CENTRAL BROWARD EAST-WEST TRANSIT STUDY OPERATIONS AND MAINTENANCE COSTING METHODOLOGY TECHNICAL MEMORANDUM



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1.0 Introduction

1.1 Background and Study Overview

The Florida Department of Transportation (FDOT), Broward County Transit (BCT), the Broward Metropolitan Planning Organization (MPO), and the South Florida Regional Transportation Authority (SFRTA), in cooperation with the Federal Transit Administration (FTA), are evaluating potential transit options in central Broward County, including premium bus service and modern streetcar. Potential east-west mobility solutions involving premium bus service or modern streetcar will be assessed for potential environmental impacts in compliance with the National Environmental Policy Act (NEPA) and the process and study requirements for the federal New Starts funding program for new transit initiatives.

1.2 Description of the Study Area

The study area, in central Broward County, extends from Oakland Park Boulevard to the north, the Sawgrass Expressway/I-75 to the west, Stirling Road and Griffin Road to the south and the Intracoastal Waterway/Port Everglades to the east. The alternatives to be analyzed would provide premium bus service or rail service from the Sawgrass Mills Mall/BB&T Center (formerly the Bank Atlantic Center) in the City of Sunrise to the Fort Lauderdale-Hollywood International Airport, providing connections along the way to major activity centers including the Sawgrass International Business Park, Plantation Midtown, the South Florida Education Center, and downtown Fort Lauderdale, as well as two connections to Tri-Rail at the Fort Lauderdale (Broward Boulevard) and the Fort Lauderdale-Hollywood International Airport (Griffin Road) stations. The Study is also considering connections to proposed passenger service on the Florida East Coast Railroad and the downtown Fort Lauderdale Wave circulator. The length of the corridor is over 20 miles and varies by alternative.



Exhibit 1: Study Location Map



1.3 Build Alternatives

The Build Alternatives have proposed alignments beginning at the Sawgrass Mills Mall/BB&T Center, to the west, then travel south to I-595 through the Sawgrass International Corporate Park. Once through the Sawgrass International Corporate Park, the alignments run east, following the I-595 corridor to University Drive. For all Build Alternatives, this portion is proposed to be premium bus service.

In the eastern portion of the study area the Build Alternatives will have the same alignment, between the Fort Lauderdale Tri-Rail Station, downtown Fort Lauderdale, the Fort Lauderdale-Hollywood International Airport, and the Fort Lauderdale-Hollywood International Airport Tri-Rail Station. For this eastern portion of the corridor, modern streetcar will be considered. The Build Alternatives have different alignment options between University Drive and I-95 detailed below.

There are three Build Alternatives that diverge at University Drive and converge at the Tri-Rail Stations, as described below.

- The SR 7/Broward Boulevard Premium Bus Alternative leaves the I-595 corridor, south on University Drive to Nova Drive where it turns east and travels to Davie Road. At Davie Road, the alignment turns north and re-enters the I-595 corridor and continues east to SR 7. At SR 7, the alignment travels north to Broward Boulevard then continues east to the Fort Lauderdale Tri-Rail Station on Broward Boulevard, where it meets the eastern portion of the alignment. For this alignment, both premium bus and modern streetcar will be considered. This Alternative is illustrated in Exhibit 2.
- The two Griffin Road Alternatives continue south from the I-595 corridor to Griffin Road, using either University Drive or a combination of University Drive, Nova Drive, and Davie Road. These Alternatives continue east on Griffin Road to the Fort Lauderdale-Hollywood International Airport Tri-Rail Station, where it meets the eastern portion of the alignment. For these alignments, both premium bus service and modern streetcar will be considered (Griffin Road Premium Bus Alternative and Griffin Road Modern Streetcar Alternative, respectively). These Alternatives are illustrated in Exhibit 3.







Exhibit 3: Griffin Road Alternatives





1.4 Methodology Report

This report presents the process used to develop operating and maintenance (O&M) cost estimates being prepared for the Central Broward East-West Transit Study. Two primary resource build-up cost models were developed: a bus cost model and a light rail transit (LRT) cost model. The bus cost model will be used to estimate premium bus services and bus rapid transit (BRT) alternatives. A streetcar cost model also was adapted from the LRT cost model for evaluating modern streetcar alternatives. Each model estimates O&M costs based on projected system operating statistics.

Steps required for estimating O&M costs are as follows:

- 1. Development of an O&M cost model for each mode,
- 2. Calibration of the models for current year of operations,
- 3. Validation of the model for prior year operations, and
- 4. Calculation of annual O&M costs.

Separate models have been developed for each transit mode. The bus O&M cost model was developed from operational and financial data supplied by BCT for the 2010 Fiscal Year. Since LRT currently is not in operation in Broward County, the LRT model is based on financial and operating data for LRT systems in Baltimore, Denver, Los Angeles, Portland, Sacramento, St. Louis, Salt Lake City, and San Jose. The LRT cost model has been adapted for the Broward County area by using Miami-Dade Transit (MDT) salary, wage, and fringe benefits rates, as well as Florida Power & Light electric utility rates to provide a local estimate of the rail vehicle traction power cost requirements.



2.0 Bus O&M Cost Model

This section presents the bus O&M cost model which estimates annual operating and maintenance costs for BCT's existing bus and demand response transit services, as well as alternatives being evaluated in this Draft EIS. A general overview of the model, input variables and formulas used in the calculation of labor and non-labor costs is provided in sections 2.1 through 2.4.

2.1 General Model Description

The bus O&M cost model is a disaggregate, resource build-up model, consistent with the methodology specified by the FTA. Line item costs are determined according to the quantity of service supplied and other system characteristics. The cost model is based on BCT's operational and financial data for the 2010 Fiscal Year. Articulated buses will be used on the planned alignment. BCT currently operates articulated buses on its Breeze routes. The model was developed using this O&M cost data. BCT's O&M costs (labor and non-labor costs) are broken out by National Transit Database (NTD) standards: mode, function, and object class. The two modes are motor bus and demand response. Function refers to the activity performed or cost center of the agency: vehicle operations, vehicle maintenance, non-vehicle maintenance, and general administration. Object class refers to groupings of expenses on the basis of goods or services purchased. Expenses for each object class (e.g. salary/wages, materials, utilities) are modeled on a separate line, thus ensuring that the equations are mutually exclusive and cover all operating costs. The 2010 BCT O&M cost data did not include ITS costs; therefore, the cost model does not include ITS O&M costs.

A cost model was developed for each alternative using Microsoft Excel and includes the following tables:

- Table 1 Input Statistics
- Table 2 Line Item Detail
- Table 3 Summary: O&M Costs by Function and Cost Type

Table 1, the Input Statistics worksheet, summarizes the operating requirements and system characteristics of each model input variable for the baseline year and validation years, as well as alternative scenarios evaluated in the Draft EIS. Table 2, the line item detail worksheet, calculates the O&M expenses for each modeled line item. Table 3 summarizes the annual cost estimate for the combined BCT motor bus and demand response services cross-tabulated by function and cost type (object class). Additional descriptions of input statistics and line item detail are provided in sections 2.2 and 2.3. The 2012 model calibration tables for the three build alternatives are presented in Appendix A.



2.2 Input Variables

A total of six input variables were used to describe operating requirements and system characteristics for BCT's motor bus and demand response transit modes. All line item costs are linked either directly or indirectly to one or more of the input variables. Each of these variables was estimated for the Build Alternatives based on proposed operating plans. The cost model's six input variables are as follows:

- Annual Revenue Bus-Hours (BUSHR) The total annual motor bus vehicle-hours in revenue service, excluding deadhead time. For Fiscal Year (FY) 2010, the BUSHR are estimated to be 1,024,606 hours.
- Annual Revenue Bus-Miles (BUSMI) The total annual motor bus vehicle-miles in revenue service, excluding deadhead mileage. For FY 2010, the BUSMI are estimated to be 14,049,190 miles.
- **Peak Buses (PKBUS)** The number of motor buses operated in maximum service. BCT's FY 2010 peak bus estimate is 236 vehicles.
- **Bus Garages (GARAGE)** The number of bus maintenance garages operated in the system. BCT operates two bus maintenance garages, the Copans Road and Ravenswood Road facilities.
- **BCT-Owned Park & Ride/Transit Centers (PNR)** As of FY 2010, the number of existing park & ride and/or transit centers that are owned and maintained by BCT was one.
- **Annual Revenue Paratransit Hours (DRHR)** The total annual demand response vehicle-hours in revenue service. For FY 2010, the DRHR are estimated to be 456,078 hours.

In addition, an Inflation Factor is used to deflate model generated costs during validation testing to compare model generated costs with actual BCT FY 2007, 2008 and 2009 costs. The Inflation Factor is used to inflate BCT FY 2010 costs to April 2012 dollars. The Inflation Factor is based on information obtained from the Southeast Urban Consumer Price Index - All Urban Consumers from the U.S. Bureau of Labor Statistics.

2.3 Line Item Detail

The line item detail worksheet lists the following parameters for each line item object class.

- Function Code
- Object Class (Section 15) Code
- Cost Type
- Baseline Cost (BCT FY 2010 Costs)
- Productivity Factor
- Driving Variable (from Input Variables)



Line Item Cost

The line item object class expenses are generally a function of the baseline cost, and the base and future values of the driving variables. This function assumes that current rates of consumption will continue in future years.

Cost equations used by the model are generally of the form:



Where:

- **Base FY 2010 Cost =** Budgeted expense in the base (FY 2010), or calibration year modeled.
- **Base Driving Variable =** Quantity of the input variable in the base (FY 2010), or calibration year.
- Future Driving Variable = Projected quantity of the input variable for the future year.

2.4 Model Validation

The ability of the bus O&M cost model to reasonably estimate annual operating and maintenance costs for future study alternatives was tested by applying the model to three prior fiscal years of operation: FY 2007, 2008, and 2009. The validation test demonstrates the sensitivity of the model, particularly for prior years in which BCT's level of bus service was different from current operations. Input variables and actual O&M costs for FY 2007, 2008, and 2009 were obtained from BCT's NTD reports. The estimated (model) costs were deflated to the specified fiscal year using the Southeast Urban Consumer Price Index – All Urban Consumers from the U.S. Bureau of Labor Statistics.

Exhibit 4 presents validation results for the bus O&M cost model. Applying the FY 2009 operating statistics, the model estimated labor costs to within 0.1%, non-labor expenses to within 1.4%, and total costs to within 3.1%. The model overestimated materials and supplies by 17.9% and underestimated purchased transportation by 23.1%. During 2009, the price of diesel began to drop to \$2.467 per gallon (according to the U.S. Energy Information Administration) and BCT completed its program to replace older fleet vehicles with newer fleet vehicles which reduced maintenance costs. These two occurrences may have contributed to the actual cost of materials and supplies being lower than the costs calculated by the model.

Applying the FY 2008 operating statistics, the model estimated labor costs to within 3.8%, non-labor expenses to within 4.3%, and total costs to within 6.8%. The model underestimated materials and supplies and purchased transportation by 17.9% and 22.7%, respectively. During 2008, the price of diesel was at a peak price of \$3.803 per gallon (according to U.S. Energy Information Administration) which may account for BCT's costs being higher than the costs calculated by the model.



The model underestimated purchased transportation costs for FY 2008 and FY 2009. Starting in FY 2008, BCT built in fuel cost escalators into the new vendor contracts resulting in higher costs for purchased transportation which may account for BCT's costs being higher than the costs calculated by the model.

The model validation reasonably calculated costs for line items, such as labor costs and non-labor expenses, which were stable and not affected by changing environments such as fuel costs, fleet replacement, and vendor contract changes. Therefore, it is concluded that the model will reasonably calculate future costs within a stable BCT environment.

Year	Expense Category	Model Estimate	Actual Costs	Percent Difference
	Salaries/Wages/Benefits	\$71,126,085	\$71,126,085	0.0%
	Materials & Supplies	\$18,143,992	\$18,143,992	0.0%
2010	Other Non-Labor Expenses	\$8,881,449	\$8,881,449	0.0%
	Purchased Transportation	\$18,588,220	\$18,588,220	0.0%
	Total	\$116,739,746	\$116,739,746	0.0%
	Salaries/Wages/Benefits	\$69,647,870	\$69,571,200	0.1%
	Materials & Supplies	\$17,783,868	\$15,083,043	17.9%
2009	Other Non-Labor Expenses	\$8,800,159	\$8,675,885	1.4%
	Purchased Transportation	\$22,138,551	\$28,783,932	-23.1%
	Total	\$118,370,448	\$122,114,060	-3.1%
	Salaries/Wages/Benefits	\$69,972,252	\$67,403,699	3.8%
	Materials & Supplies	\$17,839,433	\$21,717,036	-17.9%
2008 Other Non-Labor Expenses Purchased Transportation		\$8,794,662	\$9,193,379	-4.3%
		\$24,046,727	\$31,091,072	-22.7%
	Total	\$120,653,074	\$129,405,186	-6.8%
	Salaries/Wages/Benefits	\$80,107,102	\$67,034,811	19.5%
	Materials & Supplies	\$20,385,531	\$17,271,301	18.0%
2007	Other Non-Labor Expenses	\$9,313,780	\$8,816,542	5.6%
	Purchased Transportation	\$21,471,804	\$23,002,298	-6.7%
	Total	\$131,278,218	\$116,124,952	13.0%

Exhibit 4: Validation of Bus O&M Cost Model



3.0 Light Rail Transit O&M Cost Model

3.1 General Model Description

The LRT model has a structure with line item costs tabulated for specific cost centers (e.g. vehicle operations, vehicle maintenance, facilities maintenance, and LRT general administration). Within each cost center, line items are defined as labor, materials, services, utilities, fuel, insurance, taxes, and miscellaneous costs. The LRT model uses a series of interactive tables generated in a Microsoft Excel spreadsheet.

Specific line items are provided for unique labor positions such as power maintainer and train operator, and also for non-labor expenses such as propulsion power and station maintenance materials and supplies. Each labor and non-labor expense is modeled separately to ensure that equations are mutually exclusive and cover all operating costs. O&M costs are calculated from the quantity of service supplied (e.g., number of peak cars) or some other system characteristic (e.g., number of directional route-miles). Labor productivity rates and non-labor unit costs are based on actual cost experiences of the following eight light rail systems:

- Baltimore (Maryland Transit Administration)
- Denver (Denver Regional Transit District)
- Los Angeles (Los Angeles County Metropolitan Transportation Authority)
- Portland (Tri-County Metropolitan Transit District of Oregon)
- Sacramento (Sacramento Regional Transit District)
- St. Louis (Bi-State Development Agency)
- Salt Lake City (Utah Transit Authority)
- San Jose (Santa Clara Valley Transportation Authority)

LRT operation costs are being utilized in this report, since the number of modern streetcars currently in operation in the U.S. is too limited to provide a sufficient basis for comparison. These U.S. LRT systems are recommended as peers for the Central Broward East-West Transit Study because they operate in urban environments, link activity and/or employment centers, and serve as regional connectors. Operational speeds expected for the Griffin Road Modern Streetcar Alternative, and the similarities with the power delivery system and vehicle characteristics make LRT the best comparable system, versus the historic streetcar.

To specifically account for potential LRT costs in Broward County, the cost model reflects MDT salary, wage, and fringe benefits rates. MDT operates the Miami-Dade County's rapid transit system, known as Metrorail. Of the two rail transit operators in the region MDT is more similar to modern streetcar operations and maintenance functions than SFRTA. The Vehicle Operations utility cost for LRT traction power is modeled using Florida Power & Light electricity rates (effective in 2012).



The LRT model uses a series of interactive tables in a Microsoft Excel Spreadsheet:

- Table 1 Input Statistics
- Table 2 Labor Cost Listing
- Table 3a Non-Labor Cost Listing
- Table 3b Non-Labor Unit Costs
- Table 4 Line Item Detail
- Table 5 Summary of Alternative

The printouts from the three build alternatives model runs are included in Appendix B.

3.2 Input Variables

Input variables determine nearly all costs in the model. Some items will be linked to secondary variables such as employment or total cost. The model requires six input variables, as described below:

- **Peak Cars (PKCAR)** The maximum number of LRT vehicles in scheduled service during peak periods.
- Annual Revenue Car-Miles (CARMI) The total vehicle miles operated in revenue service during one year, excluding deadhead mileage.
- Annual Revenue Train-Hours (TRNHR) The total train-hours operated in revenue service during one year, excluding report and deadhead time.
- Passenger Stations (STATION) The number of stations in the system.
- **Directional Route-Miles (RTMILE)** The number of directional route-miles of revenue track, excluding yard and tail track. For example, one route-mile of double track equals two directional route-miles.
- Maintenance Facilities (YARD) The number of LRT maintenance and storage yards.

Park and Ride lots were not included as input variables in the LRT model, because none are proposed on the streetcar portion of the alignments. No Park and Ride lots are included in the operating plan assumptions for the streetcar alternatives.

The Inflation Factor is used to inflate FY 2010 costs obtained from the eight light rail agencies to April 2012 dollars. The Inflation Factor is based on information obtained from the Southeast Urban Consumer Price Index - All Urban Consumers from the U.S. Bureau of Labor Statistics.

Table 1 in Appendix B shows the input statistics for each peer LRT system.



Some operating parameters, such as vehicle operating speeds and acceleration, may impact the operating costs. Modern streetcar would operate similar to LRT in the western segment of the alignment, while it will operate in mixed traffic more like a circulator in the downtown area.

3.3 Labor List

The cost model assumes that a new rail division will be established prior to revenue service. However, because there is adequate existing management structure in place to support the incremental increase represented by this new service, the model removed certain administrative, maintenance, and upper level management functions and positions to ensure no duplication of staffing. The model assumes four cost centers for the modern streetcar operator:

- Rail Vehicle Operations
- Rail Vehicle Maintenance
- Rail Facilities Maintenance
- Rail Administration and Support

Job positions have been defined by analyzing staffing levels for selected rail systems. Table 2 of Appendix B is the model's Labor List with positions identifies the four LRT divisions. Average base salaries and wages are based on the most recent MDT salary and wage rates. Paid leave (e.g. vacation) is included in the average annual earnings. The model uses an estimated fringe benefit rate of 26%, which is calculated excluding sick, holiday, and vacation pay.

3.4 Non-Labor Costs

Table 3a of Appendix B illustrates the model's NTD cost categories (e.g. vehicle operations, vehicle maintenance), cost types (e.g. services, materials and supplies, utilities), and reported peer system FY 2010 costs.

Table 3b of Appendix B illustrates the models calculations and average unit costs for the peer system expenses.

The model goes beyond NTD reporting, further allocating non-labor costs for selected categories, where more detail is desirable.

- Facilities Maintenance materials and supplies may be subdivided three ways: costs related to track, way, and signals; costs related to stations; and costs related to yard, shop and central control.
- Facilities Maintenance contract services may be broken out into costs related to track, way and signals; costs related to stations; and costs related to yard, shop, and central control.
- Cost for insurance and utilities, other than traction power, have been split: 50% to yard and shops and 50% to passenger stations.



3.5 Line Item Detail

The Line Item Detail (Table 4 of Appendix B) illustrates how the model combines labor with non-labor expenses and calculates costs and staffing requirements based on the system inputs. Cost items are listed by function (rail vehicle operations, rail vehicle maintenance, rail facilities maintenance, and rail administration and support).

- Staffing requirements, in Full-Time Equivalents (FTEs), are calculated from labor productivity equations for each job classification.
- Labor cost equals the calculated staffing requirement multiplied by the average employee salary for the particular job classification (e.g. train operators).
- Total labor productivity is calculated for each department (e.g. vehicle operations employees per revenue train-hour) to check the validity of model results.
- Similarly, non-labor unit costs are calculated for each department (e.g. vehicle maintenance nonlabor cost per car-mile).

