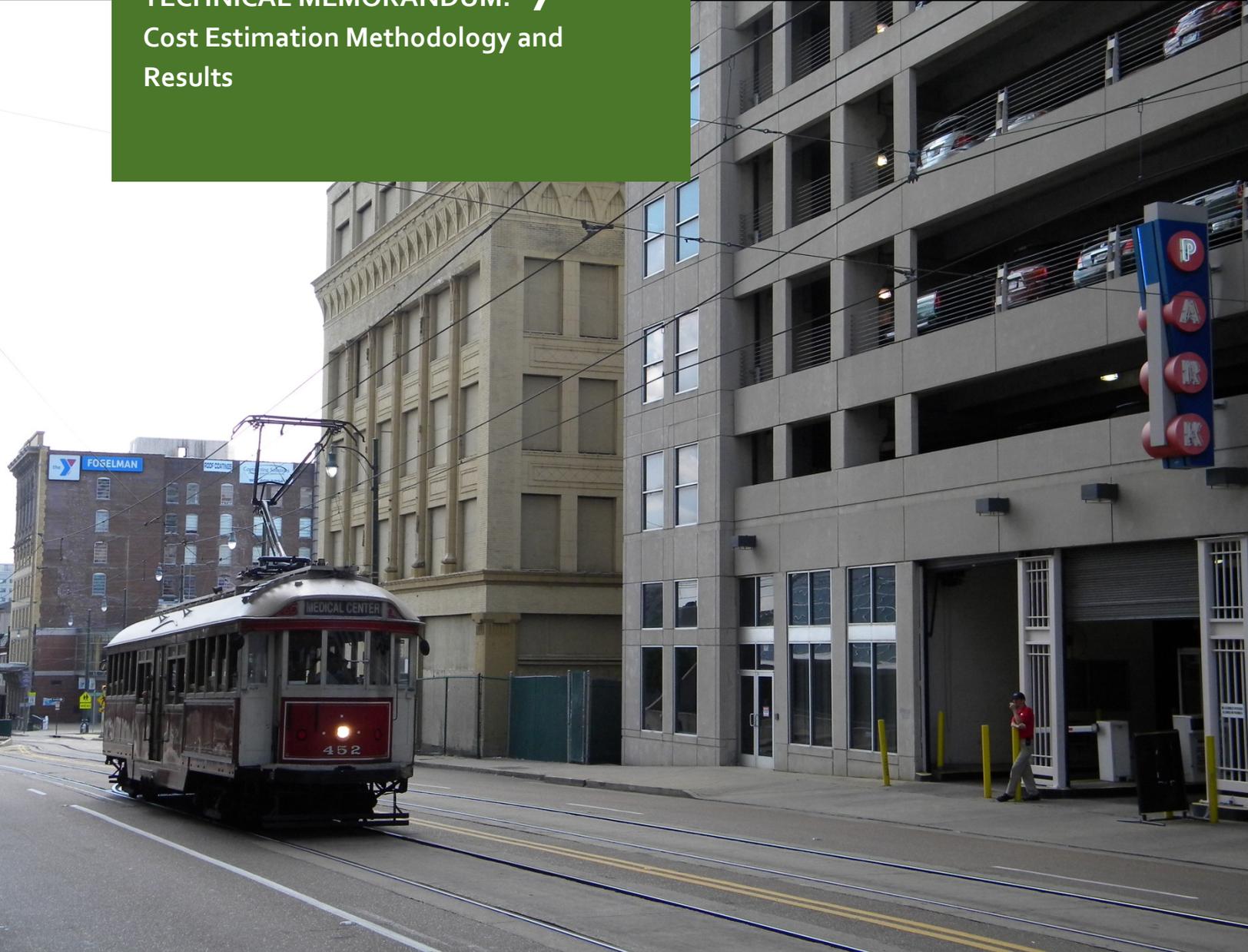
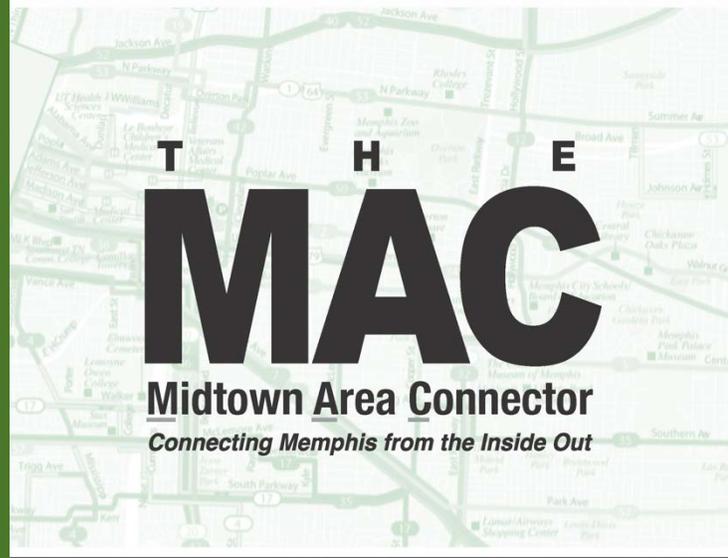


MEMPHIS AREA TRANSIT AUTHORITY

Midtown

Alternatives Analysis

TECHNICAL MEMORANDUM: **7**
Cost Estimation Methodology and
Results



April 2016

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Executive Summary



Introduction

Memphis is conducting an Alternatives Analysis to further investigate the implementation of High Capacity Transit Service through Midtown Memphis. The five goals of this project are to make Midtown Corridor transit service more compelling, connect neighborhoods and improve local circulation, support local and regional economic development goals, strengthen Midtown Corridor neighborhoods and business areas, and create an environment that will be sustainable over the long term. This project continues the implementation of the adopted Memphis Area Transit Authority (MATA) Short Range Transit Plan by initiating planning for Bus Rapid Transit (BRT) service and improving on-street transfer facilities.

Twenty-six potential High Capacity Transit Service alignments were initially identified and subjected to initial screening through public input, existing ridership data, population and employment information, identification of major activity or planned developments, and evaluation of suitable roadway geometry. Of these 26 alignments, 16 were advanced through two tiers of further evaluation in order to develop a locally preferred alternative.

Tier 1 Screening reviewed how well these 16 alignments accomplished the project goals. Tier 2 Screening, examining operations and costs, was applied to the seven alignments that passed the Tier 1 Screening. Upon coordination with MATA, the City of Memphis, and other stakeholders, a Locally Preferred Alternative was developed, connecting Downtown Memphis with the University of Memphis along Union Avenue and Poplar Avenue via Bus Rapid Transit service. The expected cost for the project is \$25,728,000.

