Tri-Rail Coastal Link Study

(formerly known as the South Florida East Coast Corridor Study)

Tri-Rail Coastal Link

Getting Southeast Florida To Work

Miami-Dade
Broward
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Broward Metropolitan Planning Organization
Florida Department of Transportation
Miami-Dade Metropolitan Planning Organization
Palm Beach Metropolitan Planning Organization
Southeast Florida Transportation Council
South Florida Regional Planning Council
South Florida Regional Transportation Authority
Treasure Coast Regional Planning Council

Preliminary Project Development Report

April 2014

Appendix 5: Operations and Maintenance Cost Methodology and Results

FINAL

FM No. 41703132201

Note to Reader:

In December 2013, the alternatives naming convention for the Tri-Rail Coastal Link study was revised to standardize how the various alternatives that were tested during Phase 3 are referenced. The Preliminary Project Development Report reflects the latest alternative names, as do those appendices to the report that were updated on or after December 2013.

In Appendix 5, the O&M Technical Memorandum and Addendum 1 reflect the previous naming convention, while Addendums 2 and 3 were updated to reflect the names in the main Preliminary Project Development Report. The table below shows the old names noted in the Technical Memorandum and Appendix 1 along with their counterparts under the new naming convention.

Old Alternative Name	New Alternative Name (Preliminary Project Development Report, Addendum 2 and Addendum 3)
Build (Technical Memorandum)	Interim Build Alternative
Full-Build Alternative (Addendum #1)	Interim Build Alternative v2
Proposed Build Alternative (Addendum #1)	Build Alternative Option A

Technical Memorandum
Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study) Draft Operating and Maintenance (O&M) Cost Estimate for Project Alternatives

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DATE	June 28, 2013 *version updated on 11/25/2013 to insert graphics of higher resolution*
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1.0 Introduction

The purpose of this technical memorandum is to document the inputs, methodology, assumptions, and the results from the Operations and Maintenance (O&M) Cost Model developed and applied to estimate initial O&M cost estimates for the planned Tri-Rail Coastal Link Service. The proposed Build Alternative consists of new commuter rail service on the Florida East Coast (FEC) Railway corridor from Toney Penna Drive in Jupiter (approximate MP 284) to Miami Government Center (approximate MP 365.6), which is an approximate distance of 81.6 miles and providing connecting service from the South Florida Regional Transportation Authority (SFRTA) existing commuter rail service (known locally as Tri-Rail) to the Tri-Rail Coastal Link Service via the Pompano Connection (Pompano Beach) and the Northwood Connection (West Palm Beach). The O&M Cost Model was utilized to estimate the O&M costs to evaluate the project alternatives during the Preliminary Project Development phase. Maintenance of Way and Access costs were not included in the model since they will be the subject of future negotiations. During the Federal Transit Administration (FTA) Project Development phase, the O&M Cost Model will be updated based on refinements to the assumptions, operating plan, latest financial data, more detailed information from the SFRTA (the eventual operator of the proposed commuter rail system) and pending FTA review of the model.

The O&M costs were developed based on consultation and coordination with the Florida Department of Transportation (FDOT), the lead agency for the technical evaluations during Preliminary Project Development and FTA Project Development phase; and the SFRTA. The project alternatives documented in this memorandum include the No-Build Alternative and the Build Alternative (including various potential operating scenarios). The Build Alternative includes three (3) potential Segments under evaluation as follows:

- Segment A from the existing Pompano Tri-Rail station to downtown Miami on the FEC via a Pompano Connection
- Segment B an extension of existing Tri-Rail service to Jupiter via a Northwood Connection

- Segment C provides service on the FEC corridor from Jupiter or West Palm Beach to downtown Miami.

Exhibit A-1 in Attachment A shows these three (3) potential segments. Estimated O&M costs were prepared for various operating scenarios under evaluation during the Preliminary Project Development phase including Options A1, A2, A4, A5, B1, B2, C1 and C2. These operating scenarios (shown in Attachment A) reflect a range of potential scenarios with further evaluation and refinement of the operations plan to occur during the FTA Project Development phase. For the purposes of a representative Build Alternative, the proposed Build Alternative documented in this memorandum is based on the combination of Options A1, B1 and C1 consistent with the train operations simulations and ridership analyses conducted as part of the project to date. Any changes to the phasing scenarios included in the Build Alternative at this stage of the planning process will result in changes to the Build Alternative estimates shown in this memorandum.

2.0 Technical Coordination with SFRTA

Prior to this model development, a general planning level O&M Cost Model (referred to as "2011 O&M Cost Model" within this memorandum) developed by SFRTA and its consultants was applied to develop O&M cost estimates for the then current project alternatives. This model estimated the O&M costs on an incremental basis (i.e. assumes costs are fixed or increased based on assumptions not directly proportional to the service level changes), which may be appropriate for a planning level analysis but not for a FTA level analysis.

On February 21, 2013, an O&M technical coordination meeting between FDOT and the SFRTA was held to review the 2011 O&M Cost Model prepared by SFRTA as well as the FTA criteria for O&M models. At this meeting, it was determined that the 2011 O&M Cost Model was originally prepared to reflect the SFRTA's Fast Start service (which was a SFRTA proposed near-term construction program) and that model would not provide accurate O&M cost projections for the Tri-Rail Coastal Link Service. Additionally, the study team (comprised of the FDOT consultants) indicated that the 2011 O&M Cost Model was not adequate to comply with the FTA standard guidelines for O&M models, which will be required in the upcoming FTA Project Development phase. It was agreed that a new cost model ("2013 O&M Cost Model") be developed to estimate O&M costs. Also, it was agreed that a range of O&M costs be presented to the Project Steering Committee and the Metropolitan Planning Organizations (MPOs), with the 2011 O&M Cost Model (incremental) representing the low-end of that range and the 2013 O&M Cost Model representing the high-end of the range for this Preliminary Project Development phase (see Section 5 for more explanation).

The study team and SFRTA's consultant were directed to develop the modeling approach and assumptions for the new cost model. The 2013 O&M Cost Model considers SFRTA's current staffing levels, operational model (contracting for key services), along with the future operational changes to develop cost estimates that are realistic for an extension of existing Tri-Rail service.

Subsequently, the study team and SFRTA's consultant held conference calls and one in-person meeting to develop the modeling approach and assumptions. The assumptions included identification of fixed versus variable costs, identification of cost drivers, future staffing levels to support the planned Tri-Rail Coastal Link Service, and derivation of peer unit costs for select cost items where current SFRTA cost structure may be deemed to be not representative of future costs. It should be noted that even though FTA technical guidance documents that only fully-allocated cost models (i.e. all costs are directly proportional to service level increases) are the appropriate approach for O&M cost forecasts[1], the study team developed a model that is only partially fully-allocated (i.e. still assuming fixed costs for certain cost centers) based on the direction from SFRTA related to their projected future operations. The model was developed in a manner and with the understanding that it can easily transition to a fully-allocated basis upon review by FTA prior to, or during, the FTA Project Development phase. The Risk Assessment in Section 6 provides additional detail on how the 2013 O&M Cost Model may materially change.

The assumption on future staffing levels to support new service and the fixed costs for the agency were provided as input by SFRTA and confirmed by SFRTA as appropriate for the current Preliminary Project Development phase. The study team did not conduct a separate assessment or an analysis to make that determination and as such did not attempt to verify the adequacy or accuracy of SFRTA's assumptions. The assumptions were reviewed with FDOT and SFRTA staff in two separate web-meetings. The 2013 O&M Cost Model was developed using these assumptions and was reviewed with SFRTA and FDOT during an in-person meeting in SFRTA offices on April 3, 2013. It is anticipated that these assumptions will be re-visited during the Project Development phase to update to a fully allocated cost model, to update for current available information from the SFRTA and also incorporate FTA feedback to the 2013 O&M Cost Model.

