Lafayette Metropolitan Expressway

Technical Memorandum 1

TOLL ROAD ENGINEERING

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PENSCO

Lafayette Metropolitan Expressway Commission

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INTRODUCTION

The Toll Road Engineering Technical Memorandum summarizes the following tasks outlined in the scope of services for the Lafayette Metropolitan Expressway (LME) Toll Feasibility Study: Alignment Alternatives, Design Features of Project, Capital Cost Estimates and Operation and Maintenance Estimates. The LME Toll Feasibility Study is being coordinated by the Lafayette Metropolitan Expressway Commission (LMEC), which is responsible for pursuing alternative and innovate funding sources, including but not limited to tolls, to supplement public revenue sources for the construction, maintenance, and operation of a safe and efficient limited access highway system exclusively within Lafayette Parish.

This technical memorandum documents the selection of alternative corridors for the purpose of this feasibility study. The design features section documents the design elements used to develop preliminary cost estimates for roadway and toll equipment construction and toll road operation and maintenance. *Figure 1-1* shows the study area located within Lafayette Parish.

Lafayette Metropolitan Expressway

STUDY AREA

Future 49

Legend

- Study Area
- Existing Interchanges

N

0 0.375 0.75 1.5 2.25 3 3.75 4.5 Miles

Figure 1-1

Study Area Map

PREVIOUS ENGINEERING STUDIES

During the course of the LMEC Feasibility Study, several engineering studies were reviewed for corridor alignment or cost estimation purposes. These studies include the North-South Beltway Bypass, I-49 Connector Environmental Impact Statement (EIS), I-49 South EIS and the Ambassador Caffery Parkway Extension South EIS.

ALIGNMENT ALTERNATIVES

This section summarizes the alignment alternatives identified as "study corridors" for developing preliminary cost estimates for roadway and toll facilities construction. Approximately ten corridors within the study area as shown in *Figure 1-1* were narrowed down into three corridors for planning purposes for this study. The corridors were identified based on the overall project goal to relieve existing traffic congestion where possible, to support projected new land development, to minimize environmental impacts, and to maximize toll revenues. It should be noted that during the next phase of the project, alternatives will be studied more closely to avoid significant impacts.

For the purpose of this study, the corridors have been named Alternative 1, Alternative 2 and Alternative 3. All three alternatives follow the same corridor from I-10 just west of the eastern boundary of Lafayette Parish to the north across I-49 at Rue Des Etoiles to about the intersection of Mardi Gras and Dillon. From there the corridor splits into three possible alternative corridors that move south across I-10 and then cross Johnston Street/US 167. The three corridors then form two different corridors that move east, terminating at US 90 or the future I-49. The three study corridors are shown in *Figure 1-2* and summarized below.

ALTERNATIVE 1

Alternative 1 corridor (outer route) is the furthest from the city of Lafayette and is the longest route at 38.4 miles. Approximately 90 percent of the corridor is undeveloped and would require a new alignment. The proposed improvements would be a four-lane tollway. For cost estimating purposes, it has been assumed that approximately 10 percent of the system would include one-way frontage roads. A total of 11 diamond interchanges, three fully directional system-to-system interchanges, two halves of the system-to-system interchanges, and a new major river crossing over the Vermilion River are proposed for this corridor.

ALTERNATIVE 2

The middle route or Alternative 2 corridor is 35.3 miles in length. The Alternative 2 corridor is approximately 90 percent undeveloped and would require a new alignment. The proposed improvements would include a four-lane tollway. For cost estimating purposes, it has been assumed that approximately 10 percent of the system would include one-way frontage roads. A total of 12 diamond interchanges, three full system-to-system interchanges, two halves of a system-to-system interchange, and a new major river crossing over the Vermilion River are proposed for this corridor.

ALTERNATIVE 3

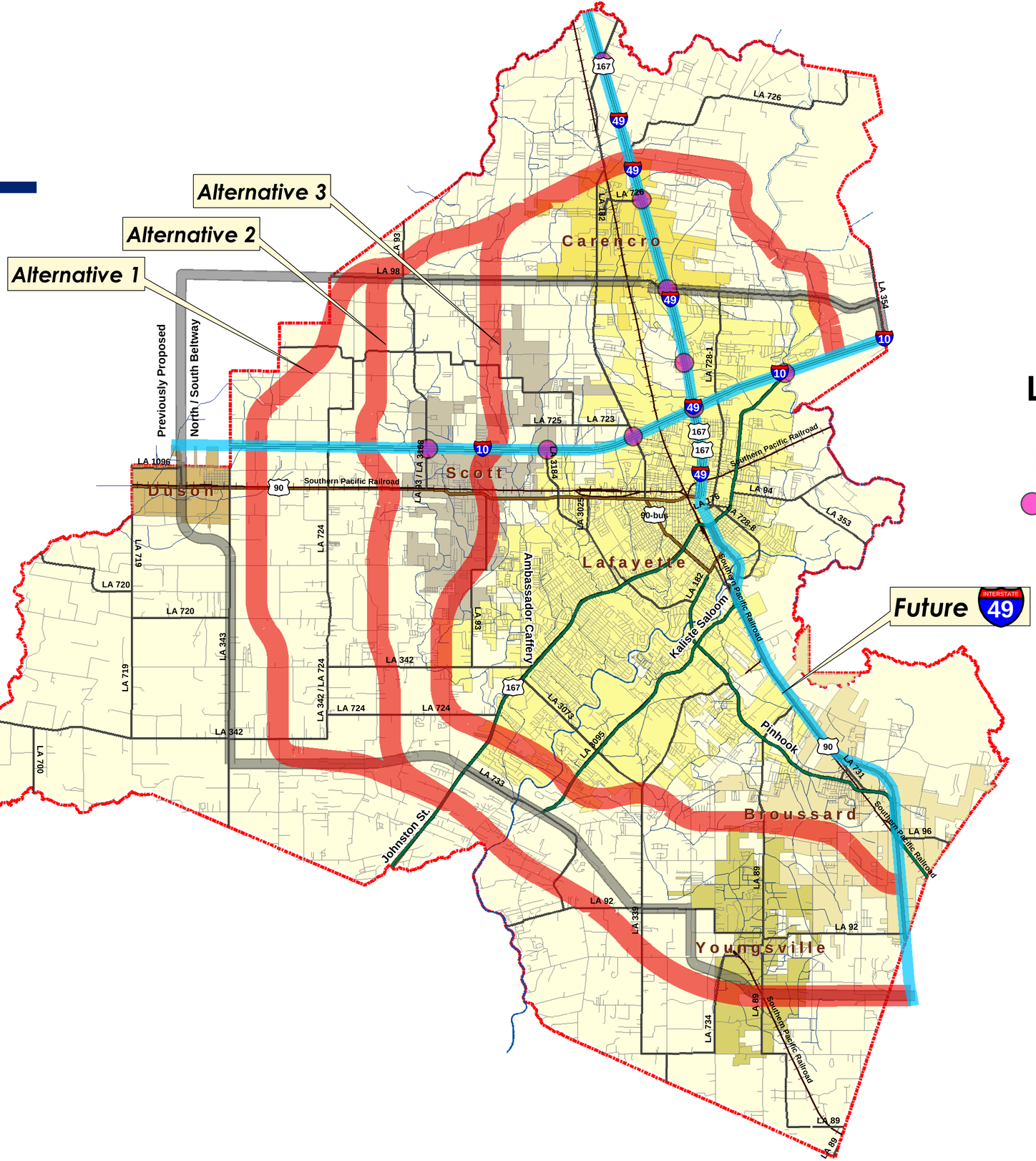
The internal route or Alternative 3 corridor is the shortest route at 31.0 miles in length. Alternative 3 is the closest to the city of Lafayette and would require a new alignment. Approximately 80 percent of the