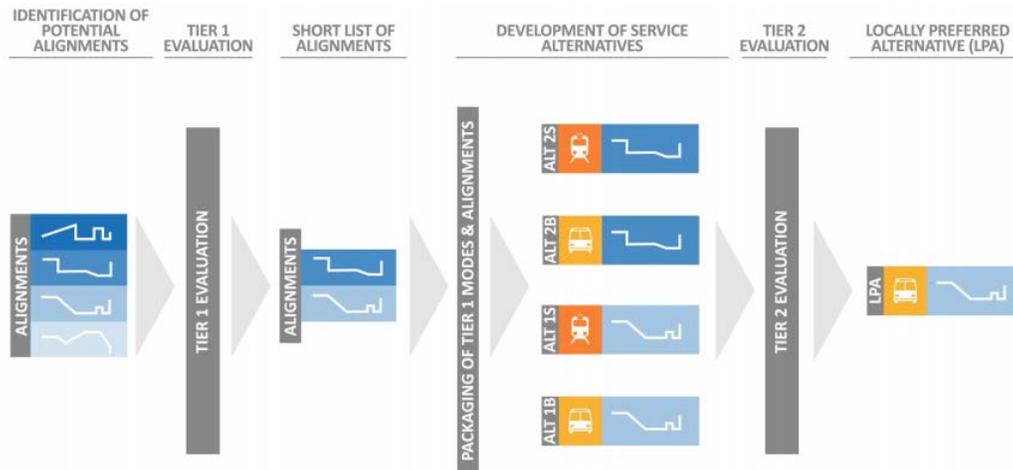
Section 1| Introduction

Project Background

Memphis is conducting an Alternatives Analysis to further investigate the implementation of High Capacity Transit Service through Midtown Memphis. The five goals of this project are to make Midtown Corridor transit service more compelling, connect neighborhoods and improve local circulation, support local and regional economic development goals, strengthen Midtown Corridor neighborhoods and business areas, and create an environment that will be sustainable over the long term. This project continues the implementation of the adopted Memphis Area Transit Authority (MATA) Short Range Transit Plan by initiating planning for Bus Rapid Transit (BRT) service and improving on-street transfer facilities.

Twenty-six potential High Capacity Transit Service alignments were initially identified and subjected to initial screening through public input, existing ridership data, population and employment information, identification of major activity or planned developments, and evaluation of suitable roadway geometry. Of these 26 alignments, 16 were advanced through two tiers of further evaluation in order to develop a locally preferred alternative as indicated in **Figure 1** below.

Figure 1: Alternatives Analysis Process



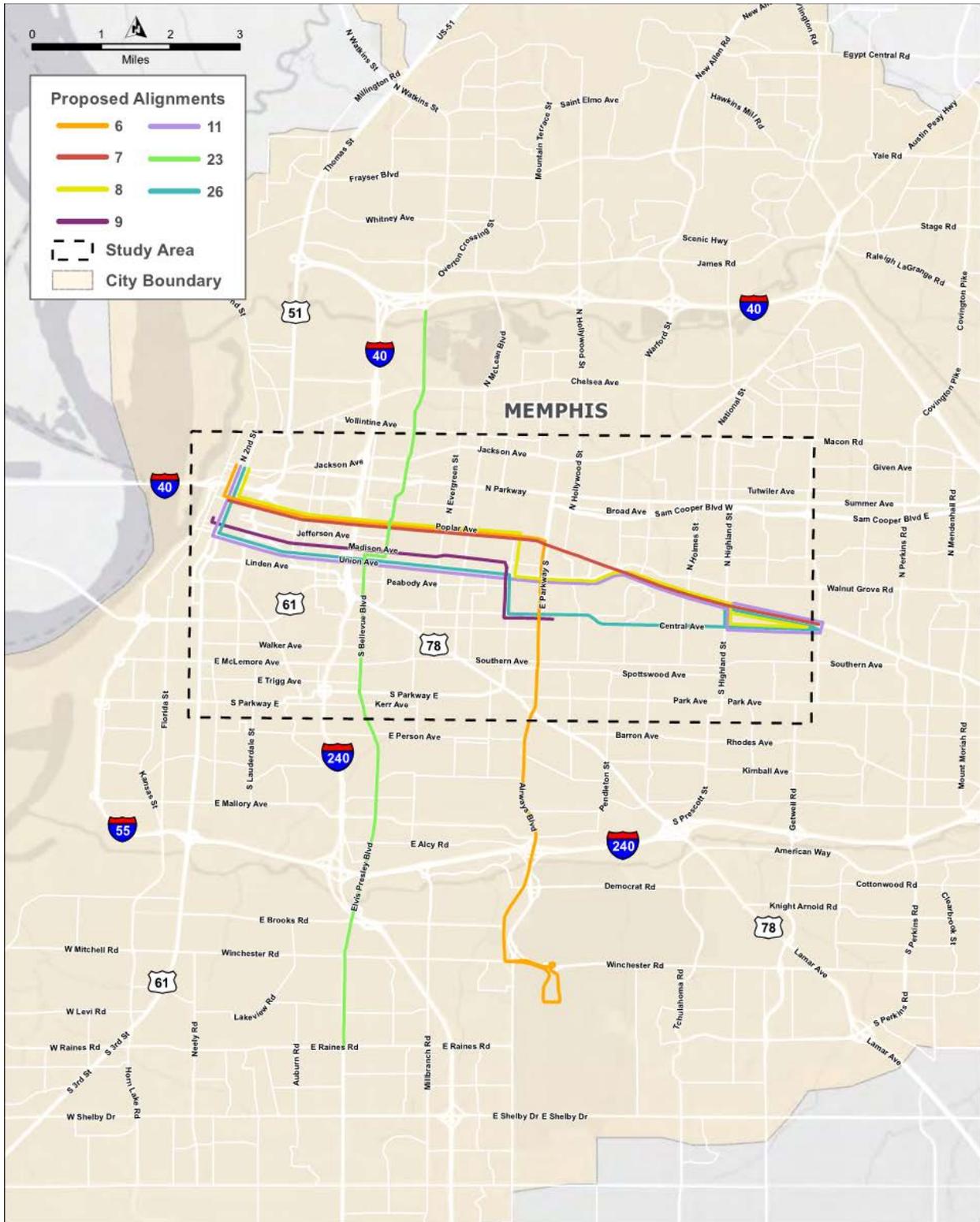
The Tier 1 screening examined how well each of the 16 alignments accomplished the goals of:

- Enhance:
 - Provide better transit service for existing riders and attract new riders
 - Provide fast, frequent, and reliable service
 - Improve transit options for Memphis' most vulnerable residents
- Connect:
 - Improve access for residents
 - Improve access to jobs
 - Improve connections with major attractions and destinations

- Improve access to civic and cultural assets
 - Improve access to visitor destinations and accommodations
 - Complement other transit investments
- Develop:
 - Support small businesses and retail districts
 - Foster compact, mixed-use development
 - Attract residential and commercial growth
- Thrive:
 - Support community desires
- Sustain
 - Develop implementable transit services

Of the 16 alignments, the seven alignments presented in **Figure 2** on the next page were selected for Tier 2 Screening.

Figure 2: Alternatives Selected for Tier 2 Screening



A draft operating plan for each alignment was generated whereby BRT service was identified as suitable for all of the alignments with the exception of Alignment 9, which would be an expansion of the existing Madison Trolley Line. To generate a Locally Preferred Alternative, the proposed alignments were further examined through Tier 2 screening: an operational analysis and estimation of capital costs.

Purpose of Document

This report describes the methodology used to estimate capital costs consistent with the current level of detail of analysis and the resulting cost estimates for various technology (Streetcar and Bus Rapid Transit) and route alternatives. Included are a description of the Federal Transit Authority's Standard Cost Categories utilized by transit agencies to secure funding, an explanation of cost estimating methods, a comparison of the calculated costs for the alternatives screened as part of the Tier 2 evaluation and the resultant Locally Preferred Alternative.

Section 2 |

Standard Cost Categories

All major transit investment pursuing federal funding through Federal Transit Administration (FTA) grant programs must organize project costs according to the agency's Standard Cost Categories (SCC) structure. This structure ensures that capital cost estimates can be fairly compared from one project to another. The most recent FTA capital costing format was used for providing totals for each category as required for Small Starts projects; the current detailed FTA SCC definitions for each type of cost are attached as Appendix A.

