71,330
				8,686.09	*10,047.20*		*13,260.29*	*13,260.29*

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Landscaping and Turf Establishment	8.30	ACR	Landscaping	72,095	83,392	26,669	110,060	110,060
				1,391.28	*1,609.30*		*2,123.95*	*2,123.95*
Turf Establishment	8.30	ACR	Landscaping	11,548	13,357	4,272	17,629	17,629
(Note: Quantity not provided by HCFCD, Seeding is assumed to be required based on construction methologies and similar WOB reaches.)								
				98.29	*113.69*		*150.05*	*150.05*
Landscaping & Vegetation Recovery	616.00	EA	Landscaping	60,547	70,035	22,397	92,432	92,432
(Note: Quantity based on HCFCD Summary Cost Table. No additional informaiton available)								
				224.32	*227.68*		*283.11*	*283.11*
TG2-VC CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	13,349.00	LF	Prime Future Work	2,994,408	3,039,298	739,968	3,779,266	3,779,266
(Note: Refer to "HCFCD_WOB_Quantity_Info_TG2conrevuc_7May12" Overall Stationing 637+90 to 771+29)								
090101 Mob, Demob & Preparatory Work	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Mob/Demob	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Project Mobilization	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
090102 Drainage and Channel Structures	1.00	LS	Prime Future Work	693,742	693,742	0	693,742	693,742
				4,821.29	*4,821.29*		*4,821.29*	*4,821.29*
Drain Pipe Modifications - Outfall Drains	84.00	EA	Bid Item Historical Cost, Includes Markups	404,988	404,988	0	404,988	404,988
(Note: Quantity and Pricing based on HCFCD Summary Cost Table)								
				3,145.00	*3,145.00*		*3,145.00*	*3,145.00*
6" - 21" Outfall and Backslop Drain	5.00	EA	Bid Item Historical Cost, Includes Markups	15,725	15,725	0	15,725	15,725
				4,303.00	*4,303.00*		*4,303.00*	*4,303.00*
24 - 36" Outfall and Backslop Drain	55.00	EA	Bid Item Historical Cost, Includes Markups	236,665	236,665	0	236,665	236,665
				6,384.00	*6,384.00*		*6,384.00*	*6,384.00*
42" - 60" Outfall and Backslop Drain	14.00	EA	Bid Item Historical Cost, Includes Markups	89,376	89,376	0	89,376	89,376
				9,302.00	*9,302.00*		*9,302.00*	*9,302.00*
66" - 84" Outfall and Backslop Drain	3.00	EA	Bid Item Historical Cost, Includes Markups	27,906	27,906	0	27,906	27,906
				15,543.00	*15,543.00*		*15,543.00*	*15,543.00*
90" - 120" Outfall and Backslop Drain	1.00	EA	Bid Item Historical Cost, Includes Markups	15,543	15,543	0	15,543	15,543
				19,773.00	*19,773.00*		*19,773.00*	*19,773.00*
Outfall Drain Structure, 120" X 120" Box	1.00	EA	Bid Item Historical Cost, Includes Markups	19,773	19,773	0	19,773	19,773
				10.81	*10.81*		*10.81*	*10.81*
Backslope Drain Swales and Interceptor Drains	26,704.00	LF	Prime Future Work	288,754	288,754	0	288,754	288,754
(Note: Spacing of Interceptor Drains stands at approximately 600 LF based on 45 Drain Structures)								

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
				4.75	*4.75*		*4.75*	*4.75*
Earthern Backslope Drain Swales	26,704.00	LF	Bid Item Historical Cost, Includes Markups	126,844	126,844	0	126,844	126,844
(Note: Item 2315-06 $4.27/lf plus 118.3% = say $4.75/LF)								
				98.00	*98.00*		*98.00*	*98.00*
Concrete Drain Structures	45.00	EA	Bid Item Historical Cost, Includes Markups	4,410	4,410	0	4,410	4,410
				50.00	*50.00*		*50.00*	*50.00*
Backslope Drains Piping, 24" RCP	3,150.00	LF	Bid Item Historical Cost, Includes Markups	157,500	157,500	0	157,500	157,500
(Note: Average Length of piping per Backslope Drain stands at 70 LF. 45 Structures x 70 LF = 3150 LF Total 2642-02 cost of 39.36/LF plus 118. esc = say $50/LF to allow for bend and coupling)								
090199 Associated General Work Items	1.00	LS	Prime Future Work	2,285,291	2,330,181	735,051	3,065,232	3,065,232
(Note: Clearing & Grubbing Cost removed per D Winslow)								
Site Preparation	1.00	LS	Prime Future Work	31,704	31,704	0	31,704	31,704
SWPPP and Erosion Control	1.00	LS	Bid Item Historical Cost, Includes Markups	31,704	31,704	0	31,704	31,704
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				6.66	*6.66*		*8.79*	*8.79*
Excavate / Load / Haul (Channels)	295,401.00	BCY	Prime Future Work	1,967,118	1,967,118	629,083	2,596,201	2,596,201
(Note: See Excal work sheet for development of crew size nd production rate. Crew hours = 750 hours)								
				2,122.04	*2,122.04*		*2,800.66*	*2,800.66*
Excavate Haul to Waste Crew	805.64	HR	Prime Future Work	1,709,596	1,709,596	546,728	2,256,324	2,256,324
				170.36	*170.36*		*224.84*	*224.84*
Waste Area Crew	805.64	HR	Prime Future Work	137,247	137,247	43,891	181,138	181,138
				149.29	*149.29*		*197.03*	*197.03*
Haul Road Maint and Flagging Crew	805.64	HR	Prime Future Work	120,275	120,275	38,464	158,739	158,739
				2,864,689.36	*3,313,586.18*		*4,373,268.56*	*4,373,268.56*
Landscaping and Turf Establishment	0.10	ACR	Landscaping	286,469	331,359	105,968	437,327	437,327
				98.29	*113.69*		*150.05*	*150.05*
Landscaping & Vegetation Recovery	2,136.00	EA	Landscaping	209,948	242,847	77,662	320,510	320,510
(Note: Quantity based on HCFCD Summary Cost Table. No additional informaiton available)								
				1,391.28	*1,609.30*		*2,123.95*	*2,123.95*
Turf Establishment	55.00	ACR	Landscaping	76,521	88,511	28,306	116,817	116,817
(Note: Quantity not provided by HCFCD, Seeding is assumed to be required based on construction methologies and similar WOB reaches.)								
				196.17	*199.64*		*246.65*	*246.65*
TG2-CC CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	7,549.00	LF	Prime Future Work	1,480,869	1,507,105	354,829	1,861,934	1,861,934
(Note: Lump Sum Unit Cost Based on file "TG2conrevuc_011409_dew_Estimate_12Apr12.xls" Overall Stationing 562+31 to 637+90)								
090101 Mob, Demob & Preparatory Work	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Mob/Demob	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
Project Mobilization	1.00	LS	Prime Future Work	15,375	15,375	4,917	20,291	20,291
090102 Drainage and Channel Structures	1.00	LS	Prime Future Work	377,464	377,464	0	377,464	377,464

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
				5,482.31	*5,482.31*		*5,482.31*	*5,482.31*
Drain Pipe Modifications - Outfall Drains	39.00	EA	Bid Item Historical Cost, Includes Markups	213,810	213,810	0	213,810	213,810
(Note: Quantity and Pricing based on HCFCD Summary Cost Table)								
				3,145.00	*3,145.00*		*3,145.00*	*3,145.00*
6" - 21" Outfall and Backslop Drain	2.00	EA	Bid Item Historical Cost, Includes Markups	6,290	6,290	0	6,290	6,290
				4,303.00	*4,303.00*		*4,303.00*	*4,303.00*
24 - 36" Outfall and Backslop Drain	30.00	EA	Bid Item Historical Cost, Includes Markups	129,090	129,090	0	129,090	129,090
				6,384.00	*6,384.00*		*6,384.00*	*6,384.00*
42" - 60" Outfall and Backslop Drain	5.00	EA	Bid Item Historical Cost, Includes Markups	31,920	31,920	0	31,920	31,920
				9,302.00	*9,302.00*		*9,302.00*	*9,302.00*
66" - 84" Outfall and Backslop Drain	5.00	EA	Bid Item Historical Cost, Includes Markups	46,510	46,510	0	46,510	46,510
				10.84	*10.84*		*10.84*	*10.84*
Backslope Drain Swales and Interceptor Drains	15,104.00	LF	Prime Future Work	163,654	163,654	0	163,654	163,654
(Note: Spacing of Interceptor Drains stands at approximately 600 LF based on 25 Drain Structures)								
				4.75	*4.75*		*4.75*	*4.75*
Earthern Backslope Drain Swales	15,104.00	LF	Bid Item Historical Cost, Includes Markups	71,744	71,744	0	71,744	71,744
(Note: Item 2315-06 $4.27/lf plus 118.3% = say $4.75/LF)								
				176.40	*176.40*		*176.40*	*176.40*
Concrete Drain Structures	25.00	EA	Bid Item Historical Cost, Includes Markups	4,410	4,410	0	4,410	4,410
				50.00	*50.00*		*50.00*	*50.00*
Backslope Drains Piping, 24" RCP	1,750.00	LF	Bid Item Historical Cost, Includes Markups	87,500	87,500	0	87,500	87,500
(Note: Average Length of piping per Backslope Drain stands at 70 LF. 25 Structures x 70 LF = 1750 LF Total 2642-02 cost of 39.36/LF plus 118. esc = say $50/LF to allow for bend and coupling)								
090199 Associated General Work Items	1.00	LS	Prime Future Work	1,088,030	1,114,266	349,912	1,464,179	1,464,179
Site Preparation	1.00	LS	Prime Future Work	20,104	20,104	0	20,104	20,104
(Note: Clearing & Grubbing Cost removed per D Winslow)								
SWPPP and Erosion Control Wally revise cost to $20,104	1.00	LS	Bid Item Historical Cost, Includes Markups	20,104	20,104	0	20,104	20,104
(Note: Quantity and Cost per HCFCD Summary Cost Table, No additinoal detail available. Pricing based on Historical Unit Costs for HCFCD Work Projects)								
				6.66	*6.66*		*8.79*	*8.79*
Excavate / Load / Haul (Channels)	135,227.00	BCY	Prime Future Work	900,496	900,496	287,978	1,188,474	1,188,474
(Note: See Excal work sheet for development of crew size nd production rate. Crew hours = 350 hours)								
				2,122.04	*2,122.04*		*2,800.66*	*2,800.66*

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
Excavate Haul to Waste Crew	368.80	HR	Prime Future Work	782,609	782,609	250,278	1,032,887	1,032,887
				170.36	*170.36*		*224.84*	*224.84*
Waste Area Crew	368.80	HR	Prime Future Work	62,828	62,828	20,092	82,921	82,921
				149.29	*149.29*		*197.03*	*197.03*
Haul Road Maint and Flagging Crew	368.80	HR	Prime Future Work	55,059	55,059	17,608	72,667	72,667
				1,674,297.52	*1,936,659.94*		*2,556,002.33*	*2,556,002.33*
Landscaping and Turf Establishment	0.10	ACR	Landscaping	167,430	193,666	61,934	255,600	255,600
				98.29	*113.69*		*150.05*	*150.05*
Landscaping & Vegetation Recovery	1,208.00	EA	Landscaping	118,735	137,341	43,921	181,262	181,262
(Note: Quantity based on HCFCD Summary Cost Table. No additional informaiton available)								
				1,391.28	*1,609.30*		*2,123.95*	*2,123.95*
Turf Establishment	35.00	ACR	Landscaping	48,695	56,325	18,013	74,338	74,338
(Note: Quantity not provided by HCFCD, Seeding is assumed to be required based on construction methologies and similar WOB reaches.)								
Recreation Components	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	4,714,076	5,769,086	1,844,949	7,614,035	7,614,035
Construction Phase A (Year 2012 through 2013)	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	562,542	688,439	220,162	908,601	908,601
14 Recreation	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	562,542	688,439	220,162	908,601	908,601
HOL.3-B Recreation and Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	562,542	688,439	220,162	908,601	908,601
				3.40	*4.15*		*5.48*	*5.48*
Parking Lots and Service Roads	8,000.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	27,161	33,239	10,630	43,869	43,869
				5.06	*6.20*		*8.18*	*8.18*
Concrete Pathways	69,300.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	350,915	429,450	137,338	566,788	566,788
Activity Guides, Controls and Signage	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	37,936	46,426	14,847	61,272	61,272
Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	146,531	179,324	57,348	236,672	236,672
Construction Phase B (Year 2013 through 2015)	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	980,680	1,200,156	383,809	1,583,965	1,583,965
14 Recreation	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	980,680	1,200,156	383,809	1,583,965	1,583,965
FNH.3-N Recreation and Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	428,226	524,063	167,595	691,658	691,658
				3.40	*4.15*		*5.48*	*5.48*
Parking Lots and Service Roads	8,000.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	27,161	33,239	10,630	43,869	43,869

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
				5.06	*6.20*		*8.18*	*8.18*
Concrete Pathways	36,960.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	187,155	229,040	73,247	302,287	302,287
Activity Guides, Controls and Signage	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	21,000	25,700	8,219	33,919	33,919
Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	149,931	183,485	58,678	242,163	242,163
				8,596.00	*10,519.78*		*13,884.00*	*13,884.00*
Field Preparation	5.00	EA	Site Work‖Note‖(Note: Pile Driving and Concrete)	42,980	52,599	16,821	69,420	69,420
FNH.3-S Recreation and Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	552,454	676,093	216,214	892,307	892,307
				3.40	*4.15*		*5.48*	*5.48*
Parking Lots and Service Roads	8,000.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	27,161	33,239	10,630	43,869	43,869
				5.06	*6.20*		*8.18*	*8.18*
Concrete Pathways	43,400.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	219,765	268,948	86,009	354,958	354,958
Activity Guides, Controls and Signage	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	101,919	124,729	39,888	164,617	164,617
Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	203,609	249,177	79,687	328,864	328,864
Construction Phase C (Year 2014 through 2016)	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	909,623	1,113,197	356,000	1,469,197	1,469,197
14 Recreation	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	909,623	1,113,197	356,000	1,469,197	1,469,197
GBW.3-N Recreation and Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	590,889	723,129	231,256	954,386	954,386
				3.40	*4.15*		*5.48*	*5.48*
Parking Lots and Service Roads	8,000.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	27,161	33,239	10,630	43,869	43,869
				5.06	*6.20*		*8.18*	*8.18*
Concrete Pathways	68,950.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	349,143	427,281	136,644	563,925	563,925
Activity Guides, Controls and Signage	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	38,646	47,295	15,125	62,419	62,419
Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	148,431	181,649	58,091	239,741	239,741
				5,501.80	*6,733.10*		*8,886.34*	*8,886.34*
Field Preparation	5.00	EA	Site Work‖Note‖(Note: Pile Driving and Concrete)	27,509	33,666	10,766	44,432	44,432

Description	Quantity	UOM	Contractor	DirectCost	CostToPrime	PrimeCMU	ContractCost	ProjectCost
JR.4-N Recreation and Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	318,735	390,068	124,743	514,811	514,811
				3.39	*4.15*		*5.48*	*5.48*
Parking Lots and Service Roads	10,400.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	35,260	43,151	13,800	56,951	56,951
				5.06	*6.20*		*8.18*	*8.18*
Concrete Pathways	36,610.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	185,382	226,871	72,553	299,424	299,424
Activity Guides, Controls and Signage	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	14,000	17,133	5,479	22,612	22,612
Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	84,092	102,912	32,911	135,824	135,824
Construction Phase D (Year 2013 through 2016)	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	2,261,231	2,767,294	884,979	3,652,273	3,652,273
14 Recreation	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	2,261,231	2,767,294	884,979	3,652,273	3,652,273
RLP Recreation and Day Use Areas	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	2,261,231	2,767,294	884,979	3,652,273	3,652,273
Mobilization/Demobilization	1.00	LS	Site Work‖Note‖(Note: Pile Driving and Concrete)	15,375	18,815	6,017	24,833	24,833
				5.06	*6.20*		*8.18*	*8.18*
Concrete Pathways	443,520.00	SF	Site Work‖Note‖(Note: Pile Driving and Concrete)	2,245,856	2,748,479	878,961	3,627,440	3,627,440

Description	Quantity	UOM	LaborCost	EQCost	MatlCost	SubBidCost	UserCost	ContractCost	ProjectCost
Bid Tab Report Detail			1,708,137.65	4,529,156.54	5,046,861.32	17,084,801.00	61,495,148.00	96,039,575.48	96,039,575.48
CONSTRUCTED Work Thru October 2011	1.0000	LS	0.00	0.00	0.00	0.00	61,392,000.00	61,392,000.00	61,392,000.00
Flood Control Componenents	1.0000	LS	0.00	0.00	0.00	0.00	61,392,000.00	61,392,000.00	61,392,000.00
Construction Phase A (Prior to October 2011)	1.0000	LS	0.00	0.00	0.00	0.00	61,392,000.00	61,392,000.00	61,392,000.00
			0.0000	*0.0000*	*0.0000*	*0.0000*	*21,010,000.0000*	*21,010,000.0000*	*21,010,000.0000*
Lands & Damages - CTD	1.0000	EA	0.00	0.00	0.00	0.00	21,010,000.00	21,010,000.00	21,010,000.00
Relocations - CTD	1.0000	LS	0.00	0.00	0.00	0.00	103,000.00	103,000.00	103,000.00
Channels & Canals - CTD	1.0000	LS	0.00	0.00	0.00	0.00	40,279,000.00	40,279,000.00	40,279,000.00
UNCONSTRUCTED Work After October 2011	1.0000	LS	1,708,137.65	4,529,156.54	5,046,861.32	17,084,801.00	103,148.00	34,647,575.48	34,647,575.48
Flood Control Reaches	1.0000	LS	702,555.29	4,500,835.74	1,667,289.72	17,007,544.00	103,148.00	27,033,540.23	27,033,540.23
Construction Phase A (Year 2012 through 2014)	1.0000	LS	277,336.32	1,239,593.08	1,261,061.37	4,553,272.00	103,148.00	8,811,055.96	8,811,055.96
Relocations	1.0000	LS	0.00	0.00	0.00	3,747,776.00	0.00	3,747,776.00	3,747,776.00
Channels & Canals	1.0000	LS	277,336.32	1,239,593.08	1,261,061.37	805,496.00	0.00	4,960,131.96	4,960,131.96
			0.0000	*0.0000*	*0.0000*	*0.0000*	*34,382.6667*	*34,382.6667*	*34,382.6667*
Cutlural Preservation / Mitigation - CTC	3.0000	ACR	0.00	0.00	0.00	0.00	103,148.00	103,148.00	103,148.00
Construction Phase B (Year 2014 through 2016)	1.0000	LS	425,218.97	3,261,242.66	406,228.35	12,454,272.00	0.00	18,222,484.26	18,222,484.26
Land & Damages	1.0000	LS	0.00	0.00	0.00	3,438,928.00	0.00	3,438,928.00	3,438,928.00
Relocations	1.0000	LS	0.00	0.00	0.00	7,779,540.00	0.00	7,918,168.63	7,918,168.63
Channels & Canals	1.0000	LS	425,218.97	3,261,242.66	406,228.35	1,235,804.00	0.00	6,865,387.63	6,865,387.63
Recreation Components	1.0000	LS	1,005,582.36	28,320.80	3,379,571.60	77,257.00	0.00	7,614,035.25	7,614,035.25
Construction Phase A (Year 2012 through 2013)	1.0000	LS	112,660.67	4,141.58	414,062.00	6,768.00	0.00	908,600.80	908,600.80
Recreation	1.0000	LS	112,660.67	4,141.58	414,062.00	6,768.00	0.00	908,600.80	908,600.80
Construction Phase B (Year 2013 through 2015)	1.0000	LS	152,360.93	8,283.16	743,440.00	42,980.00	0.00	1,583,964.98	1,583,964.98
Recreation	1.0000	LS	152,360.93	8,283.16	743,440.00	42,980.00	0.00	1,583,964.98	1,583,964.98
Construction Phase C (Year 2014 through 2016)	1.0000	LS	168,895.66	6,246.92	669,749.60	27,509.00	0.00	1,469,196.68	1,469,196.68
Recreation	1.0000	LS	168,895.66	6,246.92	669,749.60	27,509.00	0.00	1,469,196.68	1,469,196.68
Construction Phase D (Year 2013 through 2016)	1.0000	LS	571,665.11	9,649.15	1,552,320.00	0.00	0.00	3,652,272.79	3,652,272.79
Recreation	1.0000	LS	571,665.11	9,649.15	1,552,320.00	0.00	0.00	3,652,272.79	3,652,272.79

Description	Quantity	UOM	ContractCost	ProjectCost
Bid Tab Report Summary			96,039,575.48	96,039,575.48
CONSTRUCTED Work Thru October 2011	1.0000	LS	61,392,000.00	61,392,000.00
Flood Control Componenents	1.0000	LS	61,392,000.00	61,392,000.00
Construction Phase A (Prior to October 2011)	1.0000	LS	61,392,000.00	61,392,000.00
			21,010,000.0000	*21,010,000.0000*
Lands & Damages - CTD	1.0000	EA	21,010,000.00	21,010,000.00
Detention at Jones Road (STA 118000 TO STA 113000)	1.0000	LS	9,879,000.00	9,879,000.00
ROW Acquisition - E500-11-00-R001	1.0000	LS	5,351,000.00	5,351,000.00
ROW Acquisition - E500-12-00-R001	1.0000	LS	4,528,000.00	4,528,000.00
Detention at Gessner BW8 (STA 95900 to STA 93300)	1.0000	LS	4,095,000.00	4,095,000.00
ROW Acquisition - E500-10-00-R001	1.0000	LS	4,095,000.00	4,095,000.00
Detention at Fairbanks North Houston (STA 89000 to STA 85000)	1.0000	LS	5,569,000.00	5,569,000.00
ROW Acquisition - unknown - E500-02-00	1.0000	LS	2,224,000.00	2,224,000.00
ROW Acquisition - unknown - E500-01-00	1.0000	LS	3,345,000.00	3,345,000.00
Detention at Hollister Road (STA 81600 to STA 79000)	1.0000	LS	1,011,000.00	1,011,000.00
ROW Acquisition - E500-03-00-Y001	1.0000	LS	1,011,000.00	1,011,000.00
Channelization Cole Creek to Gessner (STA 93544 to STA 77129)	1.0000	LS	456,000.00	456,000.00
ROW Acquisition - E100-00-00-R001	1.0000	LS	456,000.00	456,000.00
Relocations - CTD	1.0000	LS	103,000.00	103,000.00
			141.0959	*141.0959*
Detention at Hollister Road (STA 81600 to STA 79000)	730.0000	ACR	103,000.00	103,000.00
Basin Expansion - Utility Adjustment (E500-03-00-R001)	1.0000	LS	103,000.00	103,000.00
Channels & Canals - CTD	1.0000	LS	40,279,000.00	40,279,000.00
			19,054.7619	*19,054.7619*
Detention at Jones Road (STA 118000 TO STA 113000)	420.0000	ACR	8,003,000.00	8,003,000.00
Ranchstone Stormwater Detention Basins (E500-11-00-E001)	1.0000	LS	2,852,000.00	2,852,000.00
Property Improvements to Ranchstone/Fallbrook Basins (E500-00-00-E001)	1.0000	LS	1,242,000.00	1,242,000.00
Fallbrook Regional Detention Basin (E500-12-00-E001)	1.0000	LS	3,909,000.00	3,909,000.00
			6,606.5574	*6,606.5574*
Detention at Gessner BW8 (STA 95900 to STA 93300)	427.0000	ACR	2,821,000.00	2,821,000.00
Basin Improvements - Utility Adjustment (E500-10-00-Y001)	1.0000	LS	133,000.00	133,000.00
JV Channel Project E500-10 (E200-00-00-E002)	1.0000	LS	2,688,000.00	2,688,000.00
			4,388.6703	*4,388.6703*
Detention at Fairbanks North Houston (STA 89000 to STA 85000)	1,271.0000	ACR	5,578,000.00	5,578,000.00
Basin Improvement @ FNH(E500-01-00-Y001)	1.0000	LS	317,000.00	317,000.00
Basin Improvement @ FNH(E500-01-00-Y002)	1.0000	LS	2,402,000.00	2,402,000.00
Basin Improvement (South Basin @ FNH) (E500-01-00-Y002)	1.0000	LS	2,859,000.00	2,859,000.00
			816.2615	*816.2615*
Gessner to E200 (STA 93544 to STA 104527)	10,983.0000	LF	8,965,000.00	8,965,000.00
E200 from E141 to E100 (E200-00-00-E003)	1.0000	LS	6,289,000.00	6,289,000.00
JV Channel Project - E200 (E200-00-00-E002)	1.0000	LS	2,676,000.00	2,676,000.00
			10,279.4521	*10,279.4521*