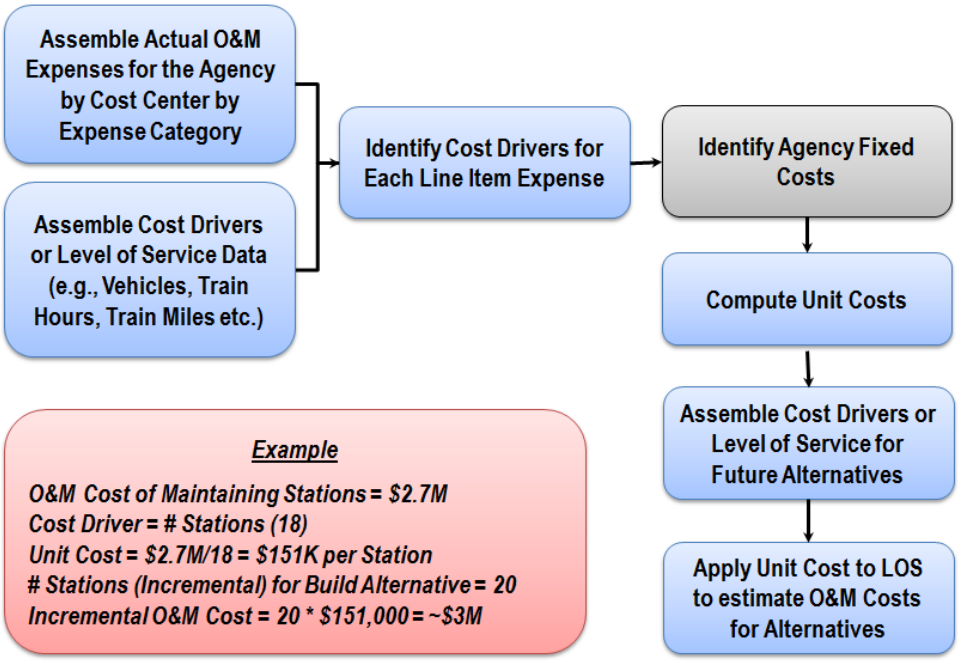
3.0 2013 O&M Cost Model

3.1 Model Development

The new 2013 O&M Cost Model was developed using SFRTA's Fiscal Year (FY) 2011-2012 Operating Budget, but reconciled to actual O&M expenses based on SFRTA's Consolidated Annual Financial Report (CAFR) for the same year. In the absence of actual costs by cost center (refer to Section 3.3), the budgeted costs for each cost center were adjusted down proportionally to match the agency-wide O&M totals to actual expenses after accounting for personnel expenses transferred to capital projects as reported in the CAFR. The 2013 O & M Cost Model is calibrated and unit costs were estimated using the SFRTA level of service reported in the National Transit Database (NTD) for the year 2010-2011. SFRTA confirmed that there was no change in service from 2010-2011 to 2011-2012.

[1] *Chapter 4 – Estimation of Operating and Maintenance Cost (Draft), Procedures and Technical Methods for Transit Project Planning, Federal Transit Administration, http://www.fta.dot.gov/12304_2396.html, Last accessed: 04/30/2013.*

Exhibit 1: 2013 O&M Cost Model Development Process



The model considered costs from all SFRTA cost centers, line item expenses, and object classes as reported in the operating budget. Within each cost center, assumptions were made on whether the expense item is fixed or variable and cost drivers were assigned for variable expense items. In addition, assumptions were made on additional staffing required for the service levels for each of the project alternatives. Exhibit 1 above illustrates the generic process involved in the development of the 2013 O&M Cost Model and the cost estimates for project alternatives.

3.2 Data Sources

The following data sources were used to develop the 2013 O&M Cost Model:

- SFRTA FY 2011-2012 Operating Budget [2]
- SFRTA FY 2011-2012 Consolidated Annual Financial Report (CAFR)
- Operations Review of Veolia Train Performance, Fourth Contract Year July 2010 through July 2011, December 2011, Prepared for Veolia Transportation By McCollom Management Consulting
- Contracts
    - Train Operations – commenced in July 2007 with a base period of 7 years and one 3 year option period
    - Security - executed in September 2010 for a period of 5 years from notice to proceed

[2] Despite the availability of more recent SFRTA budget data, FY11-12 was used because corresponding actual expenses were publicly available from the CAFR only for that year.

  - Maintenance of Equipment (MoE) – commenced in July 2007 with a base period of 7 years and one 3 year option period
  - Dispatch – executed in January 2007 with a base period of 5 years and five one year option periods
- National Transit Database data for FY 2011-2012 – level of service, peer O&M unit costs
- Southern California Regional Rail Authority Final Adopted Budget 2012-2013
- Ad-hoc data requests from SFRTA and FDOT.

3.3 Key Model Assumptions and Line Item Development

The 2013 O&M Cost Model was developed using a reasonable set of assumptions based on information known at the time of model development. Any policy changes, fundamental change in how the contracted services are procured (e.g., bundling services or turnkey approach), any subsequent changes to SFRTA financial information or changing the assumptions will materially impact these preliminary O&M estimates. It was assumed that the contracts for Operations, Maintenance, Security, Station Maintenance, and Dispatch will continue to be procured independently. Except for the Security contract, the scope of current contracts will continue in the future with normalized changes over the length of the contract. SFRTA management advised of certain proposed changes to the Security staffing approach for the planned Tri-Rail Coastal Link Service. All assumptions were reviewed with SFRTA staff and confirmed that these are appropriate for the current Preliminary Project Development phase.

3.4 Reconciling Budget to Actual Expenses

As mentioned earlier, the SFRTA FY11-12 Operating Budget served as the starting point for the 2013 O & M Cost Model development. The SFRTA CAFR for FY11-12 provided the total actual O&M expenses incurred in that fiscal year by the agency. The actual O&M expenses were approximately ten percent (10%) lower than the operating budget. However, there was a minor difference in cost center definitions between the SFRTA CAFR and SFRTA Operating Budget making it difficult to apply the adjustments at the cost center level. In the absence of any further data other then what is in the CAFR, the budget values for each cost center were adjusted down proportionally to match the agency-wide O&M totals to actual expenses after accounting for return to capital line item, which represents the expenses from the operating budget transferred to capital budget as reported in the CAFR. The adjusted cost by cost center is reported in the column titled FY11-12 Estimated Actuals in Exhibit 2.

The estimated actual expenses for each cost center were then used to adjust the line item expense within the cost center proportionally based on the budget values.

Exhibit 2: Budget to Actual Reconciliation

Cost Center	FY11-12 Budget			FY11-12 Estimated Actuals
Executive	$ 7,642,834	*Actual O&M Expenses reported in CAFR = $61,136,115 or about 10 percent less than budget*	*Assumed the FY11-12 Budget to be proportionally adjusted across cost centers to match CAFR reported actuals*	$ 6,840,993
Finance and IT	$ 6,363,540			$ 5,695,915
Human Resources	$ 363,021			$ 324,935
Legal	$ 670,317			$ 599,991
Marketing	$ 2,338,947			$ 2,093,559
Operations	$ 47,574,960			$ 42,583,677
Planning & Capital Dev.	$ 1,187,559			$ 1,062,967
Procurement	$ 1,055,765			$ 945,000
Engineering	$ 1,476,817			$ 1,321,878
Return to Capital	$ (975,000)			$ (332,801)
TOTAL	**$ 67,698,760**			**$ 61,136,115**
Contingency	*$ 500,000*			

3.4.1 Cost Center – Operations

- **Train Operations Contract** – SFRTA currently contracts with Veolia Transportation for operating the existing Tri-Rail service. Veolia provides the train crew, front-line supervision, support, management, and related administrative functions. SFRTA FY 2011-2012 Operating Budget had a single line item expense for the operations contract. This was further broken down into the above-mentioned functions on the basis of historical actual costs presented in the most recent Operations Review of Veolia Tri-Rail Performance document, performed for the contractor by McCollom Management Consulting, as a requirement in the SFRTA-Veolia Transportation Train Operations Contract. Exhibit 5 from the 2013 O&M Cost Model shows the breakdown of these costs, fixed costs, associated cost drivers, and unit costs.

  The cost of providing direct train operations, including line supervision, is driven by Revenue Train Hours. The Crew Callers and Ambassadors are assumed to be fixed. One (1) additional contractor provided staff is assumed for managing the Tri-Rail Coastal Link Service. Corporate Services cost is driven by Revenue Train Hours and the Operating Profit is assumed to grow as a function of overall growth in train operating costs (TOC).

- **Train Fuel** – Train fuel for project alternatives will be estimated as a function of Annual Train Miles for the project alternatives and cost per gallon for diesel and gallons consumed per train mile.

Train Fuel for Project Alternative = *Annual Train Miles * Gallons Consumed per Train Mile * Diesel * Cost per Gallon*

Based on direction from SFRTA, the cost of diesel fuel is assumed at $3.75 per gallon. Fuel consumption rate (gallons consumed per train mile statistic) was estimated at 2.25, using data from the NTD.