corridor is undeveloped. The proposed improvements would include a four-lane tollway. For cost estimating purposes, it has been assumed that approximately 10 percent of the system would include frontage roads. A total of 12 diamond interchanges, three full system-to-system interchanges, two halves of a system-to-system interchange, and a new major river crossing over the Vermilion River are proposed for this corridor.

Table 1-1: Summary of Corridors

CORRIDOR NAME	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Approx. Length (miles)	38.4 miles	35.3 miles	31.0 miles
Approx. ROW (acres)	1,465 acres	1,270 acres	1,160 acres
Planned Improvements	4-lane expressway w/ a portion of frontage roads	4-lane expressway w/ a portion of frontage roads	4-lane expressway w/ a portion of frontage roads
No. of Diamond Interchanges	11	12	12
No. of System-to-System Interchanges	3 full, 2 halves	3 full, 2 halves	3 full, 2 halves
New Vermilion Bridge Crossing	Yes	Yes	Yes

Lafayette Metropolitan Expressway



Legend

- Proposed Expressway Alternatives
- Existing Interchanges

N

0 0.5 1 2 3 4 5 6 Miles

Figure 1-2

Study Corridor Map

DESIGN FEATURES

In order to provide improved service to the traveling public in Lafayette, it was assumed that if a toll facility were to be implemented in Lafayette Parish, it would be designed to meet the standards of the Louisiana Department of Transportation and Development (LADOTD). Design features including design standards, typical sections, interchange types, frontage roads and river crossing are summarized below.

DESIGN STANDARDS

Roadway and roadside design standards used in this study were primarily based on LADOTD *Design Standards for Freeways* and the American Association of State Highway and Transportation Officials' (AASHTO) 2001 publications, *A Policy on Geometric Design of Highways and Streets*, and *Roadside Design Guide*. For this study, LADOTD design standards for urban freeways (F-2) were utilized as shown in *Table 1-2* below. As design progresses, adjustments can be made to meet the preferences/guidelines of the LMEC or other toll agency.

Table 1-2: Design Standards for Freeways

ITEM NO.	ITEM	URBAN (F-2)
1	Design Speed (mph)	60
2	Level of Service	C
3	Number of Lanes (minimum)	4
4	Width of Travel Lanes (ft)	12
5	Width of Shoulders	
	(a) Inside	6
	(b) Outside	10
6	Shoulder Type	Paved
7	Width of Median (minimum) (ft)	
	(a) Depressed	51
	(b) Continuous Barrier (4 lane)	15
	(c) Continuous Barrier (6 lanes)	27
8	Fore Slope (vertical-horizontal)	1:6
9	Back Slope (vertical-horizontal)	1:4
10	Pavement Cross Slope (%)	2.5
11	Stopping Sight Distance (ft)	570
12	Maximum Superelevation (%)	10
13	Minimum Radius (ft) (with 10% superelevation)	1,100
14	Maximum Grade (%)	3
15	Minimum Vertical Clearance (ft)	16
16	Width of Right-of-Way (ft)	
	(a) Depressed Median	As Needed
	(b) Median Barrier	As Needed
	(c) Minimum from edge of bridge structure	15-20
17	Bridge Design Live Load	AASHTO
18	Minimum Width of Bridges (face to face of bridge rail at gutter line) (ft)	Roadway Width
19	Horizontal Clearance (from edge of travel lane) (ft)	
	(a) 1:4 Fore Slope	N/A
	(b) 1:6 Fore Slope	32

These criteria have been developed to provide a summary of methodologies and standards used in preliminary cost estimates of the study corridors.

TYPICAL SECTIONS

Typical roadway improvement standards were developed for two types of potential corridor improvements and are shown in figures below. Design standards are shown in both figures to represent the added benefits that a tollway user would realize with conversion to a toll system. *Figure 1-3* shows the typical design standards for a four-lane freeway/expressway. A 6-foot inside and 10-foot outside shoulder, 12-foot lanes, and a median width of 51 feet from edge of driving lane to edge of driving lane was assumed. A smaller median width than the Urban Freeway F-2 design standard of 68-foot minimum was assumed to allow for possible future conversion to a six-lane freeway/expressway with a 12-foot shoulder and a 3-foot concrete barrier.