The Line Item Detail table also calculates total staffing requirements and operating cost.

3.6 Summary of Alternative

Table 5 of Appendix B illustrates how the model summarizes the results of a single model run showing the set of input variables that constitutes the test system, a tabulation of cost estimates by department and cost type, and calculations of various system cost productivity indexes. Costs are reported in April 2012 dollars.

3.7 Model Validation

The model's ability to accurately forecast O&M costs was tested by using the average 2010 operating statistics for the eight peer LRT systems as the alternative in the cost model. Since the validation model run will be compared to the average 2010 operating statistics obtained from the peer LRT systems, no inflation was added to the validation model run output. The model's calculated cost per train-hour and cost per car-mile was compared to actual unit costs for the peer systems. In addition, the model's calculation of labor productivity factors and non-labor unit costs were compared to actual labor productivity factors and non-labor unit costs for the peer systems. Validation results can be found in Section 3.7.1, Total Cost Comparison.



3.7.1 Total Cost Comparison

The first validity test was a comparison of model results on a train-hour and car-mile basis. Model results fall within the range of costs for the peer systems. Exhibit 5 presents the validation results for the LRT O&M cost model. Specific findings are as follows:

- The average total cost per train-hour for the eight peer LRT systems is \$488 per train-hour (2010 dollars). With averaged operating statistics from the peer systems, the model produces a total cost estimate of \$319 per train-hour (2010 dollars). Model results are lower than the peer average because of differences in cost of living and higher labor productivity in facilities maintenance.
- The average total cost per car-mile for the eight per LRT systems is \$12.53 (2010 dollars). With averaged operating statistics from the peer systems, the model produces a total cost estimate of \$8.33 per car-mile (2010 dollars). Again, model results are most likely lower than the peer average because of wage differences and higher labor productivity in facilities maintenance.

3.7.2 Labor Productivity Comparison

The model's staffing estimates were validated by comparing peer labor productivities for vehicle operations, vehicle maintenance, facilities maintenance, and general administration. Comparisons of labor productivity factors yield some indication of a system's cost-effectiveness. A high productivity factor implies a cost-effective system. Labor productivity factors calculated by the model fall within the range of labor productivity factors for the peer LRT systems. The black bar in exhibits 6 through 9 illustrate the value of the labor productivity factor calculated by the model. The values for each peer system and the calculated value are shown in the tables below the exhibits.

- Vehicle Operations (Exhibit 6)
- Vehicle Maintenance (Exhibit 7)
- Facilities Maintenance (Exhibit 8)
- General Administration (Exhibit 9)

3.7.3 Non-Labor Unit Cost Comparison

The model's non-labor cost estimates were validated by comparing non-labor unit costs for vehicle operations, vehicle maintenance, facilities maintenance, and general administration. Comparisons of non-labor unit costs yield some indication of a system's cost-effectiveness. A highly cost effective system is one with a low unit cost. All non-labor unit costs calculated by the model fall within the range of non-labor unit costs for the peer LRT systems. The black bar exhibits 10 through 13 illustrates the value of the non-labor unit cost calculated by the model. The values for each peer system and the calculated value are shown in the tables below the exhibits.

- Vehicle Operations (Exhibit 10)
- Vehicle Maintenance (Exhibit 11)



- Facilities Maintenance (Exhibit 12)
- General Administration (Exhibit 13)

Exhibit 5: Validation of LRT O&M Cost Model

Annual Cost Factors (2010)	
Total Cost per Revenue Train-Hour	\$319.19
Total Cost per Revenue Car-Mile	\$8.33
Vehicle Operations: Cost per Train-Hour	\$143
Vehicle Maintenance: Cost per Car-Mile	\$2.02
Facility Maintenance: Cost per Station	\$119,958
Administrative: Cost per Peak Car	\$132,699

Exhibit 6: Vehicle Operation Labor Productivity



*MCV = Model Calculated Value







Exhibit 8: Facilities Maintenance Labor Productivity









Exhibit 10: Vehicle Operation Non-Labor Productivity









Exhibit 12: Facilities Maintenance Non-Labor Productivity











4.0 Modern Streetcar O&M Cost Model Adaptation

The modern streetcar O&M cost model was adapted from the primary LRT cost model based on the general assumption that modern streetcar vehicles have higher maintenance productivities for labor and non-labor costs, as well as lower electrical energy consumption rates for traction power. Typical modern streetcar vehicles have shorter overall length, are less wide, and weigh less than most LRT vehicles. This justifies adjustments to the maintenance productivity factors. For example, the energy consumption rate was reduced from 8.0 kwh per car-mile to 6.0 kwh per car-mile. Thus, the vehicle maintenance productivity factors were modified for power maintainers, mechanics and car cleaners, as well as contract services, materials and supplies, and fuel and lubricants. Additional model adaptations include removal of certain administrative, maintenance, and upper management functions and positions to reflect their existence within the current BCT structure; reduction of certain rail facilities maintenance cost items by half of the peer LRT costs; and reduction of the number of supervisors, technicians, maintainers, and other support staff.



5.0 Summary of Alternatives

The results of the O&M cost model runs for the three Build Alternatives are summarized in Exhibits 14 through 16. Costs are reported in 2012 dollars.

Exhibit 14: SR 7/Broward Boulevard Premium Bus Alternative

Input Variables	Input Value
Bus Model Overview	
Annual Revenue Bus-Hours	26,286
Annual Revenue Bus-Miles	825,600
Peak Buses	9
Bus Garages	0
BCT Park & Ride Lots	0
Annual Revenue Demand Response Hours	0
Sub-Total Bus Model O&M Cost	\$2,291,801
Streetcar Model Overview	
Peak Cars	7
Revenue Car-Miles	291,840
Revenue Train-Hours	19,688
Passenger Stations	10
Directional Route Miles	6.4
Maintenance Facilities	1
Sub-Total Streetcar Model O&M Cost	\$3,271,858
Total O&M Cost	\$5,563,659



Exhibit 15: Griffin Road Modern Streetcar Alternative

Input Variables	Input Value					
Bus Model Overview						
Annual Revenue Bus-Hours	8,270					
Annual Revenue Bus-Miles	241,920					
Peak Buses	3					
Bus Garages	0					
BCT Park & Ride Lots	0					
Annual Revenue Demand Response Hours	0					
Sub-Total Bus Model O&M Cost	\$704,264					
Streetcar Model Overview						
Peak Cars	11					
Revenue Car-Miles	738,720					
Revenue Train-Hours	32,646					
Passenger Stations	22					
Directional Route Miles	16.2					
Maintenance Facilities	1					
Sub-Total Streetcar Model O&M Cost	\$6,529,385					
Total O&M Cost	\$7,233,649					

Exhibit 16: Griffin Road Premium Bus Alternative

Input Variables	Input Value
Bus Model Overview	
Annual Revenue Bus-Hours	21,730
Annual Revenue Bus-Miles	670,560
Peak Buses	8
Bus Garages	0
BCT Park & Ride Lots	0
Annual Revenue Demand Response Hours	0
Sub-Total Bus Model O&M Cost	\$1,899,500
Streetcar Model Overview	
Peak Cars	7
Revenue Car-Miles	287,280
Revenue Train-Hours	19,437
Passenger Stations	12
Directional Route Miles	6.3
Maintenance Facilities	1
Sub-Total Streetcar Model O&M Cost	\$3,297,965
Total O&M Cost	\$5,197,465



Appendix A: Bus O&M Cost Models

Table 1 CENTRAL BROWARD EAST-WEST TRANSIT STUDY CBEWT Bus O&M Cost Model LPA w/Nova & Davie

INPUT STATISTICS			Do not Delete	Calibration Statistics			
Input Variable	Variable Name	Input Statistics LPA Alternative	2010 Baseline	2009	2008	2007	
Annual Revenue Bus-Hours	BUSHR	8,270	1,024,606	1,014,405	1,051,090	1,254,275	
Annual Revenue Bus-Miles	BUSMI	241,920	14,049,190	13,878,467	14,245,816	16,879,810	
Peak Buses	PKBUS	3	236	240	245	241	
Bus Garages	GARAGE	0	2	2	2	2	
BCT-Owned Park & Ride	PNR	0	1	1	1	1	
Annual Revenue Paratransit Hours	DRHR	0	456,078	550,601	611,262	546,698	
Inflation Factor	INFLATE	1.06	1.00	0.99	0.97	0.96	
Alternative Name		2012 Calibration	2010 Calibration	2009 Validation	2008 Validation	2007 Validation	

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Inflation rate based on Bureau of Labor Statistics Data - South CPI (April 2012 - December 2010)

Table 2							
CENTRAL BROWAR	D FAST	WESTT	RANSIT	STUDY			
CREWT Bus O&M Cost Mo				01001			
I PA w/Nova & Davie							
		CCT					
	OKKON						
2012 Calibration		0	0	Deseline Cest	Das du stinde		Line Here
	F	Section 15	Cost	Baseline Cost	Productivit	y Di tao Mariah Ia	Line Item
Cost Center/Line Item	Function	Code	туре	(\$2010)	Factor	Driving variable	Cost (\$2012)
Bus Transportation							
Operator Wages	10	501.01	LABOR	\$32 739 261	\$31.95	per BUSHR	\$278 910
Other Wages & Salaries	10	501.02	LABOR	\$2,716,366	\$2.65	per BUSHR	\$0
Fringe Benefits	10	502.00	FRINGE	\$14 956 566	42 18%	Bus Transp salaries & wages	\$0
Contract Services	10	503.00	SERV	\$719 114	\$0.70	per BUSHR	\$6 126
Fuel & Lubricants	10	504.01	MATI	\$11.348.239	\$0.81	per BUSMI	\$206,251
Tires & Tubes	10	504.02	MATI	\$1 161 755	n/a	per PKBUS (50%) BUSMI (50%)	\$18,351
Other Materials & Supplies	10	504 99	MATI	\$17 256	\$0.001228	per BUSMI	\$314
Fuel Tax & Vehicle Registr	10	507.00	TAX	\$0	n/a	per PKBUS (50%) BUSMI (50%)	\$0
	10	507.00		ψυ	17.4		ψυ
Bus Maintenance							
Salaries & Wages	41	501.02	LABOR	\$9,947,922	\$0.71	per BUSMI	\$0
Fringe Benefits	41	502.00	FRINGE	\$3,378,197	33.96%	of Bus Maint. salaries & wages	\$0
Contract Services	41	503.00	SERV	\$194,992	n/a	per PKBUS (50%), BUSMI (50%)	\$3,080
Fuel & Lubricants (NRV)	41	504.01	MATL	\$226,088	\$958.00	per PKBUS	\$3,033
Other Materials & Supplies	41	504.99	MATL	\$5,249,905	n/a	per PKBUS (50%), BUSMI (50%)	\$82,927
Casualty & Liability	41	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Excilities Maintenance							
Salaries & Wages	42	501.02	LABOR	\$408 613	\$0.0291	per BLISMI	\$0
Fringe Benefits	42	502.00	FRINGE	\$176 778	43 26%	of Facilities Maint salaries & wages	\$0
Contract Services	42	503.00	SERV	\$228 934	n/a	per GARAGE (40%) & PNR (60%)	\$0
Other Materials & Supplies	42	504.99	MATI	\$54.496	n/a	per GARAGE (40%) & PNR (60%)	\$0
Casualty & Liability	42	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
General & Administrative							
Salaries & Wages	160	501.02	LABOR	\$5,029,007	\$21,309	per PKBUS,	\$0
Fringe Benefits	160	502.00	FRINGE	\$1,773,375	35.26%	of Genl & Admin salaries & wages	\$0
Services	160	503.00	SERV	\$4,750,707	n/a	per PKBUS (50%), BUSMI (50%)	\$75,041
Other Materials & Supplies	160	504.99	MATL	\$86,253	\$365.48	per PKBUS	\$1,157
Utilities	160	505.00	UTIL	\$749,931	\$374,966	per GARAGE	\$0
Casualty & Liability	160	506.00	INSUR	\$2,085,658	\$8,837.53	per PKBUS	\$27,983
Taxes	160	507.00	TAX	\$0	n/a	Fixed	\$0
Miscellaneous Expenses	160	509.00	MISC	\$152,113	0.18%	per Non G&A Costs	\$1,091
Expense Transfers	160	510.00	XFERS	\$0	0.00%	per Non G&A Costs	\$0
Leases & Rentals	160	512.00	LEASE	\$0	0.00%	per Non G&A Costs	\$0
Demand Response	n/a	508 00	ם ופרט	\$18 588 220	\$40.76		¢0
Semana Response	11/a	000.00		φ10,000,220	ψ-τ0.70		φυ
TOTAL COSTS				\$116,739,746			\$704,264

Table 3							
CENTRAL BROWARD EAST-W	VEST TRANSIT ST	UDY					
CBEWT Bus O&M Cost Model							
LPA w/Nova & Davie							
O&M COSTS BY FUNCTION AI	ND TYPE						
2012 Calibration							
INPUT STATISTICS							
Variable	Statistic						
Annual Revenue Bus-Hours	8,270						
Annual Revenue Bus-Miles	241,920						
Peak Buses	3						
Bus Garages	0						
BCT Park & Ride Lots	0						
Annual Revenue Demand Resp. Hours	0						
O&M COSTS							
		Bus	Bus	Facilities	General &	Paratransit	
Expense Object Class	Object Code	Transportation	Maintenance	Maintenance	Administrative	Services	Grand Total
	Sum of Cost (\$2012)	Function					
Expense Object Class	Code	10	41	42	160	n/a	Grand Total
Labor - Operator Salaries/Wages	501.01	\$278,910					\$278,910
Labor - Other Salaries/Wages	501.02	\$0	\$0	\$0	\$0		\$0
Fringe Benefits	502	\$0	\$0	\$0	\$0		\$0
Services	503	\$6,126	\$3,080	\$0	\$75,041		\$84,248
Materials & Supplies - Fuel/Lubricants	504.01	\$206,251	\$3,033				\$209,284
Materials & Supplies - Tires/Tubes	504.02	\$18,351					\$18,351
Materials & Supplies - Other	504.99	\$314	\$82,927	\$0	\$1,157		\$84,398
Utilities	505				\$0		\$0
Casualty/Liability Cost	506		\$0	\$0	\$27,983		\$27,983
Taxes	507	\$0			\$0		\$0
Purchased Transportation	508					\$0	\$0
Miscellaneous Expenses	509				\$1,091		\$1,091
Expense Transfers	510				\$0		\$0
Interest Expenses	512				\$0		\$0
Grand Total		\$509,951	\$89,040	\$0	\$105,273	\$0	\$704,264

Table 1 CENTRAL BROWARD EAST-WEST TRANSIT STUDY CBEWT Bus O&M Cost Model SR 7/Broward Alt INPLIT STATISTICS

INPUT STATISTICS			Do not Delete	Calibration Statistics		
Input Variable	Variable Name	Input Statistics LPA Alternative	2010 Baseline	2009	2008	2007
Annual Revenue Bus-Hours	BUSHR	26,286	1,024,606	1,014,405	1,051,090	1,254,275
Annual Revenue Bus-Miles	BUSMI	825,600	14,049,190	13,878,467	14,245,816	16,879,810
Peak Buses	PKBUS	9	236	240	245	241
Bus Garages	GARAGE	0	2	2	2	2
BCT-Owned Park & Ride	PNR	0	1	1	1	1
Annual Revenue Paratransit Hours	DRHR	0	456,078	550,601	611,262	546,698
Inflation Factor	INFLATE	1.06	1.00	0.99	0.97	0.96
Alternative Name		2012 Calibration	2010 Calibration	2009 Validation	2008 Validation	2007 Validation

Inflation rate based on Bureau of Labor Statistics Data - South CPI (April 2012 - December 2010)

Table 2							
CENTRAL BROWARI	D EAST-	WEST TI	RANSIT	STUDY			
CBEWT Bus O&M Cost Mo	del						
SR 7/Broward Alt							
	ORKSH	FFT					
2012 Collibration	UNNOIT						
		0	0	Described Orac	Des des de de		L'un Kom
On all On all all lines literat	F	Section 15	Cost	Baseline Cost	Productivit	y Deix in a Vanish Is	Line Item
Cost Center/Line Item	Function	Code	туре	(\$2010)	Factor	Driving variable	Cost (\$2012)
Bus Transportation							
Operator Wages	10	501.01	LABOR	\$32 739 261	\$31.95	per BLISHR	\$886 509
Other Wages & Salaries	10	501.02	LABOR	\$2,716,366	\$2.65	per BUSHR	\$0
Fringe Benefits	10	502.00	FRINGE	\$14 956 566	42 18%	Bus Transp salaries & wages	\$0
Contract Services	10	503.00	SERV	\$710 11 <i>4</i>	\$0.70	per BLISHR	\$19.472
Fuel & Lubricants	10	504.01	MATI	\$11 3/8 230	\$0.70	per BUSMI	\$703 871
	10	504.02		¢11,040,200	φ0.01	por BKBUS (50%) BUSMI (50%)	\$50,410
Other Materials & Supplies	10	504.02		\$1,101,755 \$17,256	¢0.001229	per P(B03 (50%), B03(01 (50%)	\$39,410 \$1,070
Fuel Tax & Vehicle Registr	10	507.00		\$17,230 ¢0	φ0.001220		φ1,070 ¢0
Fuel Tax & Venicle Registr.	10	507.00	IAA	φU	n/a		Φ Ο
Bus Maintenance							
Salaries & Wages	41	501.02	LABOR	\$9.947.922	\$0.71	per BUSMI	\$0
Fringe Benefits	41	502.00	FRINGE	\$3.378.197	33.96%	of Bus Maint, salaries & wages	\$0
Contract Services	41	503.00	SERV	\$194,992	n/a	per PKBUS (50%), BUSMI (50%)	\$9.971
Fuel & Lubricants (NRV)	41	504.01	MATL	\$226.088	\$958.00	per PKBUS	\$9,100
Other Materials & Supplies	41	504.99	MATL	\$5.249.905	n/a	per PKBUS (50%), BUSMI (50%)	\$268,469
Casualty & Liability	41	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Facilities Maintenance							
Salaries & Wages	42	501.02	LABOR	\$408,613	\$0.0291	per BUSMI	\$0
Fringe Benefits	42	502.00	FRINGE	\$176,778	43.26%	of Facilities Maint. salaries & wages	\$0
Contract Services	42	503.00	SERV	\$228,934	n/a	per GARAGE (40%) & PNR (60%)	\$0
Other Materials & Supplies	42	504.99	MATL	\$54,496	n/a	per GARAGE (40%) & PNR (60%)	\$0
Casualty & Liability	42	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Concrol 9 Administration							
	160	501.02		\$5,020,007	¢21.200	por DKBLIS	<u> </u>
Salalles & Wayes	100	501.02		\$3,029,007	\$21,309	per FRBUS,	φ0 Φ0
Finge Benefits	160	502.00		\$1,773,375 \$4,750,707	35.26%	or Geni & Admin salaries & wages	¢۵42.044
Services	100	503.00	SERV	\$4,750,707	11/a	per PKBUS (50%), BUSIVII (50%)	\$Z4Z,941
Other Materials & Supplies	160	504.99	MAIL	\$86,253	\$365.48	per PKBUS	\$3,472
Utilities	160	505.00		\$749,931	\$374,966		\$0
Casualty & Liability	160	506.00	INSUR	\$2,085,658	\$8,837.53		\$83,950
laxes	160	507.00	IAX	\$0	n/a	Fixed	\$0
Miscellaneous Expenses	160	509.00	MISC	\$152,113	0.18%	per Non G&A Costs	\$3,566
Expense Transfers	160	510.00	XFERS	\$0	0.00%	per Non G&A Costs	\$0
Leases & Rentals	160	512.00	LEASE	\$0	0.00%	per Non G&A Costs	\$0
Demand Response	n/a	508.00	PURCH	\$18,588,220	\$40.76	per DRHR	\$0
							A 0 001 001
TOTAL COSTS				ə110,/39,/40			ͽ ∠,∠9Ί,801