Description	Quantity	UOM	Contract Cost	Project Cost
Detention at Hollister Road (STA 81600 to STA 79000)	730.0000	ACR	7,504,000.00	7,504,000.00
Basin Improvements (E500-03-00-Y002)	1.0000	LS	2,187,000.00	2,187,000.00
Basin Imp Phase 3 (E500-03-00-E001)	1.0000	LS	5,317,000.00	5,317,000.00
			451.2945	*451.2945*
Channelization Cole Creek to Gessner (STA 93544 to STA 77129)	16,415.0000	LF	7,408,000.00	7,408,000.00
Conveyance Imp, E122 to BW*, E500-03 Exp (E100-00-00-E003)	1.0000	LS	7,408,000.00	7,408,000.00
UNCONSTRUCTED Work After October 2011	1.0000	LS	34,647,575.48	34,647,575.48
Flood Control Reaches	1.0000	LS	27,033,540.23	27,033,540.23
Construction Phase A (Year 2012 through 2014)	1.0000	LS	8,811,055.96	8,811,055.96
Relocations	1.0000	LS	3,747,776.00	3,747,776.00
CHANNELIZATION FROM E200 to FM 1960 (Sta 1224+98 to Sta 1045+27)	1.0000	LS	3,747,776.00	3,747,776.00
			248,430.0000	*248,430.0000*
Traffic Control	1.0000	EA	248,430.00	248,430.00
Traffic Control at Project Site	1.0000	LS	248,430.00	248,430.00
Traffic Control - Lump Sum Cost provided based on HCFCD Historical Unit Cost Database	3.0000	LS	248,430.00	248,430.00
Telephone / Communication Lines	1.0000	LS	252,430.00	252,430.00
Telephone LInes - 4" PVC Conduit	1.0000	LS	252,430.00	252,430.00
			252,430.0000	*252,430.0000*
Telephone Line, 24 x 4" PVC in 24" STL Pipe	1.0000	EA	252,430.00	252,430.00
Gas / Petroleum Lines	1.0000	LS	1,753,750.00	1,753,750.00
			85,000.0000	*85,000.0000*
Gas/Petroleum Pipelines, <6"	1.0000	EA	85,000.00	85,000.00
			85,000.0000	*85,000.0000*
Gas/Petroleum Line Modifications <6"	1.0000	EA	85,000.00	85,000.00
			106,250.0000	*106,250.0000*
Gas/Petroleum Pipelines, 8" - 12"	3.0000	EA	318,750.00	318,750.00
			106,250.0000	*106,250.0000*
Gas/Petroleum Line Modifications 8" to 12"	3.0000	EA	318,750.00	318,750.00
			270,000.0000	*270,000.0000*
Gas/Petroleum Pipelines, > 12"	5.0000	EA	1,350,000.00	1,350,000.00
			270,000.0000	*270,000.0000*
Gas/Petroleum Line Modifications > 12"	5.0000	EA	1,350,000.00	1,350,000.00
			137.7470	*137.7470*
Bridge Modifications	10,120.0000	SF	1,394,000.00	1,394,000.00
			170.0000	*170.0000*
West Road Bridge Extension	5,400.0000	SF	918,000.00	918,000.00
			170.0000	*170.0000*
West Road Bridge Modifications	5,400.0000	EA	918,000.00	918,000.00
			170.0000	*170.0000*
Rio Grande Bridge Extension	2,800.0000	SF	476,000.00	476,000.00

Description	Quantity	UOM	ContractCost	ProjectCost
			170.0000	*170.0000*
Rio Grande Bridge Modifications	2,800.0000	EA	476,000.00	476,000.00
Water / Waste Water Lines	1.0000	LS	99,166.00	99,166.00
			48,266.0000	*48,266.0000*
Water Line, 16" Cast Iron	1.0000	EA	48,266.00	48,266.00
			48,266.0000	*48,266.0000*
Water Line Modification 16" CI	1.0000	EA	48,266.00	48,266.00
			50,900.0000	*50,900.0000*
Water Line 12" STL	1.0000	EA	50,900.00	50,900.00
			50,900.0000	*50,900.0000*
Water Line Modification 12" STL	1.0000	EA	50,900.00	50,900.00
Channels & Canals	1.0000	LS	4,960,131.96	4,960,131.96
			256.4423	*256.4423*
CHANNELIZATION FROM GESSNER TO E200-00-00 (Sta. 935+44 to 1045+27) - Remainng Construction	10,923.0000	LF	2,801,119.10	2,801,119.10
Mob, Demob & Preparatory Work	1.0000	LS	20,291.43	20,291.43
			20,291.4321	*20,291.4321*
Mob/Demob	1.0000	EA	20,291.43	20,291.43
Project Mobilization	1.0000	LS	20,291.43	20,291.43
			845.4763	*845.4763*
Mobilization or demobilization, dozer, loader, backhoe or excavator, above 250 H.P., up to 50 miles	24.0000	EA	20,291.43	20,291.43
Drainage and Channel Structures	1.0000	LS	1,918,799.38	1,918,799.38
			4,002.7714	*4,002.7714*
Drain Pipe Modifications - Outfall Drains	35.0000	EA	140,097.00	140,097.00
			3,145.0000	*3,145.0000*
6" - 21" Outfall and Backslop Drain	2.0000	EA	6,290.00	6,290.00
			3,145.0000	*3,145.0000*
6" and 21" Outfall and Backslop Drain	2.0000	EA	6,290.00	6,290.00
			4,303.0000	*4,303.0000*
24 - 36" Outfall and Backslop Drain	23.0000	EA	98,969.00	98,969.00
			4,303.0000	*4,303.0000*
24" - 36" Outfall and Backslop Drain	23.0000	EA	98,969.00	98,969.00
			6,384.0000	*6,384.0000*
42" - 60" Outfall and Backslop Drain	4.0000	EA	25,536.00	25,536.00
			6,384.0000	*6,384.0000*
42" - 60" Outfall and Backslop Drain	4.0000	EA	25,536.00	25,536.00
			9,302.0000	*9,302.0000*
66" - 84" Outfall and Backslop Drain	1.0000	EA	9,302.00	9,302.00
			9,302.0000	*9,302.0000*
66" - 84" Outfall and Backslop Drain	1.0000	EA	9,302.00	9,302.00

Description	Quantity	UOM	ContractCost	ProjectCost
Gabion Strucutres	1.0000	LS	1,778,702.38	1,778,702.38
			86.1851	*86.1851*
Gabion boxes, galvanized steel mesh mats or boxes, stone filled, 9" deep	16,000.0000	SY	1,378,961.38	1,378,961.38
			342.5373	*342.5373*
Gabion retaining walls, stone filled gabions, stone delivered, galvanized, 3' wide, 6' long, 2'-0" high, excludes excavation	1,167.0000	EA	399,741.00	399,741.00
Associated General Work Items	1.0000	LS	862,028.29	862,028.29
Site Preparation	1.0000	LS	75,295.67	75,295.67
SWPPP and Erosion Control	1.0000	LS	75,295.67	75,295.67
Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high	1.0000	LS	75,295.67	75,295.67
			8.7887	*8.7887*
Excavate / Load / Haul (Channels)	56,300.0000	BCY	494,805.83	494,805.83
			2,800.6635	*2,800.6635*
Excavate Haul to Waste Crew	153.5455	HR	430,029.16	430,029.16
			231.5455	*231.5455*
HYDRAULIC EXCAVATOR, CRAWLER, 175,500 LBS, 5.00 CY BUCKET, 34.75' MAX DIGGING DEPTH	307.0909	HR	71,105.53	71,105.53
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	153.5455	HR	22,089.36	22,089.36
			43.1994	*43.1994*
Equip. Operators, Medium	460.6364	HR	19,899.24	19,899.24
			112.1829	*112.1829*
Rented Truck fully operated 12 CY	2,763.8182	HR	310,053.24	310,053.24
			44.8193	*44.8193*
Foreman Equip. Operators, Medium	153.5455	HR	6,881.80	6,881.80
			224.8383	*224.8383*
Waste Area Crew	153.5455	HR	34,522.89	34,522.89
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	153.5455	HR	5,800.46	5,800.46
			43.1994	*43.1994*
Equip. Operators, Medium	153.5455	HR	6,633.08	6,633.08
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	153.5455	HR	22,089.36	22,089.36
			197.0347	*197.0347*
Haul Road Maint and Flagging Crew	153.5455	HR	30,253.78	30,253.78
			59.9417	*59.9417*
GRADER, MOTOR, ARTICULATED, 6X4, 12' BLADE W/17 TEETH SCARIFIERS	76.7727	HR	4,601.89	4,601.89
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	230.3182	HR	8,700.69	8,700.69
			43.1994	*43.1994*
Equip. Operators, Medium	153.5455	HR	6,633.08	6,633.08
			60.1469	*60.1469*

Description	Quantity	UOM	ContractCost	ProjectCost
TRUCK, HIGHWAY, 50,000 LBS GVW, 3 AXLE, 6X4 (CHASSIS ONLY-ADD OPTIONS)	153.5455	HR	9,235.28	9,235.28
			7.0523	*7.0523*
TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW TRUCK)	153.5455	HR	1,082.85	1,082.85
			1.8373	*1.8373*
Channel FIll and Compaction	35,000.0000	CY	64,303.91	64,303.91
			0.9476	*0.9476*
Rough grading, channel fill, native fill hauled from other reaches of Channel	30,200.0000	BCY	28,616.96	28,616.96
			0.9317	*0.9317*
Compaction, water for, 3000 gallon truck, 6 mile haul	30,200.0000	ECY	28,135.91	28,135.91
			0.2500	*0.2500*
Compaction, 2 passes, 12" lifts, riding, sheepsfoot or wobbly wheel roller	30,200.0000	ECY	7,551.03	7,551.03
Landscaping and Turf Establishment	1.0000	LS	227,622.89	227,622.89
			2,123.9491	*2,123.9491*
Turf Establishment	45.0000	ACR	95,577.71	95,577.71
			2,123.9491	*2,123.9491*
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	45.0000	ACR	95,577.71	95,577.71
			150.0513	*150.0513*
Landscaping & Vegetation Recovery	880.0000	EA	132,045.18	132,045.18
			85.1145	*85.1145*
General planting, local varieties, shrubs, 2' - 3'	440.0000	EA	37,450.38	37,450.38
			214.9882	*214.9882*
General planting, local varieties, trees, 2' - 3'	440.0000	EA	94,594.80	94,594.80
			120.1387	*120.1387*
CHANNELIZATION FROM E200-00-00 to FM 1960 (Sta. 1045+27 to 1224+98)	17,971.0000	LF	2,159,012.87	2,159,012.87
Mob, Demob & Preparatory Work	1.0000	LS	20,291.43	20,291.43
Mob/Demob	1.0000	LS	20,291.43	20,291.43
Project Mobilization	1.0000	LS	20,291.43	20,291.43
			845.4763	*845.4763*
Mobilization or demobilization, dozer, loader, backhoe or excavator, above 250 H.P., up to 50 miles	24.0000	EA	20,291.43	20,291.43
Drainage and Channel Structures	1.0000	LS	550,104.00	550,104.00
			5,152.0588	*5,152.0588*
Drain Pipe Modifications - Outfall Drains	34.0000	EA	175,170.00	175,170.00
			4,303.0000	*4,303.0000*
24 - 36" Outfall and Backslop Drain	26.0000	EA	111,878.00	111,878.00
			4,303.0000	*4,303.0000*
24" - 36" Outfall and Backslop Drain	26.0000	EA	111,878.00	111,878.00
			6,384.0000	*6,384.0000*
42" - 60" Outfall and Backslop Drain	7.0000	EA	44,688.00	44,688.00
			6,384.0000	*6,384.0000*
42" - 60" Outfall and Backslop Drain	7.0000	EA	44,688.00	44,688.00

Description	Quantity	UOM	ContractCost	ProjectCost
			9,302.0000	*9,302.0000*
66" - 84" Outfall and Backslop Drain	2.0000	EA	18,604.00	18,604.00
			9,302.0000	*9,302.0000*
66" - 84" Outfall and Backslop Drain	2.0000	EA	18,604.00	18,604.00
			10.7124	*10.7124*
Backslope Drain Swales and Interceptor Drains	35,000.0000	LF	374,934.00	374,934.00
			4.7500	*4.7500*
Earthern Backslope Drain Swales	35,000.0000	LF	166,250.00	166,250.00
			4.7500	*4.7500*
Backslope Drain Swale, Historical Unit Cost	35,000.0000	LF	166,250.00	166,250.00
			189.4667	*189.4667*
Concrete Drain Structures	30.0000	EA	5,684.00	5,684.00
			98.0000	*98.0000*
Backslope Concrete Drain Structure, includes reinforcing and framing	58.0000	EA	5,684.00	5,684.00
			50.0000	*50.0000*
Backslope Drains Piping, 24" RCP	4,060.0000	LF	203,000.00	203,000.00
			50.0000	*50.0000*
Backslope Drain Piping, 24" RCP with Coupling and Bend	4,060.0000	LF	203,000.00	203,000.00
Associated General Work Items	1.0000	LS	1,588,617.43	1,588,617.43
Site Preparation	1.0000	LS	40,000.00	40,000.00
SWPPP and Erosion Control	1.0000	LS	40,000.00	40,000.00
Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high	1.0000	LS	40,000.00	40,000.00
			8.7887	*8.7887*
Excavate / Load / Haul (Channels)	128,400.0000	BCY	1,128,473.69	1,128,473.69
			2,800.6635	*2,800.6635*
Excavate Haul to Waste Crew	350.1818	HR	980,741.45	980,741.45
			231.5455	*231.5455*
HYDRAULIC EXCAVATOR, CRAWLER, 175,500 LBS, 5.00 CY BUCKET, 34.75' MAX DIGGING DEPTH	700.3636	HR	162,166.06	162,166.06
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	350.1818	HR	50,377.86	50,377.86
			43.1994	*43.1994*
Equip. Operators, Medium	1,050.5455	HR	45,382.98	45,382.98
			112.1829	*112.1829*
Rented Truck fully operated 12 CY	6,303.2727	HR	707,119.64	707,119.64
			44.8193	*44.8193*
Foreman Equip. Operators, Medium	350.1818	HR	15,694.90	15,694.90
			224.8383	*224.8383*
Waste Area Crew	350.1818	HR	78,734.27	78,734.27
			37.7768	*37.7768*

Description	Quantity	UOM	ContractCost	ProjectCost
Laborers, (Semi-Skilled)	350.1818	HR	13,228.76	13,228.76
			43.1994	*43.1994*
Equip. Operators, Medium	350.1818	HR	15,127.66	15,127.66
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	350.1818	HR	50,377.86	50,377.86
			197.0347	*197.0347*
Haul Road Maint and Flagging Crew	350.1818	HR	68,997.97	68,997.97
			59.9417	*59.9417*
GRADER, MOTOR, ARTICULATED, 6X4, 12' BLADE W/17 TEETH SCARIFIERS	175.0909	HR	10,495.24	10,495.24
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	525.2727	HR	19,843.13	19,843.13
			43.1994	*43.1994*
Equip. Operators, Medium	350.1818	HR	15,127.66	15,127.66
			60.1469	*60.1469*
TRUCK, HIGHWAY, 50,000 LBS GVW, 3 AXLE, 6X4 (CHASSIS ONLY-ADD OPTIONS)	350.1818	HR	21,062.35	21,062.35
			7.0523	*7.0523*
TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW TRUCK)	350.1818	HR	2,469.59	2,469.59
Landscaping and Turf Establishment	1.0000	LS	420,143.74	420,143.74
			0.0000	*0.0000*
Turf Establishment	59.0000	ACR	0.00	0.00
			0.0000	*0.0000*
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	0.0000	ACR	0.00	0.00
			150.0513	*150.0513*
Landscaping & Vegetation Recovery	2,800.0000	EA	420,143.74	420,143.74
			85.1145	*85.1145*
General planting, local varieties, shrubs, 2' - 3'	1,400.0000	EA	119,160.28	119,160.28
			214.9882	*214.9882*
General planting, local varieties, trees, 2' - 3'	1,400.0000	EA	300,983.46	300,983.46
			34,382.6667	*34,382.6667*
Cutlural Preservation / Mitigation - CTC	3.0000	ACR	103,148.00	103,148.00
Greens Bayou Mitigation Bank Cos	1.0000	LS	103,148.00	103,148.00
			103,148.0000	*103,148.0000*
Environmental Mitigation - Cost to Complete	1.0000	ACR	103,148.00	103,148.00
Environmental Mitigation - Cost to Complete	1.0000	LS	103,148.00	103,148.00
Greens Bayou Mitigation Bank	1.0000	LS	103,148.00	103,148.00
Construction Phase B (Year 2014 through 2016)	1.0000	LS	18,222,484.26	18,222,484.26
Land & Damages	1.0000	LS	3,438,928.00	3,438,928.00
DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	1.0000	LS	2,813,337.00	2,813,337.00
Land & Damages	1.0000	LS	2,813,337.00	2,813,337.00
ROW Acquisition	1.0000	LS	2,764,860.00	2,764,860.00

Description	Quantity	UOM	ContractCost	ProjectCost
ROW - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	2,764,860.00	2,764,860.00
			48,477.0000	*48,477.0000*
Adminstrative Fees	1.0000	EA	48,477.00	48,477.00
Admin Fees - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	48,477.00	48,477.00
CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	1.0000	LS	431,632.00	431,632.00
Land & Damages	1.0000	LS	431,632.00	431,632.00
ROW Acquisition	1.0000	LS	405,712.00	405,712.00
ROW - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	405,712.00	405,712.00
			25,920.0000	*25,920.0000*
Adminstrative Fees	1.0000	EA	25,920.00	25,920.00
Admin Fees - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	25,920.00	25,920.00
CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	1.0000	LS	193,959.00	193,959.00
Land & Damages	1.0000	LS	193,959.00	193,959.00
ROW Acquisition	1.0000	LS	148,220.00	148,220.00
ROW - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	148,220.00	148,220.00
			45,739.0000	*45,739.0000*
Adminstrative Fees	1.0000	EA	45,739.00	45,739.00
Admin Fees - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	45,739.00	45,739.00
Relocations	1.0000	LS	7,918,168.63	7,918,168.63
DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	1.0000	LS	1,446,600.33	1,446,600.33
Utility Line Modification - Unidentified	1.0000	LS	100,000.00	100,000.00
Lump Sum Utility Line Replacement	1.0000	LS	100,000.00	100,000.00
			100,000.0000	*100,000.0000*
Lump Sum Utility Replacements - Overhead	1.0000	EA	100,000.00	100,000.00
			1,346,600.3320	*1,346,600.3320*
Real Estate (Commercial)	1.0000	EA	1,346,600.33	1,346,600.33
			53.8051	*53.8051*
Building (Fair Market Value)	20,125.0000	SF	1,082,827.00	1,082,827.00
			1,082,827.0000	*1,082,827.0000*
Building FMV - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	EA	1,082,827.00	1,082,827.00
			6.0000	*6.0000*
Relocation (business)	20,125.0000	SF	120,750.00	120,750.00
			6.0000	*6.0000*
Business FMV - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	20,125.0000	SF	120,750.00	120,750.00
			7.1067	*7.1067*
Demolition and Removal of Buildings	20,125.0000	SF	143,023.33	143,023.33
			7.1067	*7.1067*
Building demolition, large urban projects, wood, includes 20 mile haul, excludes foundation demolition, dump fees	20,125.0000	SF	143,023.33	143,023.33
CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	1.0000	LS	4,544,150.44	4,544,150.44
			124,531.2500	*124,531.2500*
Gas / Petroleum Lines	8.0000	EA	996,250.00	996,250.00

Description	Quantity	UOM	ContractCost	ProjectCost
			85,000.0000	*85,000.0000*
Gas/Petroleum Pipelines, <6"	2.0000	EA	170,000.00	170,000.00
			85,000.0000	*85,000.0000*
Gas/Petroleum Line Modifications <6"	2.0000	EA	170,000.00	170,000.00
			106,250.0000	*106,250.0000*
Gas/Petroleum Pipelines, 8" - 12"	4.0000	EA	425,000.00	425,000.00
			106,250.0000	*106,250.0000*
Gas/Petroleum Line Modifications 8" - 12"	4.0000	EA	425,000.00	425,000.00
			131,250.0000	*131,250.0000*
Gas/Petroleum Pipelines, 8" - 12" On Bridge	1.0000	EA	131,250.00	131,250.00
			131,250.0000	*131,250.0000*
Gas/Petroleum Line Modifications 8" - 12" on Bridge	1.0000	EA	131,250.00	131,250.00
			270,000.0000	*270,000.0000*
Gas/Petroleum Pipelines, > 12" or Grouped	1.0000	EA	270,000.00	270,000.00
			270,000.0000	*270,000.0000*
Gas/Petroleum Line Modifications >12"	1.0000	EA	270,000.00	270,000.00
Traffic Control	2.0000	LS	165,620.00	165,620.00
Traffic Control	2.0000	LS	165,620.00	165,620.00
Traffic Control - Lump SUm Cost provided based on HCFCD Historical Unit Cost Database	2.0000	LS	165,620.00	165,620.00
			32,205.1429	*32,205.1429*
Water / Waste Water Lines	7.0000	EA	225,436.00	225,436.00
			17,882.0000	*17,882.0000*
WasteWater Line < 12"	3.0000	EA	53,646.00	53,646.00
			17,882.0000	*17,882.0000*
Waste Water Line Modification <12"	3.0000	EA	53,646.00	53,646.00
			21,724.0000	*21,724.0000*
WasteWater Line 14" - 16"	1.0000	EA	21,724.00	21,724.00
			21,724.0000	*21,724.0000*
Waste Water Line Modification 14" - 16"	1.0000	EA	21,724.00	21,724.00
			50,900.0000	*50,900.0000*
Water Line 12" STL	2.0000	EA	101,800.00	101,800.00
			50,900.0000	*50,900.0000*
Water Line Modification 12" STL	2.0000	EA	101,800.00	101,800.00
			48,266.0000	*48,266.0000*
Water Line 16" CI	1.0000	EA	48,266.00	48,266.00
			48,266.0000	*48,266.0000*
Water Line Modification 16" CI	1.0000	EA	48,266.00	48,266.00
			160.7836	*160.7836*
Bridge Modifications	13,145.0000	SF	2,113,500.00	2,113,500.00

Description	Quantity	UOM	ContractCost	ProjectCost
			195.0000	*195.0000*
Railway Bridge Extension	900.0000	SF	175,500.00	175,500.00
			195.0000	*195.0000*
Railway Bridge Modifications	900.0000	SF	175,500.00	175,500.00
			170.0000	*170.0000*
North Houston-Rossyln Bridge Extension	11,400.0000	SF	1,938,000.00	1,938,000.00
			170.0000	*170.0000*
HL&P Bridge Modifications (TG2-VC)	11,400.0000	SF	1,938,000.00	1,938,000.00
			149,049.2054	*149,049.2054*
Real Estate (residential)	7.0000	EA	1,043,344.44	1,043,344.44
			112,327.2857	*112,327.2857*
Building (Fair Market Value)	7.0000	EA	786,291.00	786,291.00
			112,327.2857	*112,327.2857*
Building FMV - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	7.0000	EA	786,291.00	786,291.00
			28,000.0000	*28,000.0000*
Relocation (home)	7.0000	EA	196,000.00	196,000.00
			28,000.0000	*28,000.0000*
Relocation of homes - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	7.0000	SF	196,000.00	196,000.00
			4.8455	*4.8455*
Demolition and Removal of Buildings	12,600.0000	SF	61,053.44	61,053.44
			4.8455	*4.8455*
Building demolition, large urban projects, wood, includes 20 mile haul, excludes foundation demolition, dump fees, residential	12,600.0000	SF	61,053.44	61,053.44
CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	1.0000	LS	1,927,417.86	1,927,417.86
Water / Waste Water Lines	1.0000	LS	179,854.00	179,854.00
			94,000.0000	*94,000.0000*
WasteWater Line 60"	1.0000	EA	94,000.00	94,000.00
			94,000.0000	*94,000.0000*
Waste Water Line Modification 60"	1.0000	EA	94,000.00	94,000.00
			17,882.0000	*17,882.0000*
WasteWater Line 12"	2.0000	EA	35,764.00	35,764.00
			17,882.0000	*17,882.0000*
Waste Water Line Modification < 12"	2.0000	EA	35,764.00	35,764.00
			50,090.0000	*50,090.0000*
Water Line 12" STL	1.0000	EA	50,090.00	50,090.00
			50,090.0000	*50,090.0000*
Water Line Modification 12" STL	1.0000	EA	50,090.00	50,090.00
			145,630.3218	*145,630.3218*
Real Estate (residential and commerical)	12.0000	EA	1,747,563.86	1,747,563.86
			102,138.5000	*102,138.5000*