- **Maintenance of Equipment (MoE)** – SFRTA currently contracts with Bombardier[3] for maintaining the locomotives, passenger rail cars, and the diesel multiple units (DMUs).

MoE Cost for No-Build

In FY 2011-2012, SFRTA budgeted $13,755,370 for the MoE contract. About $750,000 out of this amount was budgeted for Diesel Multiple Unit (DMU) maintenance. After adjusting down to match the SFRTA CAFR actuals, this amounted to $12,312,238, which is used as the MoE cost for the No-Build Alternative. With a total assumed vehicle fleet of 47 vehicles, MoE cost per unit vehicle is $261,963. This unit cost was applied to estimate MoE cost for the No-Build Alternative.

MoE Cost for Build Alternatives

According to the SFRTA, the contract with Bombardier was entered into when SFRTA maintained a relatively smaller fleet and small spare ratio, which required a higher availability of fleet for revenue service and presumably higher MoE cost per vehicle. Based on an analysis of its peers using NTD data, it was observed that SFRTA had high fleet productivity (annual boardings per vehicle) but lagging maintenance efficiency (higher maintenance costs per fleet vehicle). As SFRTA acquires new equipment, the current contract pricing might change and with a spare ratio that approaches industry average, the cost structure reflected in the current contract may not be a good indicator for forecasting future MoE costs. Hence the study team with input from SFRTA's consultant computed unit costs from SFRTA's peers that operate trains of similar length to forecast future MoE costs.

Based on peer averages (shown in Exhibit 3), the MoE cost per revenue vehicle is $148,230 and MoE cost per revenue vehicle mile is $4.18. Applying the peer unit costs, to forecast MoE costs for Build Alternatives, the study team with input from SFRTA's consultant assumed fifty percent (50%) of the costs to be driven by vehicles ($74,115 per vehicle) and the other fifty percent (50%) of the costs driven by revenue vehicle miles ($2.09 per revenue vehicle mile).

[3] Note the Bombardier contract does not have a similar provision to the contract with Veolia Transportation, where the contractor was required to conduct an Operations Review annually, which served as a resource for the study team to breakdown the operating expenses into a finer level of detail for developing the O&M Model.

Exhibit 3: NTD Data Analysis of Peer MoE Unit Costs

State	Service	FY 2011 MoE ($000's)	Fleet: Locos	Fleet: Coaches	Fleet: Mus	Fleet: VOMS	Revenue Vehicle Miles Traveled (000's)	Revenue Train Miles (000's)	Number of Trains in Operation (Average Weekday)	Average Units per Train RVMT / RTM	MoE $ per Revenue Vehicle	MoE $ per RVMT
CA	*Metrolink*	*$25,587*	*52*	*195*	*0*	*190*	*10,294.2*	*2,365.1*	*34*	*4*	*$103,590*	*$2.49*
MN	*Northstar*	*$2,475*	*6*	*18*	*0*	*20*	*522.9*	*145.4*	*4*	*4*	*$103,143*	*$4.73*
CT	*Shore Line*	*$7,444*	*14*	*33*	*0*	*28*	*1,017.7*	*310.5*	*6*	*3*	*$158,377*	*$7.31*
NM	*Rail Runner*	*$6,244*	*9*	*22*	*0*	*20*	*1,382.8*	*460.1*	*6*	*3*	*$201,411*	*$4.52*
UT	*FrontRunner*	*$4,174*	*18*	*37*	*0*	*34*	*1,939.5*	*646.6*	*6*	*3*	*$75,887*	*$2.15*
FL	Tri-Rail	$11,114	14	28	3	37	2,878.4	1,038.6	10	3	$246,970	$3.86
										Tri-Rail Peer Average	***$148,230***	***$4.18***
										Peer Average excluding Low and High	***$121,703***	***$3.91***

- **Stations** – SFRTA currently has a contract with Meridian Management Corporation to provide station maintenance services. The maintenance contract includes cost for daily cleaning, periodic (monthly, quarterly, semi-annual, annual) cleaning, landscaping and fertilizing, irrigation, elevator maintenance, and pest control. Separately, SFRTA pays utilities for these stations. The study team assumed the number of stations in the current SFRTA system as the cost driver and computed a unit cost per station of $151,035 annually for station maintenance, including utilities, for estimating O&M costs for project alternatives. It is the SFRTA's intent to have local jurisdictions operate and maintain the stations along the planned Tri-Rail Coastal Link Service. Formal agreements between SFRTA and local jurisdictions are not in place to confirm this financial plan arrangement, and would be premature based on where the FEC program is in the transit capital project development process. As such, the station maintenance costs are included in the overall project O&M costs consistent with FTA guidance.

- **Dispatch** – SFRTA currently contracts with CSXT and Amtrak. In the FY 2011-2012 Operating Budget, SFRTA budgeted $371,320 and $2,663,582 annually for CSXT New River bridge tender, maintenance and dispatch and Amtrak dispatch.

  After the implementation of the South Florida Operations and Maintenance Agreement (SFOMA) and Operating Agreement, which is anticipated in mid-2014, SFRTA will take over the dispatch of the FDOT owned South Florida Rail Corridor from CSXT. It is anticipated that cost efficiencies can be gained by consolidating the contracts for dispatch services within other advertised contracts. For the No-Build Alternative, the study team (working with the SFRTA's consultant) estimated a new estimate for dispatch of $1,200,000 annually, which is explained below.

To provide round the clock dispatching, the study team computed and assumed the need for a total of 10 dispatchers at a cost of $100,000 per year and supervised by 1 Chief Dispatcher at a salary of $125,000 per year. This results in $1,125,000 in annual personnel expenses. Including non-personnel expenses (e.g. training, travel and other related expenses). The dispatch costs were rounded to $1,200,000 annually.

The study team did not make any changes to the CSX bridge tender costs and assumed those costs will remain at the current levels as shown in the FY2011-2012 budget adjusted down for actual expenses.

For the purposes of this evaluation of the project alternatives, the cost of dispatch of the Tri-Rail Coastal Link Service on the FEC-owned corridor was assumed to be included as part of the access and maintenance of way costs. The validity of this assumption is based on the eventual outcome of the negotiations with the host railroad. Thus, no additional dispatch costs for the project alternatives are included in the O&M cost estimate for the project alternatives. Should this assumption change, it will be included in the next O&M cost model update.

- **Operations Management Personnel** – Based on the proposed increase in service levels for the project alternatives, the following additional staffing (is assumed to be required for operating the service requirements for the project alternatives.

Exhibit 4: Additional Staffing in Operations Department for Project Alternatives

Assumptions on Addition Staffing in Operations Department	Alternatives (values are incremental from No-Build)								
	Build	Segment A Options				Segment B Options		Segment C Options	
		A1	A2	A4	A5	B1	B2	C1	C2
Operations Project Manager – Train Operations	2	1	1	2	1	0	0	0	0
Operations Project Manager – Mechanical	1	1	1	1	1	0	0	1	1
Station Agents - FT	4	4	4	4	4	0	0	4	4

For the Operations Project Managers, the study team assumed a base salary of $70,000 and loaded salary of $93,933 to include Federal Insurance Contributions Act (FICA,), group insurance, pension expense, and State Unemployment Tax Act (SUTA) based on the SFRTA additive rates. For Station Agents, the study team assumed a base salary of $35,000 and loaded salary of $51,694 annually to include FICA, group insurance, pension expense, and SUTA based on the SFRTA additive rates.

- **Operations – Miscellaneous Expenses** – Miscellaneous expenses within the Operations Department are assumed to grow at the same rate as personnel expenses.

- **Feeder Bus Service** – No changes to feeder bus service are anticipated since there is substantial existing bus service passing by the Tri-Coastal Link Service station locations. SFRTA confirmed there will be no change in service levels of its Feeder Bus service. Hence, for project alternatives, no additional costs are included in the O&M cost

estimate. This assumption will require further evaluation in the Project Development phase based on further refinement to the ridership and operations simulation modeling and station location analyses.

Exhibit 5 summarizes the assumptions and unit costs for the Operations Department.