Table 3							
CENTRAL BROWARD EAST-W	VEST TRANSIT ST						
CBEW I BUS O&M Cost Model							
SR //Broward Alt							
O&M COSTS BY FUNCTION A	ND TYPE						
2012 Calibration							
INPUT STATISTICS							
Verieble	<u>Ctatistic</u>						
variable	Statistic						
Annual Revenue Bus-Hours	26 286						
Annual Revenue Bus-Miles	825,600						
Peak Buses	9						
Bus Garages	0						
BCT Park & Ride Lots	0						
Annual Revenue Demand Resp. Hours	0						
		-					
O&M COSTS							
		Bus	Bus	Facilities	General &	Paratransit	
Expense Object Class	Object Code	Transportation	Maintenance	Maintenance	Administrative	Services	Grand Total
	Sum of Cost (\$2012)						
Expense Object Class		10	41	42	160	n/a	Grand Total
Labor - Operator Salaries/Wages	501.01	\$886,509					\$886,509
Labor - Other Salaries/Wages	501.02	\$0	\$0	\$0	\$0		\$0
Fringe Benefits	502	\$0	\$0	\$0	\$0		\$0
Services	503	\$19,472	\$9,971	\$0	\$242,941		\$272,385
Materials & Supplies - Fuel/Lubricants	504.01	\$703,871	\$9,100				\$712,972
Materials & Supplies - Tires/Tubes	504.02	\$59,410					\$59,410
Materials & Supplies - Other	504.99	\$1,070	\$268,469	\$0	\$3,472		\$273,011
Utilities	505				\$0		\$0
Casualty/Liability Cost	506		\$0	\$0	\$83,950		\$83,950
Taxes	507	\$0			\$0		\$0
Purchased Transportation	508					\$0	\$0
Miscellaneous Expenses	509				\$3,566		\$3,566
Expense Transfers	510				\$0		\$0
Interest Expenses	512				\$0		\$0
Grand Total		\$1,670,332	\$287,541	\$0	\$333,928	\$0	\$2,291,801

Table 1 CENTRAL BROWARD EAST-WEST TRANSIT STUDY CBEWT Bus O&M Cost Model Griffin Alt with Bus

INPUT STATISTICS		Do not Delete	Calibration Statistics				
Input Variable	Variable Name	Input Statistics LPA Alternative	2010 Baseline	2009	2008	2007	
Annual Revenue Bus-Hours	BUSHR	21,730	1,024,606	1,014,405	1,051,090	1,254,275	
Annual Revenue Bus-Miles	BUSMI	670,560	14,049,190	13,878,467	14,245,816	16,879,810	
Peak Buses	PKBUS	8	236	240	245	241	
Bus Garages	GARAGE	0	2	2	2	2	
BCT-Owned Park & Ride	PNR	0	1	1	1	1	
Annual Revenue Paratransit Hours	DRHR	0	456,078	550,601	611,262	546,698	
Inflation Factor	INFLATE	1.06	1.00	0.99	0.97	0.96	
Alternative Name		2012 Calibration	2010 Calibration	2009 Validation	2008 Validation	2007 Validation	

Inflation rate based on Bureau of Labor Statistics Data - South CPI (April 2012 - December 2010)

Table 2							
CENTRAL BROWAR	D EAST-	WEST TI	RANSIT	STUDY			
CBEWT Bus O&M Cost Mo	del						
Griffin Alt with Bus							
LINE ITEM DETAIL W	ORKSH	FFT					
2012 Calibration	United						
		Section 15	Cort	Bacalina Cost	Productivit		Line Item
Cost Contor/Line Itom	Function	Codo	Type		Eactor	y Driving Variable	
COSt Center/Line Rem	Function	Code	Type	(\$2010)	Facioi	Diffing valiable	COSI (\$2012)
Bus Transportation							
Operator Wages	10	501.01	LABOR	\$32,739,261	\$31.95	per BUSHR	\$732,855
Other Wages & Salaries	10	501.02	LABOR	\$2,716,366	\$2.65	per BUSHR	\$0
Fringe Benefits	10	502.00	FRINGE	\$14.956.566	42.18%	Bus Transp. salaries & wages	\$0
Contract Services	10	503.00	SERV	\$719.114	\$0.70	per BUSHR	\$16.097
Fuel & Lubricants	10	504.01	MATL	\$11.348.239	\$0.81	per BUSMI	\$571.691
Tires & Tubes	10	504.02	MATL	\$1.161.755	n/a	per PKBUS (50%), BUSMI (50%)	\$50.046
Other Materials & Supplies	10	504.99	MATI	\$17,256	\$0.001228	per BUSMI	\$869
Fuel Tax & Vehicle Registr.	10	507.00	TAX	\$0	n/a	per PKBUS (50%), BUSMI (50%)	\$0
				\$			* *
Bus Maintenance							
Salaries & Wages	41	501.02	LABOR	\$9,947,922	\$0.71	per BUSMI	\$0
Fringe Benefits	41	502.00	FRINGE	\$3,378,197	33.96%	of Bus Maint. salaries & wages	\$0
Contract Services	41	503.00	SERV	\$194,992	n/a	per PKBUS (50%), BUSMI (50%)	\$8,400
Fuel & Lubricants (NRV)	41	504.01	MATL	\$226,088	\$958.00	per PKBUS	\$8,089
Other Materials & Supplies	41	504.99	MATL	\$5,249,905	n/a	per PKBUS (50%), BUSMI (50%)	\$226,155
Casualty & Liability	41	506.00	INSUR	\$0	\$0.00	per PKBUS	\$0
Excilition Maintonanco							
	40	501.02		¢409 612	¢0.0201	por PLISMI	¢0
Salalles & Wayes	42	501.02		\$400,013 \$176,779	φ0.0291	of Equilities Maint, colorida & wages	\$U
Contract Sonicos	42	502.00		\$170,770	43.20%	DOLLAR MARKEN AND A DIR (60%)	پې ۵۵
Other Meteriala & Supplies	42	503.00	MATI	\$220,934 \$54,406	n/a	per GARAGE (40%) & FNR (00%)	<u>۵</u> 0
Cocuplty & Liphility	42	506.00		\$04,490 ¢0	\$0.00	per GARAGE (40%) & FINK (00%)	م 0
	42	500.00	INSUR	φυ	φ0.00		φυ
General & Administrative							
Salaries & Wages	160	501.02	LABOR	\$5,029,007	\$21,309	per PKBUS,	\$0
Fringe Benefits	160	502.00	FRINGE	\$1,773,375	35.26%	of Genl & Admin salaries & wages	\$0
Services	160	503.00	SERV	\$4,750,707	n/a	per PKBUS (50%), BUSMI (50%)	\$204,650
Other Materials & Supplies	160	504.99	MATL	\$86,253	\$365.48	per PKBUS	\$3,086
Utilities	160	505.00	UTIL	\$749,931	\$374,966	per GARAGE	\$0
Casualty & Liability	160	506.00	INSUR	\$2,085,658	\$8,837.53	per PKBUS	\$74,622
Taxes	160	507.00	TAX	\$0	n/a	Fixed	\$0
Miscellaneous Expenses	160	509.00	MISC	\$152,113	0.18%	per Non G&A Costs	\$2,940
Expense Transfers	160	510.00	XFERS	\$0	0.00%	per Non G&A Costs	\$0
Leases & Rentals	160	512.00	LEASE	\$0	0.00%	per Non G&A Costs	\$0
Demand Response	n/a	508.00	PURCH	\$18,588,220	\$40.76	per DRHR	\$0
				,,,	<i></i>		φ υ
TOTAL COSTS				\$116,739,746			\$1,899,500



Appendix B: LRT O&M Cost Models

CENTRAL BROW	VARD EA	ST-WEST 1	RANSIT S	STUDY							
CBEWT LRT O&M	Cost Model										
LPA w/Nova & Davi	ie										
Table 1. Input Stati	stics										
		TEST CASE	· · · · ·			CALIBRATIO	N SYSTEMS		· · · · ·		BASE
		Alignment	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	12/10
Variable	Code	Calibration	Salt Lake City	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Calibration
Peak Cars	PKCAR	11	43	50	104	47	110	56	118	38	71
Revenue Car-Miles	CARMI	738.720	3.248.740	5.818.779	7.969.738	3.019.865	8.145.575	4.073.674	9.645.684	3.179.325	5.637.673
Revenue Train-Hours	TRNHR	32.646	84.644	116.669	183.865	133.236	305.050	81.226	187.402	84.579	147.084
Passenger Stations	STATION	22	28	37	36	65	38	48	53	33	42
Directional Route Miles	RTMILE	16	39.4	91.1	70.0	81.0	112.4	73.8	121.1	57.6	81
Maintenance Facilities	YARD	1.0	1	2	2	1	4	2	3	2	2.1
Inflation Factor	INFLATE	1.06									1.00
Alternative Name	NAME	04/12 Calibration									12/10 Calibration
Total Oper Cost Efficier	ices		\$28,006,024	\$53,945,130	\$71,424,851	\$56,685,665	\$106,374,746	\$47,846,225	\$167,914,954	\$39,400,273	\$71,449,734
	Cost/Peak Ca	ar	\$651,303	\$1,078,903	\$686,777	\$1,206,078	\$967,043	\$854,397	\$1,423,008	\$1,036,849	\$988,045
	Cost/Car-Mile	Э	\$8.62	\$9.27	\$8.96	\$18.77	\$13.06	\$11.75	\$17.41	\$12.39	\$12.53
	Cost/Train-Ho	our	\$331	\$462	\$388	\$425	\$349	\$589	\$896	\$466	\$488
	Cost/Station		\$1,000,215	\$1,457,976	\$1,984,024	\$872,087	\$2,799,335	\$996,796	\$3,168,207	\$1,193,948	\$1,684,074
	Cost/Track-M	lile	\$711,354	\$592,413	\$1,020,355	\$700,169	\$946,731	\$648,499	\$1,386,352	\$684,033	\$836,238
Labor Productivity											
Vehicle Operations	Train Hrs. / E	mp.	910	759	673	994	1,178	700	502	621	792
Vehicle Maintenance	Car Miles. / E	Emp.	39,141	108,156	104,044	38,716	52,893	59,907	45,714	51,279	62,481
Facilities Maintenance	Dir. Rt. Miles	/Emp.	0.54	0.95	0.83	0.90	0.84	1.45	0.61	0.74	0.86
Rail Admin. & Support	% Non G&A	FTE's	17%	22%	14%	20%	15%	27%	14%	2%	16%
Non-Labor Productivity											
Vehicle Operations	Non Labor Co	ost/Train Hrs.	\$31	\$78	\$47	\$57	\$38	\$120	\$267	\$32	\$84
Vehicle Maintenance	Non Labor Co	ost/Car Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.87
Facilities Maintenance	Non Labor Co	ost/Dir. Rt. Miles	\$27,947.12	\$66,500.66	\$63,295.70	\$27,414.65	\$76,257.11	\$23,229.82	\$36,881.38	\$77,467.53	\$49,874.25
Rail Admin. & Support	% Non G&A	Non-labor Costs	32%	37%	147%	12%	41%	26%	16%	36%	43%
Source: RY 2010 Nationa	al Transit Data	base Reports.									

CE	NTRAL BROWARD EAST-WEST TRANSIT STUD	Y			
СВ	EWT Streetcar O&M Cost Model				
LP	A w/Nova & Davie				
Tal	ale 2 Labor Cost Listing - Metro Dade Transit El				
1 ai					
			2012	Fringe	
	Position	Lookup	Salarv/Wage	Rate	Total
			, enter y, et alge		
Rai	Transportation				
	General Superintendent MDT (8473)	10.01	\$87,266	26.00%	\$109,955
	Chief Supervisor Rail Traffic Control (8161)	10.02	\$77,863	26.00%	\$98,107
	Rail Traffic Controller (8160)	10.03	\$53,770	26.00%	\$67,750
	Instructor (Ops & Maintenance)	10.04	\$46,107	26.00%	\$58,094
	Secretary (0031)	10.05	\$29,808	26.00%	\$37,559
	Rail Supervisor (8163)	10.06	\$46,231	26.00%	\$58,251
	Train Operator (8073)	10.07	\$34,611	26.00%	\$43,610
	Fare Inspector	10.08	\$31,387	26.00%	\$39,548
Bail	Vahiala Maintananaa				
rtai	General Superintendent MDT (8473)	20.01	\$87.266	26.00%	\$100.055
	Administrative Secretary (0004)	20.01	ψ07,200 \$31,218	20.00%	\$30,335
	Chief Supervisor Rail Vehicle Repair (8169)	20.02	ψ31,210 \$68 601	20.00%	409,000 \$86 138
	Rail Stock Clerk (8074)	20.03	\$34,299	26.00%	\$43,217
	MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	20.04	\$46 107	26.00%	\$58,094
	Foreman LRV Shops	20.00	\$46,107	26.00%	\$58,094
	Rail Vehicle Mechanic (8071)	20.07	\$45.427	26.00%	\$57.238
	Rail Maintenance Worker (8063)	20.08	\$31.387	26.00%	\$39,548
	Rail Vehicle Cleaner (8069)	20.09	\$31,387	26.00%	\$39,548
			+-)		, ,
Rai	Facilities Maintenance				
	Chief MDT Facilities Maintenance (8331)	30.01	\$81,158	26.00%	\$102,260
	Secretary (0031)	30.02	\$29,808	26.00%	\$37,559
	General Superintendent Track & Guideway (8473)	30.03	\$87,266	26.00%	\$109,955
	Manager, Power & Signals	30.04	\$46,107	26.00%	\$58,094
	MDT Property Manager (8265)	30.05	\$39,014	26.00%	\$49,158
	Rail Structure & Track Supervisor (8180)	30.06	\$52,615	26.00%	\$66,295
	Supervisor, Power	30.07	\$46,107	26.00%	\$58,094
	Facilities Maintenance Supervisor	30.08	\$39,014	26.00%	\$49,158
		30.09	\$27,806	26.00%	\$35,036
	Track Repairer (8064)	30.10	\$32,698	26.00%	\$41,199
	Transit Facilities Maintainer	30.11	Φ43,427 \$45,427	26.00%	\$07,230 \$57,238
		30.12	\$30,01/	26.00%	\$10,250
	Power Inspector	30.13	\$45.427	26.00%	\$57,238
	Rail Vehicle Electronic Technician (8068)	30.14	\$46 679	26.00%	\$58,816
	Mechanic Helper	30.16	\$29,808	26.00%	\$37,559
		20.10	+_0,000		÷••,000
LRT	General Administration				
	General Manager	40.01	\$153,285	26.00%	\$193,140
	Chief Safety & Security	40.02	\$77,863	26.00%	\$98,107
	MDT, Grant Resources (0346)	40.03	\$87,378	26.00%	\$110,096
	Operations Analyst	40.04	\$34,299	26.00%	\$43,217
L	Transit Administrative Coordinator (8310)	40.05	\$58,058	26.00%	\$73,154
	MDT Field Test Engineer (Civil) (8358)	40.06	\$91,646	26.00%	\$115,474
I	MD1 Field Test Engineer (Electrical) (8358)	40.07	\$91,646	26.00%	\$115,474
	Engineering Lechnician	40.08	\$34,299	26.00%	\$43,217
<u> </u>					
NO					-
	Comparable existing MDT positions are matched to now LPT positions				
2	Ware data from MDT FY 2012 salary and ware data				
3	Fringe benefit rate provided by MDT				-
4	No inflation assumed:		1 00		
L_1.	rte initiation dobumbu.	1	1.00		

CBEWT LRT O&M Cost Mode	el								
LPA w/Nova & Davie									
Table 3a. Non-Labor Cost Li	sting								
Cost Item	Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Average
Centraet Services	¢00.406	¢c 475 100	¢2 275 705	¢2.426.692	¢7 200 072	¢5 522 400	¢26 775 929	¢52.504	¢7 960 09
Materials & Supplies	φ22,420 ¢0	\$0,475,120	\$3,275,705	\$3,430,002	\$1,300,072	\$2,535,499	\$30,775,636	\$32,304	\$7,009,00
Miscollapoous	φ0 \$10 926	\$101,320	\$20,000	\$20,019	\$134,439	\$237,203	\$00,517	\$190,207	\$113,14
Bropulsion Bower	\$19,030	\$2,304 \$2,466,942	\$50,905 \$5 274 750	\$30,331	\$0 \$4 095 751	\$24,004	Φ12 152 020	\$2,460,421	\$17,40
Subtotal	\$2,000,034	\$9,400,842	\$8,668,133	\$7,608,761	\$11 601 062	\$9,951,071	\$10,102,029	\$2,400,431	\$12,759,90
Oper. Cost/Train-Hour	\$31.22	\$78.05	\$47.14	\$57.11	\$38.03	\$119.99	\$266.74	\$32.10	\$86.7
Vehicle Maintenance									
Contract Services	\$178,269	\$643,515	\$84,722	\$419,499	\$71,403	\$193,922	\$7,006	\$255,162	\$231,68
Materials & Supplies	\$2,947,331	\$2,309,824	\$3,437,915	\$3,381,088	\$3,528,062	\$2,710,861	\$11,770,737	\$2,820,029	\$4,113,23
Miscellaneous	\$3,370	\$3,842	\$55,426	\$39,120	\$0	\$22,077	\$0	\$511,058	\$79,36
Fuel & Lube	\$218,658	\$234,056	\$89,065	\$282,749	\$164,887	\$45,352	\$175,490	\$38,275	\$156,06
Subtotal	\$3,347,628	\$3,191,237	\$3,667,128	\$4,122,456	\$3,764,352	\$2,972,212	\$11,953,233	\$3,624,524	\$4,580,34
Veh. Maint. Cost/Car-Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.8
Facilities Maintenance									
Materials & Supplies	\$506,903	\$1,330,599	\$747,177	\$682,222	\$7,175,601	\$992,682	\$1,672,571	\$641,730	
Track/Wav/Signals	\$167.278	\$1.317.293	\$239.097	\$204.667	\$4,664,141	\$327.585	\$669.028	\$385.038	\$996.76
Stations	\$167.278	\$13.306	\$448,306	\$307.000	\$1,435,120	\$327.585	\$501.771	\$192.519	\$424.11
Yard/Shop/Central Control	\$167,278	\$0	\$59,774	\$170,556	\$1,076,340	\$327,585	\$501,771	\$64,173	\$295,93
Contract Services	\$604,489	\$4,724,951	\$3.683.522	\$1,708,076	\$1.392.648	\$731,141	2794502	3820400	
Track/Wav/Signals	\$199,481	\$4,724,951	\$1,510,244	\$1.024.846	\$905.221	\$365.571	\$1,117,801	\$382.040	\$1.278.76
Stations	\$199,481	\$0	\$147,341	\$256,211	\$278,530	\$365,571	\$838,351	\$3,056,320	\$642,72
Yard/Shop/Central Control	\$199,481	\$0	\$2,025,937	\$256,211	\$208,897	\$0	\$838,351	\$382,040	\$488,86
Miscellaneous	\$35,800	\$54,567	\$432	\$66,061	\$0	\$9,538	\$0	\$10,010	\$22,05
Subtotal	\$1,100,278	\$6,055,550	\$4,430,699	\$2,219,490	\$8,568,249	\$1,713,896	\$4,467,073	\$4,462,130	\$4,149,22
Fac. Maint. Cost/Track-Mile	\$27,947	\$66,501	\$63,296	\$27,415	\$76,257	\$23,230	\$36,881	\$77,468	\$51,36
Fac. Maint. Cost/Station	\$39,296	\$163,664	\$123,075	\$34,146	\$225,480	\$35,706	\$84,284	\$135,216	\$98,20
Contract Services	\$704 229	¢2 170 100	¢00 579 000	¢576 479	¢c 4c2 975	¢1 929 055	\$5,660,539	¢ 47 997	¢E 007 07
Materials & Supplies	\$704,336	\$2,179,190	\$22,576,023	\$370,470	\$6,403,675	\$1,030,955	\$3,009,330	\$47,637	\$5,007,27
Miscollanoous	\$121,723	\$197,392	\$509,539	\$230,712	\$304,878 \$1,096,152	\$245,547	\$1,529,110	\$7,699	\$345,03
	\$230,721	\$107,710 \$1,005,595	\$099,731	\$137,444	\$1,000,102	\$100,203	\$556,364	\$1,000	\$455,02
	\$148,490	\$1,095,585	\$52,189	\$289,400	\$23,528	\$488,555	\$556,259	\$1,040,485	\$462,50
	\$140,490	\$1,095,585	\$32,109	\$209,400	φ23,320 ¢0	\$400,000	\$330,239	\$1,040,485	\$402,30
Litilition	\$0 \$465,469	\$39,799	\$20,171 \$292,179	\$0 \$69 661	\$0 \$940.095	\$262,202	\$19,740	40 \$560.090	\$17,40
Litilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,409	\$560,989	\$513,99
Subtotal	\$2 202 711	\$6,813,841	\$24 565 996	\$1 688 768	\$0,801,031	\$3,806,249	\$10,812,405	\$3,886,290	\$7,958,52
Admin. Cost/Peak Car	\$53,319	\$136,277	\$236,212	\$35,931	\$89,108	\$67,969	\$91,631	\$102,271	\$112,48
TOTAL	\$9,383,533	\$25,166,286	\$41,331,956	\$15,639,475	\$33,735,594	\$18,238,794	\$77,221,105	\$14,688,338	\$29,447,68
NOTES:									
1. Cost for insurance and utilities of	her than traction	n power, have l	been split betw	een two lines	on this worksh	eet. 50% to va	rd and shops a	nd 50% to pass	senger
stations		. po, nave i	opin botw						
2. Non-labor costs are from FY 2010	National Transi	t Database Re	eports.						
			•						