Description	Quantity	UOM	Contract Cost	Project Cost
Building (Fair Market Value)	12.0000	EA	1,225,662.00	1,225,662.00
Building FMV - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	LS	1,225,662.00	1,225,662.00
			30,166.6667	*30,166.6667*
Relocations (home and business)	12.0000	EA	362,000.00	362,000.00
			362,000.0000	*362,000.0000*
Relocation of homes and business - Lump Sum Pricing per Preliminary Cost Estimate Summary Sheet	1.0000	SF	362,000.00	362,000.00
			5.5521	*5.5521*
Demolition and Removal of Buildings	28,800.0000	SF	159,901.86	159,901.86
			4.8455	*4.8455*
Building demolition, large urban projects, wood, includes 20 mile haul, excludes foundation demolition, dump fees, residential	19,800.0000	SF	95,941.12	95,941.12
			7.1067	*7.1067*
Building demolition, large urban projects, wood, includes 20 mile haul, excludes foundation demolition, dump fees, commerical	9,000.0000	SF	63,960.74	63,960.74
Channels & Canals	1.0000	LS	6,865,387.63	6,865,387.63
			13,306.3903	*13,306.3903*
DETENTION AT GESSNER/BELTWAY8 (ADDITION OF SOUTH OF BROOKRIVER BASIN TO GBW.2, 92 AC-FT) (Sta 959+00 to STA 933+00)	92.0000	ACR	1,224,187.91	1,224,187.91
Mob, Demob & Preparatory Work	1.0000	LS	15,528.58	15,528.58
Mob/Demob	1.0000	LS	15,528.58	15,528.58
Project Mobilization	1.0000	LS	15,528.58	15,528.58
			647.0242	*647.0242*
Mobilization or demobilization, dozer, loader, backhoe or excavator, above 250 H.P., up to 50 miles	24.0000	EA	15,528.58	15,528.58
Drainage and Channel Structures	1.0000	LS	153,356.34	153,356.34
			887.5000	*887.5000*
Drain Pipe Modifications	84.0000	EA	74,550.00	74,550.00
			71.0000	*71.0000*
36" Outfall Drains, RCP	1,050.0000	LF	74,550.00	74,550.00
			71.0000	*71.0000*
Outfall Pipe, 36" RCP	1,050.0000	LF	74,550.00	74,550.00
			310.4422	*310.4422*
Concrete and Paving	150.0000	CY	46,566.34	46,566.34
			51.7404	*51.7404*
Concrete Pilot Flow Channel - Assmue 6" concrete depth, Trapezoidal Detail	900.0000	SY	46,566.34	46,566.34
			256.4079	*256.4079*
Structural concrete, in place, channel lining, 6" thick, includes forms(4 uses) and reinforcing steel, pumped plalcement	150.0000	CY	38,461.18	38,461.18
			0.3833	*0.3833*
Slab Finishing	8,100.0000	SF	3,104.50	3,104.50
			3.0890	*3.0890*
Expansion joint, polyurethane, poured, 1/2" x 1"	405.0000	LF	1,251.03	1,251.03
			1.9449	*1.9449*
Expansion joint, premolded, bituminous fiber, 1/2" x 6"	405.0000	LF	787.68	787.68
			0.1108	*0.1108*

Description	Quantity	UOM	Contract Cost	Project Cost
Curing, burlap, 7.5 oz., 4 uses assumed	8,100.0000	SF	897.49	897.49
			5.0975	*5.0975*
C.I.P. concrete forms, slab on grade, bulkhead with keyway, wood, 6" high, 2 uses, includes erecting, bracing, stripping and cleaning	405.0000	LF	2,064.47	2,064.47
			10.7467	*10.7467*
Backslope Drain Swales and Interceptor Drains	3,000.0000	LF	32,240.00	32,240.00
			4.7500	*4.7500*
Earthern Backslope Drain Swales	3,000.0000	LF	14,250.00	14,250.00
			4.7500	*4.7500*
Backslope Drain Swale, Historical Unit Cost	3,000.0000	LF	14,250.00	14,250.00
			98.0000	*98.0000*
Concrete Drain Structures	5.0000	EA	490.00	490.00
			98.0000	*98.0000*
Backslope Concrete Drain Structure, includes reinforcing and framing	5.0000	EA	490.00	490.00
			50.0000	*50.0000*
Backslope Drains Piping, 24" RCP	350.0000	LF	17,500.00	17,500.00
			50.0000	*50.0000*
Backslope Drain Piping, 24" RCP with Coupling and Bend	350.0000	LF	17,500.00	17,500.00
Associated General Work Items	1.0000	LS	1,055,302.99	1,055,302.99
Site Preparation	1.0000	LS	35,125.77	35,125.77
SWPPP and Erosion Control	1.0000	LS	6,000.00	6,000.00
Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high	1.0000	LS	6,000.00	6,000.00
			3,883.4365	*3,883.4365*
Clearing & Grubbing	7.5000	ACR	29,125.77	29,125.77
			1,513.7952	*1,513.7952*
Clearing & grubbing, grub stumps	7.5000	ACR	11,353.46	11,353.46
			2,369.6413	*2,369.6413*
Clear and grub, cut and chip, heavy trees, to 16" diameter	7.5000	ACR	17,772.31	17,772.31
			6.1317	*6.1317*
Excavate / Load / Haul (Basins)	148,427.0000	BCY	910,116.82	910,116.82
			2,093.3783	*2,093.3783*
Excavate Haul to Waste Crew	362.0171	HR	757,838.70	757,838.70
			231.5455	*231.5455*
HYDRAULIC EXCAVATOR, CRAWLER, 175,500 LBS, 5.00 CY BUCKET, 34.75' MAX DIGGING DEPTH	362.0171	HR	83,823.43	83,823.43
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	362.0171	HR	52,080.50	52,080.50
			43.1994	*43.1994*
Equip. Operators, Medium	362.0171	HR	15,638.94	15,638.94
			44.8193	*44.8193*
Foreman Equip. Operators, Medium	362.0171	HR	16,225.35	16,225.35
			125.3809	*125.3809*

Description	Quantity	UOM	ContractCost	ProjectCost
Rented Truck fully operated - 16 CY	4,706.2220	HR	590,070.48	590,070.48
			223.6032	*223.6032*
Waste Area Crew	362.0171	HR	80,948.19	80,948.19
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	350.1818	HR	13,228.76	13,228.76
			43.1994	*43.1994*
Equip. Operators, Medium	362.0171	HR	15,638.94	15,638.94
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	362.0171	HR	52,080.50	52,080.50
			197.0347	*197.0347*
Haul Road Maint and Flagging Crew	362.0171	HR	71,329.92	71,329.92
			59.9417	*59.9417*
GRADER, MOTOR, ARTICULATED, 6X4, 12' BLADE W/17 TEETH SCARIFIERS	181.0085	HR	10,849.95	10,849.95
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	543.0256	HR	20,513.78	20,513.78
			43.1994	*43.1994*
Equip. Operators, Medium	362.0171	HR	15,638.94	15,638.94
			60.1469	*60.1469*
TRUCK, HIGHWAY, 50,000 LBS GVW, 3 AXLE, 6X4 (CHASSIS ONLY-ADD OPTIONS)	362.0171	HR	21,774.20	21,774.20
			7.0523	*7.0523*
TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW TRUCK)	362.0171	HR	2,553.05	2,553.05
			13,260.2893	*13,260.2893*
Landscaping and Turf Establishment	8.3000	ACR	110,060.40	110,060.40
			2,123.9491	*2,123.9491*
Turf Establishment	8.3000	ACR	17,628.78	17,628.78
			2,123.9491	*2,123.9491*
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	8.3000	ACR	17,628.78	17,628.78
			150.0513	*150.0513*
Landscaping & Vegetation Recovery	616.0000	EA	92,431.62	92,431.62
			85.1145	*85.1145*
General planting, local varieties, shrubs, 2' - 3'	308.0000	EA	26,215.26	26,215.26
			214.9882	*214.9882*
General planting, local varieties, trees, 2' - 3'	308.0000	EA	66,216.36	66,216.36
			283.1123	*283.1123*
CHANNELIZATION FROM VOGEL TO E122-00-00 (Sta 637+80 to Sta 771+29)	13,349.0000	LF	3,779,265.67	3,779,265.67
Mob, Demob & Preparatory Work	1.0000	LS	20,291.43	20,291.43
Mob/Demob	1.0000	LS	20,291.43	20,291.43
Project Mobilization	1.0000	LS	20,291.43	20,291.43
			845.4763	*845.4763*
Mobilization or demobilization, dozer, loader, backhoe or excavator, above 250 H.P., up to 50 miles	24.0000	EA	20,291.43	20,291.43

Description	Quantity	UOM	Contract Cost	Project Cost
Drainage and Channel Structures	1.0000	LS	693,742.00	693,742.00
Drain Pipe Modifications - Outfall Drains	84.0000	EA	*4,821.2857* 404,988.00	*4,821.2857* 404,988.00
6" - 21" Outfall and Backslop Drain	5.0000	EA	*3,145.0000* 15,725.00	*3,145.0000* 15,725.00
6" and 21" Outfall and Backslop Drain	5.0000	EA	*3,145.0000* 15,725.00	*3,145.0000* 15,725.00
24 - 36" Outfall and Backslop Drain	55.0000	EA	*4,303.0000* 236,665.00	*4,303.0000* 236,665.00
24" - 36" Outfall and Backslop Drain	55.0000	EA	*4,303.0000* 236,665.00	*4,303.0000* 236,665.00
42" - 60" Outfall and Backslop Drain	14.0000	EA	*6,384.0000* 89,376.00	*6,384.0000* 89,376.00
42" - 60" Outfall and Backslop Drain	14.0000	EA	*6,384.0000* 89,376.00	*6,384.0000* 89,376.00
66" - 84" Outfall and Backslop Drain	3.0000	EA	*9,302.0000* 27,906.00	*9,302.0000* 27,906.00
66" - 84" Outfall and Backslop Drain	3.0000	EA	*9,302.0000* 27,906.00	*9,302.0000* 27,906.00
90" - 120" Outfall and Backslop Drain	1.0000	EA	*15,543.0000* 15,543.00	*15,543.0000* 15,543.00
90" - 120" Outfall and Backslop Drain	1.0000	EA	*15,543.0000* 15,543.00	*15,543.0000* 15,543.00
Outfall Drain Structure, 120" X 120" Box	1.0000	EA	*19,773.0000* 19,773.00	*19,773.0000* 19,773.00
120" x 120" Concrete Drainage Control Stucture	1.0000	EA	*19,773.0000* 19,773.00	*19,773.0000* 19,773.00
Backslope Drain Swales and Interceptor Drains	26,704.0000	LF	*10.8131* 288,754.00	*10.8131* 288,754.00
Earthern Backslope Drain Swales	26,704.0000	LF	*4.7500* 126,844.00	*4.7500* 126,844.00
Backslope Drain Swale, Historical Unit Cost	26,704.0000	LF	*4.7500* 126,844.00	*4.7500* 126,844.00
Concrete Drain Structures	45.0000	EA	*98.0000* 4,410.00	*98.0000* 4,410.00
Backslope Concrete Drain Structure, includes reinforcing and framing	45.0000	EA	*98.0000* 4,410.00	*98.0000* 4,410.00
Backslope Drains Piping, 24" RCP	3,150.0000	LF	*50.0000* 157,500.00	*50.0000* 157,500.00

Description	Quantity	UOM	ContractCost	ProjectCost
			50.0000	*50.0000*
Backslope Drain Piping, 24" RCP with Coupling and Bend	3,150.0000	LF	157,500.00	157,500.00
Associated General Work Items	1.0000	LS	3,065,232.23	3,065,232.23
Site Preparation	1.0000	LS	31,704.00	31,704.00
SWPPP and Erosion Control	1.0000	LS	31,704.00	31,704.00
Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high	1.0000	LS	31,704.00	31,704.00
			8.7887	*8.7887*
Excavate / Load / Haul (Channels)	295,401.0000	BCY	2,596,201.38	2,596,201.38
			2,800.6635	*2,800.6635*
Excavate Haul to Waste Crew	805.6391	HR	2,256,324.02	2,256,324.02
			231.5455	*231.5455*
HYDRAULIC EXCAVATOR, CRAWLER, 175,500 LBS, 5.00 CY BUCKET, 34.75' MAX DIGGING DEPTH	1,611.2782	HR	373,084.25	373,084.25
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	805.6391	HR	115,900.85	115,900.85
			43.1994	*43.1994*
Equip. Operators, Medium	2,416.9173	HR	104,409.49	104,409.49
			112.1829	*112.1829*
Rented Truck fully operated 12 CY	14,501.5036	HR	1,626,821.26	1,626,821.26
			44.8193	*44.8193*
Foreman Equip. Operators, Medium	805.6391	HR	36,108.18	36,108.18
			224.8383	*224.8383*
Waste Area Crew	805.6391	HR	181,138.50	181,138.50
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	805.6391	HR	30,434.48	30,434.48
			43.1994	*43.1994*
Equip. Operators, Medium	805.6391	HR	34,803.16	34,803.16
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	805.6391	HR	115,900.85	115,900.85
			197.0347	*197.0347*
Haul Road Maint and Flagging Crew	805.6391	HR	158,738.85	158,738.85
			59.9417	*59.9417*
GRADER, MOTOR, ARTICULATED, 6X4, 12' BLADE W/17 TEETH SCARIFIERS	402.8195	HR	24,145.68	24,145.68
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	1,208.4586	HR	45,651.73	45,651.73
			43.1994	*43.1994*
Equip. Operators, Medium	805.6391	HR	34,803.16	34,803.16
			60.1469	*60.1469*
TRUCK, HIGHWAY, 50,000 LBS GVW, 3 AXLE, 6X4 (CHASSIS ONLY-ADD OPTIONS)	805.6391	HR	48,456.68	48,456.68
			7.0523	*7.0523*
TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW TRUCK)	805.6391	HR	5,681.61	5,681.61

Description	Quantity	UOM	ContractCost	ProjectCost
			4,373,268.5587	*4,373,268.5587*
Landscaping and Turf Establishment	0.1000	ACR	437,326.86	437,326.86
			150.0513	*150.0513*
Landscaping & Vegetation Recovery	2,136.0000	EA	320,509.65	320,509.65
			85.1145	*85.1145*
General planting, local varieties, shrubs, 2' - 3'	1,068.0000	EA	90,902.27	90,902.27
			214.9882	*214.9882*
General planting, local varieties, trees, 2' - 3'	1,068.0000	EA	229,607.38	229,607.38
			2,123.9491	*2,123.9491*
Turf Establishment	55.0000	ACR	116,817.20	116,817.20
			2,123.9491	*2,123.9491*
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	55.0000	ACR	116,817.20	116,817.20
			246.6465	*246.6465*
CHANNELIZATION VOGEL TO COLE CREEK (Sta 562+31 to Sta 637+80)	7,549.0000	LF	1,861,934.06	1,861,934.06
Mob, Demob & Preparatory Work	1.0000	LS	20,291.43	20,291.43
Mob/Demob	1.0000	LS	20,291.43	20,291.43
Project Mobilization	1.0000	LS	20,291.43	20,291.43
			845.4763	*845.4763*
Mobilization or demobilization, dozer, loader, backhoe or excavator, above 250 H.P., up to 50 miles	24.0000	EA	20,291.43	20,291.43
Drainage and Channel Structures	1.0000	LS	377,464.00	377,464.00
			5,482.3077	*5,482.3077*
Drain Pipe Modifications - Outfall Drains	39.0000	EA	213,810.00	213,810.00
			3,145.0000	*3,145.0000*
6" - 21" Outfall and Backslop Drain	2.0000	EA	6,290.00	6,290.00
			3,145.0000	*3,145.0000*
6" and 21" Outfall and Backslop Drain	2.0000	EA	6,290.00	6,290.00
			4,303.0000	*4,303.0000*
24 - 36" Outfall and Backslop Drain	30.0000	EA	129,090.00	129,090.00
			4,303.0000	*4,303.0000*
24" - 36" Outfall and Backslop Drain	30.0000	EA	129,090.00	129,090.00
			6,384.0000	*6,384.0000*
42" - 60" Outfall and Backslop Drain	5.0000	EA	31,920.00	31,920.00
			6,384.0000	*6,384.0000*
42" - 60" Outfall and Backslop Drain	5.0000	EA	31,920.00	31,920.00
			9,302.0000	*9,302.0000*
66" - 84" Outfall and Backslop Drain	5.0000	EA	46,510.00	46,510.00
			9,302.0000	*9,302.0000*
66" - 84" Outfall and Backslop Drain	5.0000	EA	46,510.00	46,510.00
			10.8351	*10.8351*

Description	Quantity	UOM	Contract Cost	Project Cost
Backslope Drain Swales and Interceptor Drains	15,104.0000	LF	163,654.00	163,654.00
			4.7500	*4.7500*
Earthern Backslope Drain Swales	15,104.0000	LF	71,744.00	71,744.00
			4.7500	*4.7500*
Backslope Drain Swale, Historical Unit Cost	15,104.0000	LF	71,744.00	71,744.00
			176.4000	*176.4000*
Concrete Drain Structures	25.0000	EA	4,410.00	4,410.00
			98.0000	*98.0000*
Backslope Concrete Drain Structure, includes reinforcing and framing	45.0000	EA	4,410.00	4,410.00
			50.0000	*50.0000*
Backslope Drains Piping, 24" RCP	1,750.0000	LF	87,500.00	87,500.00
			50.0000	*50.0000*
Backslope Drain Piping, 24" RCP with Coupling and Bend	1,750.0000	LF	87,500.00	87,500.00
Associated General Work Items	1.0000	LS	1,464,178.62	1,464,178.62
Site Preparation	1.0000	LS	20,104.00	20,104.00
SWPPP and Erosion Control Wally revise cost to $20,104	1.0000	LS	20,104.00	20,104.00
Synthetic erosion control, silt fence, polypropylene, ideal conditions, 3' high	1.0000	LS	20,104.00	20,104.00
			8.7887	*8.7887*
Excavate / Load / Haul (Channels)	135,227.0000	BCY	1,188,474.39	1,188,474.39
			2,800.6635	*2,800.6635*
Excavate Haul to Waste Crew	368.8009	HR	1,032,887.26	1,032,887.26
			231.5455	*231.5455*
HYDRAULIC EXCAVATOR, CRAWLER, 175,500 LBS, 5.00 CY BUCKET, 34.75' MAX DIGGING DEPTH	737.6018	HR	170,788.40	170,788.40
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	368.8009	HR	53,056.44	53,056.44
			43.1994	*43.1994*
Equip. Operators, Medium	1,106.4027	HR	47,795.99	47,795.99
			112.1829	*112.1829*
Rented Truck fully operated 12 CY	6,638.4164	HR	744,717.04	744,717.04
			44.8193	*44.8193*
Foreman Equip. Operators, Medium	368.8009	HR	16,529.40	16,529.40
			224.8383	*224.8383*
Waste Area Crew	368.8009	HR	82,920.56	82,920.56
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	368.8009	HR	13,932.13	13,932.13
			43.1994	*43.1994*
Equip. Operators, Medium	368.8009	HR	15,932.00	15,932.00
			143.8620	*143.8620*
TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	368.8009	HR	53,056.44	53,056.44
			197.0347	*197.0347*

Description	Quantity	UOM	Contract Cost	Project Cost
Haul Road Maint and Flagging Crew	368.8009	HR	72,666.58	72,666.58
			59.9417	*59.9417*
GRADER, MOTOR, ARTICULATED, 6X4, 12' BLADE W/17 TEETH SCARIFIERS	184.4005	HR	11,053.27	11,053.27
			37.7768	*37.7768*
Laborers, (Semi-Skilled)	553.2014	HR	20,898.19	20,898.19
			43.1994	*43.1994*
Equip. Operators, Medium	368.8009	HR	15,932.00	15,932.00
			60.1469	*60.1469*
TRUCK, HIGHWAY, 50,000 LBS GVW, 3 AXLE, 6X4 (CHASSIS ONLY-ADD OPTIONS)	368.8009	HR	22,182.23	22,182.23
			7.0523	*7.0523*
TRUCK OPTIONS, WATER TANK, 3,000 GAL (ADD 40,000 GVW TRUCK)	368.8009	HR	2,600.89	2,600.89
			2,556,002.3341	*2,556,002.3341*
Landscaping and Turf Establishment	0.1000	ACR	255,600.23	255,600.23
			150.0513	*150.0513*
Landscaping & Vegetation Recovery	1,208.0000	EA	181,262.01	181,262.01
			85.1145	*85.1145*
General planting, local varieties, shrubs, 2' - 3'	604.0000	EA	51,409.15	51,409.15
			214.9882	*214.9882*
General planting, local varieties, trees, 2' - 3'	604.0000	EA	129,852.86	129,852.86
			2,123.9491	*2,123.9491*
Turf Establishment	35.0000	ACR	74,338.22	74,338.22
			2,123.9491	*2,123.9491*
Seeding, mechanical seeding hydro or air seeding for large areas, includes lime, fertilizer and seed	35.0000	ACR	74,338.22	74,338.22
Recreation Components	1.0000	LS	7,614,035.25	7,614,035.25
Construction Phase A (Year 2012 through 2013)	1.0000	LS	908,600.80	908,600.80
Recreation	1.0000	LS	908,600.80	908,600.80
Recreation and Day Use Areas	1.0000	LS	908,600.80	908,600.80
			5.4836	*5.4836*
Parking Lots and Service Roads	8,000.0000	SF	43,868.98	43,868.98
			109.1688	*109.1688*
Welded wire fabric, sheets, 12 x 12 - W11 x W11	80.0000	CSF	8,733.50	8,733.50
			0.4858	*0.4858*
Concrete finishing, floors, monolithic, screed finish	8,000.0000	SF	3,886.50	3,886.50
			26.2669	*26.2669*
Curing, burlap, 7.5 oz., 4 uses assumed	80.0000	CSF	2,101.36	2,101.36
			196.9433	*196.9433*
Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, includes material	148.0000	CY	29,147.61	29,147.61
			8.1788	*8.1788*
Concrete Pathways	69,300.0000	SF	566,787.52	566,787.52
			8.1788	*8.1788*

Description	Quantity	UOM	ContractCost	ProjectCost
7' Wide Concrete Multi-purpose Trail, 4" Thickness, Includes forming and finshing	69,300.0000	SF	566,787.52	566,787.52
Activity Guides, Controls and Signage	1.0000	LS	61,272.47	61,272.47
			11.5536	*11.5536*
Observation Decks	2,400.0000	SF	27,728.62	27,728.62
			5,465.7364	*5,465.7364*
Interpretive Signage	2.0000	EA	10,931.47	10,931.47
			5,653.0961	*5,653.0961*
Entry Sign	2.0000	EA	11,306.19	11,306.19
			5,653.0961	*5,653.0961*
Greenbelt Signage	2.0000	EA	11,306.19	11,306.19
Day Use Areas	1.0000	LS	236,671.83	236,671.83
			1,211.3777	*1,211.3777*
Site seating, park benches, precast concrete, with backs, wood rails, 4' long	10.0000	EA	12,113.78	12,113.78
			2,745.7895	*2,745.7895*
Picnic Tables w/Conc. Pad	4.0000	EA	10,983.16	10,983.16
			13,207.4794	*13,207.4794*
Drinking Fountain (Includes Piping)	2.0000	EA	26,414.96	26,414.96
			93,579.9679	*93,579.9679*
Playground Equipment	2.0000	EA	187,159.94	187,159.94
Construction Phase B (Year 2013 through 2015)	1.0000	LS	1,583,964.98	1,583,964.98
Recreation	1.0000	LS	1,583,964.98	1,583,964.98
Recreation and Day Use Areas	1.0000	LS	691,657.66	691,657.66
			5.4836	*5.4836*
Parking Lots and Service Roads	8,000.0000	SF	43,868.98	43,868.98
			109.1688	*109.1688*
Welded wire fabric, sheets, 12 x 12 - W11 x W11	80.0000	CSF	8,733.50	8,733.50
			0.4858	*0.4858*
Concrete finishing, floors, monolithic, screed finish	8,000.0000	SF	3,886.50	3,886.50
			26.2669	*26.2669*
Curing, burlap, 7.5 oz., 4 uses assumed	80.0000	CSF	2,101.36	2,101.36
			196.9433	*196.9433*
Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, includes material	148.0000	CY	29,147.61	29,147.61
			8.1788	*8.1788*
Concrete Pathways	36,960.0000	SF	302,286.68	302,286.68
			8.1788	*8.1788*
7' Wide Concrete Multi-purpose Trail, 4" Thickness, Includes forming and finshing	36,960.0000	SF	302,286.68	302,286.68
Activity Guides, Controls and Signage	1.0000	LS	33,918.58	33,918.58
			5,653.0961	*5,653.0961*
Entry Sign	2.0000	EA	11,306.19	11,306.19
			5,653.0961	*5,653.0961*

Description	Quantity	UOM	ContractCost	ProjectCost
Greenbelt Signage	4.0000	EA	22,612.38	22,612.38
Day Use Areas	1.0000	LS	242,163.41	242,163.41
			2,745.7895	*2,745.7895*
Picnic Tables w/Conc. Pad	6.0000	EA	16,474.74	16,474.74
			1,211.3777	*1,211.3777*
Site seating, park benches, precast concrete, with backs, wood rails, 4' long	10.0000	EA	12,113.78	12,113.78
			13,207.4794	*13,207.4794*
Drinking Fountain (Includes Piping)	2.0000	EA	26,414.96	26,414.96
			93,579.9679	*93,579.9679*
Playground Equipment	2.0000	EA	187,159.94	187,159.94
			13,884.0041	*13,884.0041*
Field Preparation	5.0000	EA	69,420.02	69,420.02
			13,884.0041	*13,884.0041*
Grading & Layout fo Multipurpose Fields	5.0000	EA	69,420.02	69,420.02
Recreation and Day Use Areas	1.0000	LS	892,307.32	892,307.32
			5.4836	*5.4836*
Parking Lots and Service Roads	8,000.0000	SF	43,868.98	43,868.98
			109.1688	*109.1688*
Welded wire fabric, sheets, 12 x 12 - W11 x W11	80.0000	CSF	8,733.50	8,733.50
			0.4858	*0.4858*
Concrete finishing, floors, monolithic, screed finish	8,000.0000	SF	3,886.50	3,886.50
			26.2669	*26.2669*
Curing, burlap, 7.5 oz., 4 uses assumed	80.0000	CSF	2,101.36	2,101.36
			196.9433	*196.9433*
Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, includes material	148.0000	CY	29,147.61	29,147.61
			8.1788	*8.1788*
Concrete Pathways	43,400.0000	SF	354,957.84	354,957.84
			8.1788	*8.1788*
7' Wide Concrete Multi-purpose Trail, 4" Thickness, Includes forming and finshing	43,400.0000	SF	354,957.84	354,957.84
Activity Guides, Controls and Signage	1.0000	LS	164,616.59	164,616.59
			15,667.1521	*15,667.1521*
Kiosk	5.0000	EA	78,335.76	78,335.76
			5,653.0961	*5,653.0961*
Entry Sign	1.0000	EA	5,653.10	5,653.10
			5,653.0961	*5,653.0961*
Greenbelt Signage	2.0000	EA	11,306.19	11,306.19
			11.5536	*11.5536*
Observation Decks	6,000.0000	SF	69,321.54	69,321.54
Day Use Areas	1.0000	LS	328,863.91	328,863.91
			2,745.7895	*2,745.7895*