Figure 1-3: 4-Lane Toll Road Typical Section

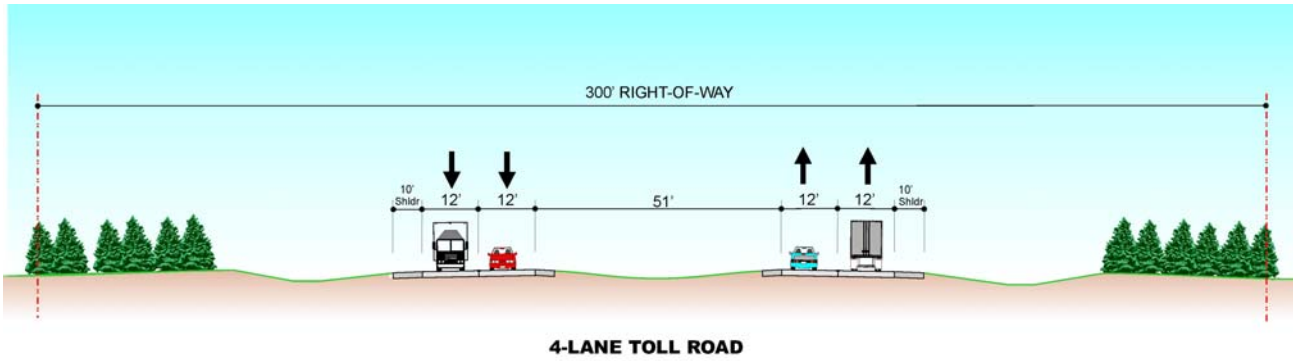
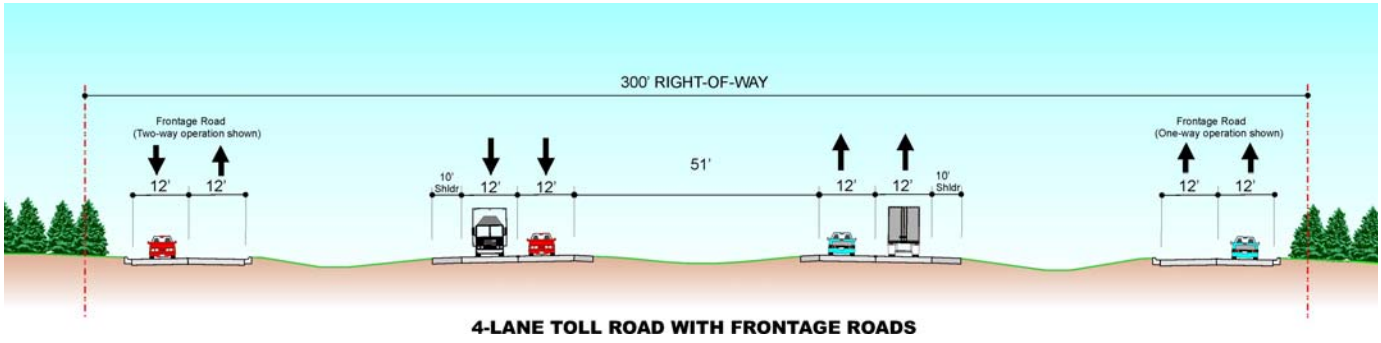


Figure 1-4 shows the typical design standards for a four lane freeway/expressway with frontage roads. A 6-foot inside and 10-foot outside shoulder, 12-foot lanes, and a median width of 51 feet from edge of driving lane to edge of driving lane was assumed. A smaller median width than the Urban Freeway F-2 design standard of 68-foot minimum was assumed to allow for possible future conversion to a six-lane freeway/expressway with a 12-foot shoulder and a 3-foot concrete barrier. The frontage roads are assumed to be two 12-foot lanes with curb and gutter. Approximately 10 percent of new toll road corridors is expected to include frontage roads. Sections along I-49 would have continuous one-way frontage roads that would be toll free.

Figure 1-4: 4-Lane Toll Road with Frontage Roads Typical Section



INTERCHANGES

Two interchange types were assumed for the toll road system: diamond and system-to-system. The diamond interchange would occur at the intersection of the mainline toll road and major cross streets. *Figures 1-5 and 1-6* show layout examples.

Figure 1-5: Typical Diamond Interchange Layout

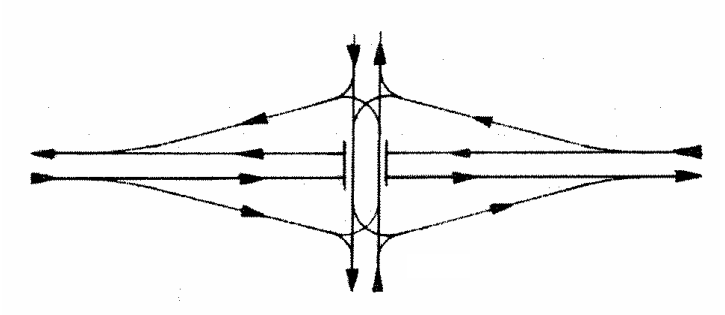
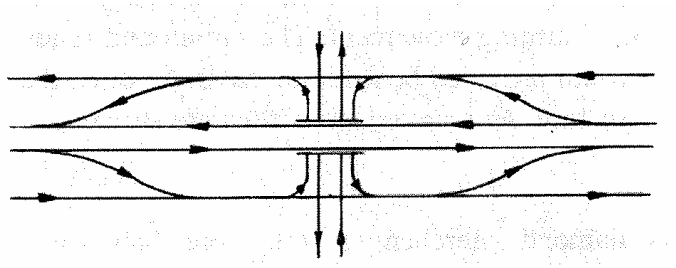


Figure 1-6: Typical Diamond Interchange with One-Way Frontage Roads Layout



The fully directional system-to-system interchange would occur where the mainline toll road meets a major highway such as I-10 or I-49. *Figures 1-7* and *1-8* show a typical layout and photograph of a typical system-to-system interchange.

Figure 1-7: Typical Fully Directional System-to-System Interchange Layout

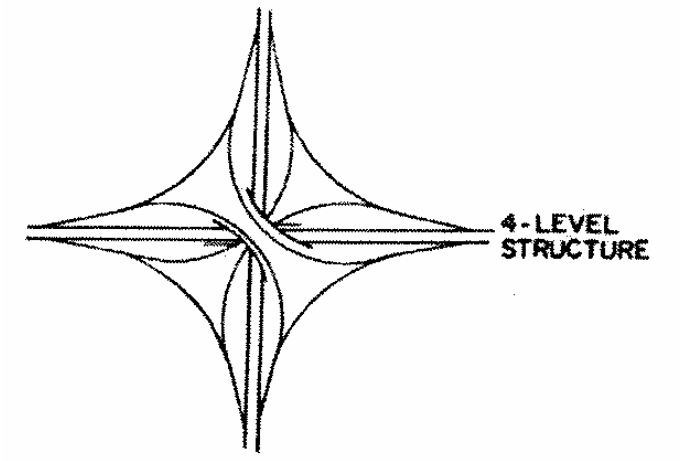
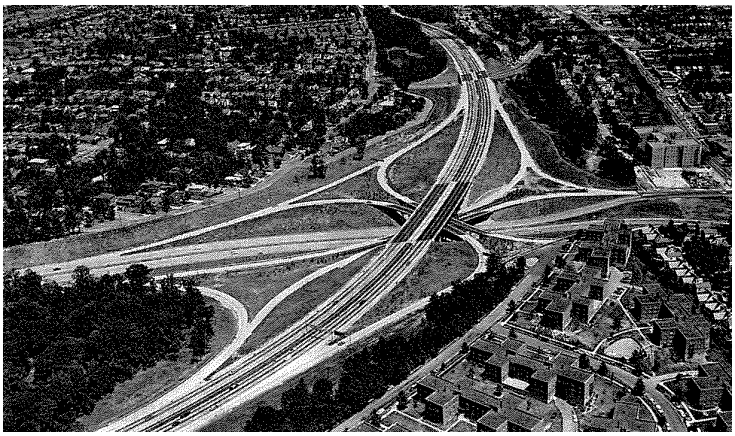


Figure 1-8: Fully Directional System-to-System Interchange Aerial Photo



Source: *A Policy on Geometric Design of Highway and Streets, Fourth Edition, AASHTO, 2001.*

FRONTAGE ROADS

For the purpose of preliminary cost estimation, frontage roads were assumed to be approximately 10 percent of the new toll road corridors. *Figure 1-4* above shows the typical cross section of the mainline toll road with frontage roads.