Exhibit 5: Summary of Assumptions for Operations Department

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Operating Agreement	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver	2011-2012 Cost Driver Value	Unit Cost
Operations										
Operations - Personnel Services	$ 2,136,007	$ 1,911,910		$ 1,911,910	100%	$ 1,911,910	$ -	Fixed		
Operations - Misc.	$ 157,325	$ 140,819		$ 140,819	100%	$ 140,819	$ -	Growth in Staff		
Operations Manager - Operations				$ -		$ -	$ -	Operations Project Manager - Operations		$ 93,933
Operations Manager - Mechanical				$ -		$ -	$ -	Operations Project Manager - Mechanical		$ 93,933
Station Agents - FT				$ -		$ -	$ -	Station Agents - FT		$ 51,694
Operations Contract										
Train Operating Costs - T&E Crew, Road Foremen	$ 7,776,836	$ 6,960,937		$ 6,960,937	0%	$ -	$ 6,960,937	Revenue Train Hours	34,900	$ 199.4538
Train Operating Costs - Crew Callers & Ambassadors	$ 1,147,402	$ 1,027,023		$ 1,027,023	100%	$ 1,027,023	$ -	Fixed		
Trian Operating Costs - G&A	$ 836,115	$ 748,394		$ 748,394	0%	$ -	$ 748,394	Ops Train Ops Contractor Mgr	8	$ 93,549.30
Train Operating Costs - Corporate Services	$ 549,788	$ 492,107		$ 492,107	50%	$ 246,054	$ 246,054	Revenue Train Hours	34,900	$ 7.0502
Operating Profit	$ 685,606	$ 613,677		$ 613,677	0%	$ -	$ 613,677	Overall Growth in TOC		
Train Fuel	$ 8,750,000	$ 7,832,002		$ 7,832,002	0%	$ -	$ 7,832,002	Revenue Train Miles	1,038,611	$ 8.4375
Dispatching										
NRB Dispatcher	$ 2,664,902	$ 2,385,316	$ (2,385,316)	$ -	100%	$ -	$ -	Fixed		
CSX Bridge Tender/Dispatcher	$ 370,000	$ 331,182	$ -	$ 331,182	100%	$ 331,182	$ -	Fixed		
ALTERNATIVE DISPATCHING COST		$ -	$ 1,200,000	$ 1,200,000	100%	$ 1,200,000	$ -	Fixed		
Stations										
Utilities	$ 710,000	$ 635,511		$ 635,511	0%	$ -	$ 635,511	Stations	18	$ 35,306.17
Maintenance Contract	$ 2,327,284	$ 2,083,119		$ 2,083,119	0%	$ -	$ 2,083,119	Stations	18	$ 115,728.84
Maintenance of Equipment										
MoE Contracts (incl. DMU)	$ 13,755,370	$ 12,312,238	$ -	$ 12,312,238	0%	$ -	$ 12,312,238	Vehicles	47	$ 261,962.51
MoE for Build/Rev Miles								Revenue Vehicle Miles	NTD Unit Cost	$ 2.09
MoE for Build/Vehicles								Vehicles	NTD Unit Cost	$ 74,114.87
Feeder Bus Service	$ 5,708,325	$ 5,109,441		$ 5,109,441	100%	$ 5,109,441	$ -	Fixed		
Grand Total	**$ 47,574,960**	**$ 42,583,677**	**$ (1,185,316)**	**$ 41,398,361**		**$ 9,966,429**	**$ 31,431,931**			

3.4.2 Cost Center – Finance and IT Department

- **Finance and IT Personnel** – The personnel costs for functions related to IT, accounting, budgeting, revenue, and grants are held constant and assumed to not grow for the project alternatives at SFRTA's direction. The Automated Fare Collection (AFC) technicians were assumed to grow for the project alternatives as shown below in Exhibit 6.

Exhibit 6: Additional Staffing in Finance and IT Department for Project Alternatives

Assumptions on Addition Staffing in Finance and IT Department	Alternatives (values are incremental from No-Build)								
	Build	Segment A - Options				Segment B - Options		Segment C -Options	
		A1	A2	A4	A5	B1	B2	C1	C2
AFC Technician	2	1	1	1	1	0	0	2	2
Senior AFC Technician	1	1	1	1	1	0	0	1	1

For AFC Technicians, the study team assumed a base salary of $40,000 and loaded salary of $57,728 to include FICA, group insurance, pension expense, and SUTA) based on the SFRTA additive rates. For Senior AFC Technician, the study team assumed a base salary of $60,000 and loaded salary of $81,865 annually to include FICA, group insurance, pension expense, and SUTA based on the SFRTA additive rates.

- **Finance and IT – Electronic Message Boards/GeoFocus** – These are the electronic message boards on the train and at the stations. The study team assumed 1/3 of these expenses to be fixed. The remaining costs were split and driven by stations and annual boardings. The unit cost per station is $2,734.98 and unit cost per annual boarding is $0.01292 annually.

- **Finance and IT – Revenue Collection and Ticket Vending Machine (TVM) Maintenance** – The cost for fare collection and TVM maintenance is driven by annual boardings. The unit cost per annual boarding is $0.03215.

- **Finance and IT – Insurance** – SFRTA's insurance broker advised that when passenger revenue doubles the insurance premium would potentially increase by fifty percent (50%) from existing levels. The study team translated this in the O&M model by keeping fifty percent (50%) of insurance costs fixed and drove the remaining costs based on annual boardings. Note that this represents the operating liability portion of the insurance and does not yet factor in the property liability insurance costs, principally driven by the fleet size, which is a relatively small component of total insurance premiums. The exact breakdown of insurance expenses by operating and property liability is not specified in SFRTA budget documents or the CAFR. During the FTA Project Development phase, a request will be made to break down insurance into these two components (based on data availability) and including the insurance cost for property liability. The No-Build and Build Alternatives assumed purchased insurance of

$200 million in passenger operating liability insurance coverage based on the federal statutory cap. The unit cost per annual boarding is $0.27290.

- **Finance and IT – Claims** – Based on the input provided by FDOT, the owner of the No-Build Right of Way, the claims payments and processing fees were assumed at $138,075 per year based on historical averages. These expenses are assumed to impact the No-Build Alternative only because it relates to the existing Tri-Rail operations. No additional costs are anticipated for the project alternatives.

- **Finance and IT – Miscellaneous Expenses** – Miscellaneous expenses within the Finance and IT department are assumed to grow at the same rate as personnel expenses. Exhibit 7 summarizes the assumptions and unit costs for the Finance and IT Department.

3.4.3 Cost Center – Legal

- **Legal – Personnel Services and Miscellaneous** – These costs were held as fixed and assumed to not grow with level of service. No additional costs are anticipated for the project alternatives.

- **Legal – Legal Fees** – The legal fees for outside attorney support is assumed to grow with annual boardings and revenue train miles. The unit cost per annual boarding is $0.02400 and unit cost per revenue train mile is $0.08804. Exhibit 8 shows the assumptions for the legal department.

3.4.4 Cost Center – Executive

All costs within this cost center are held fixed and they are assumed to not grow with the level of service. For security, SFRTA management informed the study team that it intends to recommend to its Board to make changes to security staff assignments in the future. SFRTA management proposes to re-assign security staff and spread them more widely once the planned Tri-Rail Coastal Link Service operations are initiated. SFRTA advised that the study team should not assume any additional security personnel or work hours for project alternatives. Hence, no additional costs are assumed for security for project alternatives.

3.4.5 Cost Center – Marketing

- **Marketing – Personnel Services** – The personnel expenses in the Marketing Department is held fixed per direction from SFRTA. However, to serve the higher service levels and ridership, two (2) additional part-time customer service representatives are assumed in the Marketing Department.

  For part-time marketing customer service representatives, the study team assumed a base salary of $25,000 and loaded salary of $27,139 annually to include FICA and SUTA based on the SFRTA additive rates.

- **Marketing – Marketing Contract** – The study team assumed fifty percent (50%) of the marketing contract to be fixed and the remaining is driven by stations. The unit cost per station is $12,432 annually.

All other expenses in Marketing Department are held fixed. Exhibit 9 shows the assumptions for the Department.

3.4.6 Cost Center – Planning and Capital Development

All expenses are held fixed.

3.4.7 Cost Center – Human Resources

All expenses are held fixed.