Description	Quantity	UOM	ContractCost	ProjectCost
Picnic Tables w/Conc. Pad	6.0000	EA	16,474.74	16,474.74
			1,211.3777	*1,211.3777*
Site seating, park benches, precast concrete, with backs, wood rails, 4' long	10.0000	EA	12,113.78	12,113.78
			13,207.4794	*13,207.4794*
Drinking Fountain (Includes Piping)	1.0000	EA	13,207.48	13,207.48
			35.5337	*35.5337*
Nature Trail - Grading, and Surfacing	2,348.0000	SY	83,433.24	83,433.24
			93,579.9679	*93,579.9679*
Playground Equipment	2.0000	EA	187,159.94	187,159.94
			2,745.7895	*2,745.7895*
Picnic Tables w/Conc. Pad	6.0000	EA	16,474.74	16,474.74
Construction Phase C (Year 2014 through 2016)	1.0000	LS	1,469,196.68	1,469,196.68
Recreation	1.0000	LS	1,469,196.68	1,469,196.68
Recreation and Day Use Areas	1.0000	LS	954,385.69	954,385.69
			5.4836	*5.4836*
Parking Lots and Service Roads	8,000.0000	SF	43,868.98	43,868.98
			109.1688	*109.1688*
Welded wire fabric, sheets, 12 x 12 - W11 x W11	80.0000	CSF	8,733.50	8,733.50
			196.9433	*196.9433*
Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, includes material	148.0000	CY	29,147.61	29,147.61
			0.4858	*0.4858*
Concrete finishing, floors, monolithic, screed finish	8,000.0000	SF	3,886.50	3,886.50
			26.2669	*26.2669*
Curing, burlap, 7.5 oz., 4 uses assumed	80.0000	CSF	2,101.36	2,101.36
			8.1788	*8.1788*
Concrete Pathways	68,950.0000	SF	563,924.96	563,924.96
			8.1788	*8.1788*
7' Wide Concrete Multi-purpose Trail, 4" Thickness, Includes forming and finshing	68,950.0000	SF	563,924.96	563,924.96
Activity Guides, Controls and Signage	1.0000	LS	62,419.38	62,419.38
			5,653.0961	*5,653.0961*
Entry Sign	4.0000	EA	22,612.38	22,612.38
			5,653.0961	*5,653.0961*
Greenbelt Signage	2.0000	EA	11,306.19	11,306.19
			6.3335	*6.3335*
Cross Walk	4,500.0000	SF	28,500.80	28,500.80
Day Use Areas	1.0000	LS	239,740.65	239,740.65
			2,745.7895	*2,745.7895*
Picnic Tables w/Conc. Pad	6.0000	EA	16,474.74	16,474.74
			1,211.3777	*1,211.3777*
Site seating, park benches, precast concrete, with backs, wood rails, 4' long	8.0000	EA	9,691.02	9,691.02

Description	Quantity	UOM	ContractCost	ProjectCost
			13,207.4794	*13,207.4794*
Drinking Fountain (Includes Piping)	2.0000	EA	26,414.96	26,414.96
			93,579.9679	*93,579.9679*
Playground Equipment	2.0000	EA	187,159.94	187,159.94
			8,886.3441	*8,886.3441*
Field Preparation	5.0000	EA	44,431.72	44,431.72
			13,884.0041	*13,884.0041*
Grading & Layout fo Multipurpose Fields	2.0000	EA	27,768.01	27,768.01
			5,554.5707	*5,554.5707*
Grading & Layout of Play Fields	3.0000	EA	16,663.71	16,663.71
Recreation and Day Use Areas	1.0000	LS	514,810.99	514,810.99
			5.4760	*5.4760*
Parking Lots and Service Roads	10,400.0000	SF	56,950.89	56,950.89
			109.1688	*109.1688*
Welded wire fabric, sheets, 12 x 12 - W11 x W11	104.0000	CSF	11,353.56	11,353.56
			0.4858	*0.4858*
Concrete finishing, floors, monolithic, screed finish	10,400.0000	SF	5,052.46	5,052.46
			26.2669	*26.2669*
Curing, burlap, 7.5 oz., 4 uses assumed	104.0000	CSF	2,731.76	2,731.76
			196.9433	*196.9433*
Structural concrete, placing, slab on grade, direct chute, over 6" thick, includes vibrating, includes material	192.0000	CY	37,813.12	37,813.12
			8.1788	*8.1788*
Concrete Pathways	36,610.0000	SF	299,424.11	299,424.11
			8.1788	*8.1788*
7' Wide Concrete Multi-purpose Trail, 4" Thickness, Includes forming and finshing	36,610.0000	SF	299,424.11	299,424.11
Activity Guides, Controls and Signage	1.0000	LS	22,612.38	22,612.38
			5,653.0961	*5,653.0961*
Entry Sign	2.0000	EA	11,306.19	11,306.19
			5,653.0961	*5,653.0961*
Greenbelt Signage	2.0000	EA	11,306.19	11,306.19
Day Use Areas	1.0000	LS	135,823.60	135,823.60
			2,745.7895	*2,745.7895*
Picnic Tables w/Conc. Pad	4.0000	EA	10,983.16	10,983.16
			1,211.3777	*1,211.3777*
Site seating, park benches, precast concrete, with backs, wood rails, 4' long	4.0000	EA	4,845.51	4,845.51
			93,579.9679	*93,579.9679*
Playground Equipment	1.0000	EA	93,579.97	93,579.97
			13,207.4794	*13,207.4794*
Drinking Fountain (Includes Piping)	2.0000	EA	26,414.96	26,414.96
Construction Phase D (Year 2013 through 2016)	1.0000	LS	3,652,272.79	3,652,272.79

Description	Quantity	UOM	ContractCost	ProjectCost
Recreation	1.0000	LS	3,652,272.79	3,652,272.79
Recreation and Day Use Areas	1.0000	LS	3,652,272.79	3,652,272.79
Mobilization/Demobilization	1.0000	LS	24,832.65	24,832.65
			1,034.6939	*1,034.6939*
Mobilization or demobilization, dozer, loader, backhoe or excavator, above 250 H.P., up to 50 miles	24.0000	EA	24,832.65	24,832.65
			8.1788	*8.1788*
Concrete Pathways	443,520.0000	SF	3,627,440.14	3,627,440.14
			8.1788	*8.1788*
8' Wide Concrete Multi-purpose Trail, 4" Thickness, Includes forming and finshing	443,520.0000	SF	3,627,440.14	3,627,440.14

ATTACHMENT C-10

Crystal Ball Risk Analysis Report

RISK BASED COST ANALYSIS

WHITE OAK BAYOU FEDERAL FLOOD RISK MANAGEMENT PROJECT

2013 GRR EVALUATION ESTIMATE UPDATE

HARRIS COUNTY FLOOD CONTROL DISTRICT

HARRIS COUNTY, TEXAS

August 16, 2013

Prepared by:

ATKINS

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APPENDICES

EXECUTIVE SUMMARY

The Project Development Team has reviewed and updated the Risk Based Cost Analysis of the White Oak Bayou Flood Risk Management Project, which is based on the accepted estimate developed and approved through Agency Technical Review conducted by the Walla Walla District dated 22-May-12, in order to incorporate current and relevant risk and opportunities to the project. The project is currently 63% complete, with 37% of the planned work remaining. The experience of the entire Project Delivery Team (PDT) and Construction Office has been surveyed and considered in the development of the recommended contingency. Because of this, and in part due to the relatively small sample sizes of the individual WBS, a single contingency factor has been developed for the project. This factor is based on the actual experiences of the work to date, opportunities and risk identified by the PDT, assumed probabilities of occurrence, and impacts to the project for the individual items. Additional detail and explanation of specific considerations beyond the Cost & Schedule Risk Analysis Report may be found in the Project Risk Register and Crystal Ball Model for the management of the individual factors.

The results of the probability run after these factors were evaluated and considered are shown in the following table, which is for ***Unconstructed Work*** only. At just over an 80% level of confidence, $9.1 million of contingency is estimated to meet the potential cost impact of risks on the project. Based on the 22-May-12 Detailed Estimate, the recommended contingency will increase the estimate for Unconstructed Work to from $39.6 million to $48.7 million, plus escalation and Cost to Date.

Forecast: TOTAL PROJECT CONTINGENCY

Percentile (Confidence)	Forecasted $ Contingency	Percent. Contingency
0%	$1,862,499	4.7%
10%	$5,237,877	13.2%
20%	$5,991,587	15.1%
30%	$6,544,997	16.5%
40%	$7,020,577	17.7%
50%	$7,464,915	18.8%
60%	$7,912,232	20.0%
70%	$8,409,133	21.2%
80%	$9,117,000	23.0%
90%	$9,942,920	25.1%
100%	$14,834,843	37.4%

SUMMARY COMPARISON and DISTRIBUTION OF COST

Cost to Date ($1,000's)	Cost to Complete ($1,000's)	Escalation ($1,000's)	Contingency ($1,000's)	Fully Funded ($1,000's)
$ 68,211	$ 39,641	$ 5,119	$ 9,117	$ 122,088

Based on the 80% confidence level, the Fully Funded Project is estimated at $122.1 million inclusive of contingency and escalation to the mid-point of construction, which includes $39.6 million in Cost to Complete the project.

The primary factors driving the recommended contingency amount are as follows.

Includes for point of reference, is the dollar value of the work estimated to be impacted should the risk be realized, along with the calculated risk, or most likely cost to the project. Additional detail can be found in the Crystal Ball Risk Model.

1. The identification of a proper disposal site for excavated material is the most significant risk of impact to costs on the project. There is an equal chance of this issue being a risk or an opportunity. The team considered that some contractors may actually be able to sell the material and reduce the cost of disposal significantly.

Likelihood of risk occurring: 80% ***Most Likely Cost Impact: $8.3 million***
Likeliest opportunity: -$1.0 million

2. New items which have not been captured by the cost estimate or known at the time of estimating such as modifications, appear to be likely. Typically a project of this nature runs 3-5% cost growth due to modification. Additionally, potential for missed scope is considered to be a potential given the length of the design process, the reliance on information from others, and potential changes to standard specifications, and work items.

Likelihood of risk occurring: 50% ***Most Likely Cost Impact: $1.7 million***

3. Impacts from prolonged heavy rainfall events which may create delays and additional cost for project restoration, extended overhead, and re-mobilization efforts. Days have been related to dollars based on the estimated overhead rate for field management by the contractor and project owner. The rate utilized is equal to the average daily overhead cost contained in the detailed estimate.

Likelihood of risk occurring: 50% ***Most Likely Cost Impact: $0.3 million***

There are multiple other risks identified, however, they have a very low probability of occurrence and do not have a significant impact on the CSRA results.

It is the opinion of the Risk Analyst with the consensus of the PDT, that many of the risk factors, and potential cost, that could influence cost or schedule have previously been mitigated as a result of construction being complete on 63% of the project to date. It is also important to note that the bulk of the cost to complete is contained within earthwork activities. While these activities carry an inherent risk, the reaches have been developed previously over the course of several years by Harris County Flood Control. This has been considered as one mitigating factor that has influenced the contingency heavily. Some of the inherent risk associated with large scale earth moving operations, such as those which remain are considered to be very typical and include: Variations of Quantities, Fuel Cost (Transportation), and changes in local market conditions that could impact construction prices.

PURPOSE

The purpose of this risk based cost analysis was to study the potential impact on the cost and schedule of risks and opportunities that are specific to the White Oak Bayou Flood Risk Management Project and which may cause cost and schedule overruns. Moreover it is to assess whether an appropriate contingency has been established and provide a basic outline for mitigation of the identified risks. The risks and opportunities have been studied from a probabilistic approach whereby the estimated cost is presented as a probability curve. The United States Army Corp of Engineers (USACE) recommends the contingency in the cost estimate be compared against the 80% value on the resultant probability curve.

PROJECT BACKGROUND

The White Oak Bayou Flood Risk Management Project was developed to lessen the impact of flooding in the watershed. The project is comprised of channel improvements, detention ponds, and recreation facilities. A portion of the project has already been completed which has given the Harris County Flood Control District (HCFCD) good information about the potential risks and opportunities that may impact the construction costs. Excavation and earthwork is the largest component of the work.

White Oak Bayou, a tributary of Buffalo Bayou, originates in northwest Harris County, Texas and flows southeast for approximately 25 miles through the City of Jersey Village and the City of Houston where it outfalls into Buffalo Bayou in downtown Houston. White Oak Bayou watershed drains approximately 110 square miles and is approximately 90 percent developed. Work on the lower reach of White Oak Bayou was completed in the mid 1970s under the authorization of the Flood Control Acts of 1954 and 1965 for Buffalo Bayou and Tributaries.

The current White Oak Bayou Flood Risk Management Project extends from the confluence of Cole Creek and White Oak Bayou north to Huffmiester Road in northwest Harris County. Provided in Appendix A are plots of the project components. In general the project is composed of:

- 7 Distinct Work Areas
- 15.4 miles of channel modifications
- 4 detention basins providing approximately 2,938 acre feet of storage
- Recreation facilities the cost of which is budgeted with local partners

The current Fully Funded Project Cost Estimate is $122.1 million, which includes the recommended 23% contingency described herein and escalation to the mid-point of construction. The cost estimate utilized in this analysis is provided in Appendix B. Currently, of the 7 work areas comprising the project, 3 are complete, 3 are partially complete, and 1 has not yet started.

USACE RISK ANALYSIS PROCESS

In accordance with USACE Engineer Regulation 1110-2-1302 a formal risk analysis is required for any projects exceeding $40 million and which are going forward to Congress requesting funding. Due to the age of the prior analysis and estimate, (greater than 2 years) the Cost, Schedule, and Risk Analysis are indicated for review and updating. The White Oak Bayou Federal Flood Risk Management Project is subject to this requirement. Before beginning the White Oak Bayou analysis, the USACE provided the HCFCD with a draft copy of its Cost and Schedule Risk Analysis Guidance document dated May 17, 2009. This document was utilized in the performance of the risk analysis and this update. The guidance document identifies the following key aspects of the risk analysis process:

- Uses probabilistic cost and schedule risk analysis methods within the framework of the Crystal Ball software
- Establishes reasonable contingencies reflective of an 80 percent confidence level
- Provides project leadership with contingency information for scheduling, budgeting, and project control purposes, and
- Provides tools to support decision making and risk management as the project progresses through planning and implementation.
- To fully recognize its benefits, cost and schedule risk analyses should be considered as an ongoing process conducted concurrent to, and iteratively with, other important project processes such as scope and execution plan development, resource planning, procurement planning, cost estimating, budgeting, and scheduling.

METHODOLOGY/PROCESS

For the purpose of performing the White Oak Bayou Flood Control Project risk analysis a team was assembled and lead by William Stevenson. The Evaluation Team was comprised of the following individuals:

- Mr. Wayne Crull – HCFCD – Senior Planning Director
- Mr. Dave Winslow – LJA Engineering
- Mr. Richard Scott – HCFCD – Department Manager, Capital Projects Department
- Mr. William Stevenson – ATKINS - Senior Estimator/Scheduler
- Mr. Dave Carter – ATKINS - Risk Analyst
- Mr. Bob Hundley, P.E. –ATKINS - Risk Analyst
- Ms. Janice Hillenmeyer, P.E. –ATKINS - Risk Analyst
- Ms. Casey Hall – PBS&J – Environmental
- Ian Hudson, HCFCD – Planning Director

The PDT team held its initial risk analysis workshop March 26, 2010. A copy of the agenda is provided in Appendix C along with the PowerPoint presentation orienting the PDT team to the methodology and risk analysis process. In the workshop the team identified the risks and opportunities the project could experience, the likelihood of their occurrence and the potential impact both to cost and schedule. The information was captured in the risk register provided in Appendix D. With the input obtained from the team, the risk analysts then performed the market and Monte Carlo quantitative probability analysis on the cost estimate utilizing the Crystal Ball software. A follow-up workshop was held on April 16, 2010 to review the preliminary results and to discuss the analysts' probability assumptions. The team then agreed on an appropriate contingency to be used in the cost estimate. The current update was performed without a formal additional risk review, as the project has been delayed for one year and there have been no significant changes to the potential risks on the project. However, in discussions the team determined that some adjustments did need to be made to the original probability assumptions based on current market conditions.

In regard to the schedule, the White Oak Bayou Federal Flood Risk Management Reduction Project actually is being completed through a number of individual contracts. Each contract would have its own project schedule. Provided in Appendix E is HCFCD's overall implementation schedule for the flood control project dated January 20, 2010. While the team identified the risks that could impact the schedule, the team felt that given that at this time the implementation schedule is very conceptual that performing a risk analysis on it would not produce useful information. At such time that a more detailed schedule is developed, then an analysis can be performed. Additionally, during the risk discussions it was noted that the projects are relatively independent of each other, and any delay on one project likely would have no impact on the progress of any adjacent project. Projects completed to-date have not encountered schedule issues according to the HCFCD. However, all projects have been delayed for approximately the last year and this was included in the cost evaluation. Schedule Delay has been adapted to cost, by determining the Contractor's estimate daily operating cost, plus the Owner's cost per day and applying this rate to the estimated days of delay.

In early 2012, the GRR was updated as a result of previous reviews and design changes, which required an updated cost estimate to be prepared. In addition, after 6-months, material costs are generally considered to be "stale" and should be revised and updated, which in this case, nearly 24 months had passed. In May 2012, the PDT was reassembled to discuss any potential new risks that have been identified, any changes to the existing risk profile, and confirm the opportunities identified could be reasonably be obtained. As a result, several factors changed due to the economic downturn in the National Economy, the continued rise in Fuel Cost, and the assumptions for Economic Recovery in relation to the remaining components being constructed. As part of this review, historical unit cost for the past seven (7) years were reviewed and considered. These unit costs were provided and identified by Harris County Flood Control as the actual Bid Item Cost, for the same or similar work items being constructed on White Oak. New factors were brought in and considered in the analysis to fully document and assess environmental impacts, such as heavy, or tropical, rainfall events. In July of 2013 additional comments were received and the risks have been reviewed one additional time, with the costs updated to reflect project progress and the mitigation of previously identified risks.

RISK IDENTIFICATION and EVALUATION

Provided in Appendix D is the Risk Register develop by the team. The risks were placed in the following six categories. The corresponding USACE Civil Works project feature code is identified in the left column.

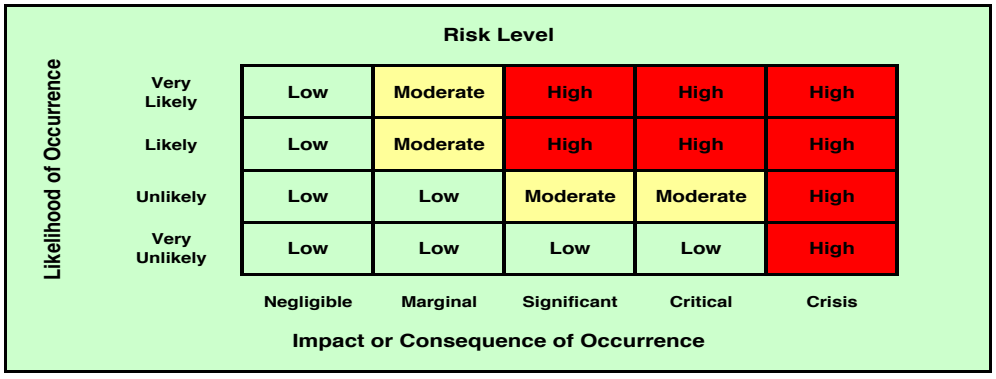
CODE	DESCRIPTION
30 & 31	Project & Program Management
	General and Economic
01	Lands and Damages
02	Relocations
09	Canals & Detention Ponds
14	Recreation Facilities

Cost and Schedule impacts, in terms of dollars, have been estimated for each of the risk factors, based on the estimated value of work that could potentially be affected by its occurrence.

The likelihood of occurrence was also identified and applied to the previously identified Cost and Schedule risks, in dollars, which yielded a most likely impact to the project for use in the Crystal Ball Model Analysis.

It should be noted that the HCFCD has already completed a portion of the flood control project and consequently the team has a greater insight into the potential risks and opportunities than is typical in a risk analysis. While not specifically called out as an opportunity, the knowledge and experience from this has affected the overall contingency on the project.

In accordance with USACE guidance, the level of risk was measured using the following criteria:



The following is a brief summary of the risks identified in each category. More specific detail is provided in the risk register.

Project & Program Management

The following eight risks and one opportunity were identified in this category;

Risk No.	PDT Event Concerns (include all to archive)	Project Cost			Project Schedule		
		Impact	Overall Risk Level	Cost Impact Prob.	Impact	Overall Risk Level	Sched. Impact Prob.
PPM-1	Contracting Plan may not be fully developed for the projects. Some uncertainty of the constructed / non constructed reached remain.	negligible	Low	5%	negligible	Low	5%
PPM-2	Standard Design Plans have been utilized in cost estimate, based on early information. Design may not capture the actual requirements of the projects. Design is considered to be low level at this time.	negligible	Low	5%	negligible	Low	5%
PPM-3	ROE may be held up or delayed due to unknown circumstances and situations.	negligible	Low	5%	negligible	Low	5%
PPM-4	Construction sequencing assumes work in stages along the canal. An issue within one reach may delay additional reaches or cause unknown costs for a work around.	negligible	Low	5%	negligible	Low	5%
PPM-5	Program Management and Construction Management Resources may be in high demand with local agencies and may not availability to push project for completion.	negligible	Low	5%	negligible	Low	5%
PPM-6	Variation in construction management costs	negligible	Low	10%	negligible	Low	5%
PPM-7	Project location may impact wetlands areas requiring additional mitigation efforts and costs	negligible	Low	10%	negligible	Low	5%
OP-1	With many contractors searching for work nationally, large scale contractors may be attracted from outside the local market, creating a more competitive bidding market. However, some markets in Texas are beginning to show inflation that could impact bids on the project, making this both an opportunity and a threat.	significant	High	50%	negligible	Low	20%

The team determined that all of the risks would have a negligible impact which resulted in all of them being categorized at a low risk level. The one opportunity the team identified has to do with the competitive bidding market that the industry has experienced over the past year due to the limited number of projects available. The team expects the market to remain very competitive for the short term, however economic recovery is looming and is expected within the next 6-12 months. As the economy recovers, and contractors limited supply of labor and materials is a very likely occurrence, this may put upward cost pressure on the contractor, resulting in a higher cost of construction.

General and Economic

Three General and Economic risks were identified;

Risk No.	PDT Event Concerns (include all to archive)	Project Cost			Project Schedule		
		Impact	Overall Risk Level	Cost Impact Prob.	Impact	Overall Risk Level	Sched. Impact Prob.
GE-1	Material pricing may rise as a result of inflation and other market economy factors.	negligible	Low	10%	negligible	Low	10%
GE-2	Given work will be drainage channels and basins, large rain fall events as well as hurricanes and tropical storms may create delays and cost impacts to construction.	negligible	Low	10%	marginal	Moderate	50%
GE-3	Fuel costs appear to be on the rise again and may lead to higher bids.	marginal	Moderate	30%	negligible	Low	10%

The first is related to material costs. Material costs had stabilized however indications in the market are that they are starting to move upward again. The PDT team felt the impact would be negligible because the projects are not material intensive, in that they primarily involve the movement of dirt. In regard to the fuel costs, unless the anticipated continued increases in cost are avoided, this could have an impact on many areas of the estimate, including Hauling and excavation cost. The risk of heavy rainfall has been re-evaluated and has been modified from the previous opinion that was adequately addressed in the cost estimate already. Given the proximity to the Gulf Coast, and prior years of dry conditions, it is generally expected that a wetter cycle will be realized in terms of weather patterns.

Lands and Damages

In regard to real estate acquisition, the market and the resistance to sell of individual land owners, the team noted almost all the land required for the project has already been acquired. It is the PDT's understanding that only two other parcels remain to be purchased. Overall the team rated risks to lands and damages costs as low.