RIVER CROSSING

All three toll road corridors cross the Vermilion River in the southeast quadrant, where the river is considered a navigable waterway. Each study corridor would require a major bridge crossing with 50-feet vertical clearance.

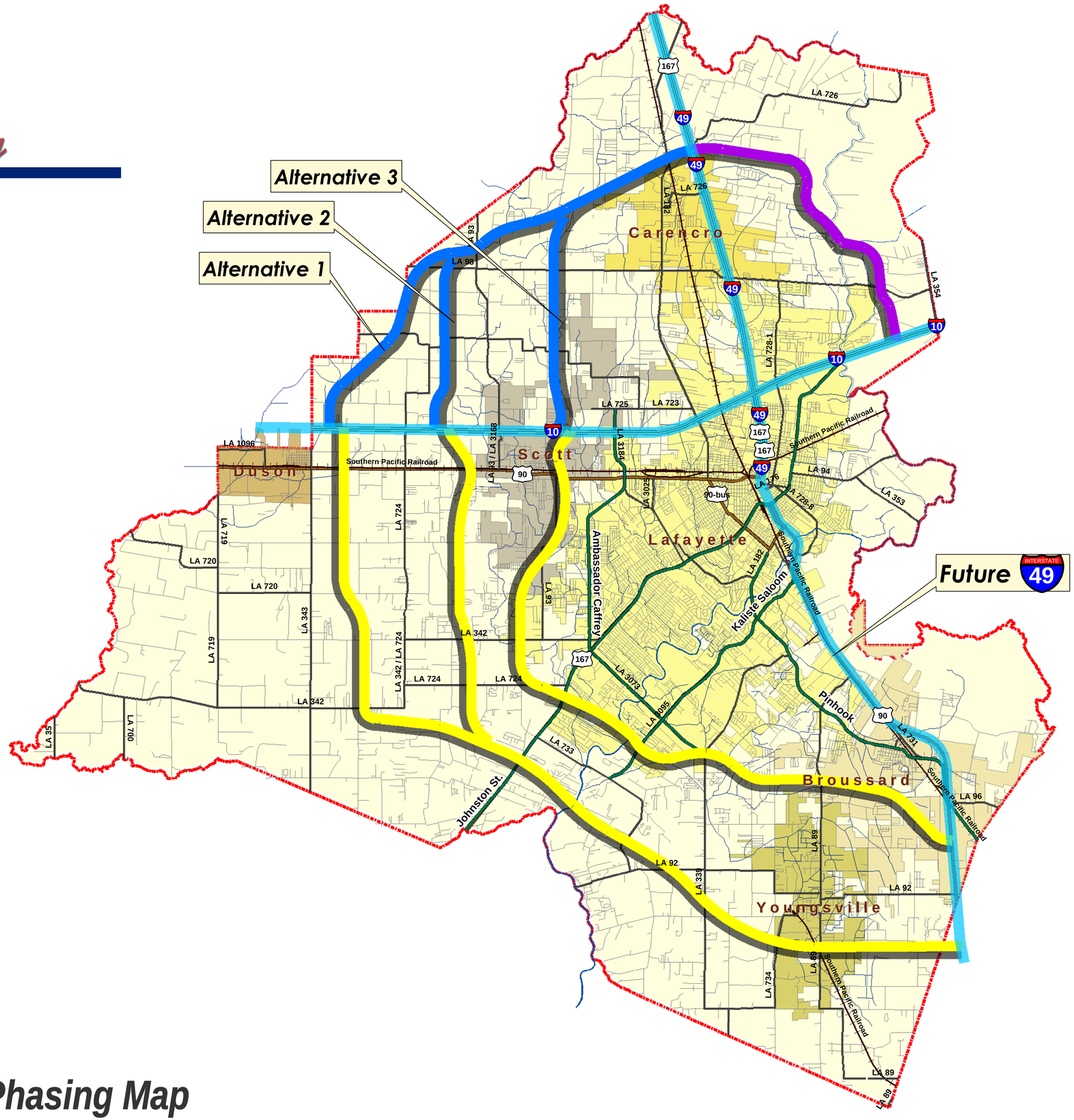
PROJECT PHASING

For preliminary analysis, the study corridors were broken into phases of construction. Phase B runs south of I-10 to U.S. 90, Phase C1 runs northeast of I-10 to I-49 north and Phase D runs east of I-49 back south to I-10. Because the entire toll road system will most likely not be built all at one time, the phasing option allows for staging construction to accommodate funding limitations. Phase B has an estimated opening date of 2012 with subsequent phases every three or four years. *Figure 1-9* shows the phasing layout and schedule for each study corridor that has been used for this study. *Table 1-3* summarizes the phasing lengths for each study corridor.

Table 1-3: Study Corridor Phasing Summary

PHASES	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
B	21.0 miles	19.0 miles	16.4 miles
C1	10.5 miles	9.4 miles	7.7 miles
D	6.9 miles	6.9 miles	6.9 miles
Total	**38.4 miles**	**35.3 miles**	**31.0 miles**

Lafayette Metropolitan Expressway



Legend

- Proposed Expressway Alternatives
- Phase B
- Phase C1
- Phase D

N

0 0.5 1 2 3 4 5 6 Miles

Figure 1-9

Construction Phasing Map

COST ESTIMATES

This section describes the approach used to estimate implementation costs, operations and maintenance costs and the reserve fund deposit for the highway corridors and major bridge crossings.

METHODOLOGY

All cost analyses were done under the assumption of a closed-barrier toll system, and were estimated in current dollars. Cost inflationary factors were applied if cost estimates from previous studies were used in this study. It should be noted that all costs are approximate and preliminary for this feasibility study.

Mainline Toll Road Methodology

Typical roadway standards were developed for a four-lane expressway with frontage roads and a four-lane expressway without frontage roads. The standards were then translated into a cost per linear mile for each mainline. The cost per linear mile for each mainline type includes cost estimates for the paving, grading, and major and minor drainage elements. Quantities were estimated for pavement, base course, embankment, seeding and fertilizing, striping, etc. to develop a cost per mile price for the main roadway and frontage roads. For estimating purposes, it was assumed that 10 percent of a given length of a particular phase of the expressway project would be constructed with frontage roads and the remaining 90 percent of the length would be constructed without frontage roads. Exact locations of the limits of expressway with and without frontage roads were not identified. Unit prices were derived using the LADOTD Bid Item Weighted Unit Prices for the 3rd Quarter of 2004 as listed on the DOTD website.