Exhibit 7: Summary of Assumptions for Finance and IT Department

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FD OT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver 1	Unit Cost 1	Cost Driver 2	Unit Cost 2
Finance and IT Department											
Staff - Salaries	$ 2,149,197	$ 1,923,716		$ 1,923,716	100%	$ 1,923,716	$ -	Fixed			
Miscellaneous	$ 705,347	$ 631,346		$ 631,346	100%	$ 631,346	$ -	Growth in Staff within Dept	n/a		
AFC Technician				$ -	0%	$ -	$ -	AFC Technician	$ 57,728		
Sr. AFC Technician				$ -	0%	$ -	$ -	Sr. AFC Technician	$ 81,865		
Electronic Message Boards/GeoFocus	$ 165,000	$ 147,689		$ 147,689	33.33%	$ 49,230	$ 98,459	Stations	$ 2,734.98	Annual Boardings	$ 0.01292
Telecommunications Expense	$ 247,000	$ 221,086		$ 221,086	100%	$ 221,086	$ -	Fixed			
Revenue Collection/TVM Maintenance	$ 405,000	$ 362,510		$ 362,510	66.21%	$ 240,000	$ 122,510	Annual Boardings	$ 0.03215		
Office Rent	$ 591,996	$ 529,887		$ 529,887	100.00%	$ 529,887	$ -	Fixed			
Insurance	$ 2,100,000	$ 1,879,680		$ 1,879,680	50%	$ 939,840	$ 939,840	Annual Boardings	$ 0.24666		
Additional Insurance			$ 200,000	$ 200,000	50%	$ 100,000	$ 100,000	Annual Boardings	$ 0.02624		
FDOT Share of Claims Payments			$ 138,075	$ 138,075	100%	$ 138,075	$ -	Fixed			
FDOT Claims Processing			$ 138,075	$ 138,075	100%	$ 138,075	$ -	Fixed			
Sub-Total	**$ 6,363,540**	**$ 5,695,915**	**$ 476,150**	**$ 6,172,065**		**$ 4,911,256**	**$ 1,260,809**				

Exhibit 8: Summary of Assumptions for Legal Department

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FD OT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver 1	Unit Cost 1	Cost Driver 2	Unit Cost 2
Legal Department											
Personnel Services	$ 448,167	$ 401,148		$ 401,148	100%	$ 401,148	$ -	Fixed			
Miscellaneous	$ 17,840	$ 15,968		$ 15,968	100%	$ 15,968	$ -	Fixed			
Legal Fees	$ 204,310	$ 182,875		$ 182,875	0%	$ -	$ 182,875	Annual Boardings	$ 0.02400	Revenue Train Miles	$ 0.08804
Sub-Total	**$ 670,317**	**$ 599,991**		**$ 599,991**		**$ 417,116**	**$ 182,875**				

Exhibit 9: Summary of Assumptions for Marketing Department

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver 1	Unit Cost 1
Marketing Department									
Personnel Services	$ 1,490,934	$ 1,334,514		$ 1,334,514	100%	$ 1,334,514	$ -	Fixed	
Miscellaneous	$ 348,013	$ 311,502		$ 311,502	100%	$ 311,502	$ -	Fixed	
Marketing Contract	$ 500,000	$ 447,543		$ 447,543	50%	$ 223,771	$ 223,771	Stations	$ 12,432
Marketing Customer Service Reps-PT				$ -	0%	$ -	$ -	Marketing Customer Service Reps-PT	$ 27,139
Sub-Total	**$ 2,338,947**	**$ 2,093,559**		**$ 2,093,559**		**$ 1,869,787**	**$ 223,771**		

Exhibit 10: Summary of Assumptions for Engineering Department

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs
Engineering							
Personnel Services	$ 784,337	$ 702,049		$ 702,049	100%	$ 702,049	$ -
Miscellaneous	$ 192,480	$ 172,286		$ 172,286	100%	$ 172,286	$ -
MoW - New River Bridge	$ 500,000	$ 447,543	$ (447,543)	$ -	100%	$ -	$ -
Maintenance of Way			$ 14,400,000	$ 14,400,000	100%	$ 14,400,000	$ -
On-call Environmental Clean-up			$ 100,000	$ 100,000	100%	$ 100,000	$ -
GRAND TOTAL	$ 1,476,817	$ 1,321,878	$ 14,052,457	$ 15,374,335		$ 15,374,335	$ -

3.4.8 Cost Center – Engineering

With the implementation of the SFOMA and the Operating Agreement between FDOT and SFRTA, the Engineering Department will undergo the biggest transformation at SFRTA prior to the Tri- Rail Coastal Link Service opening. These operational changes include increases in personnel and contracted service to maintain track, signals, bridges, and select structures that are currently maintained by CSXT for FDOT. However, the changes impact the No-Build Alternative and do not impact the Build Alternatives. Once the SFRTA Engineering Department is staffed up for these changes, the staffing levels are assumed to be sufficient to absorb the oversight of the planned Tri-Rail Coastal Link Service operations for engineering and maintenance of way. The cost for maintenance of way and access fee (along with dispatch) on the FEC will be based on future negotiations with the host railroad.

Exhibit ***10*** shows the changes to the Engineering Department No-Build O&M budget as a result of SFOMA and the Operating Agreement. The source for this data is from FDOT presentations to the SFRTA governing board and SFOMA Cost Update updated by Bergmann Associates in November 2012. The study team did not verify any of the costs and assumptions in the Bergmann analysis but did cross check the study results against NTD data and found the results within a range of reasonableness. The study team, after confirmation with FDOT, assumed $100,000 annually for on-call environmental clean-up.

3.5 Level of Service for Project Alternatives

The preliminary service plan for the planned Tri-Rail Coastal Link Service is a key assumption for the initial estimation of the O&M costs for the project alternatives. As of March 2013, the service plan is based on ridership and operations modeling evaluations conducted during Phase 3 of the SFECC Study which involved coordination with the Project Steering Committee. The service plan for the proposed Build Alternative is shown graphically in ***Exhibit A-1 (Attachment A).*** This Build Alternative is anticipated to involve infrastructure improvements to the 81.6-mile section of the FEC Railway from Jupiter to Miami.

Currently, the Build Alternative for the Tri-Rail Coastal Link Service has been developed based on operations modeling of the existing and projected freight service, proposed All Aboard Florida (AAF) intercity passenger service, proposed FEC Amtrak service and the planned Tri-Rail Coastal Link service plan. FEC filed two public documents outlining the proposed AAF service including a Surface Transportation Board (STB) filing on October 9, 2012 and an Environmental Assessment (EA) on October 31, 2012. For the purposes of this preliminary O&M cost estimation, the operations simulation output from the EA scenario were used to estimate the level of service for project alternatives.

As part of the identification of potential phasing strategies for the proposed Build Alternative, three (3) potential phasing scenarios were identified for study. The phasing scenarios, Segment A, B, and C, provide the advantage of phased project implementation involving a reduced initial project scope to increase cost-feasibility. Each segment involves different operating plan scenarios, which result in changes to the service plan. The

following operating scenarios were modeled – Options A1, A2, A4, A5, B1, B2, C1, and C2. The Build Alternative documented in this memorandum is based on the combination of options A1, B1 and C1. Exhibit 11 summarizes the level of service for the No-Build and Build Alternatives. The rolling stock requirements are discussed in detail in the following section.

Exhibit 11: Level of Service for Project Alternatives

		(Values are incremental from No-Build)								
			Segment A				Segment B		Segment C	
Description	Existing Tri-Rail Service	Build Alternative	New service from Tri-Rail Pompano Beach Station to Miami Government Center (via Pompano Connection from SFRC to FEC)				New service from Tri-Rail in West Palm Beach to FEC in Jupiter (via Northwood Connection		New service from West Palm Beach to Miami Government Center on FEC	
Scenarios	No-Build	Build	Option A1	Option A2	Option A4	Option A5	Option B1	Option B2	Option C1	Option C2
Total Vehicles (incl. spare)	47	33	22	22	33	29	-	-	15	15
Annual Revenue Train Miles	1,038,611	1,146,328	514,842	514,842	966,669	851,423	91,643	100,093	539,843	644,571
Annual Revenue Vehicle Miles	2,878,369	5,861,415	2,059,366	2,059,366	5,142,750	4,681,765	1,642,676	1,676,476	2,159,373	2,578,285
Annual Revenue Train Hours	34,900	35,161	20,627	20,627	27,451	25,420	(2,986)	(3,203)	17,521	19,497
Stations	18	20	11	11	11	11	2	3	18	20
Annual Boardings	3,835,000	3,422,000	2,035,500	2,271,500	2,773,000	2,271,500	177,000	118,000	944,000	1,091,500

Source: Annual Revenue Train Miles, Annual Revenue Vehicle Miles, and Annual Revenue Train Hours provided by AECOM (04/10/2013); Stations and Annual Boardings from Project Steering Committee presentations.

The level of service assumptions based on the operating plans is shown in Exhibit 11. It is important to note that MOS B1 and MOS B2 result in a small decrease in Annual Revenue Train Hours as compared to the No-Build Alternative due to optimization to the train schedule and equipment during the operations simulation (AECOM, April 2013). If these optimizations cannot be realized upon implementation, the resulting O&M costs would be increased.