Risk No.	PDT Event Concerns (include all to archive)	Project Cost			Project Schedule		
		Impact	Overall Risk Level	Cost Impact Prob.	Impact	Overall Risk Level	Sched. Impact Prob.
LD-1	The real estate market may affect real estate acquisition costs.	negligible	Low	10%	negligible	Low	10%
LD-2	Individual land owners may be unwilling to cooperate with acquisition plan.	negligible	Low	10%	negligible	Low	10%

Relocations

The channel work is to be done within the existing channel and it is very unlikely that any problems will be encountered. In regard to the detention ponds, archeological finds are not expected due to the location of the project. Again given that portions of the project have been completed and most of the investigations for utilities and contaminated soils have been conducted the project is far enough along that the team felt the likelihood of these risks as being unlikely and the risk level as low.

Risk No.	PDT Event Concerns (include all to archive)	Project Cost			Project Schedule		
		Impact	Overall Risk Level	Cost Impact Prob.	Impact	Overall Risk Level	Sched. Impact Prob.
RE-1	As work progresses archeological finds may be uncovered delaying progress or causing need for redesign	significant	Low	5%	negligible	Low	5%
RE-2	Relocation involved many petroleum pipelines. Surrounding soil may be found to be contaminated resulting in increased costs	marginal	Low	5%	negligible	Low	5%
RE-3	As built drawing may differ from actual construction in place creating additional change order and design modifications.	marginal	Low	10%	marginal	Low	10%
RE-4	Bridge Designs assume standard design, which may be influenced by the utility owner.	negligible	Low	10%	negligible	Low	10%
RE-5	Unknown utilities may be discovered causing delay and additional costs.	marginal	Low	10%	marginal	Low	10%

Based on the previous construction efforts previously completed, minimal risk based cost was realized, which is expected to continue. Extensive surveys have been completed along the channels including the channels themselves and surrounding areas.

Canals and Detention Ponds

The PDT team thoroughly re-evaluated the risks factors assigned to channels and canals previously, given this cost feature represents the majority of all estimated cost to complete, and therefore represents the greatest project risk.

Risk No.	PDT Event Concerns (include all to archive)	Project Cost			Project Schedule		
		Impact	Overall Risk Level	Cost Impact Prob.	Impact	Overall Risk Level	Sched. Impact Prob.
CH-01	As work progresses archeological finds may be uncovered delaying progress or causing need for redesign	Negligible	Low	5%	marginal	Low	5%
CH-02	Construction involves improvement to existing drainage canals. Spoils may contain some degree of HTRW material	Negligible	Low	5%	negligible	Low	5%
CH-03	Site access limitations	Negligible	Low	5%	negligible	Low	5%
CH-04	Given large volume of truck traffic, surface streets may become damaged due to volumes and weight.	negligible	Low	5%	negligible	Low	5%
CH-05	Given proximity to residential properties, restrictions on work hours and activities may be required.	negligible	Low	5%	negligible	Low	5%
CH-06	Soil conditions and Site conditions may vary from expectations and plans, requiring additional surveys and analysis and potentially higher construction costs.	negligible	Low	5%	negligible	Low	5%
CH-07	Lack of local inexpensive disposal sites for excavated material.	significant	Moderate	20%	marginal	Moderate	20%
CH-08	Channels may require concrete lining based on flow rates and design criteria?	negligible	Low	5%	negligible	Low	5%
CH-09	Impact that a delay in the start of one element of the overall project could impact other elements.	negligible	Low	5%	negligible	Low	5%
CH-10	Poor Performance by Prime or Sub Contractors which leads to project delays or potential termination for Default or Convenience	moderate	Low	30%	significant	Low	10%
CH-11	New Work items and scope / Modifications	Marginal	Moderate	50%	marginal	Moderate	50%
CH-12	Local inexpensive disposal sites are found by contractors.	significant	High	80%	neglibile	Low	20%
OP-3	Local inexpensive disposal sites are found by contractors.	significant	High	80%	neglibile	Low	20%

The most significant of these involve the estimated quantities of excavation and associated work for hauling and disposal of these materials from the detention ponds. Previously this was considered an opportunity to the project based on past experience, where contractors where able to dispose of materials, at low to no cost, outside of commercial landfills, which was represented in the cost estimate. As a result of the general economic slowdown and updated guidance from the Army Corps of Engineers, a minimal cost for hauling and disposal was added in to the estimate, which is considered highly likely to change as a result of fuel cost, haul distance, economic climate, and availability of work. At the same time this represents a risk, it also represents an opportunity.

Additional consideration has been given to Contract Modifications, which previously had been considered a non-risk. As with every contract, Modifications occur, and the PDT has taken this into account, as assigned appropriate risk.

Other risks identified, included: discovering archeological finds, HTRW material, and soil condition variations were very unlikely because of the work that has already been done. Also, based on the teams familiarity with the detention pond sites the likelihood of: access limitations, restrictions on working hours other than what HCFCD already includes, and damage to surface streets was thought to be very unlikely.

Recreation Facilities

The recreation facilities are unique in that these are budgeted costs and if the costs come in higher than budgeted, HCFCD can reduce the scope to keep the project within the budgeted amount. Also the costs are shared with a sponsor. Without a sponsor, HCFCD may choose not to construct the facility. The recreation facilities also represent a small percentage of the overall flood control project's cost. Consequently, the risk levels for the identified events were all deemed to be low.

Risk No.	PDT Event Concerns (include all to archive)	Project Cost			Project Schedule		
		Impact	Overall Risk Level	Cost Impact Prob.	Impact	Overall Risk Level	Sched. Impact Prob.
REC-01	A standard design assumption has been made for estimating. Component features design may be influenced by local groups and design may deviate.	negligible	Low	5%	negligible	Low	5%
REC-02	Local groups and communities influence may impact the assumed design and cause scope creep.	negligible	Low	5%	negligible	Low	5%
OP-4	Sequencing the construction of recreation features with the channel and pond construction activities may allow for time savings and potential construction costs savings.	negligible	Low	10%	negligible	Low	10%
OP-5	Lack of local sponsor participation	negligible	Low	10%	negligible	Low	10%

QUANTITATIVE RISK ANALYSIS

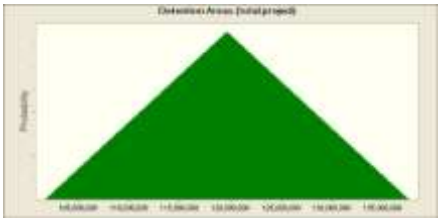
The quantitative risk analysis involved applying probability curves to the appropriate cost items of the current cost estimate based on the risks identified by the team. The probability curves were initially proposed by the risk analysts and then reviewed with the project development team. The probability curves were developed based on the risks documented in the risk register. It should be noted that in general, the risks were determined to be relatively low with the exception of those impacting the excavation and hauling of the excavated material from detention ponds. Also, the risks were found to be consistent across the major construction elements, and in order to reduce the need to correlate the probability curves the risk analysts applied the curves at the summary level of the cost estimate. The input probability assumptions the team made are provided in Appendix E.

In accordance with the USACE guidelines, the team used only the triangular and uniform distributions curves. These curves are described as follows.

The triangular distribution establishes a best case, most likely and worst case value. This distribution is recommended for the risk events that impact discreet areas or where one cost value is more likely to occur than another value.

The uniform distribution is used when any value between the best case and worst case are equally likely to occur. This distribution is recommended when the risk events are more global to the project and a most likely occurrence cannot be established.

The key distribution curve was the modeling of the risks and opportunities associated with the costs to excavate and haul away the material from the detention ponds. For this probability assumption the team used the following model. This model is slightly more conservative than used in the previous study, related to concern over current market conditions resulting in price inflation for these costs.



The cost contingency was then analyzed using the Crystal Ball software and a Monte Carlo simulation was performed. The results are provided in the following section.

MAJOR FINDINGS/OBSERVATIONS

The PDT review of the White Oak Bayou project had the following major findings / observations during the study:

There remains an opportunity to have competitive bids in the near future due to low construction volume and strong competition in the local Houston market; however, this opportunity is not as great as it was one year ago;

The detention basin work (which is by far the most significant cost item on the project) has an equal chance of a contractor taking advantage of the opportunity of excess material sale as they do of any risk of having to pay high disposal costs for the excess material;

The channel and detention basin work was considered by the PDT to have minimal risk and therefore require low contingency;

The land acquisition and relocations were considered by the PDT to have relatively low risk;
The recreation facilities were considered by the PDT to have low risk;

The major schedule risks that could impact costs include to be any further delay from funding issues;

The designs by the HCFCD have been developed after many project risks had been identified and mitigated;

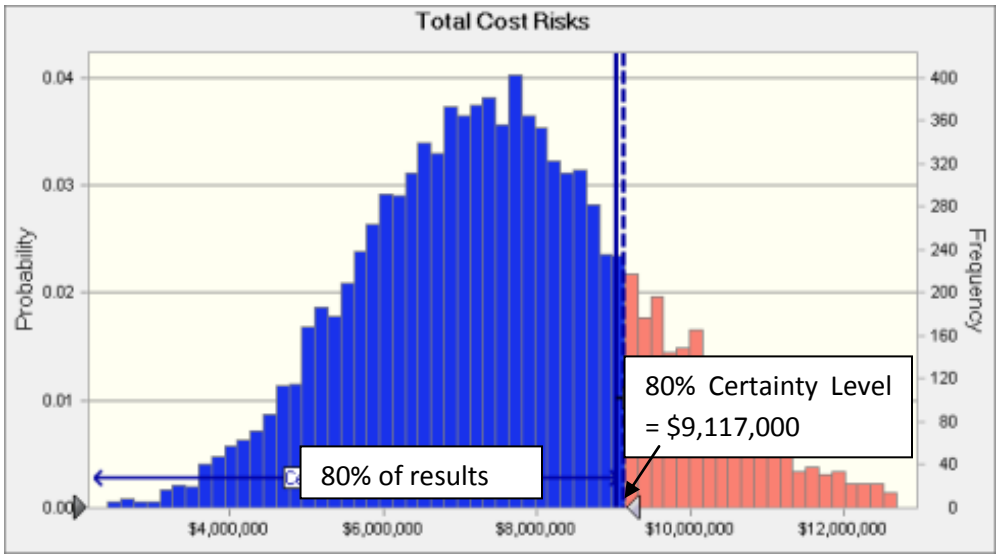
The analysis of these major findings resulted in a forecast curve that had an 80% forecast value approximately 23% higher than the base cost estimate with escalation. This relates to adding a recommended contingency of approximately $9.1 million to the estimated project. This rate is considered to be reasonable based on the several factors, including: The value of work completed, PDT and estimator confidence in unit cost, value of lessons learned, and opportunities to have favorable bids on the construction projects.

These results are shown in the following tables and resulting probability curves representing Total Project Cost on the following pages.

TOTAL FULLY FUNDED PROJECT COST

Confidence	Cost To Date	Cost to Complete	Contingency	Escalation (Project)	Fully Funded
0%	$ 68,211,000	$ 39,641,000	$1,862,499	$ 5,119,000	$114,833,499
10%			$5,237,877		$118,208,877
20%			$5,991,587		$118,962,587
30%			$6,544,997		$119,515,997
40%			$7,020,577		$119,991,577
50%			$7,464,915		$120,435,915
60%			$7,912,232		$120,883,232
70%			$8,409,133		$121,380,133
80%			$9,117,000		$122,088,000
90%			$9,942,920		$122,913,920
100%			$14,834,843		$127,805,843

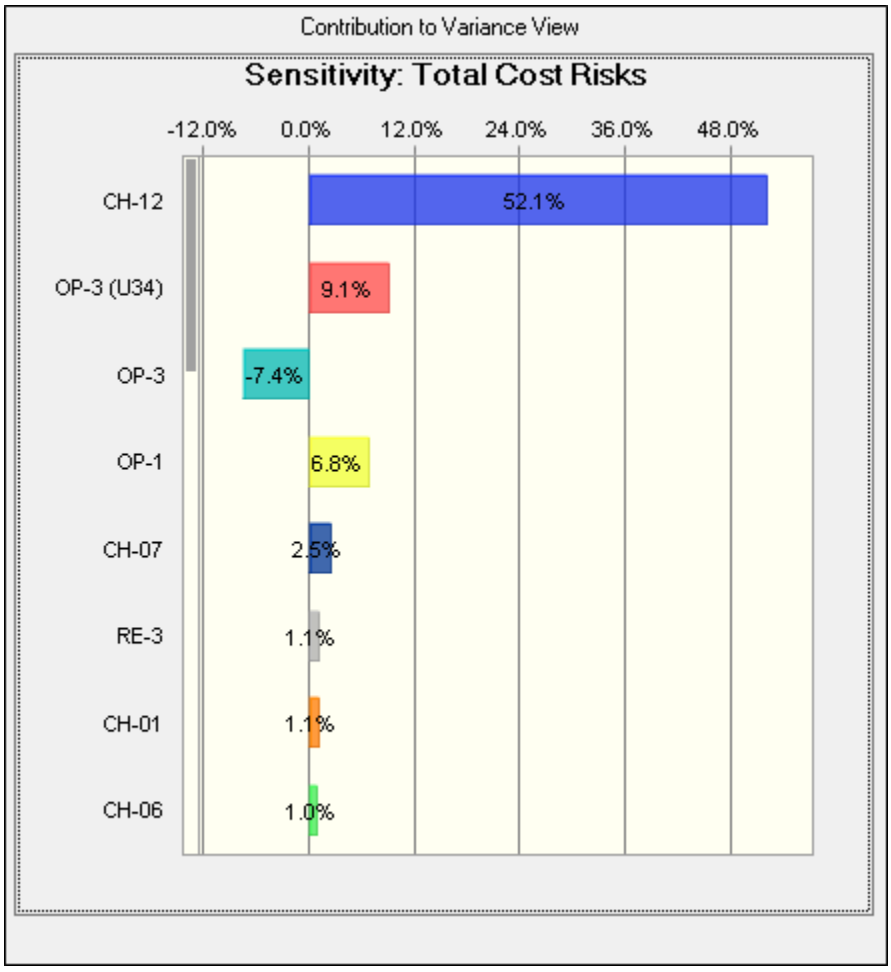
TOTAL PROJECT COST and SCHEDULE RISK FORECAST CURVE



The table and probability curve graphics above demonstrate the current potential for the costs of the project, with the current estimate of fully funded project to be $122.1 million. This includes $9.1 million in contingency at the 80% confidence level.

The cost has been developed through consideration of both Cost Risks and Schedule Risks which are combined to achieve the overall project cost risk on the project. The Schedule Risk has been correlated into dollars based on the Daily Overhead Cost contained in the Detailed Cost Estimate at $4,500 per day. This is then applied to the number of impact days and the likelihood of occurrence of delay.

SENSITIVITY CHART



The sensitivity graph above demonstrates that the current concern for variance is in the channel excavation (CH-12) disposal of material. OP-3 demonstrates the potential for an opportunity should a contractor have the ability to dispose of material close to the site for a low expense. As noted, there are relative few significant risks remaining on this project.

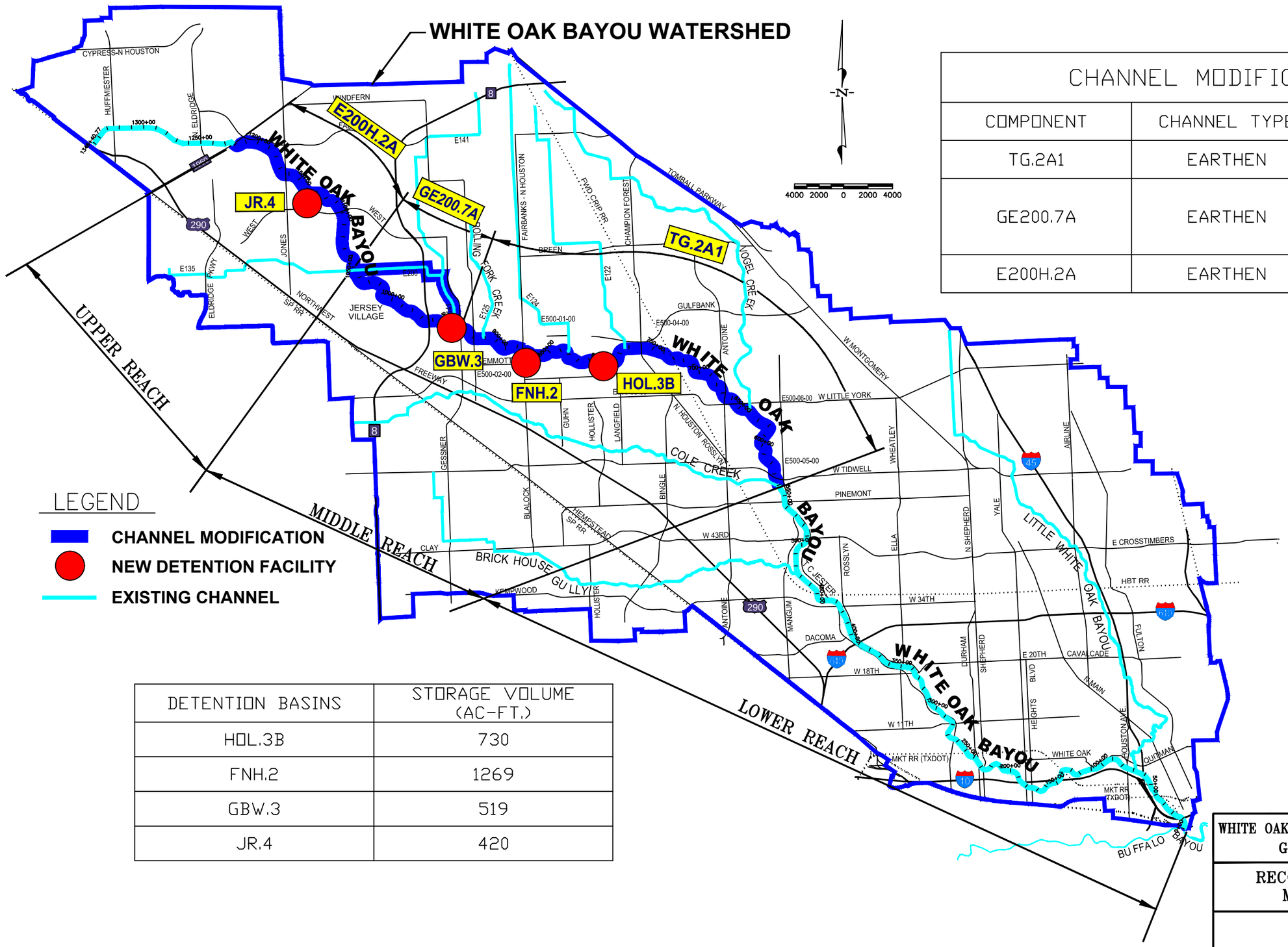
MITIGATION RECOMMENDATIONS

Given that a significant portion of the project has already been completed, HCFCD has acquired all but a few parcels of right of way, a significant amount of investigative work has been performed, and highly developed plans developed to 2005 Flood Control Standard Specifications, the PDT team does not offer any mitigation recommendations, beyond continuing with current Construction Management philosophies and approaches. The HCFCD should continue to encourage the major opportunities for optimal contractor bidding by reviewing and approving local acceptable disposal sites nearby the project, and working to get the projects bid during this time of cost stabilization and a competitive bidding environment.

APPENDICES

APPENDIX A – PROJECT COMPONENT PLOTS

WHITE OAK BAYOU WATERSHED



CHANNEL MODIFICATIONS

COMPONENT	CHANNEL TYPE	TYPICAL BOTTOM WIDTH (FT.)
TG.2A1	EARTHEN	50′-60′
GE200.7A	EARTHEN	30′-80′ (WITH GABIONS FOR EROSION PROTECTION)
E200H.2A	EARTHEN	50′-80′

LEGEND

- CHANNEL MODIFICATION
- NEW DETENTION FACILITY
- EXISTING CHANNEL

DETENTION BASINS	STORAGE VOLUME (AC-FT.)
HOL.3B	730
FNH.2	1269
GBW.3	519
JR.4	420

WHITE OAK BAYOU FEDERAL FLOOD CONTROL PROJECT
GENERAL REEVALUATION REPORT

RECOMMENDED PLAN FLOOD RISK MANAGEMENT COMPONENTS

Harris County Flood Control District

EXHIBIT 5-1

APPENDIX B – CURRENT COST ESTIMATE 0203a

	Feature	Contract	Description	Project Cost	01	02	09	15		$ 30.00	$ 31.00
CTD	01		LANDS AND DAMAGES								
		ALL	Upper Detention Pond (Off-Line) Sta 610+00	$ 21,010,000.00	$ 21,010,000.00						
	02		RELOCATIONS								
		ALL	Relocations Cost to Date	$ 103,000.00		$ 103,000.00					
	09		CHANNELS & CANALS								
		ALL	Channels & Canals Cost to Date	$ 40,279,000.00		$ 40,279,000.00					
	30		PLANNING, ENGINEERING, and DESIGN								
		ALL	All Contracts, PED to Date	$ 1,352,000.00						$ 1,352,000.00	
	31		SURVELLANCE, INSPECTION, and OVERHEAD								
		ALL	All Contracts, SIOH To Date	$ 5,467,000.00							$ 5,467,000.00
			TOTAL COST TO DATE, ALL REACHES/CONTRACTS	$ 68,211,000.00	$ 21,010,000.00	$ 40,382,000.00	$ -	$ -		$ 1,352,000.00	$ 5,467,000.00

	Feature	Contract	Description	Project Cost	01	02	09	14	18	30	31
CTC	01		LANDS AND DAMAGES								
		A	Construction Phase A (Year 2014 through 2016)	$ -	$ -						
		B	Construction Phase B (Year 2016 through 2018)	$ 3,438,928.00	$ 3,438,928.00						
	02		RELOCATIONS								
		A	Construction Phase A (Year 2014 through 2016)	$ 3,747,776.00		$ 3,747,776.00					
		B	Construction Phase B (Year 2016 through 2018)	$ 7,918,168.63		$ 7,918,168.63					
	09		CHANNELS and CANALS								
		A	Construction Phase A (Year 2014 through 2016)	$ 4,960,131.96			$ 4,960,131.96				
		B	Construction Phase B (Year 2016 through 2018)	$ 6,865,387.63			$ 6,865,387.63				
	14		RECREATION								
		C	Recreation Construction Phase C (Year 2014 through 2015)	$ 908,600.80				$ 908,600.80			
		D	Recreation Construction Phase D (Year 2015 through 2016)	$ 1,583,964.98				$ 1,583,964.98			
		E	Recreation Construction Phase E (Year 2016 through 2018)	$ 1,469,196.68				$ 1,469,196.68			
		F	Recreation Construction Phase F (Year 2015 through 2018)	$ 3,652,272.79				$ 3,652,272.79			
	18		CULTURAL RESOURCE PRESERVATION								
		A	Greens Bayou Mitigation Bank	$ 103,148.00					$ 103,148.00		
	30		PLANNING, ENGINEERING, and DESIGN (6%)								
		A	Construction Phase A (Year 2014 through 2016)	$ 529,000.00						$ 529,000.00	
		B	Construction Phase B (Year 2016 through 2018)	$ 886,000.00						$ 886,000.00	
		C	Recreation Construction Phase C (Year 2014 through 2015)	$ 55,000.00						$ 55,000.00	
		D	Recreation Construction Phase D (Year 2015 through 2016)	$ 95,000.00						$ 95,000.00	
		E	Recreation Construction Phase E (Year 2016 through 2018)	$ 88,000.00						$ 88,000.00	
		F	Recreation Construction Phase F (Year 2015 through 2018)	$ 219,000.00						$ 219,000.00	
	31		SURVELLANCE, INSPECTION, and OVERHEAD (10%)								
		A	Construction Phase A (Year 2014 through 2016)	$ 881,000.00							$ 881,000.00
		B	Construction Phase B (Year 2016 through 2018)	$ 1,479,000.00							$ 1,479,000.00
		C	Recreation Construction Phase C (Year 2014 through 2015)	$ 91,000.00							$ 91,000.00
		D	Recreation Construction Phase D (Year 2015 through 2016)	$ 158,000.00							$ 158,000.00
		E	Recreation Construction Phase E (Year 2016 through 2018)	$ 147,000.00							$ 147,000.00
		F	Recreation Construction Phase F (Year 2015 through 2018)	$ 365,000.00							$ 365,000.00
			TOTAL COST TO DATE, ALL REACHES/CONTRACTS	$ 39,640,575.47	$ 3,438,928.00	$ 11,665,944.63	$ 11,825,519.59	$ 7,614,035.25	$ 103,148.00	$ 1,872,000.00	$ 3,121,000.00

01	02	09	15	18	30	31
$ 24,448,928	$ 52,047,945	$ 11,825,520	$ 7,614,035	$ 103,148	$ 3,224,000	$ 8,588,000
TOTAL PROJECT COST without Contingency and Escalation					$	107,851,575

August 2013 - Revised Mitigation Cost in Feature 18, Schedule shifted 2 years to Right

June 11, 2013 - Revised Environmental Mitigation

May 24, 2013 Revised Recreation, Deletion of FNH Cell

April 2013 to adjust Quanitties for FHN3 and GBW3 Basins per D WInslow

May 9, 2012 ATR Comment Resolution and Backcheck Estimate

Updated September 2012 for Lands & Damages per LJA

PED (30) and CM (31) costs are specifically excluded from teh MCACES per direction from ATR Reviewers. Cost are added via the TPCS