The SCC classification includes the following categories:

- Category 10: Guideway and Track Elements;
- Category 20: Stations, Stops, Terminals and Intermodal;
- Category 30: Support Facilities: Yards, Shops, and Administrative Buildings;
- Category 40: Sitework and Special Conditions;
- Category 50: Systems;
- Category 60: Right of Way, Land, and Existing Improvements;
- Category 70: Vehicles;
- Category 80: Professional Services;
- Category 90: Unallocated Contingency; and
- Category 100: Finance Charges.

Additional descriptions of the types of costs included in each category are provided below. The definitions are typical examples of types of costs that may be incurred on major transit projects; however, not all of the design elements noted in the descriptions are necessary for the options considered for the proposed Memphis project.

SCC Category 10 – Guideway and Track Element

Guideway and track elements consist of portions of the transit system constructed within the transit right of way. Category 10 includes a guideway within a dedicated/exclusive right-of-way or in mixed traffic; required cut and fill; underground tunnels and aerial structures; embedded track; direct fixation track; ballasted track; necessary removal of asphalt, earth excavation, backfill, drilling, mining, finished grading, and retaining walls; and other work needed for guideway or track construction. The unit of measure is typically in track feet unless otherwise noted. Trackage at the maintenance facility is included separately within the Support Facilities category (SCC Category 30).

SCC Category 20 – Station, Stops, Terminals, and Intermodal

Category 20 consists of any cost associated with the stations either above or below ground including: grading, excavation, ventilation structures and equipment, station power and lighting, platforms, canopies, finishes, equipment, ticket vending machines, landscaping, mechanical and electrical components, access control, security, artwork, station furnishings (benches, trash receptacles, etc.) and signage. At this level of detail, a "typical" station design was identified and the same unit cost was

applied to all station locations; site-specific station elements would be considered as part of future Preliminary Engineering activities.

SCC Category 30 – Support Facilities, Yard, Shops, and Administrative Buildings

Category 30 is comprised of vehicle storage and maintenance buildings; track for storage of vehicles; office support areas; major shop equipment and bus maintenance facilities; costs associated with clearing and grubbing, rough grading, excavation, construction of building structures, drainage facilities, roadways, asphalt pathways, lighting, mechanical and electrical components, landscaping, access control, safety and security, fueling stations; and other items necessary for construction and operation of a storage and maintenance facility.

SCC Category 40 – Sitework and Special Conditions

Included within Category 40 are all of the materials and labor required for construction of the transitway; environmental mitigation and hazardous material/soil contamination removal; required wetland, historical/archeological and park mitigation; sidewalks, public art and bike facilities; fencing; site lighting and signage; as well as any costs associated with mobilization, traffic mitigation and temporary construction. Examples of sitework includes the costs for clearing, grubbing, earthwork, utility relocations (private and public), hazardous material mitigation, wetland mitigation, construction of retaining or MSE walls, roadways, curb and gutter, drainage facilities, landscaping, and the installation of erosion control measures and maintenance of traffic devices not otherwise included in the other categories.

SCC Category 50 – Systems

Category 50 includes costs associated with communications, train control, train signals, traffic signals, crossing protection, traction power substations, and the catenary power distribution system.

SCC Category 60 – Right of Way, Land, and Existing Improvements

Category 60 includes the costs for parcel impacts, including purchase, easements, relocations, real estate fees, and professional services associated with parcels needed for the transit and highway improvements. Professional services can include administration, real estate and relocation consultants, legal counsel, court expenses, insurance, etc.

SCC Category 70 – Vehicles

Category 70 includes the cost of modern streetcar vehicles using electric propulsion, and/or enhanced rubber-tired buses for the bus-based alternatives.

SCC Category 80 – Professional Services

Under professional services Category 80, FTA identifies eight sub-categories. These categories represent expenditures related to project engineering; project and construction management; insurance; legal matters (such as permit review fees and surveys); testing and inspections; and technology-related training of personnel.

The costs allowed for each professional service subcategory were estimated using a percentage of construction costs based on historical averages for projects of this type (specific cost percentages are documented later in this report). The right-of-way and vehicle procurement costs are not factored in when calculating professional services. Costs were calculated individually for each professional service subcategory, and not cumulatively. The eight professional services sub-categories include:

- Preliminary Engineering;
- Final Design;
- Project Management for Design and Construction;
- Construction Administration and Management;
- Professional Liability and other Non-Construction Insurance;
- Legal, Permits, Review Fees by other agencies, cities, etc.;
- Surveys, Testing, Investigation, and Inspection; and
- Start up.

SCC Category 90 – Unallocated Contingency

Category 90 provides a standard unallocated contingency to account for any items or issues potentially not considered.

SCC Category 100 – Finance Charges

Category 100 includes finance charges expected to be paid by the project sponsor/grantee prior to either the completion of the project or the fulfillment of the Small Starts funding commitment, whichever occurs later in time. Finance charges incurred after the later of these two dates would not be included in the total project cost.

The finance charges are derived by the initial proposed finance strategy, based on the analysis of the sources and uses of the funds. The amount and type of debt financing required and revenues available determine the finance charges. By year, the finance charges are calculated in year of expenditure dollars.

Section 3|

Capital Cost Estimating Methodology

Types of Cost Estimates

There are two methods commonly used for estimating unit prices:

- Historical Bid Price Method as a basis for establishing unit prices for a proposed project, based on past unit price bids for similar work adjusted for time and project location using a recognized construction cost index.
- Time and Material Method of development for unit prices based on nationally recognized productivity, local labor and equipment rates from a similar or same database; and material or subcontract costs from the same data base or as obtained by the estimating team for the project. This method may also be known as the Crew Price Method.

These methods can be used either individually or in combination. During the conceptual engineering phase of project development, when there is the least amount of engineering detail available, the Historical Bid Price method is used for most items but not exclusively. As the project moves into the 30 percent preliminary engineering phase, the Time and Material method begins to replace historical bid prices for those items that can be quantified based on actual preliminary designs or appropriate assumptions which can significantly contribute to the project's total cost. In some cases, neither the Historical Bid Price method nor the Time and Material method accurately portrayed the cost, in which case, a specialized cost method may be needed.

Historical Bid Price Method

Preparing capital cost estimates using historical bid prices is one of the simplest and most widely used methods. When using this method, a number of considerations were taken into account and factors applied as needed:

- Adjust any bid prices where the date is older than 12 months from the current date by using an escalation factor as described in Section 3.5.
- Adjust bid prices to reflect conditions of the project, such as type of terrain, geographical location, soil, traffic and other related factors, and economic conditions. These adjustments are typically based on the experience and judgment of the estimator. For location factor adjustments, the City Cost Index (CCI) published by RSMeans was used.
- Ensure that the scope of work in the historical unit price is substantially similar to the work on this project.

There are a few sources for historical bid prices that were used, that can be broadly grouped into civil/structural and systems. The civil/structural items were taken from bid prices from the recent projects in Tampa, Columbus, and Orlando. The systems group typically represents items that are unique to transit construction projects and include items like trackwork, traction power, train control, fare collection, etc. Unit prices for items in this category were taken from a database of historical bid

prices from other transit projects around the United States and then adjusted by escalation and location factors.