Interchange Methodology

Interchange cost estimates were developed for both a typical diamond interchange and a system-to-system interchange. The cost estimate for a typical diamond interchange was developed using the recently constructed Louisiana Avenue Interchange, modified as appropriate, as a basis for lane widths, ramp lengths and geometry. The typical section for the mainline roadway was used for pavement, base course, etc. thicknesses for ramp quantity calculations. Drainage and lighting costs were derived through reviews of recently bid or constructed LADOTD interchange projects of similar size and nature.

Fully directional system-to-system interchanges can vary greatly in cost depending on the circumstances of design needs. For preliminary purposes, the cost estimate for a fully directional system-to-system interchange was assumed to be $50,000,000.

Mainline Vermilion River Crossing Methodology

The cost estimate for the Vermilion River crossing was determined by developing a cost per square foot that has been updated based on the 3rd quarter weighted averages of 2004. The cost per square foot was then increased by 10 percent to account for addition complexity of building two spans over the river and the increase in height. The bridge width is in accordance with LADOTD Design Standards for urban freeway classification, F-2.

ASSUMPTIONS

Construction cost estimates for each study corridor and major bridge crossing were developed based on an assessment of each corridor's or bridge's infrastructure needs. A review of the existing and planned

roadway infrastructure was performed to determine the extent and nature of the existing roadway infrastructure. Construction cost estimates were developed for a closed barrier toll collection system.

Mainline Toll Road

The corridor development plan consisted of providing a four-lane, fully access-controlled highway meeting current AASHTO guidelines for an interstate type facility. In most cases, the toll road would require complete new construction on new alignment. Frontage roads were assumed for 10 percent of the corridor length.

Toll Facilities

Generic, typical toll plaza configurations and unit costs for ramp and mainline locations were developed and included in the construction cost estimates accordingly. The unit costs for toll collection equipment and installation were based on recent bid tabulations from other comparable tollway authorities as well as previous team experience on other toll projects. The mainline toll plaza assumed two multi-mode booth lanes in each direction (i.e., able to accept cash, coin machines and ETC toll transactions) and two electronic toll collection (ETC) express lanes in each direction. Each ramp toll plaza included two multi-mode booth lanes. An example toll collection layout can be seen in *Technical Memorandum #2, Figure 2-4*. Start up toll system costs for ETC and the information systems for the toll road were also included in the toll cost estimate. The ETC and information systems software was assumed to be a pre-packaged, off-the-shelf product that is not customized specifically for this project.

CAPITAL COSTS

Construction cost estimates include grading, drainage, surfacing and paving for a four-lane interstate-type facility. For new construction, unit costs per mile for an interstate facility were developed based on LADOTD bid tabs, planning procedures and earlier studies. Special considerations were given for interchanges and toll plazas on an individual lump-sum basis. Major bridge crossings and other special features were added accordingly. Other incidental costs include erosion control, signing and paving, maintenance of traffic and utility relocations. Right-of-way costs were developed using recent real estate transactions by LADOTD and local experts and are included. Design and construction administration costs were also included.

Included in Appendix A to this report are more details regarding the estimates of the construction costs for the corridors and bridges. As shown in the Appendix, grading, drainage, surfacing and paving unit costs range from $3.6 million to $5.4 million per linear mile. Add-ons include miscellaneous items such as major utilities, local road reconstruction and interchange signalization. A design and construction contingency of 25 percent to account for design, design unknowns and construction administration was included. Right-of-way costs, where needed, were developed using recent LADOTD right-of-way real estate transactions and recent residential and commercial properties transaction information from real estate data. ROW cost estimates range from $1.2 million to $2.3 million per mile. Toll plaza costs were included appropriately assuming lump sum unit costs of $6 million each for mainline toll plazas and $1.9 million per tolled interchange for ramp plazas. *Table 1-4* presents the total construction cost estimates (2004) for the study corridors and *Table 1-5* summarizes the capital cost estimates by phase.

Table 1-4: Summary of Capital Cost Estimates ($ in millions)

COST ITEM	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Roadway/Bridge Construction	$523.8M	$521.6M	$485.8M
Toll Plaza Construction	$45.6M	$47.6M	$47.5M
Right-of-Way	$47.8M	$47.3M	$71.2M
Design, CEI, and Contingency (additional)	$142.9M	142.2M	$139.2M
Total	**$760.1M**	**$758.7M**	**$743.7M**
Cost Per Mile	$19.8M per mile	$21.5M per mile	$24.0M per mile

Table 1-5: Summary of Capital Cost Estimates by Phase ($ in millions)

	Length (miles)	Capital Cost	Cost Per Mile
Alternative 1	38.4	$760.1M	$19.8M
Phase B	21.0	$420.3M	$20.0M
Phase C1	10.5	$194.7M	$18.5M
Phase D	6.9	$145.1M	$21.0M
Alternative 2	35.3	$758.7M	$21.5M
Phase B	19.0	$412.7M	$21.7M
Phase C1	9.4	$201.1M	$21.4M
Phase D	6.9	$144.9M	$21.0M
Alternative 3	31.0	$743.7M	$24.0M
Phase B	16.4	$407.4M	$24.8M
Phase C1	7.7	$191.2M	$24.8M
Phase D	6.9	$145.1M	$21.0M

As shown in *Table 1-5*, Alternative 1 has the largest capital cost estimate as a whole system however the cost per mile is lower than Alternatives 2 and 3. Alternative 3 has the lowest capital cost estimate however the cost per mile is the highest.

ANNUAL OPERATIONS & MAINTENANCE COSTS

Planning level estimates of the annual Operations and Maintenance (O&M) costs were developed for each of the study corridors. The derivation of this data was, in part, based on the similar tollway systems currently in operation in neighboring states as well as team experience on similar toll studies. O&M costs refer to the perpetual costs associated with the operations and upkeep of the tollway system. These costs represent the annual revenue necessary to responsibly operate and maintain the toll road in a manner similar with customary practice. The annual O&M costs for the feasibility study included cost estimates for the following cost categories:

- **Administration** – The annual costs associated with toll authority staff and activities, public relations, communications, salaries, and materials/supplies.

- **Insurance** – The annual costs to insure the toll facility including facility, liability and business interruption insurance.