CENTRAL BROWAR	D EAST	-WEST	TRANSIT S	TUDY									
CREWT L RT O&M Cost	Model		T T										
L BA w/Neve & Devie	Nouei												
LPA W/Nova & Davie													
Table 3b. Non-Labor Un	it Costs												
		Datation					0070		I				11-11 0
Coot Ham	Cada	Driving	Calt Laka	Ct. Louis	Denum	UNIT CO	USIS Dortland	Coommonto	Los Angeles	Deltimere	A. 10 10 10	1/22	Unit Cost
Cost nem	Code	variable	Sall Lake	St. Louis	Deriver	San Jose	Pontanu	Sacramento	LOS Angeles	Daitimore	Average	Use	x Unit
Vahiala Operationa													
Contract Sonicas	100.1	TDNILID	\$0.26	\$55 50	¢17.00	\$25.70	\$24.20	¢60.10	\$106.24	¢0 62	¢ 77.47	¢07.47 4	\$4.040.026
Materials & Supplies	100.1	VO empl	\$0.20	\$1.050	\$318	\$214	\$519	\$2.045	\$190.24	\$0.02	\$529.01	\$529.01 72	\$101 695
Miscellaneous	100.2	VO empl	φ0 \$213	\$1,000 \$15	¢113	\$4214 \$421	010¢	\$2,040	\$01¢	\$1,441 \$45	\$126.89	\$126.89	\$24,302
Propulsion Power	100.3	CARMI	\$0.80	\$0.42	\$0.66	\$1.35	\$0 50	\$0.97	\$1 36	\$0.77	\$0.86	\$0.86	\$4 826 370
	100.4	CARINI	φ0.00	ψ 0. 42	φ0.00	φ1.55	ψ0.50	\$0.57	\$1.50	ψ0.77	φ0.00	φ0.00	\$8,993,402
											Veh Operati	ons Cost/Train-Hr =	\$61.14
											Point Operation		¢0
Vehicle Maintenance													
Contract Services	200.1	CARMI	\$0.05	\$0.11	\$0.01	\$0.14	\$0.01	\$0.05	\$0.00	\$0.08	\$0.06	\$0.06	\$318,784
Materials & Supplies	200.2	CARMI	\$0.91	\$0.40	\$0.43	\$1.12	\$0.43	\$0.67	\$1.22	\$0.89	\$0.76	\$0.76	\$4,271,281
Miscellaneous	200.3	VM empl	\$41	\$71	\$724	\$502	\$0	\$325	\$0	\$8,243	\$237.40	\$237.40 3.	\$23,336
Fuel & Lube	200.4	PKCAR	\$5,085	\$4,681	\$856	\$6,016	\$1,499	\$810	\$1,487	\$1,007	\$2,680.22	\$2,680.22	\$189,626
													\$4,803,027
											Veh. Mainten	ance Cost/Car-Mile =	\$0.85
Facilities Maintenance													
Materials & Supplies													
Track/Way/Signals	300.1	RTMILE	\$4,249	\$14,466	\$3,416	\$2,528	\$41,511	\$4,440	\$5,524	\$6,685	\$5,901.02	\$5,901.02 4.	\$476,692
Stations	300.2	STATION	\$4,249	\$360	\$12,453	\$4,723	\$37,766	\$4,440	\$9,467	\$5,834	\$5,932.26	\$5,932.26 4.	\$250,638
Yard/Shop/Central Ctrl.	300.3	YARD	\$4,249	\$0	\$29,887	\$170,556	\$269,085	\$4,440	\$167,257	\$32,087	\$14,132.49	\$14,132.49 1,4,5	5 \$30,032
Contract Services													
Track/Way/Signals	300.4	RTMILE	\$5,067	\$51,888	\$21,575	\$12,659	\$8,056	\$4,955	\$9,229	\$6,633	\$7,766.39	\$7,766.39 6,7	\$627,378
Stations	300.5	STATION	\$5,067	\$0	\$4,093	\$3,942	\$7,330	\$7,616	\$15,818	\$92,616	\$4,674.52	\$4,674.52 1,3	\$197,499
Yard/Shop/Central Ctrl.	300.6	YARD	\$5,067	\$0	\$1,012,969	\$256,211	\$52,224	\$0	\$279,450	\$191,020	\$111,996.11	\$111,996.11 7	\$237,992
Miscellaneous	300.7	FM empl	\$494	\$567	\$5	\$734	\$0	\$187	\$0	\$128	\$264.45	\$264	\$26,601
													\$1,846,831
											Fac. Maint.	Cost/Track-Mile =	\$22,862
											Fac. Main	t. Cost/Station =	\$43,712
Concret Administration													
General Administration	400.4	DKCAD	¢16.000	£40 E04	¢017.000	¢10.005	¢50,700	¢22.020	¢40.047	¢1.050	¢20,449,00	¢20,440,7	¢0.454.400
Materiala & Supplies	400.1	PRCAR	\$10,300	\$43,304	¢706	\$12,200	\$00,703	\$32,030 €024	\$40,047	\$1,259	\$30,446.00	\$30,440 / \$4,467	\$2,154,196
Miscellancous	400.2	Total empl	\$420 \$924	\$1,007 \$506	\$700 \$1,412	\$290	\$002 \$1,725	\$024 \$660	\$1,720	φ2,100 ¢27	\$1,100.00	φ1,107 ¢012	\$327,329
Cocupity & Lipbility	400.3	CARM	\$0.05	\$500	\$1,412	\$360 \$0.10	\$1,723	\$000 \$0.12	\$1,070	γ27 \$2 0.2	¢0.11	4013 ¢0	\$507,625
Casualty & Liability	400.4	PTMIE	\$3,772	\$12,031	\$746	\$0.10	00.00 00.00	\$0.12	\$0.00	\$0.33 \$18.168	\$3 252 64	\$3 253 3 6	\$390,193
	400.5	PKCAP	\$0,772	\$796	\$271	φ3,373 ¢0	\$0	\$0,022	\$167	\$10,100 \$0	\$270.27	\$270	\$10,122
Litilities	400.0	STATION	\$16.624	\$20,486	\$10.644	\$1 056	\$22.368	\$5.483	\$14,386	\$17.000	\$13,505,93	\$13,506	\$570.625
Litilities	400.8	VARD	\$465,468	\$378,994	\$191 589	\$68,661	\$212,000	\$131,602	\$254 156	\$280,495	\$247,932,40	\$247 932	\$526,856
Ounties	400.0	17110	φ400,400	φ070,004	φ101,000	φ00,001	φ 2 12,400	φ101,002	φ204,100	φ200,400	φ247,002.40	φ241,002	\$5,025,101
											Admin, C	Cost/Peak Car =	\$71.026
•													
											Calibration N	on-Labor Cost	\$20,668,361
NOTES: The following cities were	not included	d in the calcu	lation of average ur	nit costs where	specified, beca	use they were	considered ou	itliers:					
1. Los Angeles													
2. Sacramento													
3. Baltimore													
4. Portland													
5. San Jose													
6. St. Loius													
7. Denver													

Calculation of Propulsion Power Costs	Estimated kwl	h per month =	369,360				
	UNIT	MONTHLY		ANNUAL			
CHARGE	COST	COST		COST			
1 Customer Charge	\$179.19	\$1,434		\$17,202			
2 Energy Charge	6.0) kwh per RE\	/CARMI				
	\$0.1019	\$37,627		\$451,519			
3 Demand Charge	13.2	2 KW per sub	station				
	\$7.60	\$803		\$9,631			
TOTAL STREETCAR TRACTION POWER				\$478,352			
Cost per kwh =				\$0.11			
Cost per Rev. Car-Mile =				\$0.65			
1. FPL Business Rate Schedule GSLD-2 (General Service Large Demand), effective 1/1/12.							
2. One Customer Charge assumed for each substation; assume 1 substation per route-mile.							
3. Average energy consumption rate for Salt Lake City, St. Louis, San Jose and Portland (se	e calculation below).					
4. Maximum demand assumed supplied to each substation = 13.2KV (Portland); assume 1 s	substation per route	e-mile.					
5. Assume negotiated rates with no transmission/distribution charges and no rate riders.							
				Average	kwh Consumption	n Rate	
	Propulsion \$	\$/kwh		kwh	rev. car-mi	kwh/rev. car-m	i
	\$2,600,654	\$0.11	Salt Lake	23,196,953	2,982,557	7.78	3
	\$2,466,842	2 \$0.07	' St. Louis	36,302,117	5,024,244	7.23	3
	\$4,087,109	9 \$0.18	San Jose	22,358,361	2,459,638	9.09	9
	\$4,085,751	\$0.08	8 Portland	53,556,304	6,023,056	8.89	9
	\$13,240,356	\$0.10) Subtotal	135,413,735	16,489,495	8.21	l <<< Use 8.0
	\$3,951,671	I \$0.11	Sacramento	34,946,640	3,429,277	10.19	9
	\$4,072,291	\$0.06	5 Dallas	70,181,785	5,153,160	13.62	2
	\$5,274,759	9 \$0.11	Denver	46,339,256	3,869,345	11.98	3
	\$13,152,029	9 \$0.14	Los Angeles	95,971,346	8,114,242	11.83	3
	\$2,460,431	l \$0.07	Baltimore	33,758,160	2,060,331	16.38	3
	\$42,151,537	7 \$0.10) Total	416,610,922	39,115,850	10.65	5

CENTRAL BROW	WARD EAST-WEST TRANSIT ST	ΓUDY							
CBEWT LRT O&M	Cost Model	_							
I PA w/Nova & Davi	ie								
Table 4 Line Itom	Notail								
	Jetali								
04/12 Calibration									
					Annual	Draductivity	+		Annual Cast
Cost Hom		Dont	Cada	Turno	Forningo	Froductivity	Drivor	ETEo	Annual Cost
Cost item		Dept.	Code	туре	Earnings	Factor	Driver	FIES	(04/ 12 donars)
Rail Vehicle Operation	e								
General Superintende	ent MDT (8473)	100	10.01	LABOR	\$109 955	0	Fixed	0.0	\$0
Chief Supervisor Rail	Traffic Control (8161)	100	10.02	LABOR	\$98,107	0	# of Controllers	0.0	\$0
Rail Traffic Controller	(8160)	100	10.03	LABOR	\$67.750	0	# of Operators	0.0	\$0
Instructor (Ops & Mai	intenance)	100	10.04	LABOR	\$58,094	0.020	# of Operators	1.0	\$58,094
Secretary (0031)	,	100	10.05	LABOR	\$37,559	0	YARD	0.0	\$0
Rail Supervisor (8163))	100	10.06	LABOR	\$58,251	0.17	# of Operators	4.0	\$233,004
Train Operator (8073)		100	10.07	LABOR	\$43,610	0.769	TRNHR	25.0	\$1,090,253
Fare Inspector		100	10.08	LABOR	\$39,548	0.015	CARMI	7.0	\$276,835
Overtime, Operators		100		LABOR		5.0%	Operator Wages		\$54,513
Overtime, Other ATU	Empl.	100		LABOR		5.0%	Other ATU Wages		\$13,842
System Police Officer	rs	100		SERV		\$0.394	1,000 TRNHR		\$0
Other Contract Servic	es	100	100.1	SERV		\$27.47	TRNHR		\$946,658
Materials & Supplies		100	100.2	MATL		\$529	Dept. Employee		\$20,659
Miscellaneous		100	100.3	MISC		\$126.89	Dept. Employee		\$4,955
Propulsion Power		100	100.4	UTIL		<u>n/a</u>	Calculated Separately	<u>.</u>	\$478,352
	Subtotal							37.0	\$3,177,165
						Train-Hours/O	perations Employee		882.3
						Operations No	on-Labor Cost/Train-Hou	ır	\$44.43
Rail Vehicle Maintenan	ice								
General Superintende	ent MDT (8473)	200	20.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Administrative Secret	ary (0094)	200	20.02	LABOR	\$39,335	0	YARD	0.0	\$0
Chief Supervisor Rail	Vehicle Repair (8169)	200	20.03	LABOR	\$86,438	0	YARD	0.0	\$0
Rail Stock Clerk (807-	4)	200	20.04	LABOR	\$43,217	2.0	Shifts, YARD	2.0	\$86,434
MDT Operation Mainte	enance Instructor (Rail Maintenance) (8106)	200	20.05	LABOR	\$58,094	1.0	YARD	0.0	\$0
Foreman, LRV Shops		200	20.06	LABOR	\$58,094	2.0	Shifts, YARD	2.0	\$116,189
Rail Vehicle Mechanic	c (80/1)	200	20.07	LABOR	\$57,238	0.133	10,000 CARMI	10.0	\$572,383
Rail Maintenance Wo	(2000)	200	20.08	LABOR	\$39,548	0.167	# Elec./Mech.	0.0	\$0
Rail Venicle Cleaner ((8069)	200	20.09	LABOR	\$39,548	0.20	PKCAR	2.0	\$79,096
Overtime, A IU Emplo	yees	200	000.4	LABOR		5.0%	Dept. A IU Wages		\$36,896
Contract Services		200	200.1	SERV		\$0.06	CARMI		\$33,066
Materiais & Supplies		200	200.2	MAIL		\$0.76			\$443,043
		200	200.3			\$237.40	Dept. Employee		\$4,009
Fuel & Lube	Cubicital	200	200.4	FUEL		\$2,080.22	PROAR	40.0	<u>\$31,118</u>
	SUDIOIAI							16.0	\$1,402,233
						Car Milas /Vah	icle Maint, Employee		16 170
						Veh Maint M	on-Labor Cost/Car-Mile		40,170 \$0.60
						• on. Maint. IV			ψυ.03

CENTRAL BROWARD EAST-WEST TRANSIT S	TUDY							
CBEWT L RT O&M Cost Model								
		_						
l able 4. Line item Detail								
04/12 Calibration								
				Annual	Productivity			Annual Cost
Cost Item	Dept.	Code	Туре	Earnings	Factor	Driver	FTEs	(04/'12 dollars)
		_						
Rail Facilities Maintenance								
Chief MDT Facilities Maintenance (8331)	300	30.01	LABOR	\$102,260	0	Fixed	0.0	\$0
Secretary (0031)	300	30.02	LABOR	\$37,559	0	YARD	0.0	\$0
General Superintendent Track & Guideway (8473)	300	30.03	LABOR	\$109,955	0	Fixed	0.0	\$0
Manager, Power & Signals	300	30.04	LABOR	\$58,094	0	Fixed	0.0	\$0
MDT Property Manager (8265)	300	30.05	LABOR	\$49,158	0	FIXED	0.0	\$0
Rail Structure & Track Supervisor (8180)	300	30.06	LABOR	\$66,295	0.2	# T&VV Maint.	1.0	\$66,295
Supervisor, Power	300	30.07	LABOR	\$58,094	0.2	# P&S Maint.	1.0	\$58,094
Facilities Maintenance Supervisor	300	30.08	LABOR	\$49,108	0.2	# D&G Maint.	1.0	\$49,138 \$25,030
Trook Depairer (0064)	300	30.09		\$30,030 ¢41,100	0.125		1.0	\$30,030 ¢00,000
Dower Maintainer	200	20.10		\$41,199 \$57,229	0.125		2.0	\$02,390 \$114.477
Transit Eacilities Maintainer	200	20.12		\$57,230	0.100	STATION	2.0	\$114,477 \$114,477
Electrician	300	30.12		\$10,230	0.10	STATION	2.0	\$08.316
Power Inspector	300	30.13	LABOR	\$57 238	0.10	RTMILE	2.0	\$57,238
Rail Vehicle Electronic Technician (8068)	300	30.14	LABOR	\$58,816	0.03	RTMILE	0.0	ψ37,230 \$0
Mechanic Helper	300	30.16	LABOR	\$37,559	0.07	# Maintainers	0.0	ço su
Overtime ATLI Employees	300	00.10	LABOR	ψ01,000	5.0%	Dept ATLL Wares	0.0	\$33 774
Materials & Sunnlies	000		EXECUT		0.070	Dopt. And Magoo		φου, Η Ι
Track/Way	300	300.1	MATI		\$5,901	RTMI F		\$50 450
Stations	300	300.2	MATI		\$5,932	STATION		\$68,875
Yard/Shop	300	300.3	MATL		\$14,132	YARD, PK VEH		\$7,458
Contract Services					•••,••=	,,		. .,
Track/Way	300	300.4	SERV		\$7.766	RTMILE		\$66.397
Stations	300	300.5	SERV		\$4.675	STATION		\$54.272
Yard/Shop	300	300.6	SERV		\$111,996	YARD, PK VEH		\$59,104
Miscellaneous	300	300.7	MISC		\$264.45	Dept. Employee		\$3,629
Subtotal							13.0	\$1,019,448
					Track-Miles/F	acil. Maint. Employee		1.25
					Facil. Maint. I	Von-Labor Cost/Track-	Mile	\$19, 147
Rail Administration & Support								
General Manager	400	40.01	LABOR	\$193,140	0	Fixed	0.0	\$0
Chief Safety & Security	400	40.02	LABOR	\$98,107	1	Fixed	1.0	\$98,107
MDT, Grant Resources (0346)	400	40.03	LABOR	\$110,096	0	Fixed	0.0	\$0
Operations Analyst	400	40.04	LABOR	\$43,217	0	PKCAR	0.0	\$0
Administrative Secretary (0094)	400	40.05	LABOR	\$39,335	0	Fixed	0.0	\$0
MDT Field Test Engineer (Civil) (8358)	400	40.06	LABOR	\$115,474	0.033	RTMILE	0.0	\$0
MDT Field Test Engineer (Electrical) (8358)	400	40.07	LABOR	\$115,474	0.040	PKCAR	0.0	\$0
Engineering Technician	400	40.08	LABOR	\$43,217	1.0	# Engineer	0.0	\$0
Other Support Staff	400	_	LABOR	\$37,559	0	Total LRT empl.	<u>0.0</u>	\$0
Overtime, ATU Employees	400		LABOR		5.0%	Dept. A IU Wages		\$0
Contract Services	400	400.1	SERV		\$30,448	PKCAR		\$1/6,/53
Materials & Supplies	400	400.2	MAIL		\$1,167	Total LRT empl.		\$41,252
Miscellaneous	400	400.3	MISC		\$813.48	Total LRT empl.		\$28,763
Casualty & Liability	400	400.4	INSUR		\$0.11			\$82,455
	400	400.5	INSUR		\$3,253	RIMILE		\$55,616
Taxes	400	400.0			\$270	PRCAR		\$3,138
Station Utilities	400	400.7	UTIL		\$13,506	STATION		\$313,013
	400	400.8			<u> </u>			φ 130,843
							1.0	ə930,539
					G/A ETE/O+h	er G&A FTF (% and)		20/
					G/A Non-Lah	or Costs/Other Non-La	hor Costs	270
		+ +			Con Non Educ	. coolo, culor norrea		5770
TOTAL EMPLOYEES AND COST							67 0	\$6,529,385
·		1		1			0.10	+-,,-00