Time and Material Price (Crew Price) Method

This method allows a unit price to be developed that can better reflect current pricing levels based on local factors and conditions. It is also easier to make adjustments for changes in market conditions, which might affect productivity or the cost of labor or materials. One of the advantages of using an estimating program based on a nationally recognized database is that the input and analysis of the data necessary to calculate the unit price for any given construction activity is an integral part of the software. The following steps are required in order to develop a unit price using this method:

- Analyze the proposed construction;
- Develop quantities for work design or based on appropriate assumptions;
- Estimate productivity rates based on past experience or a recognized database;
- Obtain materials prices using available sources and local vendors of a recognized database;
- Determine labor and equipment rates from local sources or a recognized database;
- Add subcontractor mark ups for work typically subcontracted;
- Calculate direct unit price using the above factors; and
- Add general contractors' mark ups to include overhead and profit for the total unit price.

The following sources were used to obtain basic cost data that were input into the database estimating program in order to develop any needed construction unit prices:

- Equipment rates – RSMMeans and/or Corp of Engineers Construction Equipment Ownership and Operating Expense Schedule, and
- Material prices - Material and supply prices for locally available material were obtained from local supplier quotes, if possible. Secondary sources of material cost data may be taken from RSMMeans, Engineering News-Report (ENR) or other published resources.

Miscellaneous Estimate Types

There are a number of special estimate types that are sometimes required during the project development process. The methodology used to develop the costs associated with these estimates is again a function of the level of engineering design available when the estimate request is developed.

These estimate types include:

- A Fair Price Cost Estimate is developed from information pertaining to a specific project or contract unit that is already under fabrication, installation or construction. It may be used as the basis for negotiations with the contractor or as a comparison to estimates submitted by the contractor reflecting changes in the scope of the original contract (change orders or claims) to assure that the quoted price is fair and equitable. It is normally used during the construction phase.
- A Life Cycle Cost Estimate is appropriate when there is a desire to compare two or more alternative design choices where initial capital cost comparisons only could lead to the erroneous selection of the most cost effective solution. This estimate takes into account the annual costs (O&M) related to each alternative as well as the initial capital cost. It is normally used during the design phase; and,

- Design or Trade-off Studies are generally design phase support estimates and can be developed by either parametric or deterministic methods. These estimates compare differential costs and not the total cost of each option under study. Care has to be taken to set boundaries for each option that are consistent so that "apple and oranges" comparisons are not made. Differential costs were expressed in dollars and not as a percentage difference.

Software

There are a number of choices that can be made in the selection of software for developing and preparing capital cost estimates. These choices include standard spreadsheet software like Microsoft Excel, or commercially produced database estimating programs such as Timberline that contains a cost database developed from both historical and current pricing. Reports were prepared in Microsoft Excel utilizing the Federal Transit Authority's Small Starts Worksheet and a combination of both the Historical and Time and Material Methods.

Engineering Design Phase Cost Estimate Types

The type of cost estimate that is used for any given project development stage is dependent on the level of engineering design that has been completed. The decision on which estimate type is appropriate for a particular project or portion of the project is based on the estimator's experience and judgment considering the level of engineering design completed at the time the estimate is requested. **Table 1** shows the major FTA project development stages, as defined in this project by percentage of design completion.

Table 1: Project Development Stages

Development Stage	Percent of Design Completion
System Planning	0% to 5%
Alternatives Analysis / Conceptual Design	5% to 20%
Preliminary and Advanced Preliminary Engineering	20% to 65% (Preliminary Engineering to 30%, Advanced Preliminary Engineering to 65%)
Final Design	65% to 100%
Design Services During Construction	Design changes due to changed conditions during construction

These development stages represent the different degrees of project definition and thus the level of engineering design completed. The development stages are used throughout this document to indicate different applications of the various estimating policies or procedures. Because of the variability, the decision on what is the most appropriate estimating procedure to apply at any given point are made based on the actual levels of project engineering and project definition at that time. The goal is to prepare project estimates in a consistent and uniform manner, organized and standardized in methods and format to facilitate estimate review and checking.

Alternatives Analysis / Conceptual Design Phase

At the Alternatives Analysis Design Phase, main components of the project are outlined. This includes: major roadway items, grading, track, grade crossings, major structural items (including stations, bridges and retaining walls), and major systems elements (including traction power, communications elements, train control elements, fare collection elements and corrosion control elements). Due to the very preliminary nature of this design phase, the Historical Bid Price Method is the primary, but not exclusive, method used to develop the cost estimate.

Preliminary Engineering Design Phase

At the 30% Preliminary Engineering design phase, the Conceptual Design based cost estimate will be refined to include more detailed cost estimating of the work for items such as demolition of existing structures and roads, stormwater drainage, refined structural items (bridges and retaining walls), utility relocations, water line relocations, sewer line relocations, systems integration, grading and drainage for stations, and utilities for stations. The 30 percent design phase cost estimate will be a mix of historical unit price and crew price methods based on the design detail of particular elements. Based on past projects of this type, the ratio of historical unit price to crew price will range from 50/50 to 30/70 respectively.

Advanced Engineering Design Phase

At the 65% Advanced Engineering design phase, the Preliminary Design-based cost estimate will be refined to include more detailed quantifying of work and development of more unit costs based on the crew price method. At this stage the majority of the unit costs will be developed using the crew price method and detailed quantities will also be available for the majority of the work. Historical unit prices will only be used when sufficient detail is not provided on the plans or sufficient information does not permit appropriate assumptions to be made for the development of quantities. Based on past projects of this type, the ratio of historical unit price to crew price method will range from 30/70 to 10/90 respectively.

Advanced Engineering Design Phase

At the 90% Final Engineering design phase, the Advanced Design based cost estimate will again be refined to include more detailed quantifying of work and development of more unit costs based on the crew price method. At this stage the all of the unit costs will be developed using the crew price method and detailed quantities will also be available for the all of the work. This estimate is also known as the Engineers Estimate of Cost.

Contingency

Contingencies are typically included in an estimate as an allowance for lack of information incorporated in a particular design phase. Contingency allowances are used to account for those items of work (and their corresponding costs) which may not be readily apparent or cannot be quantified at the current level of design, such as major project scope changes, a potential project change resulting from public/political issues, environmental or technical requirements, or risk associated with right-of-way. For the purposes of this estimating program, contingencies are assigned to two major categories –

allocated and unallocated. The allocated and unallocated contingencies are applied in the appropriate FTA category, and the same percentages do not necessarily need to be used for all of them.

Allocated Contingency

Allocated contingency is used for projects where the engineering design level is determined to be less than 100 percent complete. Because the level of project information is incomplete for individual scopes of work and due to the risk associated with this lack of information, a contingency allowance in the range of 10 percent to 50 percent is allocated based on the FTA Standard Cost Categories. The exact percentage selected for each cost category is based on professional judgment and experience related to the cost variability typically seen for items of work within a particular cost category. The percentages shown in **Table 2** below are the values that were used for this capital cost estimate.

Table 2: Contingency by FTA Category

FTA SCC Number	Description	Allocated Contingency (%)
10	Guideway Elements	25
20	Stations, Stops, Terminals, Intermodal	25
30	Support Facilities: Yard, Shops, and Admin Buildings	25
40	Sitework and Special Conditions	25
50	Systems	25
60	Right of Way, Land, Existing Improvements	50
70	Vehicles	10
80	Professional Services	10

Unallocated Contingency

Unallocated contingency is the second category to be used. The reasons for applying this contingency are similar to those for allocated contingency, primarily as an allowance for risk related to the level of design. Once a project reaches a design level of 30 percent or greater, there is generally sufficient detail on which to base both quantity and unit price development, that a single contingency can be added to the overall project which is not allocated to the individual SCC. An unallocated contingency of 5% was applied to the cost estimate.