- **Toll Collection** – Toll collection costs are those costs directly incurred through the fare collection process, including toll collector salaries and related expenses. Toll collection costs are directly proportional to the toll collection staffing labor requirements. As a measure of the total toll collection requirements, the number of manual toll booth lanes and the number of electronic toll collection (ETC) lanes were estimated for the toll system. The number of manned lanes for each system depends on the traffic volumes and the extent of automatic coin machine and ETC utilization.

  Toll collection staff was assumed to include one manager, one supervisor per shift, four toll collectors at the mainline toll plaza and one at each ramp plaza (two ramps tolled per interchange). Three, 8-hour shifts were assumed for the mainline toll plaza and two, 8-hour shifts for each ramp plaza (the ramps were assumed to be unmanned at night). An annual cost for cash pickup (i.e. Brinks) was also included in the toll collection costs.

- **Toll Facility and Toll Collection System Maintenance** – Toll facility maintenance is the annual cost to maintain the buildings associated with the toll system and was based on a unit cost per square footage of facility buildings. The toll facility maintenance assumes facility maintenance area to be 10,000 square feet per mainline toll plaza and 2,000 square feet per ramp toll plaza. Toll collection system maintenance includes annual maintenance for the manual and ETC equipment and is estimated on a per lane basis for both manual booth lanes and ETC lanes.

- **Roadway Maintenance** – Roadway maintenance costs are those associated with the upkeep of the turnpike pavement and roadside, including mowing, sign and guardrail repair, minor bridge repair, and pavement resurfacing. The annual costs to maintain the entire length of the four-lane facility were developed as an annual cost per lane-mile.

- **Utilities** – The annual costs associated with the utilities for the toll system lanes, including both the manual booth lanes and the ETC lanes.

- **Engineering/Traffic Consulting** – The annual costs associated with retaining an independent engineering and traffic consultant for the toll system.

- **Highway Patrol** – The annual costs to employ highway patrol for the toll facility for enforcement and safety. This includes patrol operating at all times, assuming three shifts – weekdays, weeknights and weekends. It also includes vehicle operating and maintenance costs.

- **Customer Care Center** – The annual costs associated with leasing space and paying salaries for a Customer Care Center where customers of the toll facility can go to purchase ETC transponders and maintain their accounts. Supplies for the Customer Care Center are covered within Administration and the ETC software and hardware needs are covered within the capital costs.

The 2004 annual O&M costs for the project are shown in *Table 1-6*.

Table 1-6: Summary of Operations & Maintenance Cost Estimates for Alternative 1

	Phase B	Phase C1	Phase D	TOTAL
Annual Operations and Maintenance	$5,010,000	$2,470,000	$1,878,000	$9,360,000

THE REPLACEMENT RESERVE MAINTENANCE FUND

Included in the annual costs of operating and maintaining a turnpike system are replacement reserve maintenance fund considerations as shown in *Table 1-7* below. On an annual basis, the Annual Reserve Maintenance Fund (ARMF) needs to be deposited for the replacement of the system's infrastructure to replace or refurbish the system at the end of its service life, assumed to be 30 years. The depreciation of the system's value is a function of the system's use and the extent that annual maintenance activities are able to defer major system reconstruction. It is assumed that upon reaching maturity, the system's driving surface, including the pavement and bridge decks, will require reconstruction in its original configuration. The remaining value of these elements, consisting of the pavement base and the bridge substructure, would depend on the rate of the system's deterioration due to use and weathering. Upgrades of the system for increased capacity demands or new design standards would not be included. Assuming a typical construction value for these elements of the system's infrastructure of around 15 percent of the original construction costs, necessary deposits into a "sinking" fund are assumed to accrue during the typical life of the system to provide the necessary funds to reconstruct the system upon reaching its service life. Using a discount rate of six percent, an annual deposit approximately equaling 0.19 percent of the original construction cost would be necessary during the life of the Project. The RMF deposits would likely have to be supplemented by potential bond refinancing or sale of additional debt if the costs to reconstruct exceed available monies in this fund. Other considerations such as toll increases and major maintenance bond issues are considerations for additional funds, of course, assuming the Project toll revenues could support this process. The annual deposit into the reserve maintenance fund is shown in *Table 1-7* below.

Table 1-7: Summary of O&M and ARMF Cost Estimates for Alternative 1

ANNUAL COST CATEGORY	Phase B	Phase C1	Phase D	Total
Annual Operations and Maintenance	$5,010,000	$2,470,000	$1,878,000	$9,360,000
Annual Reserve Maintenance Fund	$800,000	$370,000	$280,000	$1,450,000
Total Annual Cost	**$5,810,000**	**$2,840,000**	**$2,158,000**	**$10,808,000**