CENTRAL BRO	WARD EAST-WE	ST TRA	NSIT ST	UDY						
CBEWT LRT O	&M Cost Model									
LPA w/Nova &	Davie									
Table 5. Summ	ary of Alternativ	е								
04/12 Calibration										
I. INPUT VARIABLES										
		Input	1							
Operating Statistic		Value								
Peak Cars		11	1							
Revenue Car-Miles		738,720	1							
Revenue Train-Hours		32,646	1							
Passenger Stations		22								
Directional Route Miles		16.2								
Maintenance Facilities		1]							
II. COST SUMMARY B	Y COST CATEGORY/COS	ST TYPE (04/	12\$)	LABOR	ΜΔΤΙ	MISC	SERV	ΤΑΥ		TOTAL
	1,1601							100	1.1.1.11	IOTAL
I R Operations	100	FUEL	INSUR	\$1,726,540	\$20,659	\$4.955	\$946.658		\$478.352	101AL \$3,177,165
LR Operations LRV Maintenance	100 200	\$31.118	INSUR	\$1,726,540 \$890,997	\$20,659 \$443.043	\$4,955	\$946,658 \$33.066		\$478,352	\$3,177,165 \$1,402,233
LR Operations LRV Maintenance LR Facilities Maint.	100 200 300	\$31,118	INSUR	\$1,726,540 \$890,997 \$709,263	\$20,659 \$443,043 \$126,783	\$4,955 \$4,009 \$3,629	\$946,658 \$33,066 \$179,774		\$478,352	\$3,177,165 \$1,402,233 \$1,019,448
LR Operations LRV Maintenance LR Facilities Maint. LR Administration	100 200 300 400	\$31,118	\$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107	\$20,659 \$443,043 \$126,783 \$41,252	\$4,955 \$4,009 \$3,629 \$28,763	\$946,658 \$33,066 \$179,774 \$176,753	\$3,138	\$478,352	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total	100 200 300 400 Grand Total	\$31,118 \$31,118 \$31,118	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total	100 200 300 400 Grand Total	\$31,118 \$31,118 \$31,118	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total	100 200 300 400 Grand Total CTORS (04/12\$)	\$31,118 \$31,118 \$31,118	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total III. ANNUAL COST FAC Total Cost per Revenue	Dept. 100 200 300 400 400 Grand Total 500 CTORS (04/12\$) 7 Train-Hour = 500	\$31,118 \$31,118 \$31,118 \$200.01	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total III. ANNUAL COST FAC Total Cost per Revenue Total Cost per Revenue	100 200 300 400 Grand Total CTORS (04/12\$) Train-Hour = Car-Mile =	\$31,118 \$31,118 \$31,118 \$200.01 \$8.84	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total III. ANNUAL COST FAC Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai	Dept. 100 200 300 400 400 Grand Total 5 CTORS (04/12\$) 7 Train-Hour = Car-Mile = n-Hour = 5	\$31,118 \$31,118 \$31,118 \$200.01 \$8.84 \$97	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total III. ANNUAL COST FAC Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai Veh. Maint. Cost per Ca	Dept. 100 200 300 400 400 Grand Total 5 CTORS (04/12\$) 7 Train-Hour = 6 Car-Mile = 5 n-Hour = 6 ar-Mile = 5	\$31,118 \$31,118 \$31,118 \$200.01 \$8.84 \$97 \$1.90	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai Veh. Maint. Cost per Ca Facil. Maint. Cost per S	CTORS (04/12\$) Train-Hour = Car-Mile = ar-Mile = itation =	\$31,118 \$31,118 \$200.01 \$8.84 \$97 \$1.90 \$46,339	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	\$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385
LR Operations LRV Maintenance LR Facilities Maint. LR Administration Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai Veh. Maint. Cost per Ca Facil. Maint. Cost per S Administrative Cost per	CTORS (04/12\$) Train-Hour = Car-Mile = ar-Mile = Station = Peak Car =	\$31,118 \$31,118 \$200.01 \$8.84 \$97 \$1.90 \$46,339 \$84,594	\$138,070 \$138,070	\$1,726,540 \$890,997 \$709,263 \$98,107 \$3,424,907	\$20,659 \$443,043 \$126,783 \$41,252 \$631,736	\$4,955 \$4,009 \$3,629 \$28,763 \$41,356	\$946,658 \$33,066 \$179,774 \$176,753 \$1,336,252	\$3,138 \$3,138	\$478,352 \$444,455 \$922,807	101AL \$3,177,165 \$1,402,233 \$1,019,448 \$930,539 \$6,529,385

CENTRAL BROW	VARD EA	ST-WEST 1	RANSIT S	TUDY							
CBEWT LRT O&M	Cost Model										
SR7/Broward Alt											
Table 1. Input Stati	stics										
		TEST CASE	· · · · ·			CALIBRATIO	NSYSTEMS		· · ·		BASE
		Alignment	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	12/10
Variable	Code	Calibration	Salt Lake City	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Calibration
Peak Cars	PKCAR	7	43	50	104	47	110	56	118	38	71
Revenue Car-Miles	CARMI	291.840	3.248.740	5.818.779	7.969.738	3.019.865	8.145.575	4.073.674	9.645.684	3.179.325	5.637.673
Revenue Train-Hours	TRNHR	19,688	84,644	116,669	183,865	133,236	305,050	81,226	187,402	84,579	147,084
Passenger Stations	STATION	10	28	37	36	65	38	48	53	33	42
Directional Route Miles	RTMILE	6	39.4	91.1	70.0	81.0	112.4	73.8	121.1	57.6	81
Maintenance Facilities	YARD	1.0	1	2	2	1	4	2	3	2	2.1
Inflation Factor	INFLATE	1.06									1.00
Alternative Name	NAME	04/12 Calibration									12/10 Calibration
Total Oper Cost Efficier	ices		\$28,006,024	\$53,945,130	\$71,424,851	\$56,685,665	\$106,374,746	\$47,846,225	\$167,914,954	\$39,400,273	\$71,449,734
	Cost/Peak Ca	ar	\$651,303	\$1,078,903	\$686,777	\$1,206,078	\$967,043	\$854,397	\$1,423,008	\$1,036,849	\$988,045
	Cost/Car-Mile	9	\$8.62	\$9.27	\$8.96	\$18.77	\$13.06	\$11.75	\$17.41	\$12.39	\$12.53
	Cost/Train-Ho	bur	\$331	\$462	\$388	\$425	\$349	\$589	\$896	\$466	\$488
	Cost/Station		\$1,000,215	\$1,457,976	\$1,984,024	\$872,087	\$2,799,335	\$996,796	\$3,168,207	\$1,193,948	\$1,684,074
	Cost/Track-M	lile	\$711,354	\$592,413	\$1,020,355	\$700,169	\$946,731	\$648,499	\$1,386,352	\$684,033	\$836,238
Labor Productivity											
Vehicle Operations	Train Hrs. / E	mp.	910	759	673	994	1,178	700	502	621	792
Vehicle Maintenance	Car Miles. / E	Emp.	39,141	108,156	104,044	38,716	52,893	59,907	45,714	51,279	62,481
Facilities Maintenance	Dir. Rt. Miles	/Emp.	0.54	0.95	0.83	0.90	0.84	1.45	0.61	0.74	0.86
Rail Admin. & Support	% Non G&A	FTE's	17%	22%	14%	20%	15%	27%	14%	2%	16%
Non-Labor Productivity											
Vehicle Operations	Non Labor Co	ost/Train Hrs.	\$31	\$78	\$47	\$57	\$38	\$120	\$267	\$32	\$84
Vehicle Maintenance	Non Labor Co	ost/Car Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.87
Facilities Maintenance	Non Labor Co	ost/Dir. Rt. Miles	\$27,947.12	\$66,500.66	\$63,295.70	\$27,414.65	\$76,257.11	\$23,229.82	\$36,881.38	\$77,467.53	\$49,874.25
Rail Admin. & Support	% Non G&A	Non-labor Costs	32%	37%	147%	12%	41%	26%	16%	36%	43%
Source: RY 2010 Nationa	al Transit Data	base Reports.									

CE	NTRAL BROWARD EAST-WEST TRANS	T STUD	Y			
СВ	EWT Streetcar Q&M Cost Model		-			
SR	7/Broward Alt					
	No 2 Labor Cost Listing Matro Dado Transit	CI				
Tac	ble 2. Labor Cost Listing - Metro Dade Transit,	FL				
			2012	Fringe		
	Position	Lookup	Salany/Maga	Pate	Total	
	rosiuon	соокир	Salal y/ Wage	Nate	Total	
Rail	Transportation					_
	General Superintendent MDT (8473)	10.01	\$87,266	26.00%	\$109,955	
	Chief Supervisor Rail Traffic Control (8161)	10.02	\$77.863	26.00%	\$98.107	
	Rail Traffic Controller (8160)	10.03	\$53,770	26.00%	\$67,750	
	Instructor (Ops & Maintenance)	10.04	\$46,107	26.00%	\$58,094	
	Secretary (0031)	10.05	\$29,808	26.00%	\$37,559	
	Rail Supervisor (8163)	10.06	\$46,231	26.00%	\$58,251	
	Train Operator (8073)	10.07	\$34,611	26.00%	\$43,610	
	Fare Inspector	10.08	\$31,387	26.00%	\$39,548	
Rail	Vehicle Maintenance	a				
	General Superintendent MDT (8473)	20.01	\$87,266	26.00%	\$109,955	
	Administrative Secretary (0094)	20.02	\$31,218	26.00%	\$39,335	_
	Unier Supervisor Kall Vehicle Kepair (8169)	20.03	\$68,601	26.00%	\$86,438	
	Rall Stock Clerk (8074)	20.04	\$34,299	26.00%	\$43,217	_
	Foreman L BV Shape	20.05	\$40,107 \$46,107	26.00%	\$58,094 \$58,004	_
	Poleman, LRV Shops	20.00	\$40,107 \$45,427	26.00%	\$38,094 \$57,229	
	Pail Maintenance Worker (8063)	20.07	\$40,427 \$31,387	20.00%	\$30,230 \$30,548	
	Rail Vehicle Cleaner (8069)	20.00	\$31,307	26.00%	\$39,540 \$39,548	
		20.03	ψ31,307	20.0070	ψ09,0 1 0	
Rail	Facilities Maintenance					
	Chief MDT Facilities Maintenance (8331)	30.01	\$81.158	26.00%	\$102.260	
	Secretary (0031)	30.02	\$29,808	26.00%	\$37,559	
	General Superintendent Track & Guideway (8473)	30.03	\$87,266	26.00%	\$109,955	
	Manager, Power & Signals	30.04	\$46,107	26.00%	\$58,094	-
	MDT Property Manager (8265)	30.05	\$39,014	26.00%	\$49,158	
	Rail Structure & Track Supervisor (8180)	30.06	\$52,615	26.00%	\$66,295	
	Supervisor, Power	30.07	\$46,107	26.00%	\$58,094	
	Facilities Maintenance Supervisor	30.08	\$39,014	26.00%	\$49,158	
	Account Clerk (0310)	30.09	\$27,806	26.00%	\$35,036	
	Track Repairer (8064)	30.10	\$32,698	26.00%	\$41,199	
	Power Maintainer	30.11	\$45,427	26.00%	\$57,238	
	I ransit Facilities Maintainer	30.12	\$45,427	26.00%	\$57,238	
-	Electrician	30.13	\$39,014	26.00%	\$49,158	
	Power Inspector Pail Vahiala Electronia Tachnician (8068)	30.14	\$45,427	26.00%	\$57,238 \$59,916	
	Machania Helper	30.15	\$40,079 \$20,909	26.00%	\$30,810 \$27,550	_
		30.10	φ29,000	20.00%	φ37,55 9	
IRT	General Administration					
	General Manager	40.01	\$153 285	26.00%	\$193 140	_
-	Chief Safety & Security	40.02	\$77,863	26.00%	\$98,107	
	MDT. Grant Resources (0346)	40.03	\$87.378	26.00%	\$110.096	
	Operations Analyst	40.04	\$34,299	26.00%	\$43,217	
	Transit Administrative Coordinator (8310)	40.05	\$58,058	26.00%	\$73,154	
	MDT Field Test Engineer (Civil) (8358)	40.06	\$91,646	26.00%	\$115,474	-
	MDT Field Test Engineer (Electrical) (8358)	40.07	\$91,646	26.00%	\$115 <u>,</u> 474	_
	Engineering Technician	40.08	\$34,299	26.00%	\$43,217	
NO	TES:					
1.	Comparable existing MDT positions are matched to new LRT	positions.				
2.	Wage data from MDT FY 2012 salary and wage data.					
3.	Fringe benefit rate provided by MD1.					_
4.	INO INTIATION ASSUMED:		1.00			

CENTRAL BROWARD E	AST-WES	T TRANS	T STUDY						
CBEWT LRT O&M Cost Mode	el								
SR7/Broward Alt									
Table 3a. Non-Labor Cost Li	stina								
	J								
Cost Item	Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Average
Vehicle Operations									
Contract Services	\$22,426	\$6,475,126	\$3,275,705	\$3,436,682	\$7,380,872	\$5,533,499	\$36,775,838	\$52,504	\$7,869,082
Materials & Supplies	\$0	\$161,326	\$86,686	\$28,619	\$134,439	\$237,263	\$60,517	\$196,267	\$113,140
Miscellaneous	\$19,836	\$2,364	\$30,983	\$56,351	\$0	\$24,004	\$0	\$6,192	\$17,466
Propulsion Power	\$2,600,654	\$2,466,842	\$5,274,759	\$4,087,109	\$4,085,751	\$3,951,671	\$13,152,029	\$2,460,431	\$4,759,906
Subtotal	\$2,642,916	\$9,105,658	\$8,668,133	\$7,608,761	\$11,601,062	\$9,746,437	\$49,988,384	\$2,715,394	\$12,759,593
Oper. Cost/Train-Hour	\$31.22	\$78.05	\$47.14	\$57.11	\$38.03	\$119.99	\$266.74	\$32.10	\$86.75
Vehicle Maintenance									
Contract Services	\$178,269	\$643,515	\$84,722	\$419,499	\$71,403	\$193,922	\$7,006	\$255,162	\$231,687
Materials & Supplies	\$2,947,331	\$2,309,824	\$3,437,915	\$3,381,088	\$3,528,062	\$2,710,861	\$11,770,737	\$2,820,029	\$4,113,231
Miscellaneous	\$3,370	\$3,842	\$55,426	\$39,120	\$0	\$22,077	\$0	\$511,058	\$79,362
Fuel & Lube	\$218,658	\$234,056	\$89,065	\$282,749	\$164,887	\$45,352	\$175,490	\$38,275	\$156,067
Subtotal	\$3,347,628	\$3,191,237	\$3,667,128	\$4,122,456	\$3,764,352	\$2,972,212	\$11,953,233	\$3,624,524	\$4,580,346
Veh. Maint. Cost/Car-Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.81
Facilities Maintenance					-				
Materials & Supplies	\$506,903	\$1,330,599	\$747,177	\$682,222	\$7,175,601	\$992,682	\$1,672,571	\$641,730	-
Track/Way/Signals	\$167,278	\$1,317,293	\$239,097	\$204,667	\$4,664,141	\$327,585	\$669,028	\$385,038	\$996,766
Stations	\$167,278	\$13,306	\$448,306	\$307,000	\$1,435,120	\$327,585	\$501,771	\$192,519	\$424,111
Yard/Shop/Central Control	\$167,278	\$0	\$59,774	\$170,556	\$1,076,340	\$327,585	\$501,771	\$64,173	\$295,935
Contract Services	\$604,489	\$4,724,951	\$3,683,522	\$1,708,076	\$1,392,648	\$731,141	2794502	3820400	· · · · · · · · · · · ·
Track/Way/Signals	\$199,481	\$4,724,951	\$1,510,244	\$1,024,846	\$905,221	\$365,571	\$1,117,801	\$382,040	\$1,278,769
Stations	\$199,481	\$0	\$147,341	\$256,211	\$278,530	\$365,571	\$838,351	\$3,056,320	\$642,726
Yard/Shop/Central Control	\$199,481	\$0	\$2,025,937	\$256,211	\$208,897	\$0	\$838,351	\$382,040	\$488,865
Miscellaneous	\$35,800	\$54,567	\$432	\$66,061	\$0	\$9,538	\$0	\$10,010	\$22,051
Subtotal	\$1,100,278	\$6,055,550	\$4,430,699	\$2,219,490	\$8,568,249	\$1,713,896	\$4,467,073	\$4,462,130	\$4,149,222
Fac. Maint. Cost/Track-Mile	\$27,947	\$66,501	\$63,296	\$27,415	\$76,257	\$23,230	\$36,881	\$77,468	\$51,364
Fac. Maint. Cost/Station	\$39,296	\$163,664	\$123,075	\$34,146	\$225,480	\$35,706	\$84,284	\$135,216	\$98,206
LRI General Administration	\$704.000	#0.470.400	* ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<i>Ф</i>ГТО 4ТО	#0.400.07 5	\$1.000 OFF	# F 000 500	# 17 007	# F 007 070
Contract Services	\$704,338	\$2,179,190	\$22,578,023	\$576,478	\$6,463,875	\$1,838,955	\$5,669,538	\$47,837	\$5,007,279
Materiais & Supplies	\$121,725	\$699,992	\$389,339	\$258,712	\$504,878	\$245,547	\$1,529,118	\$615,899	\$545,651
Miscellaneous	\$238,721	\$187,716	\$699,731	\$137,444	\$1,086,152	\$166,263	\$956,564	\$7,606	\$435,025
	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
	\$148,496	\$1,095,585	\$52,189	\$289,406	\$23,528	\$488,555	\$556,259	\$1,046,485	\$462,563
	\$U	\$39,799	\$28,171	\$U \$C8 C61	\$U \$940.095	\$51,969	\$19,740	\$U \$FEO 080	\$17,460
Utilities	\$465,468	\$757,987	\$383,178	\$68,661	\$849,985	\$263,203	\$762,469	\$560,989	\$513,992
Subtotol	\$405,400	\$757,907 \$6,913,941	\$303,170	\$00,001 \$1,699,769	\$049,905 \$0,901,031	\$203,203	\$762,469	\$360,969 \$3,896,300	\$313,992
Admin Cost/Rook Cor	φ∠,∠9∠,/11	\$126 277	¢226,242	Φ1,088,768 \$25,024	\$9,001,931	\$3,000,∠49 \$67.0€0	\$10,612,415 \$01,624	\$3,080,290 \$102,271	\$1,908,025 \$110,000
Aumin. Cost/Feak Car	φυσ,319	φ130,277	φ230,212	φ30,931	<i>ф09,108</i>	<i>Ф</i> 07,909	φ91,031	φ102,271	φ11∠,488
ΤΟΤΑΙ	\$0.202.522	\$25 166 296	\$41 321 050	\$15 620 475	\$33 725 504	\$18 229 704	\$77 221 105	\$14 600 220	\$20 /17 606
	φ 9 ,303,333	ψ20, 100,200	φ - 1,331,930	ψ15,059,475	ψ00,700,094	ψ10,230,794	ψιι, ΖΖΙ, 105	ψ14,000,330	Ψ 23,447,000
NOTES									
NUTES.	har than tractic	nower been	aaan anlit katu	ioon two lines	on this works-	oot 50% to	rd and abort a	ad 50% to 555	
1. Cost for insurance and utilities, of	nei than tractio	n power, nave i	been spiit betv	veen two imes	on this worksh	eet. 50% to ya	iru and shops al	iu 50% to pas	senger
2 Non-labor costs are from FY 2010	National Trans	it Database Re	ports						

z .		The Database Reports.		
З.	\$2010 inflated to Budget with CPI-U:	1.0000 (South CPI, Dec	əc. 2010)	