3.6 Estimating Vehicle Requirements for No-Build and Build Alternatives

SFRTA is currently strategizing on its eventual fleet use for the proposed No-Build and the Build Alternatives. Meanwhile to estimate the O&M costs, the study team made the following assumptions to the No-Build fleet based on assumptions from the previous SFRTA Fast Start project and publicly available information on SFRTA's equipment procurements. These assumptions require reevaluation during the FTA Project Development phase as SFRTA will have finalized their fleet strategy by the next phase based on their vehicle replacement and overhaul plans.

3.6.1 No-Build Alternative

The study team assumed a total active fleet of eighteen (18) locomotives for the No-Build as shown in Exhibit 12.

Exhibit 12: Locomotive Inventory and Assumptions for No-Build

Passenger Locomotives	Quantity	Status	Assumption	No-Build
MK F40 PHL (#802, 803, 805)	3	In service	To be retired by No-Build	0
MK F40 PHL (#801, 804)	2	Currently stored	Inoperable	0
MK F40PHM-2C (#807-809)	3	In service	To be retired by No-Build	0
EMD F40PHR (#810-811)	2	In service	Continue to be in service	2
EMD GP49PH-3 (#812-817)	6	In service	Continue to be in service	6
BL36PH	10	Being procured	New locomotives on order	10
Total	**26**			**18**

The study team assumed a total active fleet of twenty-nine (29) passenger cars (passenger coaches and cab cars) for the No-Build Alternative as shown in Exhibit 13. Any passenger car that is part of SFRTA's current inventory that is at least thirty (30) years by of age 2020 will be retired at or soon after implementation. Based on NTD data, about twenty-one (21) cars will be at least or approaching thirty (30) years in age. These twenty-one (21) passenger cars are assumed to be retired by that time or shortly after and therefore assumed not to be included in the long term active fleet. The study team assumed that DMUs will not be part of the No-Build or Build Alternative fleet.

Exhibit 13: Passenger Car Inventory and Assumptions for No-Build

Passenger Cab Cars and Coaches	Quantity	Status	Assumption	No-Build
Bombardier Cab Cars (#501-511)	11	In service	Based on NTD data, between cab cars and passenger cars, about 21 cars will be approaching 30 years age by 2020. Assume 21 cars to be retired for No-Build.	5
Bombardier Coaches (1001-1015)	15	In service		
Hyundai/Rotem Cab Cars (#512-513,...)	10	2 currently in service/ remainder being procured	8 more on order	10
Hyundai/Rotem Coaches	14	Being Procured	New coaches, on order	14
Total	**50**			**29**

3.6.2 Build Alternatives

For the proposed Build Alternatives, the study team assumed the peak vehicle consists identified as part of the simulation modeling for the project alternatives (AECOM, April 2013). Each peak vehicle consist includes one (1) locomotive, two (2) passenger cars and one (1) cab car consistent with the operations evaluation. Again, it was also assumed that the DMUs will not be in service. A 12.5% spare ratio was added to the peak vehicle estimates provided by AECOM. Exhibit 14 shows the revenue vehicle requirements for the project alternatives.

Exhibit 14: Vehicle Requirements for Build Alternatives

Vehicle Type	No-Build	Alternatives (values are incremental from No-Build)								
		Build	Segment A - Options				Segment B - Options		Segment C -Options	
			A1	A2	A4	A5	B1	B2	C1	C2
Passenger Coaches + Cab Cars	29	31	22	22	31	28	0	0	15	15
Locomotives	18	2	0	0	2	1	0	0	0	0
Total	**47**	**33**	**22**	**22**	**33**	**29**	**0**	**0**	**15**	**15**

Based on these estimates, the passenger car and locomotive fleet at No-Build is sufficient (no additional vehicles required) to operate the service requirements for Options B1 and B2. Also, the locomotive fleet at No-Build is sufficient to operate the service requirements for Options A1, A2, C1, and C2. For all other Options, the rolling stock requirements have to be augmented as shown in Exhibit 14. These assumptions have to be verified and re-evaluated once SFRTA completes the fleet strategy discussed above.

4.0 Estimated Future O&M Cost for No-Build Alternative

Exhibit 15 shows the build-up of costs from the FY2011-2012 budget to estimate an O&M cost for the No-Build Alternative. This serves as the baseline above which additional O&M costs for project alternatives are computed and reported in the next section.

In the Operating Department the adjustments are:

- Dispatch costs – credit from efficiencies gained from consolidating and re-procuring dispatch contracts.

In the Finance and IT Department the adjustments are:

- Additional insurance
- FDOT share of claims payments and processing.

In the Engineering Department, the adjustments are:

- Credit for New River Bridge MoW since these costs are absorbed as part of the SFOMA/FDOT-SFRTA Operating Agreement
- Additional cost for MoW after SFOMA implementation
- Additional cost for on-call environmental clean-up.

Exhibit 15: O&M Cost for No-Build Alternative

FY 2011 - 2012 Operating Expenses	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Operating Agreement	No-Build O&M Costs	Fixed Costs	% Fixed
Operations Department	$ 47,574,960	$ 42,583,677	$ (1,185,316)	$ 41,398,361	$ 9,966,429	24%
Administration						
Executive	$ 7,642,834	$ 6,840,993	$ -	$ 6,840,993	$ 6,840,993	100%
Finance and IT	$ 6,363,540	$ 5,695,915	$ 476,150	$ 6,172,065	$ 4,911,256	80%
Legal	$ 670,317	$ 599,991	$ -	$ 599,991	$ 417,116	70%
Marketing	$ 2,338,947	$ 2,093,559	$ -	$ 2,093,559	$ 1,869,787	89%
Planning and Capital	$ 1,187,559	$ 1,062,967	$ -	$ 1,062,967	$ 1,062,967	100%
Procurement	$ 1,055,765	$ 945,000	$ -	$ 945,000	$ 945,000	100%
Human Resources	$ 363,021	$ 324,935	$ -	$ 324,935	$ 324,935	100%
Engineering	$ 1,476,817	$ 1,321,878	$ 14,052,457	$ 15,374,335	$ 15,374,335	100%
Sub-total	**$ 68,673,760**	**$ 61,468,916**	**$ 13,343,291**	**$ 74,812,207**	**$ 41,712,819**	**55.76%**
Return to capital	$ (975,000)	$ (332,801)	*(SFRTA CAFR actual)*			
Total	$ 67,698,760	$ 61,136,115	*(SFRTA CAFR actual)*			

4.1 Fixed Costs

Exhibit 15 shows that about fifty-six percent (56%) of SFRTA O&M expenses are fixed. This is considered on the higher end for peer agencies. Some of the higher fixed costs by cost center may be explained as follows.

Operations – The following cost categories make up the majority of fixed costs in the Operations Cost Center.

- Bus Operations ($5.1M) - SFRTA asserted that it does not anticipate any major change in current public transit agencies' bus service in response to Tri-Rail Coastal Link Service because there is substantial existing bus service adjacent to the proposed FEC Line station locations. Hence, the study team treated these costs as fixed.
- Dispatch and Bridge Tender ($1.5M) - Dispatch costs for No-Build Alternative is assumed to be fixed for the existing Tri-Rail corridor. For the Build Alternatives, the Dispatch costs are not included in the O&M cost estimate at this time.

Engineering ($15.4M) – Absorption of MoW on the existing Tri-Rail corridor will result in a substantial increase in responsibilities, and are included in the O&M costs for the No-Build Alternative. With the increase in staff and contracting services, SFRTA will be able to absorb minimal oversight of the MoW of the FEC corridor, which is the primary responsibility of the host railroad for which SFRTA will pay a MoW fee.

The above listed cost items account for $22M out of the $41.7M or roughly fifty-three percent (53%) of the fixed costs.

While this explanation still does not address the FTA preference to develop O&M cost models using a fully allocated modeling approach, the study team adopted this initial approach because it was directed by the SFRTA to do so based on the agency's ability to absorb additional service within existing staffing levels.

5.0 Estimated Future O&M Cost for Project Alternatives

Based on the assumptions documented in this memorandum, the preliminary O&M cost estimate for the project alternatives are shown in Exhibit 16. The O&M cost estimates for project alternatives are incremental or in addition to No-Build Alternative costs.