APPENDIX A

ALTERNATIVE 1

QUANTITIES AND UNIT COSTS SUPPLIED BY *HNTB, PENSCO and C.H. Fenstermaker*

Item No.	Cost Item	Units	Unit Cost	Item	Phase B		Phase C1		Phase D		TOTAL
	Mainline				**Quant.**	**Cost**	**Quant.**	**Cost**	**Quant.**	**Cost**	
1	- 4-Lane Toll Road w/ Frontage Roads	CL Mile	**$5,374,000.00**	Cost for paving, grading, and drainage.[1]	**2.10**	**$11,285,400.00**	**1.05**	**$5,642,700.00**	**0.69**	**$3,708,060.00**	**$20,636,160.00**
2	- 4-Lane Toll Road w/out Frontage Roads	CL Mile	**$3,635,000.00**	Cost for paving, grading, and drainage.[1]	**18.90**	**$68,701,500.00**	**9.45**	**$34,350,750.00**	**6.21**	**$22,573,350.00**	**$125,625,600.00**
	Subtotal				21.00	$79,986,900.00	10.50	$39,993,450.00	6.90	$26,281,410.00	**$146,261,760.00**
	Interchanges (Including Bridges)										
3	- Typical Diamond Interchange (new)	Ea.	**$6,500,000.00**	Cost for new interchange, including mainline grade separation, slip ramps, cross street, and lighting.	**6**	**$39,000,000.00**	**3**	**$19,500,000.00**	**2**	**$13,000,000.00**	**$71,500,000.00**
4	- Typical System-to-System Interchange (new)	Ea.	[C] **$50,000,000.00**	Cost for new directional interchange, including mainline grade separation, ramps (grade and structures), cross street, and lighting.	**2**	**$100,000,000.00**	**1**	**$50,000,000.00**	**1**	**$50,000,000.00**	**$200,000,000.00**
	Subtotal					$139,000,000.00		$69,500,000.00		$63,000,000.00	**$271,500,000.00**
	Bridges/Structures										
5	- Mainline - Vermilion River Crossing	Ea.	**$17,700,000.00**	Cost for construction of a major river bridge.	**1**	**$17,700,000.00**		**$0.00**		**$0.00**	**$17,700,000.00**
6	- Other Mainline Bridges	Ea.	**$1,500,000.00**	Cost for construction of other bridges (bayous, local roads, etc.).	**20.0** [B]	**$30,000,000.00**	**12.0** [B]	**$18,000,000.00**	**4.5** [B]	**$6,750,000.00**	**$54,750,000.00**
	Subtotal					$47,700,000.00		$18,000,000.00		$6,750,000.00	**$72,450,000.00**
	Miscellaneous										
7	- Major Utilities	Lump Sum	**$11,937,000.00**	Cost of relocating major utilities.	**Lump**	**$9,229,000.00**	**Lump**	**$2,166,000.00**	**Lump**	**$542,000.00**	**$11,937,000.00**
8	- Local Roads	Ea.	**$1,400,000.00**	Cost to reconstruct cross-roads that are not accounted for in Items 3 and 4.	**8**	**$11,200,000.00**	**4**	**$5,600,000.00**	**3**	**$4,200,000.00**	**$21,000,000.00**
8a	-Interchange Signallization	Ea.	**$120,000.00**	[D] Cost of Signallization for diamond interchanges.	**3**	**$360,000.00**	**1.5**	**$180,000.00**	**1**	**$120,000.00**	**$660,000.00**
9	- R/W	Acres	Varies			$27,780,500		$11,800,000		$8,206,000	**$47,786,500**
	Subtotal					$48,569,500.00		$19,746,000.00		$13,068,000.00	**$81,383,500.00**
10	**SUBTOTAL**					$315,256,400.00		$147,239,450.00		$109,099,410.00	**$571,595,260.00**
11	- Engineering and Contingency	% of Construct. Costs	25%	Contingency funds applied to total of construction costs above		$78,814,100.00		$36,809,862.50		$27,274,852.50	**$142,898,815.00**
12	- Mainline Toll Plazas	Ea.	**$4,753,300**	Cost of Mainline Toll Plaza	2	$9,506,600.00	1	$4,753,300.00	1	$4,753,300.00	**$19,013,200.00**
13	- Mainline Startup Costs (First phase only)	Lump Sum	**$5,000,000**	Cost of System Software & Hardware	1	$5,000,000.00	n/a		n/a		**$5,000,000.00**
14	- Ramp Toll Plazas (two per interchange)	Ea.	**$1,961,900**	Cost of two Ramp Toll Plazas per interchange	6	$11,771,400.00	3	$5,885,700.00	2	$3,923,800.00	**$21,580,900.00**
15	**TOTAL**					$420,348,500.00		$194,688,312.50		$145,051,362.50	**$760,088,175.00**

1. Paving includes roadway surface, base and shoulders. Grading assumes 5' embankment height. Drainage includes major structures (box culverts) and minor structures (culverts).

PENSCO NOTES

[A] ***Quantity adjusted to account for total estimated cost of work for this phase.***

[B] ***R.R. Overpass Bridges equivalent to 7.0 X Unit Cost. Vermilion River Crossing (Non-navigable) equivalent to 2.5 X Unit Cost.***

[C] ***As per HNTB***

[D] ***Includes 2 signals per interchange.***

ALTERNATIVE 2

QUANTITIES AND UNIT COSTS SUPPLIED BY *HNTB, PENSCO and C.F. Fenstermaker*

Item No.	Cost Item	Units	Unit Cost	Item	Phase B		Phase C1		Phase D		TOTAL
	Mainline				**Quant.**	**Cost**	**Quant.**	**Cost**	**Quant.**	**Cost**	
1	- 4-Lane Toll Road w/ Frontage Roads	CL Mile	**$5,339,000.00**	Cost for paving, grading, and drainage.[1]	**1.90**	**$10,144,100.00**	**0.94**	**$5,018,660.00**	**0.69**	**$3,683,910.00**	**$18,846,670.00**
2	- 4-Lane Toll Road w/out Frontage Roads	CL Mile	**$3,616,000.00**	Cost for paving, grading, and drainage.[1]	**17.10**	**$61,833,600.00**	**8.46**	**$30,591,360.00**	**6.21**	**$22,455,360.00**	**$114,880,320.00**
	Subtotal				19.00	$71,977,700.00	9.40	$35,610,020.00	6.90	$26,139,270.00	$133,726,990.00
	Interchanges (Including Bridges)										
3	- Typical Diamond Interchange (new)	Ea.	**$6,500,000.00**	Cost for new interchange, including mainline grade separation, slip ramps, cross street, and lighting.	**6**	**$39,000,000.00**	**4**	**$26,000,000.00**	**2**	**$13,000,000.00**	$78,000,000.00
4	- Typical System-to-System Interchange (new)	Ea.	[C] **$50,000,000.00**	Cost for new directional interchange, including mainline grade separation, ramps (grade and structures), cross street, and lighting.	**2**	**$100,000,000.00**	**1**	**$50,000,000.00**	**1**	**$50,000,000.00**	$200,000,000.00
	Subtotal					$139,000,000.00		$76,000,000.00		$63,000,000.00	$278,000,000.00
	Bridges/Structures										
5	- Mainline - Vermilion River Crossing	Ea.	**$17,700,000.00**	Cost for construction of a major river bridge.	**1**	**$17,700,000.00**		**$0.00**		**$0.00**	$17,700,000.00
6	- Other Mainline Bridges	Ea.	**$1,500,000.00**	Cost for construction of other bridges (bayous, local roads, etc.).	**21.0** [B]	**$31,500,000.00**	**12.0** [B]	**$18,000,000.00**	**4.5** [B]	**$6,750,000.00**	$56,250,000.00
						$49,200,000.00		$18,000,000.00		$6,750,000.00	$73,950,000.00
	Miscellaneous										
7	- Major Utilities	Lump Sum	**$12,817,000**	Cost of relocating major utilities.	**Lump**	**$10,109,000.00**	**Lump**	**$2,166,000.00**	**Lump**	**$542,000.00**	$12,817,000.00
8	- Local Roads	Ea.	**$1,400,000.00**	Cost to reconstruct cross-roads that are not accounted for in Items 3 and 4.	**8**	**$11,200,000.00**	**5**	**$7,000,000.00**	**3**	**$4,200,000.00**	$22,400,000.00
8a	-Interchange Signallization	Ea.	**$120,000.00**	[D]Cost of Signallization for diamond interchanges.	**3**	**$360,000.00**	**2**	**$240,000.00**	**1**	**$120,000.00**	$720,000.00
9	- R/W	Acres	Varies			$27,304,500		$11,790,000		$8,206,000	$47,300,500.00
						$48,973,500.00		$21,196,000.00		$13,068,000.00	$83,237,500.00
10	**Subtotal**					$309,151,200.00		$150,806,020.00		$108,957,270.00	$568,914,490.00
11	- Engineering and Contingency	% of Construct. Costs	25%	Contingency funds applied to total of construction costs above minus toll plazas		$77,287,800.00		$37,701,505.00		$27,239,317.50	$142,228,622.50
12	- Mainline Toll Plazas	Ea.	**$4,753,300**	Cost of Mainline Toll Plaza	2	$9,506,600.00	1	$4,753,300.00	1	$4,753,300.00	$19,013,200.00
13	- Mainline Startup Costs (First phase only)	Lump Sum	**$5,000,000**	Cost of System Software & Hardware	1	$5,000,000.00					$5,000,000.00
14	- Ramp Toll Plazas	Ea.	**$1,961,900**	Cost of two Ramp Toll Plazas per interchange	6	$11,771,400.00	4	$7,847,600.00	2	$3,923,800.00	$23,542,800.00
15	**TOTAL**					**$412,717,000.00**		**$201,108,425.00**		**$144,873,687.50**	**$758,699,112.50**