CENTRAL BROWAR	D EAST	-WEST	TRANSIT S	TUDY									
CBEWT L BT O&M Cost	Model												
SB2/Broward Alt	liouer												
SR7/Broward Alt													
Table 3b. Non-Labor Un	it Costs												
		Daily days of					0070						Linit Coot
Cost Item	Code	Variable	Salt Lake	St Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Average	1/60	Unit Cost
	Couc	Vanabie	Gan Lanc	Ot. Louis	Denver	Gan bose	1 ontidina	Gaeramento	Los Angeles	Daitimore	riverage	000	× 0///
Vehicle Operations													
Contract Services	100.1	TRNHR	\$0.26	\$55.50	\$17.82	\$25.79	\$24.20	\$68.12	\$196.24	\$0.62	\$27.47	\$27.47 1 .	\$4.040.936
Materials & Supplies	100.2	VO empl	\$0	\$1.050	\$318	\$214	\$519	\$2,045	\$162	\$1,441	\$529.01	\$529.01 2.	\$101.695
Miscellaneous	100.3	VO empl	\$213	\$15	\$113	\$421	\$0	\$207	\$0	\$45	\$126.89	\$126.89	\$24,392
Propulsion Power	100.4	CARMI	\$0.80	\$0.42	\$0.66	\$1.35	\$0.50	\$0.97	\$1.36	\$0.77	\$0.86	\$0.86	\$4,826,379
													\$8,993,402
											Veh. Operati	ions Cost/Train-Hr =	\$61.14
Vehicle Maintenance													
Contract Services	200.1	CARMI	\$0.05	\$0.11	\$0.01	\$0.14	\$0.01	\$0.05	\$0.00	\$0.08	\$0.06	\$0.06	\$318,784
Materials & Supplies	200.2	CARMI	\$0.91	\$0.40	\$0.43	\$1.12	\$0.43	\$0.67	\$1.22	\$0.89	\$0.76	\$0.76	\$4,271,281
Miscellaneous	200.3	VM empl	\$41	\$71	\$724	\$502	\$0	\$325	\$0	\$8,243	\$237.40	\$237.40 3.	\$23,336
Fuel & Lube	200.4	PKCAR	\$5,085	\$4,681	\$856	\$6,016	\$1,499	\$810	\$1,487	\$1,007	\$2,680.22	\$2,680.22	\$189,626
												0	\$4,803,027
											Ven. Mainten	ance Cost/Car-Mile =	\$0.85
Excilition Maintenance											-		
Materials & Supplies													
Track/Way/Signals	300.1	PTMI E	\$4.240	\$14.466	\$3.416	\$2.528	\$11 511	\$4.440	\$5 524	\$6 685	\$5 001 02	\$5 001 02 4	\$476 602
Stations	300.1	STATION	\$4 249	\$360	\$12,453	\$4 723	\$37,766	\$4 440	\$9,467	\$5,834	\$5,932.26	\$5,932,26,4	\$250,638
Yard/Shop/Central Ctrl	300.3	YARD	\$4 249	\$0	\$29,887	\$170,556	\$269.085	\$4 440	\$167,257	\$32,087	\$14 132 49	\$14 132 49 1 4 5	\$30,032
Contract Services	000.0		\$ 1, <u>2</u> 10	φe	¢20,007	¢0,000	\$200,000	\$ 1,110	1 F	<i>Q02,001</i>	\$11,10 <u>2</u> .10	\$11,102.10 1,1,0	\$00,00 <u>2</u>
Track/Way/Signals	300.4	RTMILE	\$5.067	\$51,888	\$21 575	\$12 659	\$8.056	\$4 955	\$9 229	\$6.633	\$7 766 39	\$7 766 39 6 7	\$627.378
Stations	300.5	STATION	\$5,067	\$0	\$4.093	\$3.942	\$7,330	\$7.616	\$15.818	\$92,616	\$4,674.52	\$4.674.52 1.3	\$197,499
Yard/Shop/Central Ctrl.	300.6	YARD	\$5,067	\$0	\$1.012.969	\$256.211	\$52.224	\$0	\$279,450	\$191.020	\$111,996,11	\$111,996,11 7	\$237,992
Miscellaneous	300.7	FM empl	\$494	\$567	\$5	\$734	\$0	\$187	\$0	\$128	\$264.45	\$264	\$26,601
		·											\$1,846,831
											Fac. Maint.	Cost/Track-Mile =	\$22,862
											Fac. Main	nt. Cost/Station =	\$43,712
General Administration													
Contract Services	400.1	PKCAR	\$16,380	\$43,584	\$217,096	\$12,265	\$58,763	\$32,838	\$48,047	\$1,259	\$30,448.00	\$30,448 7	\$2,154,196
Materials & Supplies	400.2	Total empl	\$420	\$1,887	\$786	\$715	\$802	\$824	\$1,720	\$2,180	\$1,166.68	\$1,167	\$527,529
Miscellaneous	400.3	Total empl	\$824	\$506	\$1,412	\$380	\$1,725	\$558	\$1,076	\$27	\$813.48	\$813	\$367,825
Casualty & Liability	400.4	CARMI	\$0.05	\$0.19	\$0.01	\$0.10	\$0.00	\$0.12	\$0.06	\$0.33	\$0.11	\$0	\$596,195
Casualty & Liability	400.5	RIMILE	\$3,772	\$12,031	\$746	\$3,575	\$209	\$6,622	\$4,593	\$18,168	\$3,252.64	\$3,253 3,6	\$262,752
laxes	400.6	PKCAR	\$0	\$796	\$271	\$0	\$0	\$928	\$167	\$0	\$270.27	\$270	\$19,122
Utilities	400.7	STATION	\$16,624	\$20,486	\$10,644	\$1,056	\$22,368	\$5,483	\$14,386	\$17,000	\$13,505.93	\$13,506	\$570,625
Utilities	400.8	YARD	\$465,468	\$378,994	\$191,589	\$68,661	\$212,496	\$131,602	\$254,156	\$280,495	\$247,932.40	\$247,932	\$526,856
											A desire	Cast/Deals Cas	\$5,025,101 \$74,006
											Aumin. C	JUSI/Feak Car =	\$71,020
											Calibration N	on-Labor Cost	\$20,668,361
											Cambradion II		\$20,000,001
NOTES: The following cities were	not included	d in the calcu	ation of average ur	nit costs where	e specified, beca	ause they were	considered ou	itliers:					
1. Los Angeles													
2. Sacramento													
3. Baltimore													
4. Portland													
5. San Jose													
6. St. Loius													
7. Denver													

Calculation of Propulsion Power Costs	Estimated kw	h per month =	145,920				
	UNIT	MONTHLY		ANNUAL			
CHARGE	COST	COST		COST			
1 Customer Charge	\$179.19	\$538		\$6,451			
2 Energy Charge	6.0	kwh per REV	/CARMI				
	\$0.1019	\$14,865		\$178,378			
3 Demand Charge	13.2	2 KW per subs	station				
	\$7.60	\$301		\$3,612			
TOTAL STREETCAR TRACTION POWER				\$188,440			
Cost per kwh =				\$0.11			
Cost per Rev. Car-Mile =				\$0.65			
1. FPL Business Rate Schedule GSLD-2 (General Service Large Demand), effect	ive 1/1/12.						
2. One Customer Charge assumed for each substation; assume 1 substation per	route-mile.						
3. Average energy consumption rate for Salt Lake City, St. Louis, San Jose and F	Portland (see calculation below).					
4. Maximum demand assumed supplied to each substation = 13.2KV (Portland);	assume 1 substation per route	e-mile.					
5. Assume negotiated rates with no transmission/distribution charges and no rate	e riders.						
				Average	wh Consumptior	1 Rate	
	Propulsion \$	\$\$/kwh		kwh	rev. car-mi	kwh/rev. car-mi	
	\$2,600,654	4 \$0.11	Salt Lake	23,196,953	2,982,557	7.78	
	\$2,466,842	2 \$0.07	St. Louis	36,302,117	5,024,244	7.23	
	\$4,087,109	9 \$0.18	San Jose	22,358,361	2,459,638	9.09	
	\$4,085,751	1 \$0.08	Portland	53,556,304	6,023,056	8.89	
	\$13,240,356	5 \$0.10	Subtotal	135,413,735	16,489,495	8.21	<<< Use 8.0
	\$3,951,671	1 \$0.11	Sacramento	34,946,640	3,429,277	10.19	
	\$4,072,291	1 \$0.06	Dallas	70,181,785	5,153,160	13.62	
	\$5,274,759	9 \$0.11	Denver	46,339,256	3,869,345	11.98	
	\$13,152,029	9 \$0.14	Los Angeles	95,971,346	8,114,242	11.83	1
	\$2,460,431	1 \$0.07	Baltimore	33,758,160	2,060,331	16.38	
	\$42,151,537	7 \$0.10	Total	416,610,922	39,115,850	10.65	

CENTRAL BROWARD EAST-WEST TRANSIT ST	UDY							
CBEWT LRT O&M Cost Model								
Table 4. Line Item Detail								
SR //Broward Alt		_						
04/12 Calibration								
				Annual	Productivity			Annual Cost
Cost Item	Dept.	Code	Туре	Earnings	Factor	Driver	FTEs	(04/'12 dollars)
Rall Venicle Operations	100	10.01		\$100 OFF	0	Fixed	0.0	¢o
Chief Superinterident MDT (0473)	100	10.01	LABOR	\$109,900	0	Fixeu # of Controlloro	0.0	\$U
Chief Supervisor Rail Hallic Control (6161)	100	10.02	LABOR	\$90,107	0	# of Operators	0.0	\$U
Rail Hallic Controller (0100)	100	10.03	LABOR	\$67,750	0.020	# of Operators	0.0	\$U
Instructor (Ops & Maintenance)	100	10.04	LABOR	\$00,094	0.020		0.0	\$U
Deil Supervicer (2162)	100	10.05		\$37,339 \$50,251	0.17	# of Operators	0.0	ΦU \$174 752
Train Operator (9072)	100	10.00		\$12,610	0.17		3.0	\$174,733 \$654,453
Fare Inspector	100	10.07	LABOR	\$43,010	0.769		15.0	\$004,102
Pale Inspector	100	10.06	LABOR	39,340	0.015		3.0	\$110,044 \$22,709
Overtime, Operators	100	_	LABOR		5.0%	Operator wages		φ32,700 ¢5,000
Overume, Other A to Empi.	100	_			0.0%	1 000 TDNILID		φ <u></u> σ,932
System Police Olicels	100	400.4	SERV		\$0.394 ¢07.47			ΦC ΦC 70 000
Other Contract Services	100	100.1	SERV		\$27.47	IRNHR Dant Employee		\$570,906
Materials & Supplies	100	100.2	MAIL		\$529	Dept. Employee		\$11,725
Miscellaneous	100	100.3	MISC		\$126.89	Dept. Employee		\$2,812
Propulsion Power	<u>100</u>	100.4			<u>n/a</u>	Calculated Separately		\$188,440
Subtotal	_						21.0	\$1,760,072
					Train-Hours/O	perations Employee		937.5
					Operations No	on-Labor Cost/Train-Hou	r	\$39.31
Rail Vehicle Maintenance								
General Superintendent MDT (8473)	200	20.01	LABOR	\$109,955	0	Fixed	0.0	\$0
Administrative Secretary (0094)	200	20.02	LABOR	\$39.335	0	YARD	0.0	\$0
Chief Supervisor Rail Vehicle Repair (8169)	200	20.03	LABOR	\$86,438	0	YARD	0.0	\$0
Rail Stock Clerk (8074)	200	20.04	LABOR	\$43.217	2.0	Shifts, YARD	1.0	\$43.217
MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	200	20.05	LABOR	\$58.094	1.0	YARD	0.0	\$0
Foreman, LRV Shops	200	20.06	LABOR	\$58.094	2.0	Shifts, YARD	1.0	\$58.094
Rail Vehicle Mechanic (8071)	200	20.07	LABOR	\$57.238	0.133	10.000 CARMI	4.0	\$228,953
Rail Maintenance Worker (8063)	200	20.08	LABOR	\$39.548	0.167	# Elec./Mech.	0.0	\$0
Rail Vehicle Cleaner (8069)	200	20.09	LABOR	\$39,548	0.20	PKCAR	1.0	\$39.548
Overtime, ATU Employees	200		LABOR		5.0%	Dept. ATU Wages		\$15.586
Contract Services	200	200.1	SERV		\$0.06	CARMI		\$8,709
Materials & Supplies	200	200.2	MATL		\$0.76	CARMI		\$116.686
Miscellaneous	200	200.3	MISC		\$237.40	Dept. Employee		\$1,754
Fuel & Lube	200	200.4	FUEL		\$2,680.22	PKCAR		\$19,802
Subtotal					<u> </u>		7.0	\$532,349
					Car-Miles/Veh	nicle Maint. Employee		41,691
					Veh. Maint. N	on-Labor Cost/Car-Mile		\$0.50

CENTRAL BROWARD EAST-WEST TRANSIT ST	UDY							
CREWT RT O&M Cost Model	1							
Table 4. Line Item Dateil								
l adie 4. Line item Detail								
SR7/Broward Alt								
04/12 Calibration								
				Annual	Productivity			Annual Cost
Cost Item	Dept.	Code	Туре	Earnings	Factor	Driver	FTEs	(04/'12 dollars)
Rail Facilities Maintenance								
Chief MDT Facilities Maintenance (8331)	300	30.01	LABOR	\$102,260	0	Fixed	0.5	\$51,130
Secretary (0031)	300	30.02	LABOR	\$37,559	0	YARD	0.0	\$0
General Superintendent Track & Guideway (8473)	300	30.03	LABOR	\$109,955	0	Fixed	0.0	\$0
Manager, Power & Signals	300	30.04	LABOR	\$58,094	0	Fixed	0.0	\$0
MDT Property Manager (8265)	300	30.05	LABOR	\$49,158	0	Fixed	0.0	\$0
Rail Structure & Track Supervisor (8180)	300	30.06	LABOR	\$66,295	0.2	# I&W Maint.	0.3	\$22,098
Supervisor, Power	300	30.07	LABOR	\$58,094	0.2	# P&S Maint.	0.3	\$19,365
Facilities Maintenance Supervisor	300	30.08	LABOR	\$49,158	0.2	# B&G Maint.	0.3	\$16,386
Account Clerk (0310)	300	30.09	LABOR	\$35,036	1.0	YARD	1.0	\$35,036
Track Repairer (8064)	300	30.10	LABOR	\$41,199	0.125	RIVILE	1.0	\$41,199 \$57,000
Transit Excilities Maintainer	200	20.12		\$07,200 \$57,200	0.100		1.0	\$07,230 \$57,220
	200	20.12	LABOR	\$37,230 \$40,159	0.10	STATION	1.0	\$37,230 \$40,159
	300	30.13		\$49,100	0.10		1.0	\$49,130 \$0
Pail Vehicle Electronic Technician (8068)	300	30.14	LABOR	\$58,816	0.03		0.0	0¢ 02
Mechanic Helper	300	30.15	LABOR	\$37 550	0.07	# Maintainers	0.0	00
	300	50.10	LABOR	ψ01,000	5.0%	Pent ATILWares	0.0	\$14 886
Materials & Sunnlies	500		LADOR		5.070	Dept. ATO Wages		φ14,000
Track/Way	300	300.1	MATI		\$5 901	RTMII F		\$19 931
Stations	300	300.2	MATI		\$5,932	STATION		\$31,307
Yard/Shop	300	300.3	MATI		\$14 132	YARD PK VEH		\$3 729
Contract Services	000	000.0	NU (TE		¢11,102	17110,11111		
Track/Way	300	300.4	SERV		\$7.766	RTMILE		\$26.231
Stations	300	300.5	SERV		\$4.675	STATION		\$24,669
Yard/Shop	300	300.6	SERV		\$111.996	YARD. PK VEH		\$29.552
Miscellaneous	300	300.7	MISC		\$264.45	Dept. Employee		\$1,814
Subtotal					<u> </u>		6.5	\$500,967
					Track-Miles/F	acil. Maint. Employee		0.98
					Facil. Maint. N	Von-Labor Cost/Track	-Mile	\$21,443
Rail Administration & Support								
General Manager	400	40.01	LABOR	\$193,140	0	Fixed	0.0	\$0
Chief Safety & Security	400	40.02	LABOR	\$98,107	1	Fixed	0.0	\$0
MDT, Grant Resources (0346)	400	40.03	LABOR	\$110,096	0	Fixed	0.0	\$0
Operations Analyst	400	40.04	LABOR	\$43,217	0	PKCAR	0.0	\$0
Administrative Secretary (0094)	400	40.05	LABOR	\$39,335	0	Fixed	0.0	\$0
MDT Field Test Engineer (Civil) (8358)	400	40.06	LABOR	\$115,474	0.033	RTMILE	0.0	\$0
MDT Field Test Engineer (Electrical) (8358)	400	40.07	LABOR	\$115,474	0.040	PKCAR	0.0	\$0
Engineering Technician	400	40.08	LABOR	\$43,217	1.0	# Engineer	0.0	\$0
Other Support Staff	400		LABOR	\$37,559	0	Total LRT empl.	<u>0.0</u>	\$0
Overtime, AIU Employees	400		LABOR		5.0%	Dept. A IU Wages		\$0
Contract Services	400	400.1	SERV		\$30,448	PKCAR		\$112,479
Materials & Supplies	400	400.2	MAIL		\$1,167	Total LRT empl.		\$21,242
Miscellaneous	400	400.3	MISC		\$813.48	Total LRT empl.		\$14,811
Casuality & Liability	400	400.4	INSUR		\$0.11			\$32,575
	400	400.5			\$3,253 \$270			\$21,972
Idxes Station Utilition	400	400.0			\$270 \$12,506			\$1,997 \$142,551
Vard Utilities	400	400.7			\$13,500			\$142,001
	400	+00.0			<u>4241,302</u>		0.0	¢130,043
							0.0	φ 470,409
	-				G/A FTF/Oth	er G&A FTF (%ane)		0%
	_	-			G/A Non-Labo	or Costs/Other Non-L	abor Costs	45%
					2			
TOTAL EMPLOYEES AND COST							34.5	\$3.271.858
r								