Escalation

There are two situations where it is sometimes necessary to make use of escalation factors. The first case involves taking a cost with a base year that is older than the current base by one or more years. In this situation, actual historical construction cost index values can be used to calculate the escalation factor from the period in question to the present. The second case involves taking a current base year cost and projecting it into a future base year. In this situation, the escalation factor would be calculated using the most recent ten year moving average using RSMeans Quarterly CCIs for the geographic location nearest to the project. The methodology used is based on a statistical calculation of the annual average construction cost change over the ten years preceding the data date using the RSMeans CCI.

Then the calculated annual average change is used to forecast construction to the midpoint of the anticipated construction period for the project.

For planning purposes as part of this analysis, all costs were projected as base-year costs in 2015 dollars as the timeframe for construction was undefined. As a result, there are no SCC Category 100 Finance Charges.

Right of Way Costs

The Consultant identified the parcels needed as right of way for the project, including recommendations regarding complete or partial acquisition, which generally consist of route corner clips and stop locations that extend beyond the existing right-of-way.

For this estimate, parcel tax values obtained from Shelby County were used. More detailed right of way costs, including typical administrative expenses (appraisals, attorney fees, etc.) for property acquisition will be included in estimates for subsequent work phases.

Soft Costs

Soft cost add-ons are included to represent the costs of engineering, project and construction management and administration, insurance, permits and fees, training/startup/testing and any force account work. These add on costs are calculated as a percentage of construction costs only (excluding vehicle procurement and right-of-way costs) and are itemized below the construction cost subtotal. The percentages are applied individually and not cumulatively. For the Alternatives Analysis phase, the soft cost percentages shown in **Table 3** below have been selected based on historical averages for projects of this type.

Table 3: Soft Costs as a Percentage of Construction Costs

Soft Cost	Percentage (%)
Project Development	3
Engineering	12
Project Management for Design and Construction	5
Construction Administration and Management	10
Professional Liability and other Non-Construction Insurance	2
Legal – Permits, Review Fees by other Agencies, Cities, etc.	2
Surveys, Testing, Investigation, Inspection	0.5
Start Up	1

As the project evolves through the design process, these percentages should be adjusted.

Section 4 | Capital Costs

Summary of Costs

The estimated capital costs for each of the seven alignments subjected to Tier 2 screening were determined to be:

- Alignment 6: \$43,684,000
- Alignment 7: \$36,965,000
- Alignment 8: \$35,242,000
- Alignment 9: \$65,616,930
- Alignment 11: \$37,230,000
- Alignment 23: \$43,847,000
- Alignment 26: \$38,419,000

Each of these costs are broken down by FTA SCC in the following sections.

Alignment 6

Alignment 6 is a Bus Rapid Transit route connecting Downtown to Memphis International Airport via Poplar Avenue and Airways Boulevard. The Capital Cost Estimate for the service is presented in **Table 4** below.

Table 4: Alignment 6 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	13.57 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,766,000
20 – Stations, Stops, Terminals, Intermodal	39 Stations	\$18,750,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,423,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$3,001,000

FTA SCC / Project Component	Description	Cost
<i>Construction Subtotal</i>		\$24,939,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$1,615,000
70 – Vehicles	Purchase of 13 branded buses	\$7,150,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$7,899,000
<i>Subtotal</i>		\$41,603,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$2,080,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$43,684,000

Alignment 7

Alignment 7 is a Bus Rapid Transit route connecting Downtown to the University of Memphis via Poplar Avenue. The Capital Cost Estimate for the service is presented in **Table 5** below.

Table 5: Alignment 7 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	8.39 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,174,000
20 – Stations, Stops, Terminals, Intermodal	26 Stations	\$12,750,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,019,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$1,766,000
<i>Construction Subtotal</i>		\$16,709,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$1,098,000
70 – Vehicles	Purchase of 22 branded buses (11 needed for BRT service to the University of Memphis, 22 to continue regular service to Germantown)	\$12,100,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$5,298,000
<i>Subtotal</i>		\$35,204,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$1,760,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$36,965,000

Alignment 8

Alignment 8 is a Bus Rapid Transit route connecting Downtown to the University of Memphis via Poplar Avenue, Cooper Street, and Union Avenue. The Capital Cost Estimate for the service is presented in **Table 6** below.

Table 6: Alignment 8 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	10.39 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,277,000
20 – Stations, Stops, Terminals, Intermodal	30 Stations	\$14,750,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,157,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$2,327,000
<i>Construction Subtotal</i>		\$19,510,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$1,270,000
70 – Vehicles	Purchase of 12 branded buses	\$6,600,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$6,183,000
<i>Subtotal</i>		\$33,564,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$1,678,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$35,242,000

Alignment 9

Alignment 9 is the extension of the Madison Avenue Trolley line connecting Downtown to the Memphis Fairgrounds via Madison Avenue, Cooper Street, and Central Avenue. It is a 2.82 mile extension of the existing 4.38 mile Trolley Line. The Capital Cost Estimate for the service, presented in **Table 7** below, assumes that new modern streetcars and a new maintenance facility are required. If MATA elects to use the existing vintage streetcars and maintenance facility, the estimate is reduced \$65 million (as shown in **Table 8**).

Table 7: Alignment 9 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	2.82 Miles of New Double Track (Connects to 4.38 miles of existing double track)	\$10,803,000
20 – Stations, Stops, Terminals, Intermodal	8 Stations	\$1,239,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	Provide a new maintenance facility	\$10,800,000
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$19,074,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$12,511,000
<i>Construction Subtotal</i>		\$54,426,000
60 – Right of Way, Land, Existing Improvements	Streetcar would be located within the existing right of way.	\$0
70 – Vehicles	Purchase of 8 modern streetcars.	\$38,400,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$11,647,000
<i>Subtotal</i>		\$104,473,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$10,448,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$114,921,000

Table 8: Alignment 9 Capital Cost Estimate (With Existing Trolleys and Maintenance Facility)

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	2.82 Miles of New Double Track (Connects to 4.38 miles of existing double track)	\$0.00
20 – Stations, Stops, Terminals, Intermodal	8 Stations	\$0.00
30 – Support Facilities: Yards, Shops, Admin. Buildings	Provide a new maintenance facility	\$0.00
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$0.00
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$43,625,731
<i>Construction Subtotal</i>		\$43,625,731
60 – Right of Way, Land, Existing Improvements	Streetcar would be located within the existing right of way.	\$0.00
70 – Vehicles	Purchase of 8 modern streetcars.	\$0.00
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$11,647,000
<i>Subtotal</i>		\$55,272,492
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$9,387,996
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$64,660,488

Alignment 11

Alignment 11 is a Bus Rapid Transit route connecting Downtown to the University of Memphis via Union Avenue and Poplar Avenue. The Capital Cost Estimate for the service is presented in **Table 9** below.

Table 9. Alignment 11 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	10.99 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,291,000
20 – Stations, Stops, Terminals, Intermodal	31 Stations	\$15,250,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,224,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$3,151,000
<i>Construction Subtotal</i>		\$20,916,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$1,313,000
70 – Vehicles	Purchase of 12 branded buses	\$6,600,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$6,628,000
<i>Subtotal</i>		\$35,457,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$1,773,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$37,230,000

Alignment 23

Alignment 23 is a Bus Rapid Transit route connecting North Memphis to the Whitehaven via Watkins Street, Cleveland Street, Peabody Avenue, Bellevue Boulevard, and Elvis Presley Boulevard. The Capital Cost Estimate for the service is presented in **Table 10** below.