1. Paving includes roadway surface, base and shoulders. Grading assumes 5' embankment height. Drainage includes major structures (box culverts) and minor structures (culverts).

PENSCO NOTES

[A] ***Quantity adjusted to account for total estimated cost of work for this phase.***

[B] ***R.R. Overpass Bridges equivalent to 7.0 X Unit Cost. Vermilion River Crossing (Non-navigable) equivalent to 2.5 X Unit Cost.***

[C] ***As per HNTB***

[D] ***Includes 2 signals per interchange.***

Lafayette Metropolitan Expressway Commission

ALTERNATIVE 3

QUANTITIES AND UNIT COSTS SUPPLIED BY *HNTB, PENSCO and C.H. Fenstermaker*

Item No.	Cost Item	Units	Unit Cost	Item	Phase B		Phase C1		Phase D		TOTAL
	Mainline				**Quant.**	**Cost**	**Quant.**	**Cost**	**Quant.**	**Cost**	
1	- 4-Lane Toll Road w/ Frontage Roads	CL Mile	**$5,347,000.00**	Cost for paving, grading, and drainage. [1]	**1.64**	**$8,769,080.00**	**0.77**	**$4,117,190.00**	**0.69**	**$3,689,430.00**	$16,575,700.00
2	- 4-Lane Toll Road w/out Frontage Roads	CL Mile	**$3,645,000.00**	Cost for paving, grading, and drainage. [1]	**14.76**	**$53,800,200.00**	**6.93**	**$25,259,850.00**	**6.21**	**$22,635,450.00**	$101,695,500.00
					16.4	$62,569,280.00	7.7	$29,377,040.00	6.9	$26,324,880.00	$118,271,200.00
	Interchanges (Including Bridges)										
3	- Typical Diamond Interchange (new)	Ea.	**$6,500,000.00**	Cost for new interchange, including mainline grade separation, slip ramps, cross street, and lighting.	**6**	**$39,000,000.00**	**4**	**$26,000,000.00**	**2**	**$13,000,000.00**	$78,000,000.00
4	- Typical System-to-System Interchange (new)	Ea.	[C] **$50,000,000.00**	Cost for new directional interchange, including mainline grade separation, ramps (grade and structures), cross street, and lighting.	**2**	**$100,000,000.00**	**1**	**$50,000,000.00**	**1**	**$50,000,000.00**	$200,000,000.00
						$139,000,000.00		$76,000,000.00		$63,000,000.00	$278,000,000.00
	Bridges/Structures										
5	- Mainline - Vermilion River Crossing	Ea.	**$17,700,000.00**	Cost for construction of a major river bridge.	**1**	**$17,700,000.00**		**$0.00**		**$0.00**	$17,700,000.00
6	- Other Mainline Bridges	Ea.	**$1,500,000.00**	Cost for construction of other bridges (bayous, local roads, etc.).	**14.0** [B]	**$21,000,000.00**	**10.0** [B]	**$15,000,000.00**	**4.5** [B]	**$6,750,000.00**	$42,750,000.00
						$38,700,000.00		**$15,000,000.00**		**$6,750,000.00**	$60,450,000.00
	Miscellaneous										
7	- Major Utilities	Lump Sum	**$5,919,000**	Cost of relocating major utilities.	**Lump**	**$2,189,000.00**	**Lump**	**$3,188,000.00**	**Lump**	**$542,000.00**	$5,919,000.00
8	- Local Roads	Ea.	**$1,400,000.00**	Cost to reconstruct cross-roads that are not accounted for in Items 3 and 4.	**8**	**$11,200,000.00**	**5**	**$7,000,000.00**	**3**	**$4,200,000.00**	$22,400,000.00
8a	-Interchange Signallization	Ea.	**$120,000.00**	[D]Cost of Signallization for diamond interchanges.	**3**	**$360,000.00**	**2**	**$240,000.00**	**1**	**$120,000.00**	$720,000.00
9	- R/W	Acres	Varies			$50,885,875		$12,062,500		$8,206,000	$71,154,375.00
						$64,634,875.00		$22,490,500.00		$13,068,000.00	$100,193,375.00
10	**Subtotal**					$304,904,155.00		$142,867,540.00		$109,142,880.00	$556,914,575.00
11	- Engineering and Contingency	% of Construct. Costs	25%	Contingency funds applied to total of construction costs above		$76,226,038.75		$35,716,885.00		$27,285,720.00	$139,228,643.75
12	- Mainline Toll Plazas	Ea.	**$4,753,300**	Cost of Mainline Toll Plaza	2	$9,506,600.00	1	$4,753,300.00	1	$4,753,300.00	$19,013,200.00
13	- Mainline Startup Costs (First phase only)	Lump Sum	**$5,000,000**	Cost of System Software & Hardware	1	$5,000,000.00					$5,000,000.00
14	- Ramp Toll Plazas	Ea.	**$1,961,900**	Cost of two Ramp Toll Plazas per interchange	6	$11,771,400.00	4	$7,847,600.00	2	$3,923,800.00	$23,542,800.00
15	**TOTAL**					**$407,408,193.75**		**$191,185,325.00**		**$145,105,700.00**	**$743,699,218.75**

1. Paving includes roadway surface, base and shoulders. Grading assumes 5' embankment height. Drainage includes major structures (box culverts) and minor structures (culverts).

PENSCO NOTES

[A] Quantity adjusted to account for total estimated cost of work for this phase.

[B] R.R. Overpass Bridges equivalent to 7.0 X Unit Cost. Vermilion River Crossing (Non-navigable) equivalent to 2.5 X Unit Cost.

[C] As per HNTB

[D] Includes 2 signals per interchange.