CENTRAL BRO	WARD EAST-WE	ST TRA	NSIT ST	UDY						
CBEWT LRT O	&M Cost Model									
SR7/Broward A	Alt									
Table 5. Summ	ary of Alternativ	е								
04/12 Calibration										
I. INPUT VARIABLES										
		Input	1							
Operating Statistic		Value								
Peak Cars		7	1							
Revenue Car-Miles		291,840	1							
Revenue Train-Hours		19,688	1							
Passenger Stations		10								
Directional Route Miles		6.4	1							
Maintenance Facilities		1								
II. COST SUMMARY B	Y COST CATEGORY/COS Dept.	ST TYPE (04) FUEL	/ 12\$) INSUR	LABOR	MATL	MISC	SERV	ТАХ	UTIL	TOTAL
LR Operations	100	¢10.900		\$986,188	\$11,725	\$2,812	\$570,906		\$188,440	\$1,760,072
LRV Maintenance	200	\$19,60Z		\$300,390 \$262,724	\$110,000	\$1,754	\$0,709			\$032,349 \$500.067
LR Facilities Maint.	400		\$54,546	\$303,734	\$21,242	\$14,811	\$112,479	\$1,997	\$273,394	\$478,469
Grand Total	Grand Total	\$19,802	\$54,546	\$1,735,320	\$204,620	\$21,192	\$772,547	\$1,997	\$461,834	\$3,271,858
	CTORS (04/12\$)									
Total Cost per Revenue	Train-Hour =	\$166.19								
Total Cost per Revenue	Car-Mile =	\$11.21								
Veh Ops Cost per Trai										
Veh. Maint. Cost per Ca	in-Hour = ar-Mile =	\$89 \$1.82								
Veh. Maint. Cost per Ca Facil. Maint. Cost per S	in-Hour = ar-Mile = Station =	\$89 \$1.82 \$50,097								

CENTRAL BROV	VARD EA	ST-WEST 1	FRANSIT S	TUDY							
CBEWT LRT O&M (Cost Model										
Griffin Alt with Bus											
Table 1. Input Statis	stics										
		TEST CASE				CALIBRATIO	N SYSTEMS				BASE
		Alignment	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	FY 10	12/10
Variable	Code	Calibration	Salt Lake City	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Calibration
Peak Cars	PKCAR	7	43	50	104	47	110	56	118	38	71
Revenue Car-Miles	CARMI	287,280	3,248,740	5.818.779	7,969,738	3.019.865	8.145.575	4.073.674	9.645.684	3,179,325	5.637.673
Revenue Train-Hours	TRNHR	19.437	84.644	116.669	183,865	133,236	305.050	81,226	187.402	84.579	147.084
Passenger Stations	STATION	12	28	37	36	65	38	48	53	33	42
Directional Route Miles	RTMILE	6	39.4	91.1	70.0	81.0	112.4	73.8	121.1	57.6	81
Maintenance Facilities	YARD	1.0	1	2	2	1	4	2	3	2	2.1
Inflation Factor	INFLATE	1.06									1.00
Alternative Name	NAME	04/12 Calibration	1								12/10 Calibration
Total Oper Cost Efficien	ces		\$28,006,024	\$53,945,130	\$71,424,851	\$56,685,665	\$106,374,746	\$47,846,225	\$167,914,954	\$39,400,273	\$71,449,734
	Cost/Peak C	ar	\$651,303	\$1,078,903	\$686,777	\$1,206,078	\$967,043	\$854,397	\$1,423,008	\$1,036,849	\$988,045
	Cost/Car-Mile	е	\$8.62	\$9.27	\$8.96	\$18.77	\$13.06	\$11.75	\$17.41	\$12.39	\$12.53
	Cost/Train-Ho	our	\$331	\$462	\$388	\$425	\$349	\$589	\$896	\$466	\$488
	Cost/Station		\$1,000,215	\$1,457,976	\$1,984,024	\$872,087	\$2,799,335	\$996,796	\$3,168,207	\$1,193,948	\$1,684,074
	Cost/Track-M	lile	\$711,354	\$592,413	\$1,020,355	\$700,169	\$946,731	\$648,499	\$1,386,352	\$684,033	\$836,238
Labor Productivity											
Vehicle Operations	Train Hrs. / E	imp.	910	759	673	994	1,178	700	502	621	792
Vehicle Maintenance	Car Miles. / E	Emp.	39,141	108,156	104,044	38,716	52,893	59,907	45,714	51,279	62,481
Facilities Maintenance	Dir. Rt. Miles	/Emp.	0.54	0.95	0.83	0.90	0.84	1.45	0.61	0.74	0.86
Rail Admin. & Support	% Non G&A	FTE's	17%	22%	14%	20%	15%	27%	14%	2%	16%
Non-Labor Productivity											
Vehicle Operations	Non Labor Co	ost/Train Hrs.	\$31	\$78	\$47	\$57	\$38	\$120	\$267	\$32	\$84
Vehicle Maintenance	Non Labor Co	ost/Car Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.87
Facilities Maintenance	Non Labor Co	ost/Dir. Rt. Miles	\$27,947.12	\$66,500.66	\$63,295.70	\$27,414.65	\$76,257.11	\$23,229.82	\$36,881.38	\$77,467.53	\$49,874.25
Rail Admin. & Support	% Non G&A	Non-labor Costs	32%	37%	147%	12%	41%	26%	16%	36%	43%
Source: RY 2010 Nationa	al Transit Data	base Reports.									

CE	NTRAL BROWARD EAST-WEST TRANS	T STUD	Y			
СВ	EWT Streetcar O&M Cost Model					-
Gri	ffin Alt with Bus					
Tat	ble 2. Labor Cost Listing - Metro Dade Transit.	FL				-
	<u>, , , , , , , , , , , , , , , , , , , </u>					-
			2012	Fringe		
	Position	Lookup	Salary/Wage	Rate	Total	
Rail	Transportation					
	General Superintendent MDT (8473)	10.01	\$87,266	26.00%	\$109,955	
	Chief Supervisor Rail Traffic Control (8161)	10.02	\$77,863	26.00%	\$98,107	
	Rail Traffic Controller (8160)	10.03	\$53,770	26.00%	\$67,750	_
	Instructor (Ops & Maintenance)	10.04	\$46,107	26.00%	\$58,094	
	Beil Supervisor (8162)	10.05	\$29,808 \$46,221	26.00%	\$37,559 \$59,251	_
	Train Operator (9072)	10.00	\$40,231 \$24,611	20.00%	\$30,201 \$42,610	
	Foro Inspector	10.07	\$34,011 \$21,207	26.00%	\$43,010 \$20,549	
		10.00	φ31,307	20.00%	φ 39, 546	-
Rail	Vehicle Maintenance					-
	General Superintendent MDT (8473)	20.01	\$87.266	26.00%	\$109.955	
	Administrative Secretary (0094)	20.02	\$31,218	26.00%	\$39.335	-
	Chief Supervisor Rail Vehicle Repair (8169)	20.03	\$68,601	26.00%	\$86,438	-
	Rail Stock Clerk (8074)	20.04	\$34,299	26.00%	\$43,217	-
	MDT Operation Maintenance Instructor (Rail Maintenance) (8	20.05	\$46,107	26.00%	\$58,094	
	Foreman, LRV Shops	20.06	\$46,107	26.00%	\$58,094	
	Rail Vehicle Mechanic (8071)	20.07	\$45,427	26.00%	\$57,238	
	Rail Maintenance Worker (8063)	20.08	\$31,387	26.00%	\$39,548	
	Rail Vehicle Cleaner (8069)	20.09	\$31,387	26.00%	\$39,548	
Rail	Facilities Maintenance				-	
	Chief MDT Facilities Maintenance (8331)	30.01	\$81,158	26.00%	\$102,260	
	Secretary (0031)	30.02	\$29,808	26.00%	\$37,559	
	General Superintendent Track & Guideway (8473)	30.03	\$87,266	26.00%	\$109,955	
	Manager, Power & Signals	30.04	\$46,107	26.00%	\$58,094	
	MDT Property Manager (8265)	30.05	\$39,014	26.00%	\$49,158	
	Rall Structure & Track Supervisor (8180)	30.06	\$52,615	26.00%	\$66,295	
	Supervisor, Power	30.07	\$40,107 \$20,014	26.00%	\$38,094 \$40,159	_
	Account Clark (0310)	30.00	\$39,014	20.00%	\$49,100 \$35,036	-
-	Track Repairer (8064)	30.09	\$32,608	26.00%	\$33,030	-
	Power Maintainer	30.10	\$45,427	26.00%	\$57,238	-
	Transit Facilities Maintainer	30.12	\$45 427	26.00%	\$57,238	-
	Flectrician	30.13	\$39.014	26.00%	\$49,158	
	Power Inspector	30.14	\$45.427	26.00%	\$57.238	-
	Rail Vehicle Electronic Technician (8068)	30.15	\$46,679	26.00%	\$58,816	
	Mechanic Helper	30.16	\$29,808	26.00%	\$37,559	_
LRT	General Administration					
	General Manager	40.01	\$153,285	26.00%	\$193,140	
	Chief Safety & Security	40.02	\$77,863	26.00%	\$98,107	
	MDT, Grant Resources (0346)	40.03	\$87,378	26.00%	\$110,096	
	Operations Analyst	40.04	\$34,299	26.00%	\$43,217	
	Transit Administrative Coordinator (8310)	40.05	\$58,058	26.00%	\$73,154	
	MDT Field Test Engineer (Civil) (8358)	40.06	\$91,646	26.00%	\$115,474	
	MDT Field Test Engineer (Electrical) (8358)	40.07	\$91,646	26.00%	\$115,474	
	Engineering Technician	40.08	\$34,299	26.00%	\$43,217	
NICT						
	Comparable existing MDT positions are matched to norm LDT	nonitiona				
1. 2	Wage data from MDT_EV 2012 salary and wage data	positions.				_
∠. 3	Fringe benefit rate provided by MDT					-
J. ⊿	No inflation assumed:		1 00			-
т.			1.00			

CENTRAL BROWARD E	AST-WES	T TRANS	T STUDY	•					
CBEWT L BT O&M Cost Mod	el								
Criffin Alt with Bug									
Table 3a. Non-Labor Cost Li	sting								
									·
Cost Item	Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Average
Vehicle Operations					•		• • • • • • • • • •		
Contract Services	\$22,426	\$6,475,126	\$3,275,705	\$3,436,682	\$7,380,872	\$5,533,499	\$36,775,838	\$52,504	\$7,869,082
Materials & Supplies	\$0	\$161,326	\$86,686	\$28,619	\$134,439	\$237,263	\$60,517	\$196,267	\$113,140
Miscellaneous	\$19,836	\$2,364	\$30,983	\$56,351	\$0	\$24,004	\$0	\$6,192	\$17,466
Propulsion Power	\$2,600,654	\$2,466,842	\$5,274,759	\$4,087,109	\$4,085,751	\$3,951,671	\$13,152,029	\$2,460,431	\$4,759,906
Subtotal	\$2,642,916	\$9,105,658	\$8,668,133	\$7,608,761	\$11,601,062	\$9,746,437	\$49,988,384	\$2,715,394	\$12,759,593
Oper. Cost/Train-Hour	\$31.22	\$78.05	\$47.14	\$57.11	\$38.03	\$119.99	\$266.74	\$32.10	\$86.75
Vehicle Maintenance									
Contract Services	\$178,269	\$643,515	\$84,722	\$419,499	\$71,403	\$193,922	\$7,006	\$255,162	\$231,687
Materials & Supplies	\$2,947,331	\$2,309,824	\$3,437,915	\$3,381,088	\$3,528,062	\$2,710,861	\$11,770,737	\$2,820,029	\$4,113,231
Miscellaneous	\$3,370	\$3,842	\$55,426	\$39,120	\$0	\$22,077	\$0	\$511,058	\$79,362
Fuel & Lube	\$218,658	\$234,056	\$89,065	\$282,749	\$164,887	\$45,352	\$175,490	\$38,275	\$156,067
Subtotal	\$3,347,628	\$3,191,237	\$3,667,128	\$4,122,456	\$3,764,352	\$2,972,212	\$11,953,233	\$3,624,524	\$4,580,346
Veh. Maint. Cost/Car-Mile	\$1.03	\$0.55	\$0.46	\$1.37	\$0.46	\$0.73	\$1.24	\$1.14	\$0.81
Facilities Maintenance									
Materials & Supplies	\$506 903	\$1,330,599	\$747 177	\$682 222	\$7 175 601	\$992 682	\$1 672 571	\$641 730	
Track/Way/Signals	\$167,278	\$1 317 293	\$239.097	\$204 667	\$4,664,141	\$327,585	\$669.028	\$385,038	\$996 766
Stations	\$167,278	\$13,306	\$448,306	\$307,000	\$1 435 120	\$327,585	\$501,771	\$192 519	\$424 111
Yard/Shop/Central Control	\$167,278	\$0	\$59 774	\$170,556	\$1,076,340	\$327,585	\$501 771	\$64 173	\$295,935
Contract Services	\$604 489	\$4 724 951	\$3 683 522	\$1 708 076	\$1,392,648	\$731 141	2794502	3820400	<i>_</i> 200,000
Track/Way/Signals	\$199 481	\$4 724 951	\$1,510,244	\$1,024,846	\$905 221	\$365,571	\$1 117 801	\$382.040	\$1 278 769
Stations	\$199,481	\$0	\$147.341	\$256.211	\$278,530	\$365.571	\$838.351	\$3.056.320	\$642.726
Yard/Shop/Central Control	\$199,481	\$0	\$2,025,937	\$256,211	\$208,897	\$0	\$838.351	\$382,040	\$488.865
Miscellaneous	\$35,800	\$54.567	\$432	\$66.061	\$0	\$9.538	\$0	\$10.010	\$22.051
Subtotal	\$1,100,278	\$6.055.550	\$4,430,699	\$2,219,490	\$8,568,249	\$1,713,896	\$4,467,073	\$4,462,130	\$4,149,222
Fac. Maint. Cost/Track-Mile	\$27.947	\$66.501	\$63.296	\$27.415	\$76.257	\$23,230	\$36.881	\$77.468	\$51.364
Fac. Maint. Cost/Station	\$39,296	\$163,664	\$123,075	\$34,146	\$225,480	\$35,706	\$84,284	\$135,216	\$98,206
L PT Conorol Administration									
Contract Services	\$704 229	¢2 170 100	¢22 579 022	¢576 479	¢6 462 975	¢1 929 055	¢5 660 529	¢17 027	¢5 007 270
Materials & Supplies	\$104,338	\$600.002	\$380,330	\$258 712	\$504 878	\$245 547	\$1,009,008	\$615,800	\$5,007,279
	\$121,723	\$099,992	\$309,339	\$200,712	\$304,878	\$245,547	\$1,529,118	\$015,899	\$345,001
	\$230,721	\$107,710 \$1,005,595	\$099,731 \$52,190	\$137,444	\$1,000,102 \$22,529	\$100,203	\$950,504 \$556,250	\$7,000 \$1,046,495	\$435,025
Casualty & Liability	\$148,490	\$1,095,585	\$52,109 \$52,109	\$209,400	\$23,520	\$400,555 \$400,555	\$550,259 \$556,250	\$1,040,485	\$402,503
	\$140,490	\$1,095,585	\$02,109 \$29,171	\$209,400 ¢0	\$23,528 \$0	\$400,000 \$51,060	\$350,239	\$1,040,485	\$402,303
Litilition	\$0 \$465,469	\$39,799 \$757.097	\$20,171 \$202,170	00 00 00 00	Φ Φ Φ Φ Φ Φ Φ Φ Φ Φ Φ Φ Φ Φ	\$262,202	\$19,740	40 \$560.090	\$17,400
Litilities	\$405,408	\$757,987	\$303,170 \$292,179	\$00,001	\$849,905	\$203,203	\$702,409	\$500,989	\$513,992
Subtotal	\$405,408	\$101,901	\$363,176	\$00,001 \$1,699,769	\$049,900	\$203,203	\$702,409	\$300,989 \$3,996,200	\$313,992 \$7,059,525
Admin. Cost/Peak Car	\$53,319	\$136,277	\$236,212	\$35,931	\$89,108	\$67,969	\$91,631	\$102,271	\$112,488
		,			,,	, , , , , , , , , , , , , , , , , , , ,			. ,
TOTAL	\$9,383,533	\$25,166,286	\$41,331,956	\$15,639,475	\$33,735,594	\$18,238,794	\$77,221,105	\$14,688,338	\$29,447,686
NOTES									
1 Cost for insurance and utilities at	hor than tractic	n nower here	hoon colit hot	in an two lines	on this worksh	oot E0% to vo	rd and chore a	ad 50% to page	congor
stations		r power, nave	Seen spin betw		on this works	1001. 0070 to ye	and and anops a	ia 0076 to pas	Jonger

2. Non-labor costs are from FY 2010 National Transit Database Reports

		anonal manon batababb no	ponto.				
3.	\$2010 inflated to Budget with CP	I-U: 1.0000	(South CPI.	Dec. 2010)			
			(,			