Table 10: Alignment 23 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	11.04 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,659,000
20 – Stations, Stops, Terminals, Intermodal	39 Stations	\$19,500,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,427,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$2,427,000
<i>Construction Subtotal</i>		\$25,008,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$1,679,000
70 – Vehicles	Purchase of 13 branded buses	\$7,150,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$7,921,000
<i>Subtotal</i>		\$41,759,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$2,088,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$43,847,000

Alignment 26

Alignment 26 is a Bus Rapid Transit route connecting Downtown with the University of Memphis via Union Avenue and Central Avenue. The Capital Cost Estimate for the service is presented in **Table 11** below.

Table 11: Alignment 26 Capital Cost Estimate

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	11.51 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,368,000
20 – Stations, Stops, Terminals, Intermodal	32 Stations	\$15,750,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,265,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$3,362,000
<i>Construction Subtotal</i>		\$21,744,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$1,356,000
70 – Vehicles	Purchase of 12 branded buses	\$6,600,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$6,889,000
<i>Subtotal</i>		\$36,590,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$1,829,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$38,419,000

Section 5|

Locally Preferred Alternative

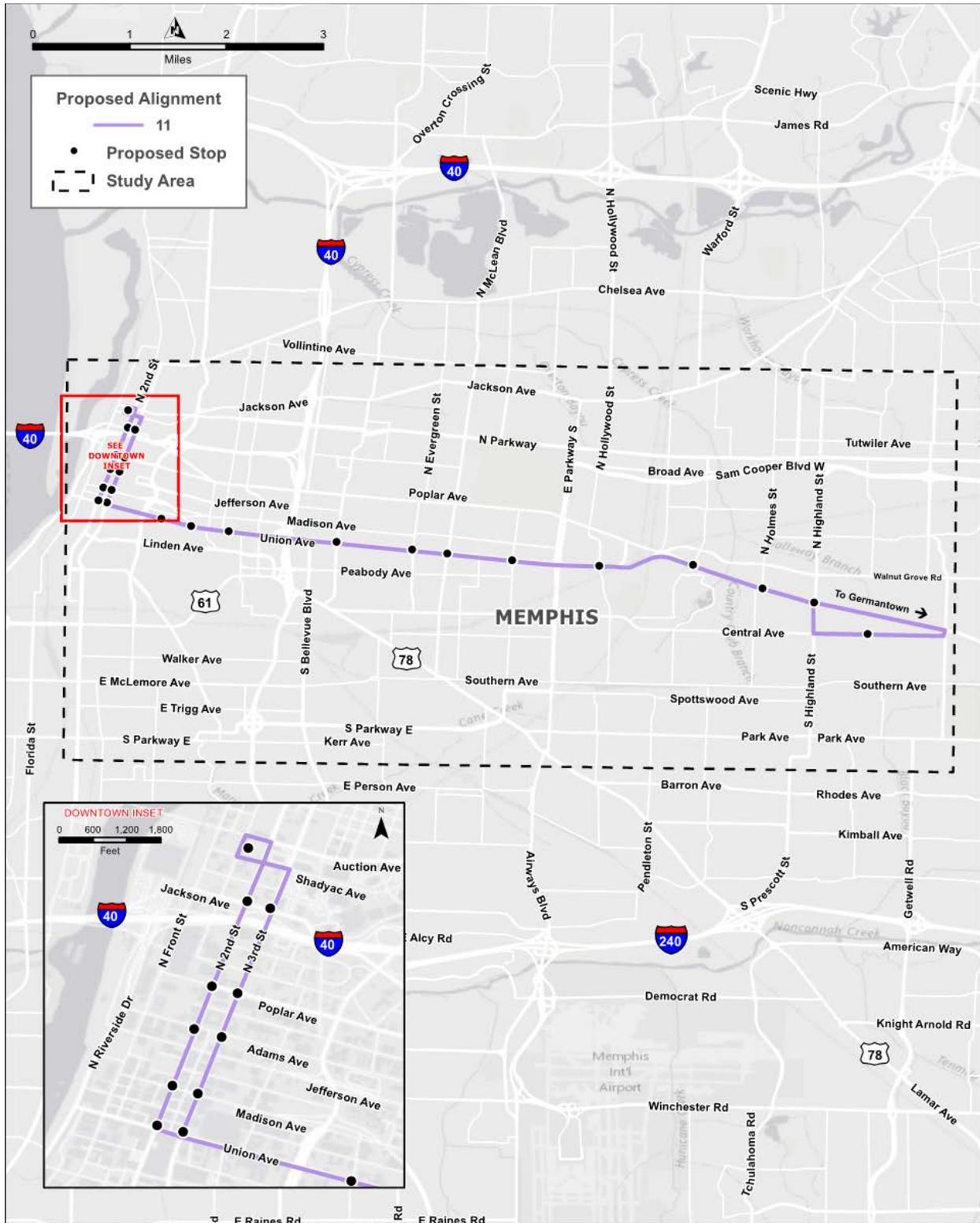
Analysis and Evolution

After comparing the seven alignments during the Tier 2 screening, Alignment 11 was recommended for acceptance as the Locally Preferred Alternative. The criteria for projected operations to determine the Locally Preferred Alternative included ridership and travel time, projected capital costs, and projected operating and maintenance costs. Upon input from MATA, the City of Memphis, and other stakeholders, Alignment 11 was modified to reduce the number of stations and provide better connections in the downtown area through the utilization of MATA’s proposed Downtown Transit Emphasis Corridors along Second Street and B.B. King Boulevard (formerly Third Street). **Figure 3** below shows the proposed section along Union Avenue, while **Figure 4** shows the evolved Alignment 11, station locations, and possible route transfers available at the stations on the next page.

Figure 3: Proposed Section along Union Avenue



Figure 4: Alternative 11 – Locally Preferred Alternative



Capital Cost Estimate

The projected capital cost of Alignment 11 had been \$37,230,000 prior to recommendations from MATA, the City of Memphis, and other stakeholders. Significant cost savings were available from these revisions, particularly due to the reduction in number of stations, which resulted in an updated estimate of \$25,728,000. The Capital Cost Estimate for the BRT service is presented in **Table 12** below with the recommended changes incorporated.

Table 12: Alignment 11 - Locally Preferred Alternative

FTA SCC / Project Component	Description	Cost
10 – Guideway and Track Elements	11.11 Miles of Milling, Resurfacing, and Striping (1 lane in each direction)	\$1,298,000
20 – Stations, Stops, Terminals, Intermodal	23 Stations	\$8,750,000
30 – Support Facilities: Yards, Shops, Admin. Buildings	None – the existing Operations and Maintenance Facility will be used	\$0
40 – Sitework and Special Conditions	Includes demolition required for construction of stations, utility relocations, and bicycle / pedestrian improvements.	\$1,106,000
50 – Systems	Traffic signal upgrades to allow Transit Signal Priority and communications system.	\$3,170,000
<i>Construction Subtotal</i>		\$14,324,000
60 – Right of Way, Land, Existing Improvements	Purchase additional right of way to accommodate station locations.	\$754,000
70 – Vehicles	Purchase of 9 branded buses	\$4,950,000
80 – Professional Services	Preliminary engineering, final design, project management, construction management, insurance, permitting and fees, and survey	\$4,475,000
<i>Subtotal</i>		\$24,502,000
90 – Unallocated Contingency	Standard unallocated contingency to account for any items or issues potentially not considered	\$1,225,000
100 – Finance Charges	None as only base year costs are being compared in 2015 dollars	\$0
TOTAL BASE COST (2015 DOLLARS)		\$25,728,000