APPENDIX C – RISK REGISTER 0403

US Army Corps of Engineers®

RISK REGISTER
WHITE OAK BAYOU FLOOD CONTROL PROJECT

APRIL 2012 UPDATE

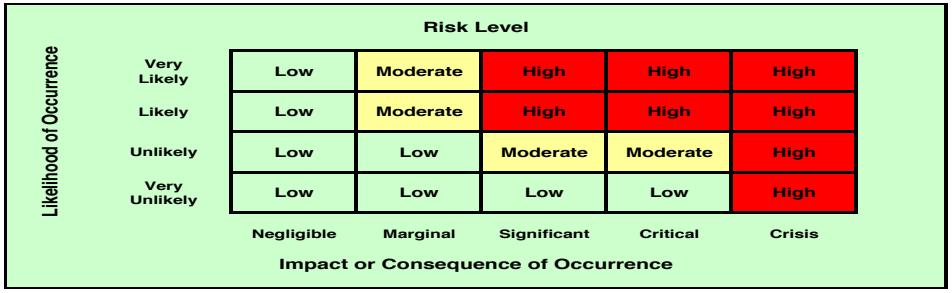
Harris County Flood Control District

Risk No.	Risk Subject	PDT Event Concerns (include all to archive)	PDT Discussions (support the likelihood and impact)	Project Cost				Project Schedule			
				L'Hood	Impact	Overall Risk Level	Cost Impact Prob.	L'Hood	Impact	Overall Risk Level	Sched. Impact Prob.
GENERAL AND ECONOMIC RISKS											
GE-1	Inflation / Escalation	Material pricing may rise as a result of inflation and other market economy factors.	Escalation not allowed under Water Resources and Development Act of 1996 Section 211 language. Can't get reimbursed for escalation. Minor materials that are not affected by escalation. Doesn't affect what gov't pays. Escalation to consider: fuel, equipment prices. In General the economy remains very weak during this election year, and is not expected to show signifigant signs of recovery until late 2013/2014	likely	negligible	Low	10%	very unlikely	negligible	Low	10%
GE-2	Weather Impacts	Given work will be drainage channels and basins, large rain fall events as well as hurricanes and tropical storms may create delays and cost impacts to construction.	The weather impacts or the lack thereo could lengthen or shorten schedule, however not the cost due to the structure of the contract. Weather impacts have been very minimal in the recent years. The WOB would only be affected by a substaintial rainfall that would stress the drainage system. The high water could take 5-7 days to fall to a workable level after an event.	unlikely	negligible	Low	10%	Likely	marginal	Moderate	50%
GE-3	Energy Costs	Fuel costs appear to be on the rise again and may lead to higher bids.	The team discussed that prices will be fixed when the contract is entered into. The team expect that the impact of fuel prices on cost is likely and that it could be significant. Although the team does not expect the extreme price fluctuations that were seen in past years.	likely	marginal	Moderate	30%	unlikely	negligible	Low	10%
Feature Code 01 - LANDS & DAMAGES											
LD-1	Real Estate Acquisition Costs	The real estate market may affect real estate acquisition costs.	The team noted that there is only one none structural buy out (apartment complex) yet to be completed. However if the real estate market did result in a too expensive price the county had the option of dropping the acquisition.	likely	negligible	Low	10%	unlikely	negligible	Low	10%
LD-2	Real Estate Acquisition Costs	Individual land owners may be unwilling to cooperate with acquisition plan.	At the time of this risk analysis most properties have already been acquired. Two parcels at a detention basin remain to be acquired.	unlikely	negligible	Low	10%	unlikely	negligible	Low	10%
Feature Code 02 - RELOCATIONS											
RE-1	Historic Finds	As work progresses archeological finds may be uncovered delaying progress or causing need for redesign	The majority of the channel has already been worked on in the past, so the likelihood of finding any unknown utilities is low.	very unlikely	significant	Low	5%	very unlikely	negligible	Low	5%
RE-2	HTRW (Hazardous Material)	Relocation involved many petroleum pipelines. Surrounding soil may be found to be contaminated resulting in increased costs	In one basin a problem was found, investigation was done and monitoring wells were installed . The contaminated soil will be isolated.	very unlikely	marginal	Low	5%	very unlikely	negligible	Low	5%
RE-3	As Built Construction / Standard Design	As built drawing may differ from actual construction in place creating additional change order and design modifications.	Existing pipeline crossing the channel. As built show pipe is low enough but it's not. Investigation done before bidding so that everything is out of the way.	unlikely	marginal	Low	10%	unlikely	marginal	Low	10%

Risk No.	Risk Subject	PDT Event Concerns (include all to archive)	PDT Discussions (support the likelihood and impact)	Project Cost				Project Schedule			
				L'Hood	Impact	Overall Risk Level	Cost Impact Prob.	L'Hood	Impact	Overall Risk Level	Sched. Impact Prob.
RE-4	Bridge Designs	Bridge Designs assume standard design, which may be influenced by the utility owner.	City of Houston utilities; arranged before bidding	unlikely	negligible	Low	10%	unlikely	negligible	Low	10%
RE-5	Unknown Utilities	Unknown utilities may be discovered causing delay and additional costs.	Good investigations have identified existing utilities.	unlikely	marginal	Low	10%	unlikely	marginal	Low	10%
Feature Code 09 - CANALS and DETENTION PONDS											
CH-01	Historic Finds	As work progresses archeological finds may be uncovered delaying progress or causing need for redesign	The team felt the risk of impact was very unlikely because the majority of areas have already been worked on.	very unlikely	Negligible	Low	5%	very unlikely	marginal	Low	5%
CH-02	HTRW (Hazardous Material)	Construction involves improvement to existing drainage canals. Spoils may contain some degree of HTRW material	The team felt the risk was unlikely based on the previous construction that has been done. As discussed in the relocation section hazardous material was found in one basin. Monitoring wells were installed and some investigation has already been done. The contaminated soil will be isolated	very unlikely	Negligible	Low	5%	very unlikely	negligible	Low	5%
CH-03	Site Access	Site access limitations	The team did not fell access would be an issue for contractors. There is good access to the basins which are bounded by roads, and in the channel the county has enough ROW to allow for contractor access.	very unlikely	Negligible	Low	5%	very unlikely	negligible	Low	5%
CH-04	Damage to Public Roadways	Given large volume of truck traffic, surface streets may become damaged due to volumes and weight.	try to pick a route that won't be damaged; contractor is responsible for fixing any damage caused to roads	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
CH-05	Work Hours / Site Access	Given proximity to residential properties, restrictions on work hours and activities may be required.	restricted to work between 7am-7pm, that is typical. Contractor must get approval to work nights/weekends	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
CH-06	Soil Conditions	Soil conditions and Site conditions may vary from expectations and plans, requiring additional surveys and analysis and potentially higher construction costs.	The team felt this issue had been well vetted and discussed. Soil analyses and surveys have been performed on the majority of the basins and considered in design. Some geotech investigations remain to be done however the team did not expect any problems.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
CH-07	Hauling Costs	Lack of local inexpensive disposal sites for excavated material.	The team noted that the hauling costs represent a signifganct portion of the estimate. The team considered this to be one of the most likely cause of variability in the prices fof fuel. The risk is beleieved to outweight the opportunity as it relates to rising fuel costs.	unlikely	significant	Moderate	20%	likely	marginal	Moderate	20%
CH-08	Channel Construction	Channels may require concrete lining based on flow rates and design criteria?	The team considered this and felt that enough evaluation has be done such that the likelyhood of any changes was low and if changes were done they would be negligible.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%

Risk No.	Risk Subject	PDT Event Concerns (include all to archive)	PDT Discussions (support the likelihood and impact)	Project Cost				Project Schedule			
				L'Hood	Impact	Overall Risk Level	Cost Impact Prob.	L'Hood	Impact	Overall Risk Level	Sched. Impact Prob.
CH-09	Construction Sequencing	Impact that a delay in the start of one element of the overall project could impact other elements.	Each element of the overall project is independent of another and consequently this risk was considered very unlikely.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
CH-10	Poor Performance	Poor Performance by Prime or Sub Contractors which leads to project delays or potential termination for Default or Convenience	Although unlikely, the risk does exists that with multple contracts being run concurretnly, the local market of skilled workers will be reduced and increase a risk for termination. Qualified and capable bidders are known, and depending up the contract mechansim, may be screeended in advance. Risk assumes the impacts of thos associated with Termination for Convenience.	unlikely	moderate	Low	30%	very unlikely	significant	Low	10%
CH-11	Additional Scope	New Work items and scope / Modifications	New items which have not been captured by the cost estimate or known at the time of estimating such as modifcations, appear to be likley. Typically a project of this nature runs 3-5% cost growth due to modification. Additioally, potential for missed scope is considered to be likley given the lenght of the design process, the reliance on information from others, and the continue changes to standrd specifications, and work items along the way.	likely	Marginal	Moderate	50%	likely	marginal	Moderate	50%
CH-12	Disposal Costs	Local inexpensive disposal sites are found by contractors.	As discussed in CH-07 risk there is an equal chance of this issue being a risk or an opportunity. The team considered that some contractors may actually be able to sell the material and reduce the cost of disposal significantly. (May 2012) Current MCACES estimate assumes that material will be disposed in landfill with no tipping fee. Cost per CY for spread and palcement, stands at $0.62. Therefor this is considered to be a Risk moreso than opportuntiy at this time.	likely	significant	High	80%	likely	neglibile	Low	20%
	OPPORTUNITIES										
OP-3	Disposal Costs	Local inexpensive disposal sites are found by contractors.	As discussed in CH-07 risk there is an equal chance of this issue being a risk or an opportunity. The team considered that some contractors may actually be able to sell the material and reduce the cost of disposal significantly. (May 2012) Current MCACES estimate assumes that material will be disposed in landfill with no tipping fee. Cost per CY for spread and palcement, stands at $0.62. Therefor this is considered to be a Risk moreso than opportuntiy at this time.	likely	significant	High	80%	likely	neglibile	Low	20%
Feature Code 14 - RECREATION											
REC-01	Standard Design Assumptions	A standard design assumption has been made for estimating. Component features design may be influenced by local groups and design may deviate.	The team considered that it may see deviation in costs due to assumptions made. It also consided that the trails are wide enough for both hike & bike and likely wouldn't need to be redesigned.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
REC-02	Design Growth / Scope Change	Local groups and communities influence may impact the assumed design and cause scope creep.	The team noted that this mostly a budgeted item whereby the county has significant control of the costs of how much the county spends on the recreation features.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
	OPPORTUNITIES										
OP-4	Construction Sequencing	Sequencing the construction of recreation features with the channel and pond construction activities may allow for time savings and potential construction costs savings.	The team considered that the recreation features, depending on sponsor support, could be built concurrently with the detention ponds and channel work. This might result in a cost savings provided the work is done by the same contractor doing the channel or detention work.	likely	negligible	Low	10%	likely	negligible	Low	10%
OP-5	Removal of Recreation Components	Lack of local sponsor participation	If a local sponsor does not come forward to participate in the costs than the work may not be done.	likely	negligible	Low	10%	likely	negligible	Low	10%

Risk No.	Risk Subject	PDT Event Concerns (include all to archive)	PDT Discussions (support the likelihood and impact)	Project Cost				Project Schedule			
				L'Hood	Impact	Overall Risk Level	Cost Impact Prob.	L'Hood	Impact	Overall Risk Level	Sched. Impact Prob.
PROJECT & PROGRAM MGMT (Feature Codes 30 Planning, Engineering & Design and 31 Construction Management)											
PPM-1	Contracting Plan	Contracting Plan may not be fully developed for the projects. Some uncertainty of the constructed / non constructed reached remain.	Low risk of creating a problem. Over the last 10 years the county has exceeded $5 B in construction costs	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
PPM-2	Standard Design	Standard Design Plans have been utilized in cost estimate, based on early information. Design may not capture the actual requirements of the projects. Design is considered to be low level at this time.	Team members understood that there were construction plans completed for some of the remaining components to be constructed and that the standard design is more than adequate.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
PPM-3	Rights of Entry	ROE may be held up or delayed due to unknown circumstances and situations.	It was noted that there is only one component where this is an issue and that the HCFCD has the legal authority to go on any land if not impacting property.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
PPM-4	Construction Sequencing	Construction sequencing assumes work in stages along the canal. An issue within one reach may delay additional reaches or cause unknown costs for a work around.	Based on the remaining work to be done the risk of a the construction sequencing being a problem is low. Work is to be done is phases. Detention first, then channel, then recreation. Delay of detention work would not affect project cost.	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
PPM-5	Program Management Resources	Program Management and Construction Management Resources may be in high demand with local agencies and may not availability to push project for completion.	This is a Level 1 priority project. Low risk of impact	very unlikely	negligible	Low	5%	very unlikely	negligible	Low	5%
PPM-6	Construction Management	Variation in construction management costs	The team expects the costs to range between 5 and 10%, with the most likely cost being about 7%.	likely	negligible	Low	10%	very unlikely	negligible	Low	5%
PPM-7	Wetlands Impact	Project location may impact wetlands areas requiring additional mitigation efforts and costs	Wetland mitigation costs are included in the current cost estimate. The team does not expect to incur any other mitigation costs. It was noted that they have not been able to do a field investigation on 2 areas (3rd cell of GBW E510 and 3rd cell of FMH) not owned. Mitigation cost is minor compared to project cost	likely	negligible	Low	10%	very unlikely	negligible	Low	5%
	OPPORTUNITIES										
OP-1	Bidding Climate	With many contractors searching for work nationally, large scale contractors may be attracted from outside the local market, creating a more competitive bidding market. However, some markets in Texas are beginning to show inflation that could impact bids on the project, making this both an opportunity and a threat.	High likelihood of favorable prices if construction begins in the near future. However, some cost trends in Texas are showing cost inflation. Thus, a threat has also been considered at the high end of the range.	very likely	significant	High	50%	likely	negligible	Low	20%



Likelihood is measured as likelihood of impacting cost or schedule.

Impact is a measure of the event's effect on project objectives with relation to scope, cost, and/or schedule -- **Negligible**, **Marginal**, **Significant**, **Critical**, or **Crisis.** Impacts on Project Cost may vary in severity from impacts on Project Schedule.

Risk Level is the resultant of Likelihood and Impact **Low**, **Moderate**, or **High**. Refer to the matrix located at top of page.

APPENDIX D – INPUT PROBABILITY ASSUMPTIONS 0403

Crystal Ball Report - Assumptions
Simulation started on 8/10/2013 at 9:14 AM
Simulation stopped on 8/10/2013 at 9:14 AM

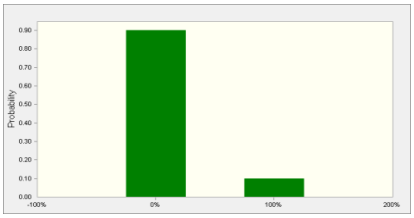
Run preferences:	
Number of trials run	10,000
Monte Carlo	
Random seed	
Precision control on	
Confidence level	95.00%
Run statistics:	
Total running time (sec)	49.26
Trials/second (average)	203
Random numbers per sec	25,780
Crystal Ball data:	
Assumptions	127
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	2

Assumptions

Worksheet: [Aug2013_WhiteOak_Risk_Register_Rev7_Update_Revised.xls]WOB Risk Register

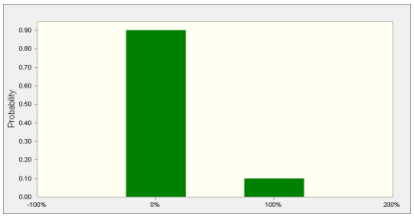
Assumption: **Cell: N10**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N10)



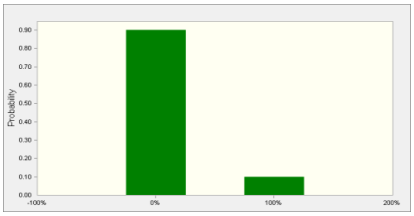
Assumption: **Cell: N12**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N12)



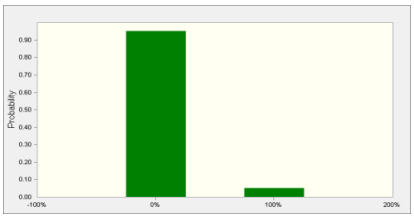
Assumption: **Cell: N13**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N13)



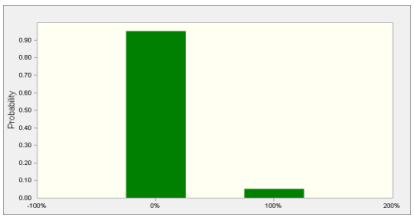
Assumption: **Cell: N15**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N15)



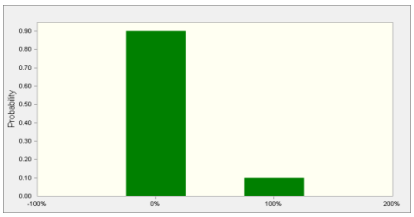
Assumption: **Cell: N16**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N16)



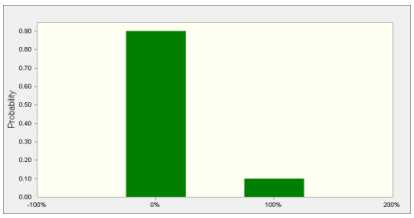
Assumption: **Cell: N17**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N17)



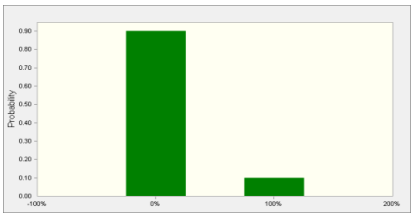
Assumption: **Cell: N18**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N18)



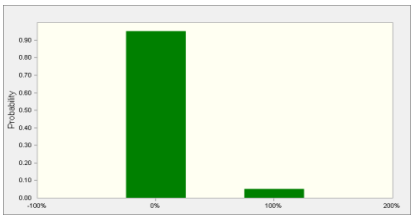
Assumption: **Cell: N19**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N19)



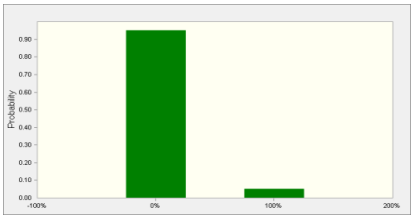
Assumption: **Cell: N21**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N21)



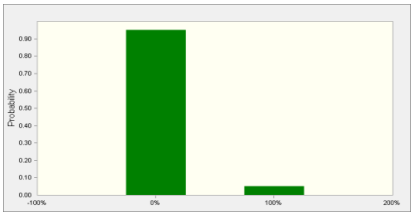
Assumption: **Cell: N22**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N22)



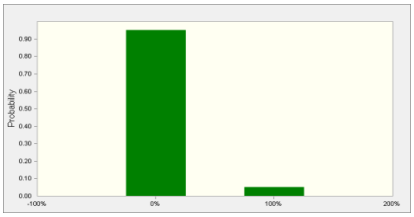
Assumption: **Cell: N23**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N23)



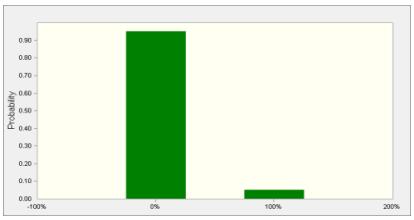
Assumption: **Cell: N24**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N24)



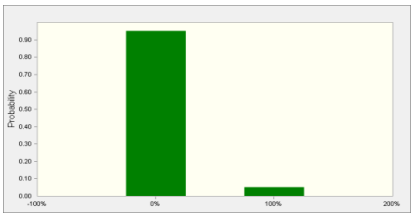
Assumption: **Cell: N25**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N25)



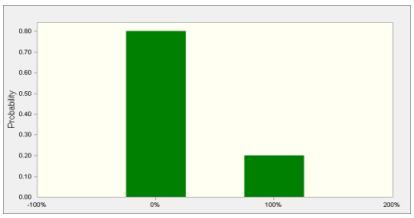
Assumption: **Cell: N26**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N26)



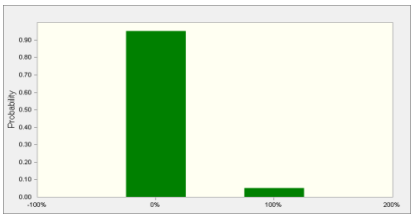
Assumption: **Cell: N27**

Yes-No distribution with parameters:
Probability of Yes(1) 0.2 (=N27)



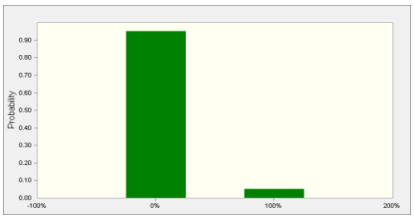
Assumption: **Cell: N28**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N28)



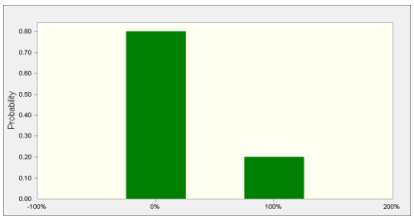
Assumption: **Cell: N29**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N29)



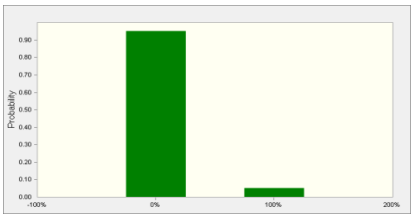
Assumption: **Cell: N34**

Yes-No distribution with parameters:
Probability of Yes(1) 0.2 (=N34)



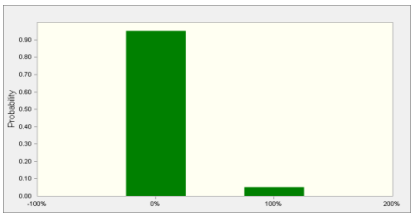
Assumption: **Cell: N36**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N36)



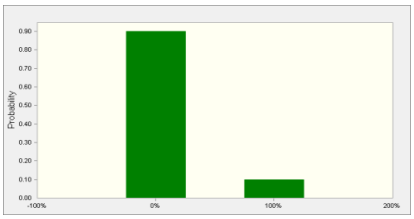
Assumption: **Cell: N37**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N37)



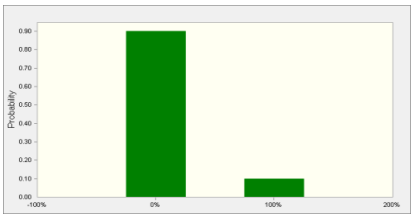
Assumption: **Cell: N39**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N39)



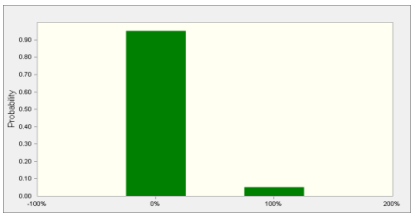
Assumption: **Cell: N40**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N40)



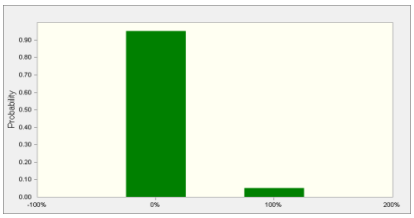
Assumption: **Cell: N42**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N42)



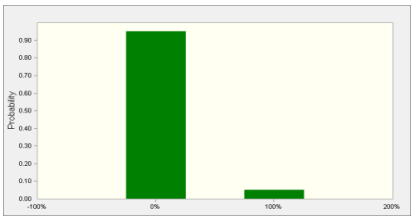
Assumption: **Cell: N43**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N43)



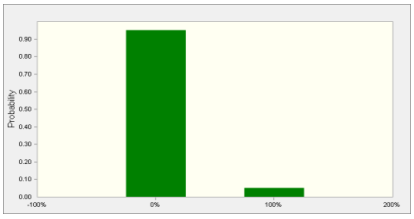
Assumption: **Cell: N44**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N44)



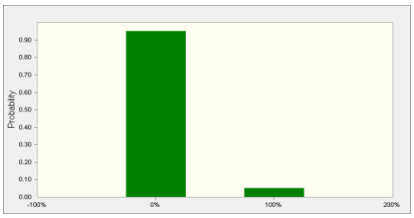
Assumption: **Cell: N45**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N45)



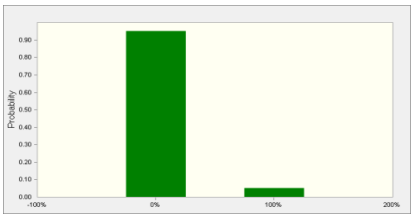
Assumption: **Cell: N46**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N46)



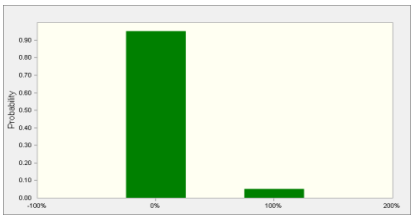
Assumption: **Cell: N47**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N47)



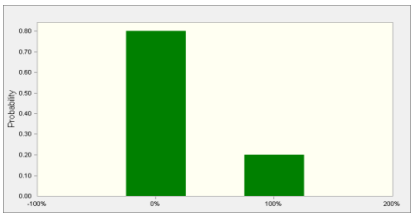
Assumption: **Cell: N48**

Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=N48)