CENTRAL BROWAR	D EAST	-WEST T	RANSIT S	TUDY									
CBEWT LRT O&M Cost	Model												
Griffin Alt with Bus													
Table 2b Non Labor Un	it Costs												
Table 35. Non-Labor On	ii Cosis												
		Drivina				UNIT C	OSTS						Unit Cost
Cost Item	Code	Variable	Salt Lake	St. Louis	Denver	San Jose	Portland	Sacramento	Los Angeles	Baltimore	Average	Use	x Unit
Vehicle Operations													
Contract Services	100.1	TRNHR	\$0.26	\$55.50	\$17.82	\$25.79	\$24.20	\$68.12	\$196.24	\$0.62	\$27.47	\$27.47 1	\$4,040,936
Materials & Supplies	100.2	VO empl	\$0	\$1.050	\$318	\$214	\$519	\$2.045	\$162	\$1,441	\$529.01	\$529.01 2.	\$101.695
Miscellaneous	100.3	VO empl	\$213	\$15	\$113	\$421	\$0	\$207	\$0	\$45	\$126.89	\$126.89	\$24,392
Propulsion Power	100.4	CARMI	\$0.80	\$0.42	\$0.66	\$1.35	\$0.50	\$0.97	\$1.36	\$0.77	\$0.86	\$0.86	\$4,826,379
													\$8,993,402
											Veh. Operati	ons Cost/Train-Hr =	\$61.14
Vehicle Maintenance													
Contract Services	200.1	CARMI	\$0.05	\$0.11	\$0.01	\$0.14	\$0.01	\$0.05	\$0.00	\$0.08	\$0.06	\$0.06	\$318,784
Materials & Supplies	200.2	CARMI	\$0.91	\$0.40	\$0.43	\$1.12	\$0.43	\$0.67	\$1.22	\$0.89	\$0.76	\$0.76	\$4,271,281
Miscellaneous	200.3	VM empl	\$41	\$71	\$724	\$502	\$0	\$325	\$0	\$8,243	\$237.40	\$237.40 3.	\$23,336
Fuel & Lube	200.4	PKCAR	\$5,085	\$4,681	\$856	\$6,016	\$1,499	\$810	\$1,487	\$1,007	\$2,680.22	\$2,680.22	<u>\$189,626</u>
													\$4,803,027
											Veh. Maintena	ance Cost/Car-Mile =	\$0.85
Facilities Maintenance													
Materials & Supplies													
Track/Way/Signals	300.1	RTMILE	\$4,249	\$14,466	\$3,416	\$2,528	\$41,511	\$4,440	\$5,524	\$6,685	\$5,901.02	\$5,901.02 4.	\$476,692
Stations	300.2	STATION	\$4,249	\$360	\$12,453	\$4,723	\$37,766	\$4,440	\$9,467	\$5,834	\$5,932.26	\$5,932.26 4.	\$250,638
Yard/Shop/Central Ctrl.	300.3	YARD	\$4,249	\$0	\$29,887	\$170,556	\$269,085	\$4,440	\$167,257	\$32,087	\$14,132.49	\$14,132.49 1,4,5	\$30,032
Contract Services		D.T. 41 5	05.007	A E4 000	004 575	0 40.050	6 0.050	A 4 9 5 5		A 0.000	07 700 00	AT TOO OO O T	\$007.070
Track/Way/Signals	300.4	RIMILE	\$5,067	\$51,888	\$21,575	\$12,659	\$8,056	\$4,955	\$9,229	\$6,633	\$7,766.39	\$7,766.39 6,7	\$627,378
Stations	300.5	STATION	\$5,067	\$0	\$4,093	\$3,942	\$7,330	\$7,616	\$15,818	\$92,616	\$4,674.52	\$4,674.52 1,3	\$197,499
Yard/Shop/Central Ctrl.	300.6	YARD	\$5,067	\$0	\$1,012,969	\$256,211	\$52,224	\$0	\$279,450	\$191,020	\$111,996.11	\$111,996.11 7	\$237,992
Miscellaneous	300.7	Fivi empi	\$494	\$207	\$5	\$734	\$0	\$187	\$0	\$128	\$264.45	\$264	\$26,601
											Foo Moint	Coot/Trook Milo -	\$1,846,831
											Fac. Maint.	t. Cost/Station =	\$43,712
Canaral Administration													
Contract Sonicas	400.1	BKCAB	\$16.290	¢42 594	\$217.006	¢10.065	¢50 762	\$22.020	\$49.047	\$1.250	\$20,449,00	\$20,449,7	¢2 154 106
Motoriale & Supplice	400.1	Total ampl	\$10,300	¢43,304 ¢1 007	\$217,090	\$12,200	400,703 ¢002	\$32,030	\$40,047	\$1,209	\$30,448.00	\$30,446 7	φ2, 104, 190 ¢507, 500
Miscellaneous	400.2	Total empl	\$824	\$506	\$1.00 \$1.412	\$380	\$1 725	\$558	\$1,720	\$2,100	\$813.48	\$913	\$367,825
Casualty & Liability	400.3	CARMI	\$0.05	\$0.19	\$0.01	\$0.10	\$0.00	\$0.12	\$0.06	\$0.33	\$0.11	\$0	\$596,195
Casualty & Liability	400.5	RTMILE	\$3,772	\$12.031	\$746	\$3.575	\$209	\$6.622	\$4.593	\$18,168	\$3,252,64	\$3,253 3.6	\$262,752
Taxes	400.6	PKCAR	\$0	\$796	\$271	\$0	\$0	\$928	\$167	\$0	\$270.27	\$270	\$19,122
Utilities	400.7	STATION	\$16,624	\$20,486	\$10,644	\$1,056	\$22,368	\$5,483	\$14,386	\$17,000	\$13,505.93	\$13,506	\$570,625
Utilities	400.8	YARD	\$465,468	\$378,994	\$191,589	\$68,661	\$212,496	\$131,602	\$254,156	\$280,495	\$247,932.40	\$247,932	\$526,856
													\$5,025,101
											Admin. C	Cost/Peak Car =	\$71,026
											Calibration No	on-Labor Cost	\$20,668,361
NOTES: The following cities were	not included	in the calcula	tion of average u	nit costs where	specified, beca	use they were	considered ou	itliers:					
Los Angeles Sacramento									-				
3 Baltimore													
4 Portland													
5 San lose													
6. St. Loius													
7. Denver													

Calculation of Propulsion Power Costs	Estimated kwh	h per month =	143,640				
	UNIT	MONTHLY		ANNUAL			
CHARGE	COST	COST		COST			
1 Customer Charge	\$179.19	\$538		\$6,451			
2 Energy Charge	6.0) kwh per RE\	/CARMI				
	\$0.1019	\$14,633		\$175,591			
3 Demand Charge	13.2	13.2 KW per subs					
	\$7.60	\$301		\$3,612			
TOTAL STREETCAR TRACTION POWER				\$185,653			
Cost per kwh =				\$0.11			
Cost per Rev. Car-Mile =				\$0.65			
1. FPL Business Rate Schedule GSLD-2 (General Service Large Demand), effective 1/1/12							
2. One Customer Charge assumed for each substation; assume 1 substation per route-mile	e.						
3. Average energy consumption rate for Salt Lake City, St. Louis, San Jose and Portland (s	see calculation below).					
4. Maximum demand assumed supplied to each substation = 13.2KV (Portland); assume 7	1 substation per route	e-mile.					
5. Assume negotiated rates with no transmission/distribution charges and no rate riders.							
				Average k	wh Consumption	1 Rate	
	Propulsion \$	\$\$/kwh		kwh	rev. car-mi	kwh/rev. car-mi	
	\$2,600,654	\$0.11	Salt Lake	23,196,953	2,982,557	7.78	1
	\$2,466,842	2 \$0.07	St. Louis	36,302,117	5,024,244	7.23	
	\$4,087,109	\$0.18	San Jose	22,358,361	2,459,638	9.09	1
	\$4,085,751	\$0.08	Portland	53,556,304	6,023,056	8.89	1
	\$13,240,356	\$0.10	Subtotal	135,413,735	16,489,495	8.21	<<< Use 8.0
	\$3,951,671	I \$0.11	Sacramento	34,946,640	3,429,277	10.19	1
	\$4,072,291	\$0.06	Dallas	70,181,785	5,153,160	13.62	
	\$5,274,759	\$0.11	Denver	46,339,256	3,869,345	11.98	,
	\$13,152,029	9 \$0.14	Los Angeles	95,971,346	8,114,242	11.83	,
	\$2,460,431	\$0.07	Baltimore	33,758,160	2,060,331	16.38	,
	\$42,151,537	\$0.10	Total	416,610,922	39,115,850	10.65	,

CENTRAL BROWARD EAST-WEST TRANSIT ST	UDY							
CBEWT LRT O&M Cost Model								
Griffin Alt with Bus								
Table 4. Line Item Detail								
	_							
04/12 Calibration								
		_		Annual	Due due thatte			A
0	Dent	Orde	T	Annual	Productivity	Duituur	FTF -	Annual Cost
Cost nem	Dept.	Code	туре	Earnings	Factor	Driver	FIES	(04/12 donars)
Rail Vehicle Operations								
General Superintendent MDT (8473)	100	10.01	LABOR	\$109.955	0	Fixed	0.0	\$0
Chief Supervisor Rail Traffic Control (8161)	100	10.02	LABOR	\$98,107	0	# of Controllers	0.0	\$0
Rail Traffic Controller (8160)	100	10.03	LABOR	\$67,750	0	# of Operators	0.0	\$0
Instructor (Ops & Maintenance)	100	10.04	LABOR	\$58.094	0.020	# of Operators	0.0	\$0
Secretary (0031)	100	10.05	LABOR	\$37.559	0	YARD	0.0	\$0
Rail Supervisor (8163)	100	10.06	LABOR	\$58,251	0.17	# of Operators	3.0	\$174,753
Train Operator (8073)	100	10.07	LABOR	\$43.610	0.769	TRNHR	15.0	\$654,152
Fare Inspector	100	10.08	LABOR	\$39.548	0.015	CARMI	3.0	\$118.644
Overtime. Operators	100		LABOR		5.0%	Operator Wages		\$32.708
Overtime, Other ATU Empl.	100		LABOR		5.0%	Other ATU Wages		\$5.932
System Police Officers	100		SERV		\$0.394	1.000 TRNHR		\$0
Other Contract Services	100	100.1	SERV		\$27.47	TRNHR		\$563.628
Materials & Supplies	100	100.2	MATL		\$529	Dept. Employee		\$11.725
Miscellaneous	100	100.3	MISC		\$126.89	Dept. Employee		\$2.812
Propulsion Power	100	100.4	UTIL		n/a	Calculated Separately	/	\$185,653
Subtotal							21.0	\$1,750,007
								. , ,
					Train-Hours/C	perations Employee		925.6
					Operations No	on-Labor Cost/Train-Hou	ır	\$39.30
Rail Vehicle Maintenance								
General Superintendent MDT (8473)	200	20.01	LABOR	\$109 955	0	Fixed	0.0	50
Administrative Secretary (0094)	200	20.02	LABOR	\$30,335	0	YARD	0.0	\$0 \$0
Chief Supenisor Rail Vehicle Renair (8160)	200	20.02	LABOR	\$86,438	0	YARD	0.0	\$0 \$0
Rail Stock Clerk (8074)	200	20.03	LABOR	\$43,217	2.0	Shifts YARD	1.0	\$43 217
MDT Operation Maintenance Instructor (Rail Maintenance) (8106)	200	20.05	LABOR	\$58,094	1.0	YARD	0.0	\$0
Foreman, LRV, Shons	200	20.00	LABOR	\$58,094	2.0	Shifts YARD	1.0	\$58.094
Rail Vehicle Mechanic (8071)	200	20.07	LABOR	\$57,238	0 133	10 000 CARMI	4.0	\$228,953
Rail Maintenance Worker (8063)	200	20.08	LABOR	\$39,548	0 167	# Flec /Mech	0.0	\$0
Rail Vehicle Cleaner (8069)	200	20.09	LABOR	\$39,548	0.20	PKCAR	1.0	\$39.548
Overtime, ATU Employees	200		LABOR		5.0%	Dept. ATU Wages	<u></u>	\$15,586
Contract Services	200	200.1	SERV		\$0.06	CARMI		\$8.573
Materials & Supplies	200	200.2	MATL		\$0.76	CARMI		\$114.863
Miscellaneous	200	200.3	MISC		\$237.40	Dept. Employee		\$1,754
Fuel & Lube	200	200.4	FUEL		\$2,680.22	PKCAR		\$19,802
Subtotal							7.0	\$530,390
					Car-Miles/Veh	nicle Maint. Employee		41,040
					Veh. Maint. N	on-Labor Cost/Car-Mile		\$0.50

CENTRAL BROWARD EAST-WEST TRANSIT ST	UDY							
CBEWT LRT O&M Cost Model								
Griffin Alt with Bus								
Table 4. Line Kem Dateil								
04/12 Calibration		_						
				Annual	Desident distant			A
Const Home	Damé	Carda	Turna	Annuai	Productivity	Duisson	FTF -	Annual Cost
Cost nem	Dept.	Code	Туре	Earnings	Factor	Driver	FIES	(04/12 dollars)
Rail Facilities Maintenance		_						
Chief MDT Facilities Maintenance (8331)	300	30.01	LABOR	\$102 260	0	Fixed	0.5	\$51 130
Secretary (0031)	300	30.02	LABOR	\$37,559	0	YARD	0.0	\$0
General Superintendent Track & Guideway (8473)	300	30.03	LABOR	\$109,955	0	Fixed	0.0	\$0
Manager. Power & Signals	300	30.04	LABOR	\$58.094	0	Fixed	0.0	\$0
MDT Property Manager (8265)	300	30.05	LABOR	\$49,158	0	Fixed	0.0	\$0 [°]
Rail Structure & Track Supervisor (8180)	300	30.06	LABOR	\$66,295	0.2	# T&W Maint.	0.3	\$22,098
Supervisor, Power	300	30.07	LABOR	\$58,094	0.2	# P&S Maint.	0.3	\$19,365
Facilities Maintenance Supervisor	300	30.08	LABOR	\$49,158	0.2	# B&G Maint.	0.3	\$16,386
Account Clerk (0310)	300	30.09	LABOR	\$35,036	1.0	YARD	1.0	\$35,036
Track Repairer (8064)	300	30.10	LABOR	\$41,199	0.125	RTMILE	1.0	\$41,199
Power Maintainer	300	30.11	LABOR	\$57,238	0.100	RTMILE	1.0	\$57,238
Transit Facilities Maintainer	300	30.12	LABOR	\$57,238	0.10	STATION	1.0	\$57,238
Electrician	300	30.13	LABOR	\$49,158	0.10	STATION	1.0	\$49,158
Power Inspector	300	30.14	LABOR	\$57,238	0.05	RTMILE	0.0	\$0
Rail Vehicle Electronic Technician (8068)	300	30.15	LABOR	\$58,816	0.07	RTMILE	0.0	\$0
Mechanic Helper	300	30.16	LABOR	\$37,559	0.20	# Maintainers	0.0	\$0
Overtime, ATU Employees	300		LABOR		5.0%	Dept. A IU Wages		\$14,886
Materials & Supplies	200	200.4	MATI		¢5.004			£40.040
Stationa	300	300.1	MATL		\$5,901 \$5,901			\$19,019 \$27,569
Stations Vard/Shop	300	300.2	MATL		\$0,932 \$14,122			\$37,008 \$2,720
Contract Sonicos	300	300.3	WATE		φ14,132	TAND, FN VEIT		φ3,729
Track/Way	300	300.4	SERV		\$7 766	RTMILE		\$25,821
Stations	300	300.5	SERV		\$4 675	STATION		\$29,603
Vard/Shop	300	300.6	SERV		\$111,996	YARD PK VEH		\$29,552
Miscellaneous	300	300.7	MISC		\$264 45	Dept Employee		\$1 814
Subtotal		00011			420 11 10		6.5	\$511.441
								, . ,
					Track-Miles/F	acil. Maint. Employee		0.97
					Facil. Maint. I	Von-Labor Cost/Track-	Mile	\$23,446
Rail Administration & Support								
General Manager	400	40.01	LABOR	\$193,140	0	Fixed	0.0	\$0
Chief Safety & Security	400	40.02	LABOR	\$98,107	1	Fixed	0.0	\$0
MDT, Grant Resources (0346)	400	40.03	LABOR	\$110,096	0	Fixed	0.0	\$0
Operations Analyst	400	40.04	LABOR	\$43,217	0	PKCAR	0.0	\$0
Administrative Secretary (0094)	400	40.05	LABOR	\$39,335	0	Fixed	0.0	\$0
MDT Field Test Engineer (Civil) (8358)	400	40.06	LABOR	\$115,474	0.033	RIMILE	0.0	\$0
MDT Field Test Engineer (Electrical) (8358)	400	40.07	LABOR	\$115,474	0.040	PKCAR # Engineer	0.0	\$U ©0
Chor Support Stoff	400	40.00		\$43,217 \$27,550	1.0	# Eligilieei	0.0	φ0 Φ0
	400			<i>431,339</i>	5.0%	Dopt ATH Wagoo	0.0	90 0.0
Contract Senices	400	400.1	SERV		\$30.448	PKCAR		پر \$112 479
Materials & Sunnlies	400	400.1	MATI		\$1 167	Total I RT empl		\$21 242
Miscellaneous	400	400.3	MISC		\$813.48	Total LRT empl		\$14 811
Casualty & Liability	400	400.4	INSUR		\$0.11	CARMI		\$32.066
Casualty & Liability	400	400.5	INSUR		\$3.253	RTMILE		\$21.628
Taxes	400	400.6	TAX		\$270	PKCAR		\$1,997
Station Utilities	400	400.7	UTIL		\$13,506	STATION		\$171,061
Yard Utilities	400	400.8	UTIL		\$247,932	YARD		\$130,843
							0.0	\$506,127
					G/A FTE/Othe	er G&A FTE (%age)		0%
					G/A Non-Labo	or Costs/Other Non-La	bor Costs	48%
TOTAL EMPLOYEES AND COST							34.5	\$3,297,965

CENTRAL BRO	WARD EAST-WE	ST TRA	NSIT ST	UDY						
CBEWT LRT O	&M Cost Model									
Griffin Alt with	Bus									
Table 5. Summ	ary of Alternativ	е								
04/12 Calibration										
I. INPUT VARIABLES										
		Input								
Operating Statistic		Value								
Peak Cars		7	1							
Revenue Car-Miles		287,280	1							
Revenue Train-Hours		19,437	1							
Passenger Stations		12								
Directional Route Miles		6.3								
Maintenance Facilities		1								
II. COST SUMMARY B	Y COST CATEGORY/COS Dept. • 100	ST TYPE (04)	/12\$) INSUR	LABOR \$986,188	MATL \$11,725	MISC \$2,812	SERV \$563,628	TAX	UTIL \$185,653	TOTAL \$1,750,007
LRV Maintenance	200	\$19,802		\$385,398	\$114,863	\$1,754	\$8,573			\$530,390
LR Facilities Maint.	300			COCO 704	¢60.016	¢1 011	001076			¢E11 111
LK Auministration	400		¢53.604	\$363,734	\$60,916	\$1,814	\$84,976 \$112,470	¢1 007	\$201 004	\$511,441 \$506,127
Grand Total	400 Grand Total	\$19,802	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total	400 Grand Total CTORS (04/12\$)	\$19,802	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total III. ANNUAL COST FA	400 Grand Total CTORS (04/12\$) Train-Hour =	\$19,802 \$169.67	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue	400 Grand Total CTORS (04/12\$) Train-Hour = Car-Mile =	\$19,802 \$169.67 \$11.48	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai	400 Grand Total CTORS (04/12\$) Train-Hour = Car-Mile =	\$19,802 \$169.67 \$11.48 \$90	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai Veh. Maint. Cost per Ca	400 Grand Total CTORS (04/12\$) Train-Hour = Car-Mile = in-Hour = ar-Mile =	\$19,802 \$169.67 \$11.48 \$90 \$1.85	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai Veh. Maint. Cost per Ca Facil. Maint. Cost per S	400 Grand Total CTORS (04/12\$) Train-Hour = Car-Mile = in-Hour = ar-Mile = Station =	\$19,802 \$169.67 \$11.48 \$90 \$1.85 \$42,620	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965
Grand Total III. ANNUAL COST FA Total Cost per Revenue Total Cost per Revenue Veh. Ops. Cost per Trai Veh. Maint. Cost per Ca Facil. Maint. Cost per S Administrative Cost per	400 Grand Total CTORS (04/12\$) Train-Hour = Car-Mile = in-Hour = ar-Mile = Station = Peak Car =	\$19,802 \$169.67 \$11.48 \$90 \$1.85 \$42,620 \$72,304	\$53,694 \$53,694	\$363,734 \$0 \$1,735,320	\$60,916 \$21,242 \$208,746	\$1,814 \$14,811 \$21,192	\$84,976 \$112,479 \$769,657	\$1,997 \$1,997	\$301,904 \$487,557	\$511,441 \$506,127 \$3,297,965