Appendix A

FTA Standard Cost Category Definitions

Memphis Area Transit Authority | Appendix A: FTA Standard Cost Category Definitions

<p>Standard Cost Categories for Small Starts Projects D E F I N I T I O N S</p> <p>(Rev.17, June, 2015)</p>		<p>NOTE: The SCC cost breakdown is based on a traditional Design Bid Build model. If your project is Design Build, to the best of your ability, separate construction costs from design, administration, testing, etc. Put all construction costs in 10 through 50. Put design, administration, testing, etc. in <i>80 Professional Services</i>.</p>
<p>10 GUIDEWAY & TRACK ELEMENTS (route miles)</p>		<p>Include guideway and track costs for all transit modes (heavy rail, light rail, commuter rail, BRT, rapid bus, bus, monorail, cable car, etc.) The unit of measure is route miles of guideway, regardless of width. As associated with the guideway, include costs for rough grading, excavation, and concrete base for guideway where applicable. Include all construction materials and labor regardless of whom is performing the work.</p> <p>In your written description of the scope, and in supporting graphic diagrams, indicate whether busway or rail track is single, double, triple, relocated, etc. Put guideway and track elements associated with yards in <i>30 Support Facilities</i> below.</p>
10.01	Guideway: At-grade exclusive right-of-way	
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)	
10.03	Guideway: At-grade in mixed traffic	
10.04	Guideway: Aerial structure	Include foundation excavation; guideway structures including caissons, columns, bridges, viaducts, cross-overs, fly-overs.
10.05	Guideway: Built-up fill	Include construction of earthen berms.
10.06	Guideway: Underground cut & cover	Include excavation, retaining walls, backfill, underground guideway structure and finishes.
10.07	Guideway: Underground tunnel	Include tunneling by means of a tunnel boring machine, drill blasting, mining, and immersed tube tunneling; tunnel structure and finishes.
10.08	Guideway: Retained cut or fill	Include excavation, retaining walls, backfill, underground guideway structure and finishes.
10.09	Track: Direct fixation	Include rails, connectors.
10.10	Track: Embedded	Include rails, ties; ballast where applicable
10.11	Track: Ballasted	Include rails, ties and ballast.
10.12	Track: Special (switches, turnouts)	Include transitional curves.

Memphis Area Transit Authority | Appendix A: FTA Standard Cost Category Definitions

10.13	Track: Vibration and noise dampening	Include upcharge for vib/noise dampening to any track condition above.
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)		As associated with stations, include costs for rough grading, excavation, station structures, enclosures, finishes, equipment; mechanical and electrical components including HVAC, ventilation shafts and equipment, station power, lighting, public address/customer information system, safety systems such as fire detection and prevention, security surveillance, access control, life safety systems, etc. Include all construction materials and labor regardless of whom is performing the work. NOTE: Count paired inbound/outbound boarding platforms as one station - do not report the total number of boarding platforms.
		Put guideway and track associated with stations in <i>10 Guideway & Track Elements</i> above.
20.01	At-grade station, stop, shelter, mall, terminal, platform	
20.02	Aerial station, stop, shelter, mall, terminal, platform	Include station structures including caissons, columns, platforms, superstructures, etc.
20.03	Underground station, stop, shelter, mall, terminal, platform	Include retaining walls, backfill, structure.
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	
20.05	Joint development	Per FTA's Joint Development Guidance, "Joint development is any income-producing activity with a transit nexus related to a real estate asset in which FTA has an interest. ...Joint development projects are commercial, residential, industrial, or mixed-use developments that are induced by or enhance the effectiveness of transit projects. . ."
20.06	Automobile parking multi-story structure	Include retaining walls, backfill, structure.
20.07	Elevators, escalators	
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS		As associated with support facilities, include costs for rough grading, excavation, support structures, enclosures, finishes, equipment; mechanical and electrical components including HVAC, ventilation shafts and equipment, facility power, lighting, public address system, safety systems such as fire detection and prevention, security surveillance, access control, life safety systems, etc. Include fueling stations. Include all construction materials and labor regardless of whom is performing the work.
		Where a support facility shares the structure with a station, its cost may be included with station cost. Identify this with a note.
		Except for guideway and track associated with a yard, include all guideway and track costs associated with support facilities in <i>10 Guideway & Track Elements</i> above.
30.01	Administration Building: Office, sales, storage, revenue counting	

Memphis Area Transit Authority | Appendix A: FTA Standard Cost Category Definitions

30.02	Light Maintenance Facility	Include service, inspection, and storage facilities and equipment.
30.03	Heavy Maintenance Facility	Include heavy maintenance and overhaul facilities and equipment.
30.04	Storage or Maintenance of Way Building	
30.05	Yard and Yard Track	Include yard construction, guideway and track associated with yard.
40 SITEWORK & SPECIAL CONDITIONS		Include all construction materials and labor regardless of whom is performing the work.
40.01	Demolition, Clearing, Earthwork	Include project-wide clearing, demolition and fine grading.
40.02	Site Utilities, Utility Relocation	Include all site utilities - storm, sewer, water, gas, electric.
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	Include underground storage tanks, fuel tanks, other hazardous materials and treatments, etc.
40.04	Environmental mitigation, e.g. wetlands, historic/archeologic, parks	Include other environmental mitigation not listed.
40.05	Site structures including retaining walls, sound walls	
40.06	Pedestrian / bike access and accommodation, landscaping	Include sidewalks, paths, plazas, landscape, site and station furniture, site lighting, signage, public artwork, bike facilities, permanent fencing.
40.07	Automobile, bus, van accessways including roads, parking lots	Include all on-grade paving.
40.08	Temporary Facilities and other indirect costs during construction	As a general rule and to the extent possible, appropriately allocate indirect costs among the construction costs in Categories 10 through 50. Where that is not possible, include in <i>40.08 Temporary Facilities</i> costs for mobilization, demobilization, phasing; time and temporary construction associated with weather (heat, rain, freezing, etc.); temporary power and facilities; temporary construction, easements, and barriers for storm water pollution prevention, temporary access and to mitigate construction impacts; project and construction supervision; general conditions, overhead, profit. NOTE: Include contractor's general liability and other insurance related to construction such as builder's risk in Cats. 10 - 50, not in 80 Professional Services below.
50 SYSTEMS		Include all construction materials and labor regardless of whom is performing the work.
50.01	Train control and signals	
50.02	Traffic signals and crossing protection	Include signal prioritization at intersections.
50.03	Traction power supply: substations	

Memphis Area Transit Authority | Appendix A: FTA Standard Cost Category Definitions

50.04	Traction power distribution: catenary and third rail	
50.05	Communications	Include passenger information systems at stations and on vehicles (real time travel information; static maps and schedules). Include equipment to allow communications among vehicles and with central control.
50.06	Fare collection system and equipment	Include fare sales and swipe machines, fare counting equipment.
50.07	Central Control	
Construction Subtotal (10 - 50)		
60 ROW, LAND, EXISTING IMPROVEMENTS		Include professional services associated with the real estate component of the project. These costs may include agency staff oversight and administration, real estate and relocation consultants, legal counsel, court expenses, insurance, etc.
60.01	Purchase or lease of real estate	If the value of right-of-way, land, and existing improvements is to be used as local match to the Federal funding of the project, include the total cost on this line item. In backup documentation, separate cost for land from cost for improvements. Identify whether items are leased, purchased or acquired through payment or for free. Include the costs for permanent surface and subsurface easements, trackage rights, etc.
60.02	Relocation of existing households and businesses	In compliance with Uniform Relocation Act.
70 VEHICLES (number)		Include professional services associated with the vehicle component of the project. These costs may include agency staff oversight and administration, vehicle consultants, design and manufacturing contractors, legal counsel, warranty and insurance costs, etc.
70.01	Light Rail	Include light rail and streetcar rail using electric, diesel or other power supply.
70.02	Heavy Rail	
70.03	Commuter Rail	Include locomotives (diesel, electric, or other), trailer cars, self-propelled multiple units (EMU electric or DMU diesel, or other power supply)
70.04	Bus	Includes "rubber-tired" buses and trolleys including new, used, historic replica, articulated, using electric, diesel, dual-power, or other power supply.
70.05	Other	Include Vans, Sedan/Station Wagon, Cable Car, People Mover, Monorail, Car/Inclined Railway, Ferry Boat, Transferred Vehicle
70.06	Non-revenue vehicles	
70.07	Spare parts	