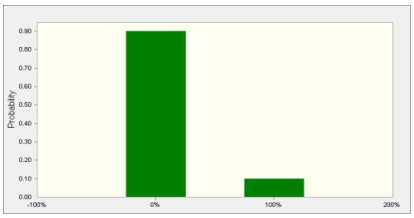
Assumption: **Cell: N50**

Yes-No distribution with parameters:
Probability of Yes(1) 0.2 (=N50)



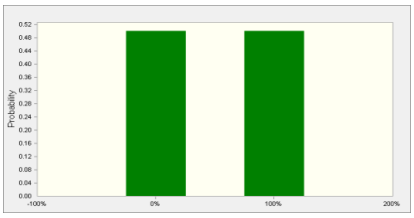
Assumption: **Cell: N8**

Yes-No distribution with parameters:
Probability of Yes(1) 0.1 (=N8)



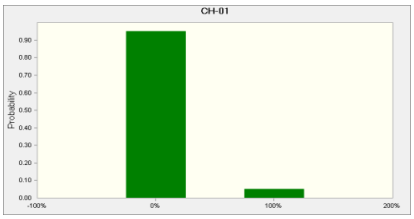
Assumption: **Cell: N9**

Yes-No distribution with parameters:
Probability of Yes(1) 0.5 (=N9)



Assumption: CH-01 **Cell: J21**

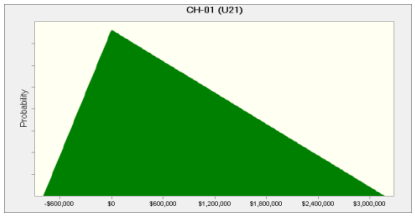
Yes-No distribution with parameters:
Probability of Yes(1) 0.05 (=J21)



Assumption: CH-01 (U21) **Cell: U21**

Triangular distribution with parameters:

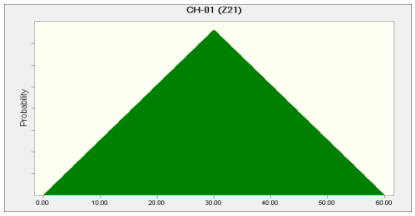
Minimum	-$792,651	(=Q21)
Likeliest	$0	(=R21)
Maximum	$3,170,603	(=S21)



Assumption: CH-01 (Z21) **Cell: Z21**

Triangular distribution with parameters:

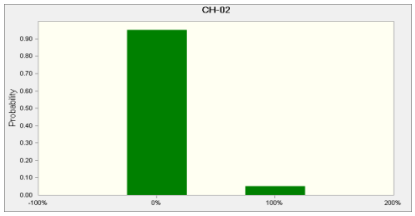
Minimum	0.00	(=W21)
Likeliest	30.00	(=X21)
Maximum	60.00	(=Y21)



Assumption: CH-02 **Cell: J22**

Yes-No distribution with parameters:

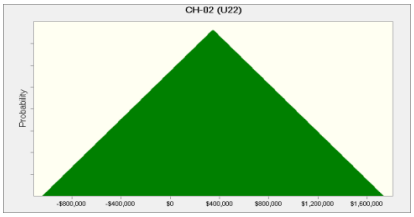
Probability of Yes(1)	0.05	(=J22)



Assumption: CH-02 (U22) **Cell: U22**

Triangular distribution with parameters:

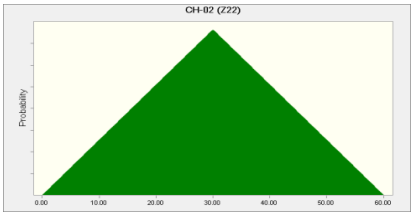
Minimum	-$1,039,427	(=Q22)
Likeliest	$346,476	(=R22)
Maximum	$1,732,379	(=S22)



Assumption: CH-02 (Z22) **Cell: Z22**

Triangular distribution with parameters:

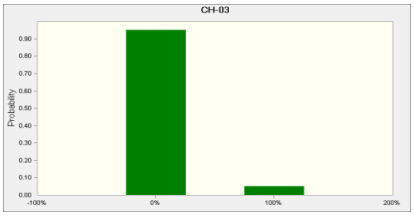
Minimum	0.00	(=W22)
Likeliest	30.00	(=X22)
Maximum	60.00	(=Y22)



Assumption: CH-03 **Cell: J23**

Yes-No distribution with parameters:

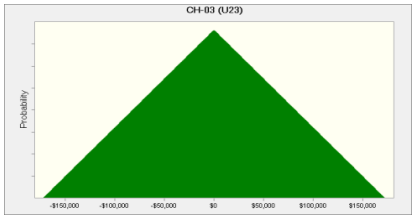
Probability of Yes(1)	0.05	(=J23)



Assumption: CH-03 (U23) **Cell: U23**

Triangular distribution with parameters:

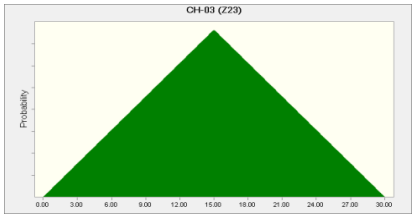
Minimum	-$171,946	(=Q23)
Likeliest	$0	(=R23)
Maximum	$171,946	(=S23)



Assumption: CH-03 (Z23) **Cell: Z23**

Triangular distribution with parameters:

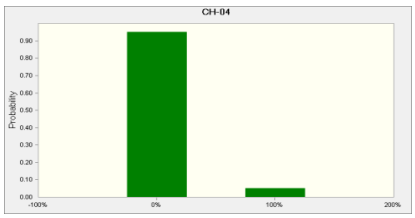
Minimum	0.00	(=W23)
Likeliest	15.00	(=X23)
Maximum	30.00	(=Y23)



Assumption: CH-04 **Cell: J24**

Yes-No distribution with parameters:

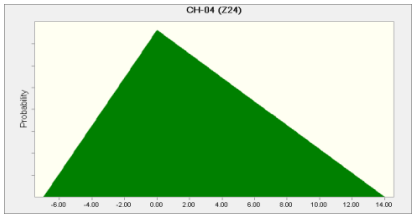
Probability of Yes(1)	0.05	(=J24)



Assumption: CH-04 (Z24) **Cell: Z24**

Triangular distribution with parameters:

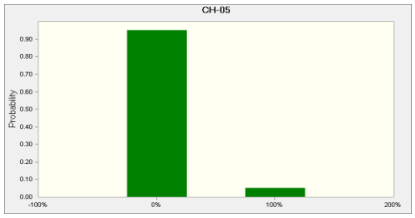
Minimum	-7.00	(=W24)
Likeliest	0.00	(=X24)
Maximum	14.00	(=Y24)



Assumption: CH-05 **Cell: J25**

Yes-No distribution with parameters:

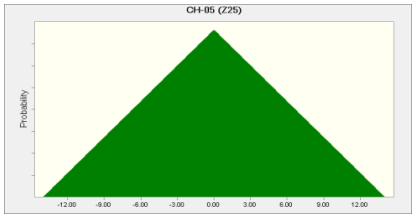
Probability of Yes(1)	0.05	(=J25)



Assumption: CH-05 (Z25) **Cell: Z25**

Triangular distribution with parameters:

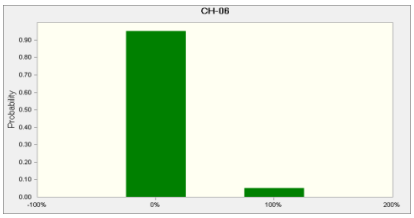
Minimum	-14.00	(=W25)
Likeliest	0.00	(=X25)
Maximum	14.00	(=Y25)



Assumption: CH-06 **Cell: J26**

Yes-No distribution with parameters:

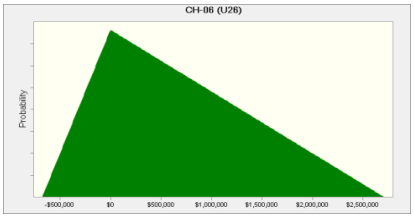
Probability of Yes(1)	0.05	(=J26)



Assumption: CH-06 (U26) **Cell: U26**

Triangular distribution with parameters:

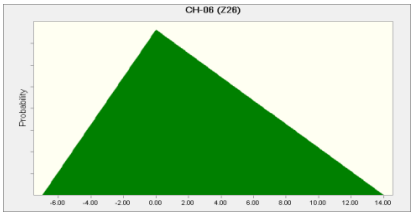
Minimum	-$675,839	(=Q26)
Likeliest	$0	(=R26)
Maximum	$2,703,354	(=S26)



Assumption: CH-06 (Z26) **Cell: Z26**

Triangular distribution with parameters:

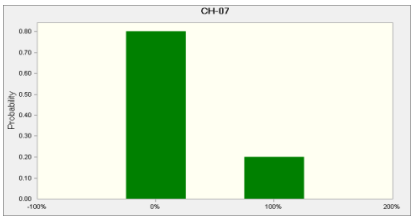
Minimum	-7.00	(=W26)
Likeliest	0.00	(=X26)
Maximum	14.00	(=Y26)



Assumption: CH-07 **Cell: J27**

Yes-No distribution with parameters:

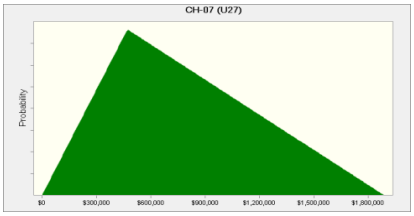
Probability of Yes(1)	0.2	(=J27)



Assumption: CH-07 (U27) **Cell: U27**

Triangular distribution with parameters:

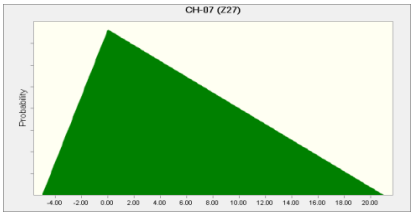
Minimum	$0	(=Q27)
Likeliest	$471,072	(=R27)
Maximum	$1,884,288	(=S27)



Assumption: CH-07 (Z27) **Cell: Z27**

Triangular distribution with parameters:

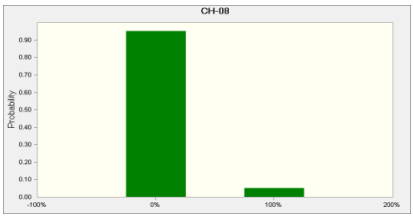
Minimum	-5.00	(=W27)
Likeliest	0.00	(=X27)
Maximum	21.00	(=Y27)



Assumption: CH-08 **Cell: J28**

Yes-No distribution with parameters:

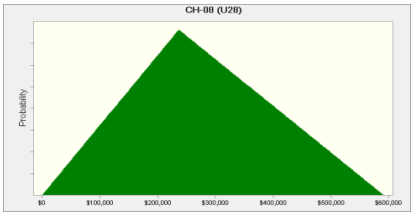
Probability of Yes(1)	0.05	(=J28)



Assumption: CH-08 (U28) **Cell: U28**

Triangular distribution with parameters:

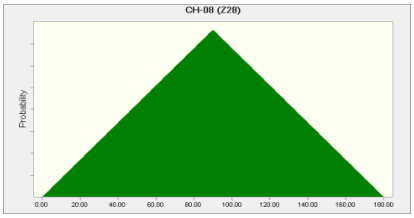
Minimum	$0	(=Q28)
Likeliest	$236,510	(=R28)
Maximum	$591,276	(=S28)



Assumption: CH-08 (Z28) **Cell: Z28**

Triangular distribution with parameters:

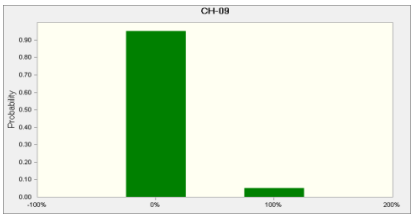
Minimum	0.00	(=W28)
Likeliest	90.00	(=X28)
Maximum	180.00	(=Y28)



Assumption: CH-09 **Cell: J29**

Yes-No distribution with parameters:

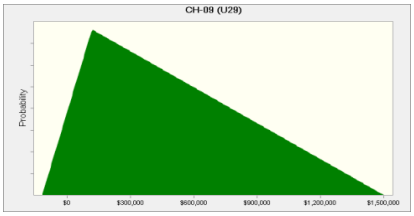
Probability of Yes(1)	0.05	(=J29)



Assumption: CH-09 (U29) **Cell: U29**

Triangular distribution with parameters:

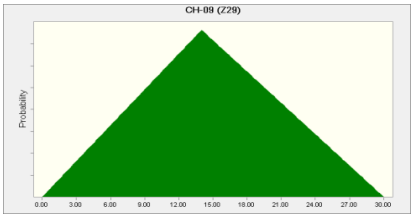
Minimum	-$118,255	(=Q29)
Likeliest	$118,255	(=R29)
Maximum	$1,500,000	(=S29)



Assumption: CH-09 (Z29) **Cell: Z29**

Triangular distribution with parameters:

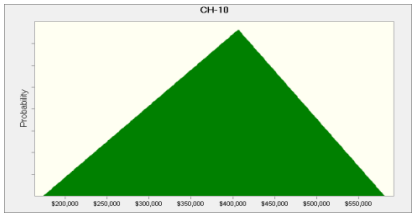
Minimum	0.00	(=W29)
Likeliest	14.00	(=X29)
Maximum	30.00	(=Y29)



Assumption: CH-10 **Cell: U30**

Triangular distribution with parameters:

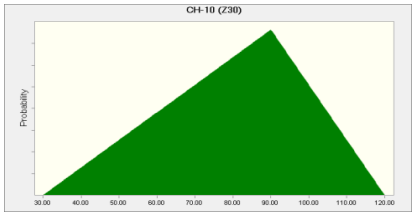
Minimum	$174,224	(=Q30)
Likeliest	$406,522	(=R30)
Maximum	$580,745	(=S30)



Assumption: CH-10 (Z30) **Cell: Z30**

Triangular distribution with parameters:

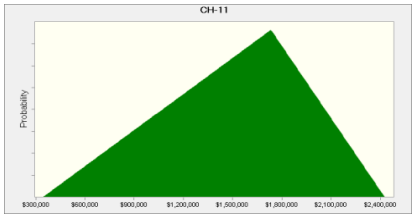
Minimum	30.00	(=W30)
Likeliest	90.00	(=X30)
Maximum	120.00	(=Y30)



Assumption: CH-11 **Cell: U31**

Triangular distribution with parameters:

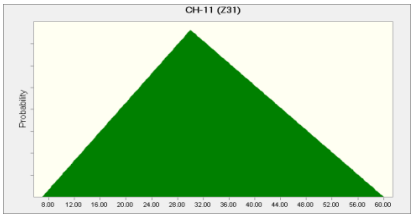
Minimum	$346,476	(=Q31)
Likeliest	$1,732,379	(=R31)
Maximum	$2,425,330	(=S31)



Assumption: CH-11 (Z31) **Cell: Z31**

Triangular distribution with parameters:

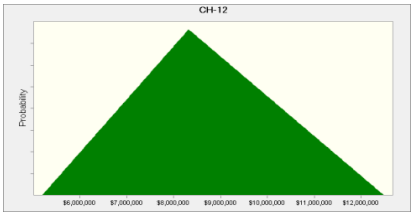
Minimum	7.00	(=W31)
Likeliest	30.00	(=X31)
Maximum	60.00	(=Y31)



Assumption: CH-12 **Cell: U32**

Triangular distribution with parameters:

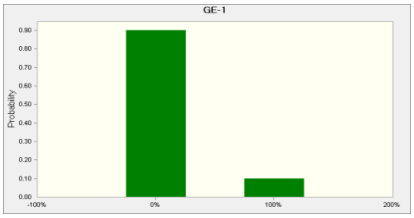
Minimum	$5,199,953	(=Q32)
Likeliest	$8,319,924	(=R32)
Maximum	$12,479,826	(=S32)



Assumption: GE-1 **Cell: J8**

Yes-No distribution with parameters:

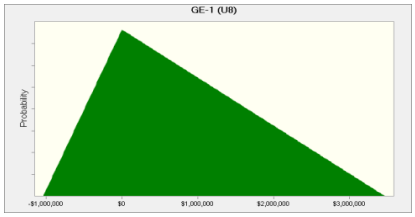
Probability of Yes(1)	0.1	(=J8)



Assumption: GE-1 (U8) **Cell: U8**

Triangular distribution with parameters:

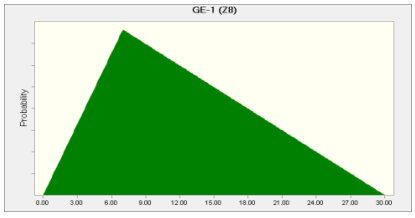
Minimum	-$1,039,427	(=Q8)
Likeliest	$0	(=R8)
Maximum	$3,464,758	(=S8)



Assumption: GE-1 (Z8) **Cell: Z8**

Triangular distribution with parameters:

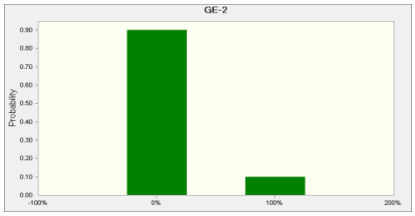
Minimum	0.00	(=W8)
Likeliest	7.00	(=X8)
Maximum	30.00	(=Y8)



Assumption: GE-2 **Cell: J9**

Yes-No distribution with parameters:

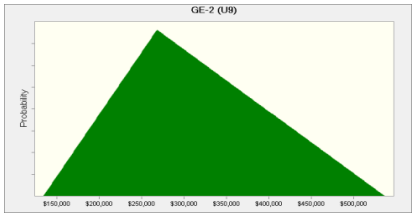
Probability of Yes(1)	0.1	(=J9)



Assumption: GE-2 (U9) **Cell: U9**

Triangular distribution with parameters:

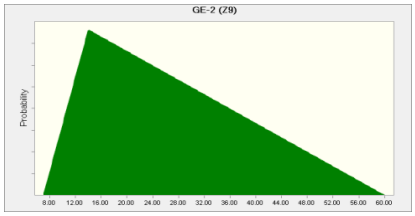
Minimum	$134,099	(=Q9)
Likeliest	$268,198	(=R9)
Maximum	$536,396	(=S9)



Assumption: GE-2 (Z9) **Cell: Z9**

Triangular distribution with parameters:

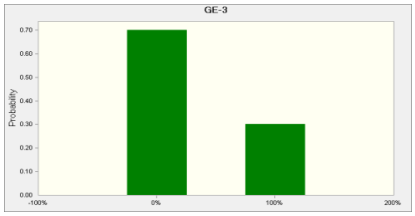
Minimum	7.00	(=W9)
Likeliest	14.00	(=X9)
Maximum	60.00	(=Y9)



Assumption: GE-3 **Cell: J10**

Yes-No distribution with parameters:

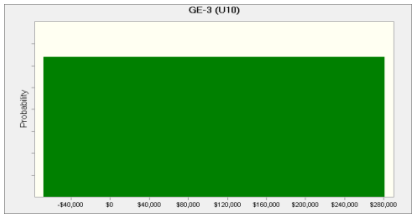
Probability of Yes(1)	0.3	(=J10)



Assumption: GE-3 (U10) **Cell: U10**

Uniform distribution with parameters:

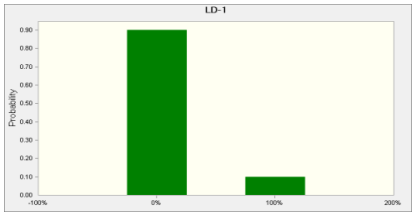
Minimum	-$68,411	(=Q10)
Maximum	$280,874	(=S10)



Assumption: LD-1 **Cell: J12**

Yes-No distribution with parameters:

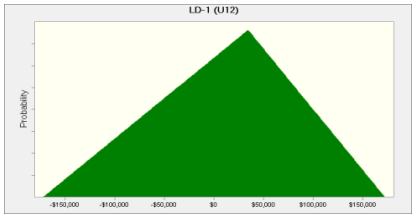
Probability of Yes(1)	0.1	(=J12)



Assumption: LD-1 (U12) **Cell: U12**

Triangular distribution with parameters:

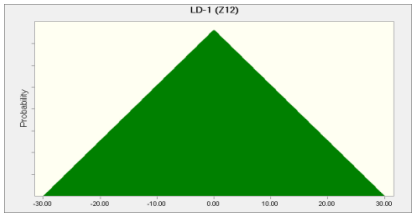
Minimum	-$171,946	(=Q12)
Likeliest	$34,389	(=R12)
Maximum	$171,946	(=S12)



Assumption: LD-1 (Z12) **Cell: Z12**

Triangular distribution with parameters:

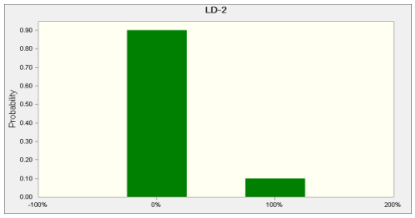
Minimum	-30.00	(=W12)
Likeliest	0.00	(=X12)
Maximum	30.00	(=Y12)



Assumption: LD-2 **Cell: J13**

Yes-No distribution with parameters:

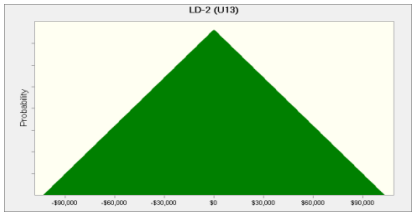
Probability of Yes(1)	0.1	(=J13)



Assumption: LD-2 (U13) **Cell: U13**

Triangular distribution with parameters:

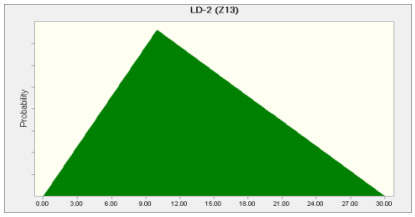
Minimum	-$103,168	(=Q13)
Likeliest	$0	(=R13)
Maximum	$103,168	(=S13)



Assumption: LD-2 (Z13) **Cell: Z13**

Triangular distribution with parameters:

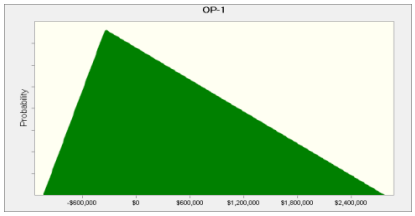
Minimum	0.00	(=W13)
Likeliest	10.00	(=X13)
Maximum	30.00	(=Y13)



Assumption: OP-1 **Cell: U50**

Triangular distribution with parameters:

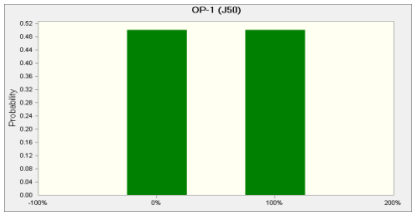
Minimum	-$1,039,427	(=Q50)
Likeliest	-$346,476	(=R50)
Maximum	$2,771,806	(=S50)



Assumption: OP-1 (J50) **Cell: J50**

Yes-No distribution with parameters:

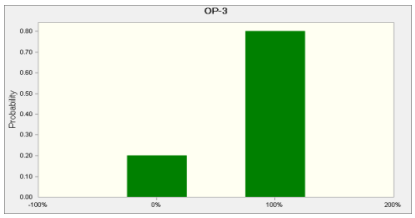
Probability of Yes(1)	0.5	(=J50)



Assumption: OP-3 **Cell: J34**

Yes-No distribution with parameters:

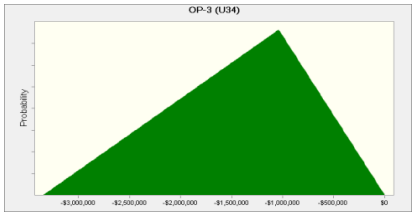
Probability of Yes(1)	0.8	(=J34)



Assumption: OP-3 (U34) **Cell: U34**

Triangular distribution with parameters:

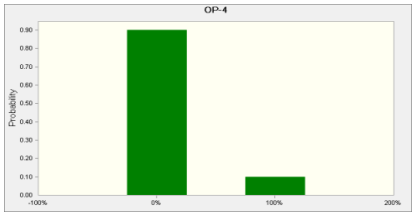
Minimum	-$3,346,635	(=S34)
Likeliest	-$1,038,654	(=R34)
Maximum	$0	(=Q34)



Assumption: OP-4 **Cell: J39**

Yes-No distribution with parameters:

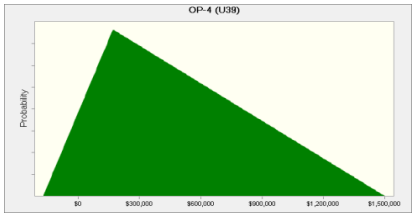
Probability of Yes(1)	0.1	(=J39)



Assumption: OP-4 (U39) **Cell: U39**

Triangular distribution with parameters:

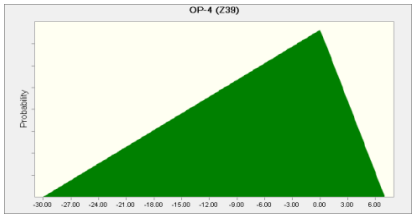
Minimum	-$170,848	(=Q39)
Likeliest	$170,848	(=R39)
Maximum	$1,500,000	(=S39)



Assumption: OP-4 (Z39) **Cell: Z39**

Triangular distribution with parameters:

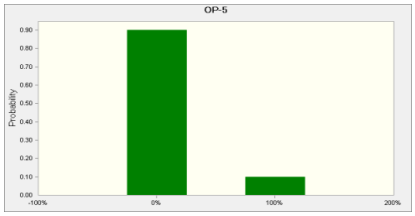
Minimum	-30.00	(=W39)
Likeliest	0.00	(=X39)
Maximum	7.00	(=Y39)



Assumption: OP-5 **Cell: J40**

Yes-No distribution with parameters:

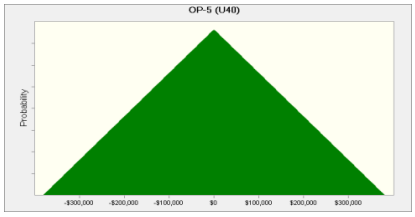
Probability of Yes(1)	0.1	(=J40)



Assumption: OP-5 (U40) **Cell: U40**

Triangular distribution with parameters:

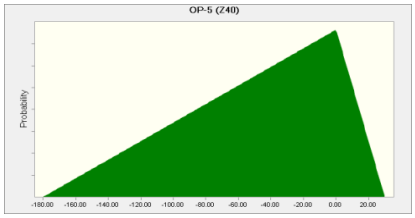
Minimum	-$380,702	(=Q40)
Likeliest	$0	(=R40)
Maximum	$380,702	(=S40)



Assumption: OP-5 (Z40) **Cell: Z40**

Triangular distribution with parameters:

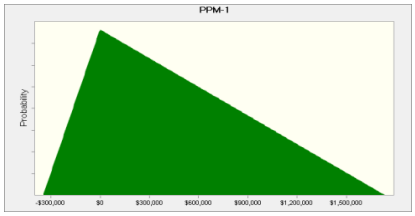
Minimum	-180.00	(=W40)
Likeliest	0.00	(=X40)
Maximum	30.00	(=Y40)



Assumption: PPM-1 **Cell: U42**

Triangular distribution with parameters:

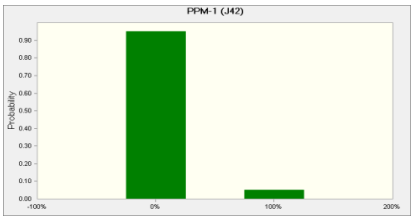
Minimum	-$346,476	(=Q42)
Likeliest	$0	(=R42)
Maximum	$1,732,379	(=S42)



Assumption: PPM-1 (J42) **Cell: J42**

Yes-No distribution with parameters:

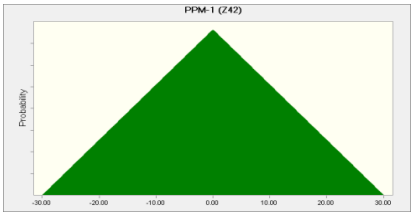
Probability of Yes(1)	0.05	(=J42)



Assumption: PPM-1 (Z42) **Cell: Z42**

Triangular distribution with parameters:

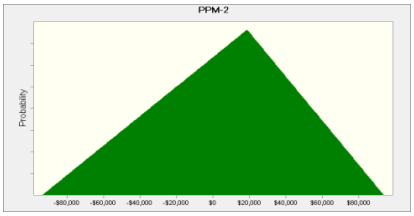
Minimum	-30.00	(=W42)
Likeliest	0.00	(=X42)
Maximum	30.00	(=Y42)



Assumption: PPM-2 **Cell: U43**

Triangular distribution with parameters:

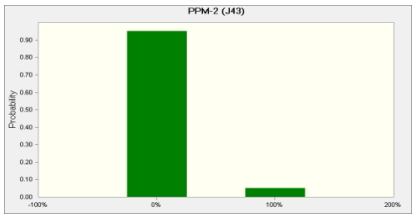
Minimum	-$93,600	(=Q43)
Likeliest	$18,720	(=R43)
Maximum	$93,600	(=S43)



Assumption: PPM-2 (J43) **Cell: J43**

Yes-No distribution with parameters:

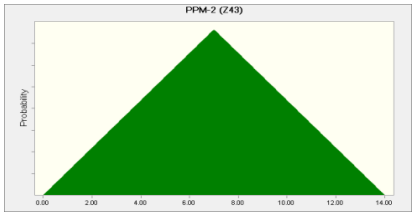
Probability of Yes(1)	0.05	(=J43)



Assumption: PPM-2 (Z43) **Cell: Z43**

Triangular distribution with parameters:

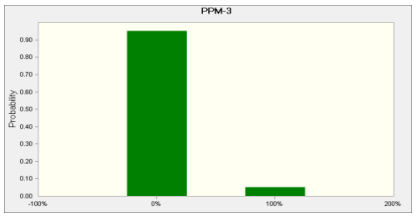
Minimum	0.00	(=W43)
Likeliest	7.00	(=X43)
Maximum	14.00	(=Y43)



Assumption: PPM-3 **Cell: J44**

Yes-No distribution with parameters:

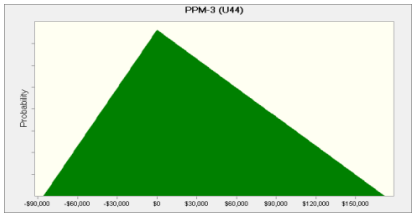
Probability of Yes(1)	0.05	(=J44)



Assumption: PPM-3 (U44) **Cell: U44**

Triangular distribution with parameters:

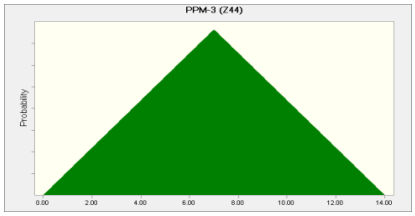
Minimum	-$85,973	(=Q44)
Likeliest	$0	(=R44)
Maximum	$171,946	(=S44)



Assumption: PPM-3 (Z44) **Cell: Z44**

Triangular distribution with parameters:

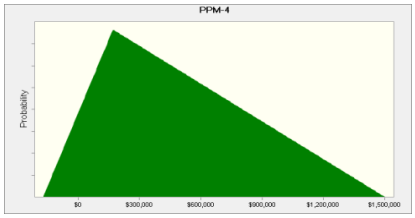
Minimum	0.00	(=W44)
Likeliest	7.00	(=X44)
Maximum	14.00	(=Y44)



Assumption: PPM-4 **Cell: U45**

Triangular distribution with parameters:

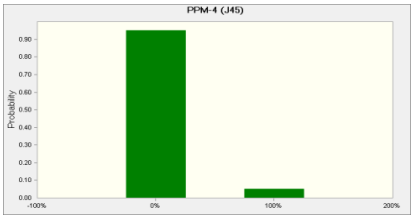
Minimum	-$170,848	(=Q45)
Likeliest	$170,848	(=R45)
Maximum	$1,500,000	(=S45)



Assumption: PPM-4 (J45) **Cell: J45**

Yes-No distribution with parameters:

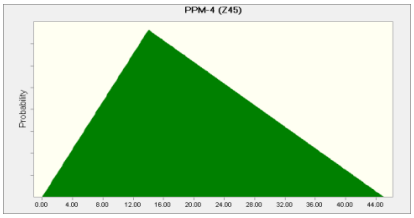
Probability of Yes(1)	0.05	(=J45)



Assumption: PPM-4 (Z45) **Cell: Z45**

Triangular distribution with parameters:

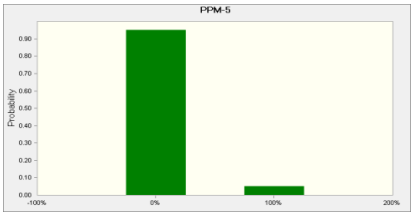
Minimum	0.00	(=W45)
Likeliest	14.00	(=X45)
Maximum	45.00	(=Y45)



Assumption: PPM-5 **Cell: J46**

Yes-No distribution with parameters:

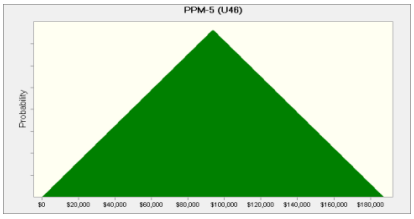
Probability of Yes(1)	0.05	(=J46)



Assumption: PPM-5 (U46) **Cell: U46**

Triangular distribution with parameters:

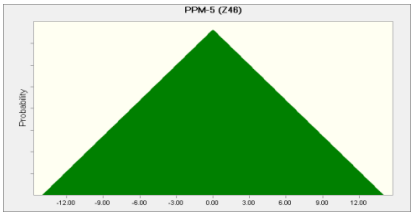
Minimum	$0	(=Q46)
Likeliest	$93,630	(=R46)
Maximum	$187,260	(=S46)



Assumption: PPM-5 (Z46) **Cell: Z46**

Triangular distribution with parameters:

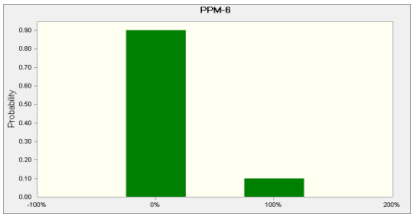
Minimum	-14.00	(=W46)
Likeliest	0.00	(=X46)
Maximum	14.00	(=Y46)



Assumption: PPM-6 **Cell: J47**

Yes-No distribution with parameters:

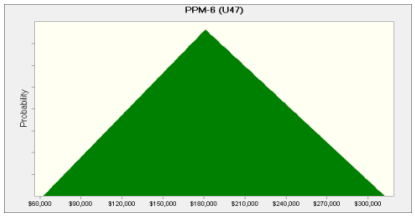
Probability of Yes(1)	0.1	(=J47)



Assumption: PPM-6 (U47) **Cell: U47**

Triangular distribution with parameters:

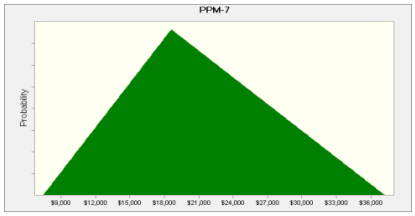
Minimum	$62,420	(=Q47)
Likeliest	$181,018	(=R47)
Maximum	$312,100	(=S47)



Assumption: PPM-7 **Cell: U48**

Triangular distribution with parameters:

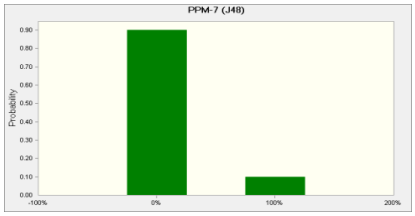
Minimum	$7,440	(=Q48)
Likeliest	$18,600	(=R48)
Maximum	$37,200	(=S48)



Assumption: PPM-7 (J48) **Cell: J48**

Yes-No distribution with parameters:

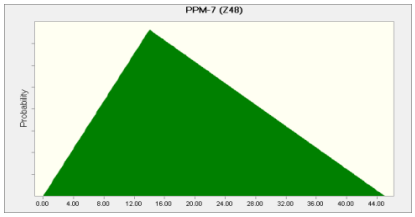
Probability of Yes(1)	0.1	(=J48)



Assumption: PPM-7 (Z48) **Cell: Z48**

Triangular distribution with parameters:

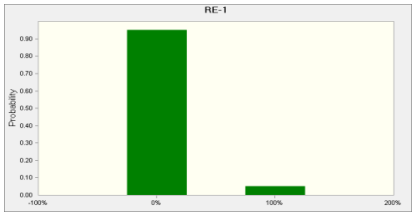
Minimum	0.00	(=W48)
Likeliest	14.00	(=X48)
Maximum	45.00	(=Y48)



Assumption: RE-1 **Cell: J15**

Yes-No distribution with parameters:

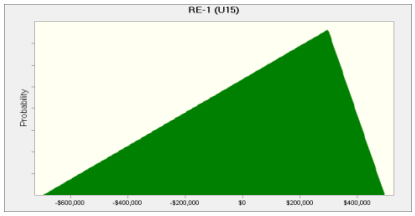
Probability of Yes(1)	0.05	(=J15)



Assumption: RE-1 (U15) **Cell: U15**

Triangular distribution with parameters:

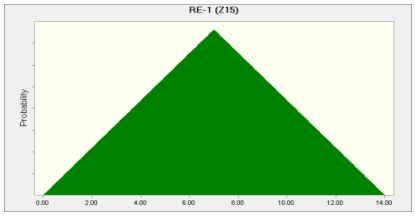
Minimum	-$694,330	(=Q15)
Likeliest	$297,300	(=R15)
Maximum	$495,500	(=S15)



Assumption: RE-1 (Z15) **Cell: Z15**

Triangular distribution with parameters:

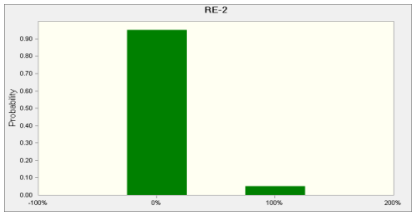
Minimum	0.00	(=W15)
Likeliest	7.00	(=X15)
Maximum	14.00	(=Y15)



Assumption: RE-2 **Cell: J16**

Yes-No distribution with parameters:

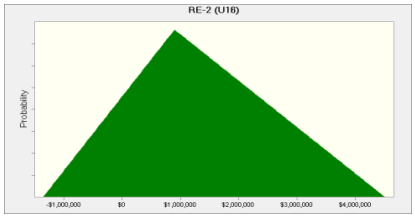
Probability of Yes(1)	0.05	(=J16)



Assumption: RE-2 (U16) **Cell: U16**

Triangular distribution with parameters:

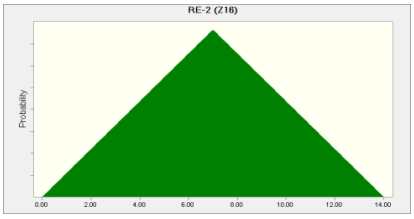
Minimum	-$1,351,020	(=Q16)
Likeliest	$900,680	(=R16)
Maximum	$4,503,400	(=S16)



Assumption: RE-2 (Z16) **Cell: Z16**

Triangular distribution with parameters:

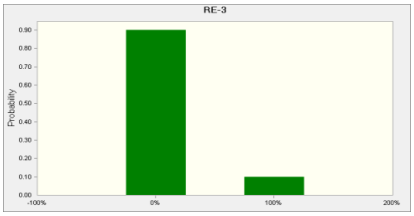
Minimum	0.00	(=W16)
Likeliest	7.00	(=X16)
Maximum	14.00	(=Y16)



Assumption: RE-3 **Cell: J17**

Yes-No distribution with parameters:

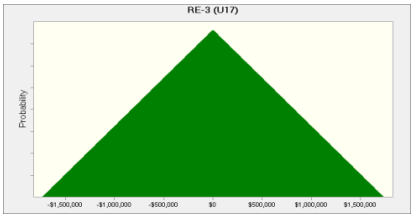
Probability of Yes(1)	0.1	(=J17)



Assumption: RE-3 (U17) **Cell: U17**

Triangular distribution with parameters:

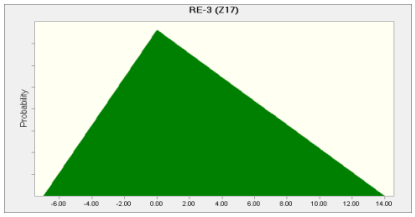
Minimum	-$1,732,379	(=Q17)
Likeliest	$0	(=R17)
Maximum	$1,732,379	(=S17)



Assumption: RE-3 (Z17) **Cell: Z17**

Triangular distribution with parameters:

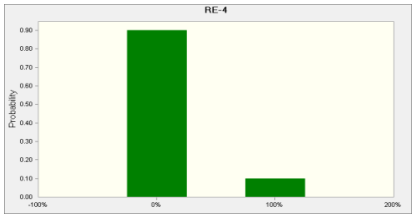
Minimum	-7.00	(=W17)
Likeliest	0.00	(=X17)
Maximum	14.00	(=Y17)



Assumption: RE-4 **Cell: J18**

Yes-No distribution with parameters:

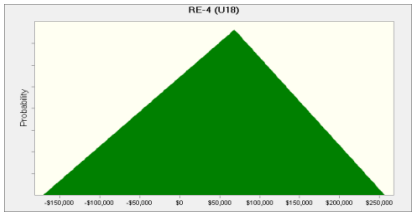
Probability of Yes(1)	0.1	(=J18)



Assumption: RE-4 (U18) **Cell: U18**

Triangular distribution with parameters:

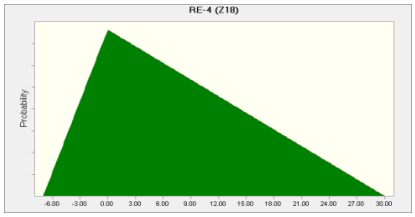
Minimum	-$171,000	(=Q18)
Likeliest	$68,400	(=R18)
Maximum	$256,500	(=S18)



Assumption: RE-4 (Z18) **Cell: Z18**

Triangular distribution with parameters:

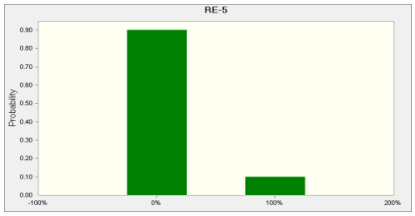
Minimum	-7.00	(=W18)
Likeliest	0.00	(=X18)
Maximum	30.00	(=Y18)



Assumption: RE-5 **Cell: J19**

Yes-No distribution with parameters:

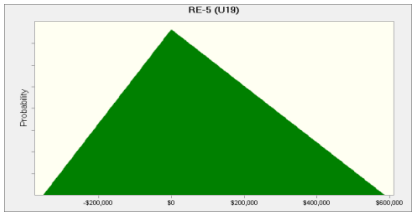
Probability of Yes(1)	0.1	(=J19)



Assumption: RE-5 (U19) **Cell: U19**

Triangular distribution with parameters:

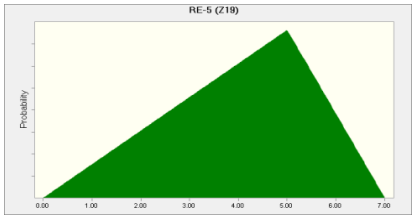
Minimum	-$351,478	(=Q19)
Likeliest	$0	(=R19)
Maximum	$585,797	(=S19)



Assumption: RE-5 (Z19) **Cell: Z19**

Triangular distribution with parameters:

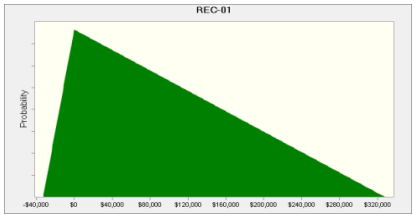
Minimum	0.00	(=W19)
Likeliest	5.00	(=X19)
Maximum	7.00	(=Y19)



Assumption: REC-01 **Cell: U36**

Triangular distribution with parameters:

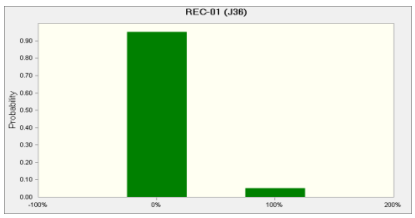
Minimum	-$32,750	(=Q36)
Likeliest	$0	(=R36)
Maximum	$327,500	(=S36)



Assumption: REC-01 (J36) **Cell: J36**

Yes-No distribution with parameters:

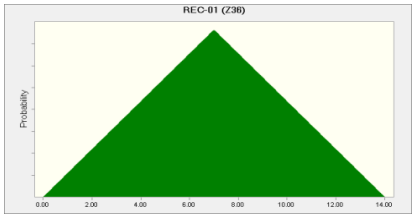
Probability of Yes(1)	0.05	(=J36)



Assumption: REC-01 (Z36) **Cell: Z36**

Triangular distribution with parameters:

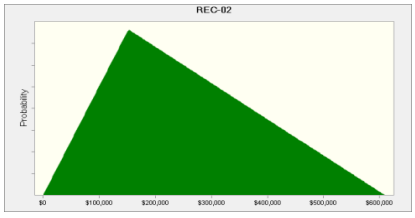
Minimum	0.00	(=W36)
Likeliest	7.00	(=X36)
Maximum	14.00	(=Y36)



Assumption: REC-02 **Cell: U37**

Triangular distribution with parameters:

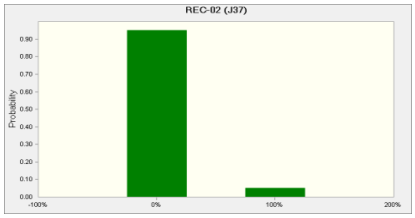
Minimum	$0	(=Q37)
Likeliest	$152,281	(=R37)
Maximum	$609,123	(=S37)



Assumption: REC-02 (J37) **Cell: J37**

Yes-No distribution with parameters:

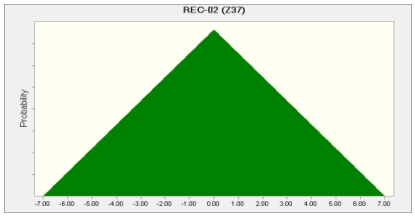
Probability of Yes(1)	0.05	(=J37)



Assumption: REC-02 (Z37) **Cell: Z37**

Triangular distribution with parameters:

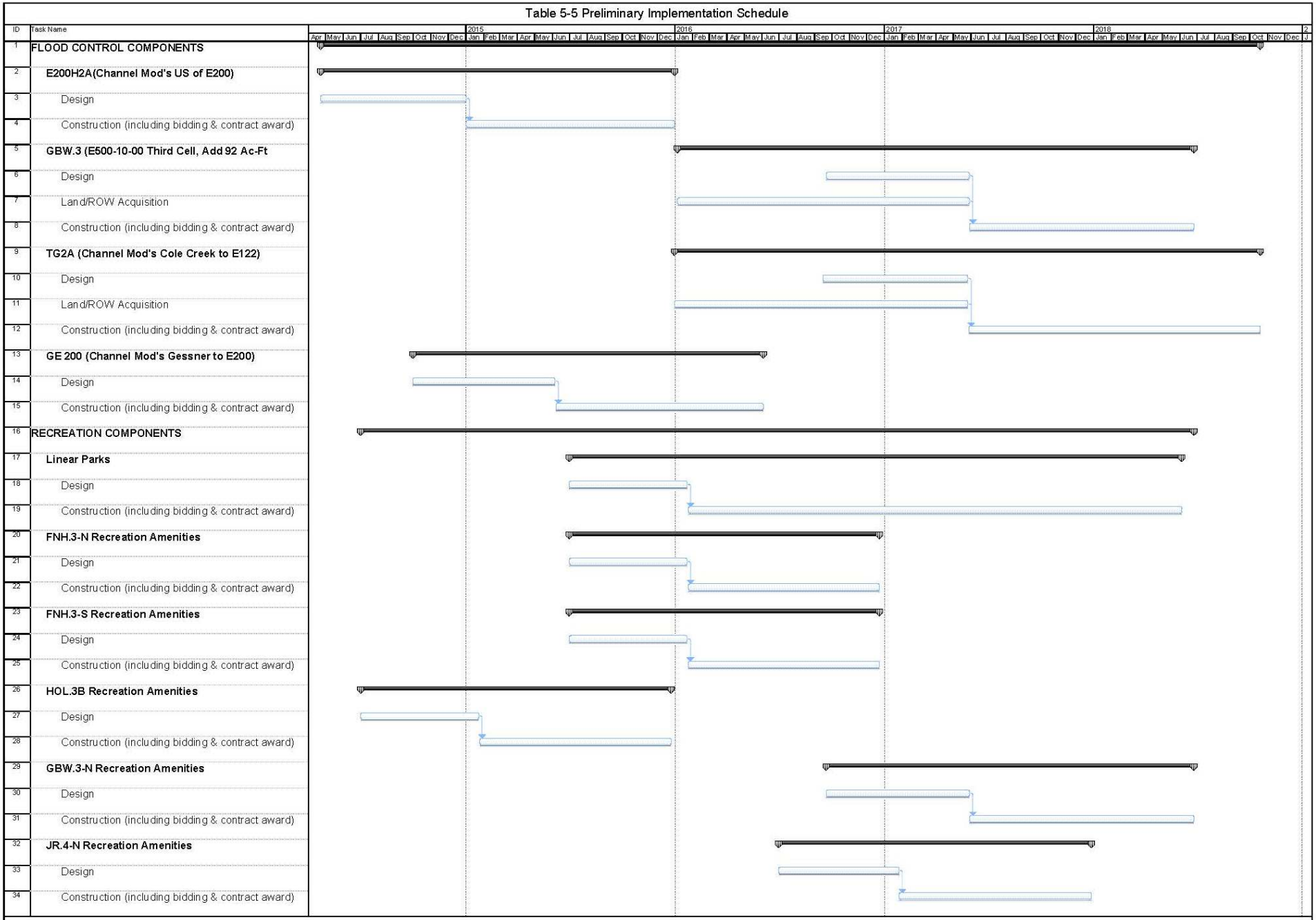
Minimum	-7.00	(=W37)
Likeliest	0.00	(=X37)
Maximum	7.00	(=Y37)



End of Assumptions

APPENDIX E – PROJECT SCHEDULE 0301

Table 5-5 Preliminary Implementation Schedule



Notes:
1. Construction began in 1998. Elements remaining to be constructed are shown in the schedule.