Exhibit 16: O&M Cost Estimates for Project Alternatives

INITIAL O&M RESULTS (in millions)	No-Build	O&M Costs for Build Alternatives are incremental from No-Build Costs								
			Segment A				Segment B		Segment C	
		Build	Option A1	Option A2	Option A4	Option A5	Option B1	Option B2	Option C1	Option C2
Transportation	$26.37	$18.04	$9.40	$9.40	$14.79	$13.35	$0.12	$0.14	$8.84	$10.16
Vehicle Maintenance	$12.31	$14.69	$5.93	$5.93	$13.19	$11.93	$3.43	$3.50	$5.62	$6.50
Administration	$10.87	$0.96	$0.59	$0.61	$0.68	$0.64	$0.05	$0.06	$0.65	$0.70
Security	$4.82	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Claims and Insurance	$2.36	$0.93	$0.56	$0.62	$0.76	$0.62	$0.05	$0.03	$0.26	$0.30
Non-Vehicle Maintenance	$18.09	$3.02	$1.66	$1.66	$1.66	$1.66	$0.30	$0.45	$2.72	$3.02
GRAND TOTAL	**$74.82**	**$37.64**	**$18.14**	**$18.22**	**$31.08**	**$28.20**	**$3.95**	**$4.18**	**$18.09**	**$20.68**

Exhibit B-1 (Attachment B) shows the cost worksheets for each cost center and project alternative.

Exhibit 17: O&M Cost Estimates for Project Steering Committee Presentation

Alternative	No-Build	Build	Segment A	Segment B	Segment C
Annual O&M Cost (in millions)	$74.8	$37.6	$18.1 to $31.1	$3.9 to $4.2	$18.1 to $20.7

Note: O&M Cost for Build Alternatives are in addition to No-Build Costs

It was the study team's intention to present a low-to-high range of O&M costs to the Project Steering Committee. The cost estimates presented here and developed using the 2013 O&M Cost Model were intended to represent the higher-end of the O&M range with the SFRTA 2011 O&M Cost Model representing the low-end of the O&M range as described in Section 2. However, the 2011 O&M Cost Model was not updated by the SFRTA to reflect the level of service resulting from operations and simulation modeling for the project alternatives (AECOM, April 2013). Any comparison of O&M costs estimated using 2011 O&M Cost Model and 2013 O&M Cost Model will not be a consistent comparison, since the level of service was derived from different analyses. Hence a low-to-high range of potential O&M costs is not presented in this memorandum. Instead, the range of costs presented here represents the range of costs based on the current operating scenarios.

6.0 Risk Assessment

The 2013 O&M Cost Model is built around a set of assumptions that were known to the study team at the time of model development. Any change in these assumptions will have an impact on the O&M costs for the Tri-Rail Coastal Link Service alternatives. The key risk areas, a brief description, and impact on O&M costs are presented below.

Item	Description
Fixed costs	The 2013 O&M Cost Model assumes certain SFRTA O&M expenses to be fixed. These assumptions are based on input provided by SFRTA staff and their assessment of how much cost SFRTA is able to absorb with increase in service levels. Re-assigning these or part of these to variable costs and assigning a cost driver, as currently required by FTA, will materially increase the O&M cost estimates (see Section 2 for more detail on current FTA guidance).
Additional staffing	Future staffing levels to support new service for project alternatives and the fixed cost assumptions for the agency were provided as input by SFRTA. The study team did not conduct a separate assessment or an analysis to make that determination. Increasing or reducing the staffing levels will impact the O&M cost estimates.
Security contract	SFRTA management advised that it intends to propose to re-assign current security staff and spread them across both lines, which are located in relative close proximity. This assumption results in no net increase in security costs beyond the existing expenditure levels. Changing this assumption will materially impact the O&M cost estimate for the project alternatives.
Dispatch	SFRTA intends to gain cost efficiencies, by consolidating the dispatch contracts, resulting in net savings, once SFOMA is implemented. If the dispatch contracts are not consolidated, then the current expense levels will continue and savings will not be realized in the No-Build Alternative. Dispatch costs on the FEC are not included in the O&M cost estimates. It will be included in the MoW fee negotiations with FEC.
MoW and Potential Access Fees on FEC	These expenses are not included in the O&M estimate. It will be based on negotiations with the host railroad.
Procurement of Contracts	SFRTA currently procures contracts individually for operations, maintenance, security, station maintenance, and dispatching. Combining these contracts and procuring them from a turnkey vendor might result in cost efficiencies, assuming the scope of the contracts does not significantly change. These may result in lower O&M unit costs and hence lower than estimated O&M costs for the project alternatives.

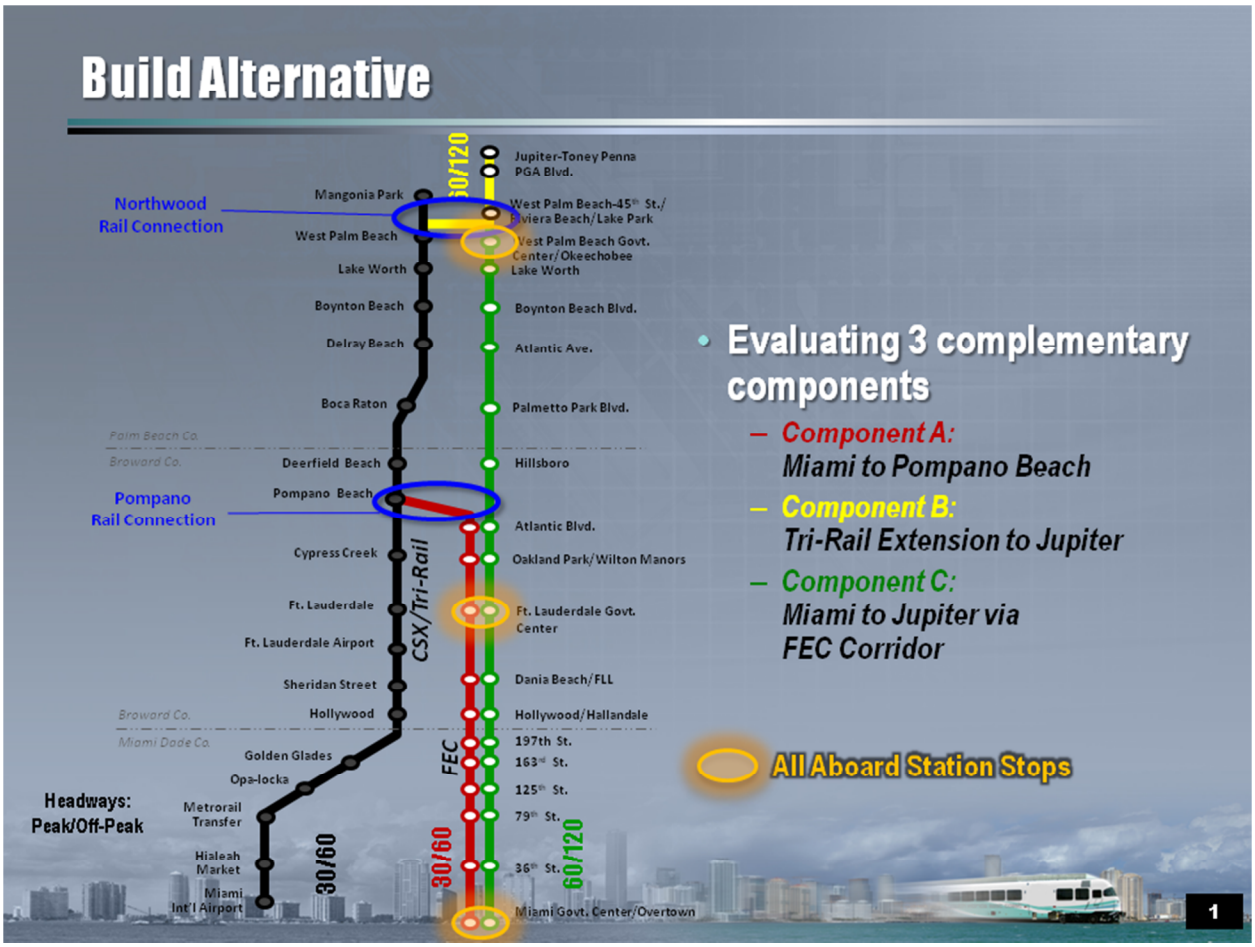
Item	Description
MoE and Vehicle Requirements	The assumptions on fleet requirements in No-Build and project alternatives need further review in the FTA Project Development phase and verification with SFRTA once their on-going fleet analysis is completed. MoE costs for No-Build and Build Alternatives use two (2) different methodologies. Preferably, this should be reconciled in the FTA Project Development phase based on discussions with SFRTA.
Reconciling Budget to Actuals	Since actual costs by cost center were not available from the SFRTA, the study team applied an across the board reduction, roughly ten percent (10%) in cost center budget to match CAFR actuals. In reality, the actual costs by cost centers may have increased or decreased disproportionately by cost center and an across the board reduction may not accurately represent the estimated O&M costs.