Memphis Area Transit Authority | Appendix A: FTA Standard Cost Category Definitions

80 PROFESSIONAL SERVICES (applies to Cats. 10-50)		Cat. 80 applies to Cats. 10-50. Cat. 80 includes all professional, technical and management services related to the design and construction of fixed infrastructure (Cats. 10 - 50) during the project development and construction phases of the project. This includes environmental work, design, engineering and architectural services; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants.
80.01	Project Development	
80.02	Engineering (not applicable to Small Starts)	Include professional liability insurance and other non-construction insurance on 80.05 unless insurance for the agency and its consultants is already included in other lines.
80.03	Project Management for Design and Construction	
80.04	Construction Administration & Management	Include costs associated with professional services related to real estate and vehicles in Cats. 60 and 70.
80.05	Professional Liability and other Non-Construction Insurance	<i>(Note that costs for planning activities and NEPA work done before FTA approval to enter project development (PD), regardless of funding source, are not included in an SSGA and therefore, should not be included in the Standard Cost Category worksheets. For example, on one and the same grant, costs incurred prior to FTA approval to enter PD should be omitted from these worksheets whereas costs incurred after FTA approval to enter PD should be included.)</i>
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	
80.07	Surveys, Testing, Investigation, Inspection	
80.08	Start up	Include start up and training. Include in Cats. 10 - 50 above access and protection work by agency staff or outside contractors.
Subtotal (10 - 80)		
90 UNALLOCATED CONTINGENCY		Includes unallocated contingency, project reserves. Document allocated contingencies for individual line items on the BUILD Main worksheet.
Subtotal (10 - 90)		
100 FINANCE CHARGES		<p>Include finance charges expected to be paid by the project sponsor/grantee prior to either the completion of the project or the fulfillment of the Small Starts funding commitment, whichever occurs later in time. Finance charges incurred after this date should not be included in Total Project Cost. (See FFGA Circular FTA C5200.1A Chapter III for additional information.)</p> <p>Derive finance charges from the Small Starts project's financial plan, based on an analysis of the sources and uses of funds. The amount and type of debt financing required and revenues available determine the finance charges. By year, compute finance charges in year-of-expenditure (YOE) dollars. On the Inflation worksheet enter the finance charges for the appropriate years.</p>
Total Project Cost (10 - 100)		

Appendix B

Locally Preferred Alternative Cost Estimate Details

Memphis Area Transit Authority | Appendix B: Locally Preferred Alternative Cost Estimate Details

		Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)		11.11	1,038	260	1,298
10.01	Guideway: At-grade exclusive right-of-way				0
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)				0
10.03	Guideway: At-grade in mixed traffic	11.11	1,038	260	1,298
10.04	Guideway: Aerial structure				0
10.05	Guideway: Built-up fill				0
10.06	Guideway: Underground cut & cover				0
10.07	Guideway: Underground tunnel				0
10.08	Guideway: Retained cut or fill				0
10.09	Track: Direct fixation				0
10.10	Track: Embedded				0
10.11	Track: Ballasted				0
10.12	Track: Special (switches, turnouts)				0
10.13	Track: Vibration and noise dampening				0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)		23	7,000	1,750	8,750
20.01	At-grade station, stop, shelter, mall, terminal, platform	23	7,000	1,750	8,750
20.02	Aerial station, stop, shelter, mall, terminal, platform				0
20.03	Underground station, stop, shelter, mall, terminal, platform				0
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.				0

Memphis Area Transit Authority | Appendix B: Locally Preferred Alternative Cost Estimate Details

		Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)
20.05	Joint development				0
20.06	Automobile parking multi-story structure				0
20.07	Elevators, escalators				0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS			0	0	0
30.01	Administration Building: Office, sales, storage, revenue counting				0
30.02	Light Maintenance Facility				0
30.03	Heavy Maintenance Facility				0
30.04	Storage or Maintenance of Way Building				0
30.05	Yard and Yard Track				0
40 SITEWORK & SPECIAL CONDITIONS			885	221	1,106
40.01	Demolition, Clearing, Earthwork		13	3	16
40.02	Site Utilities, Utility Relocation				0
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments				0
40.04	Environmental mitigation, e.g. wetlands, historic/archeologic, parks				0
40.05	Site structures including retaining walls, sound walls				0
40.06	Pedestrian / bike access and accommodation, landscaping		200	50	250
40.07	Automobile, bus, van accessways including roads, parking lots				0
40.08	Temporary Facilities and other indirect costs during construction		672	168	839
50 SYSTEMS			2,536	634	3,170

Memphis Area Transit Authority | Appendix B: Locally Preferred Alternative Cost Estimate Details

		Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)
50.01	Train control and signals				0
50.02	Traffic signals and crossing protection		1,070	268	1,338
50.03	Traction power supply: substations				0
50.04	Traction power distribution: catenary and third rail				0
50.05	Communications		1,466	367	1,833
50.06	Fare collection system and equipment				0
50.07	Central Control				0
Construction Subtotal (10 - 50)			11,459	2,865	14,324
60 ROW, LAND, EXISTING IMPROVEMENTS			502	251	754
60.01	Purchase or lease of real estate		502	251	754
60.02	Relocation of existing households and businesses				0
70 VEHICLES (number)		9	4,500	450	4,950
70.01	Light Rail				0
70.02	Heavy Rail				0
70.03	Commuter Rail				0
70.04	Bus	9	4,500	450	4,950
70.05	Other				0
70.06	Non-revenue vehicles				0
70.07	Spare parts				0

Memphis Area Transit Authority | Appendix B: Locally Preferred Alternative Cost Estimate Details

		Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)			4,068	407	4,475
80.01	Project Development		344	34	378
80.02	Engineering (not applicable to Small Starts)		1,375	138	
80.03	Project Management for Design and Construction		573	57	630
80.04	Construction Administration & Management		1,146	115	1,261
80.05	Professional Liability and other Non-Construction Insurance		229	23	252
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.		229	23	252
80.07	Surveys, Testing, Investigation, Inspection		57	6	63
80.08	Start up		115	11	126
Subtotal (10 - 80)			20,530	3,973	24,502
90 UNALLOCATED CONTINGENCY					1,225
Subtotal (10 - 90)					25,728
100 FINANCE CHARGES					0
Total Project Cost (10 - 100)					25,728
Allocated Contingency as % of Base Yr Dollars w/o Contingency					19.35%
Unallocated Contingency as % of Base Yr Dollars w/o Contingency					5.97%
Total Contingency as % of Base Yr Dollars w/o Contingency					25.32%
Unallocated Contingency as % of Subtotal (10 - 80)					5.00%