Attachment A

Proposed Tri-Rail Coastal Link Service

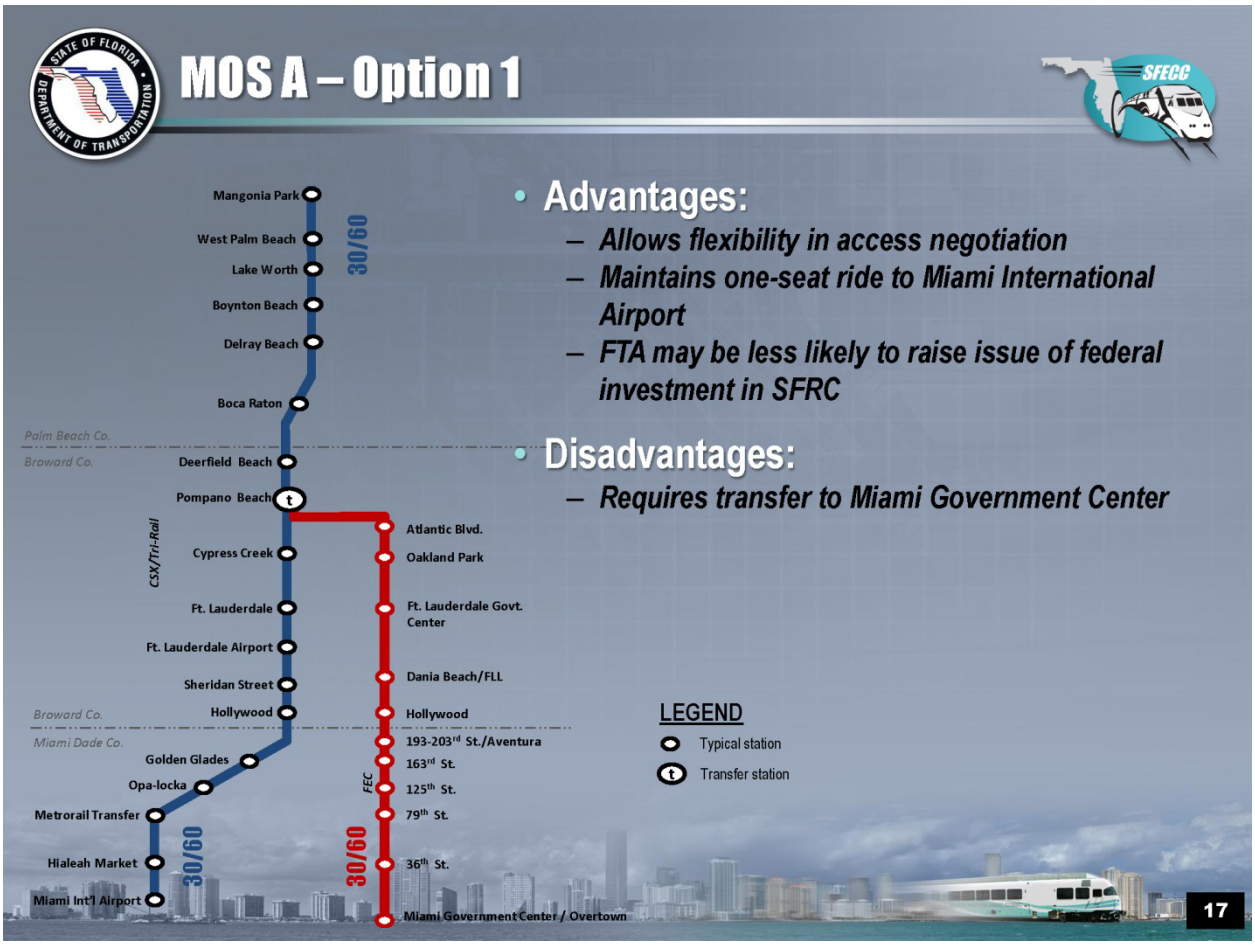
Build Alternative

Exhibit A-1 – Tri-Rail Coastal Link Service Plan for Build Alternative



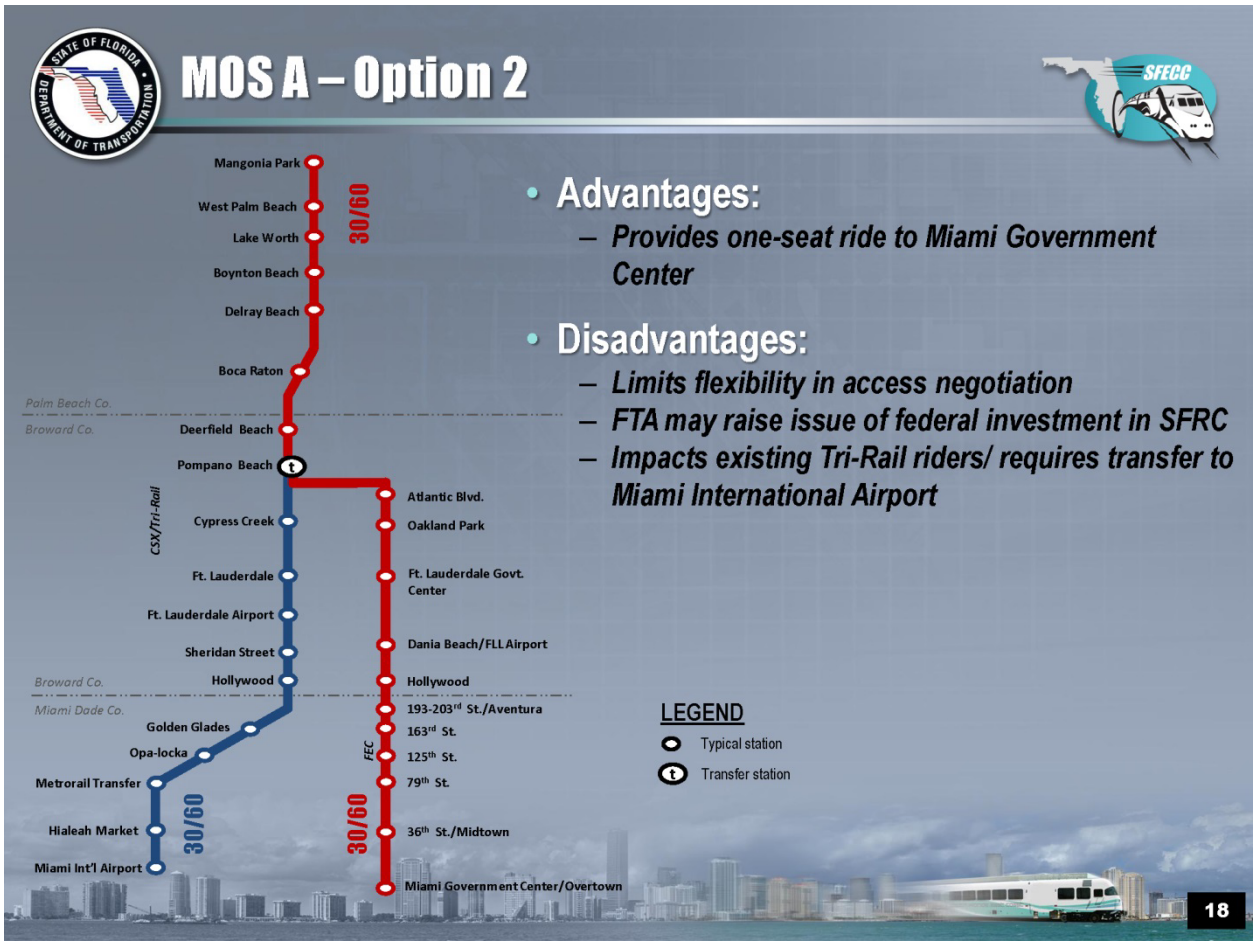
Source: Federal Transit Administration presentation on 02/14/13; Service plan provided by AECOM.

Exhibit A-2 – Tri-Rail Coastal Link Service Plan Options



Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Exhibit A-3 – Tri-Rail Coastal Link Service Plan Options

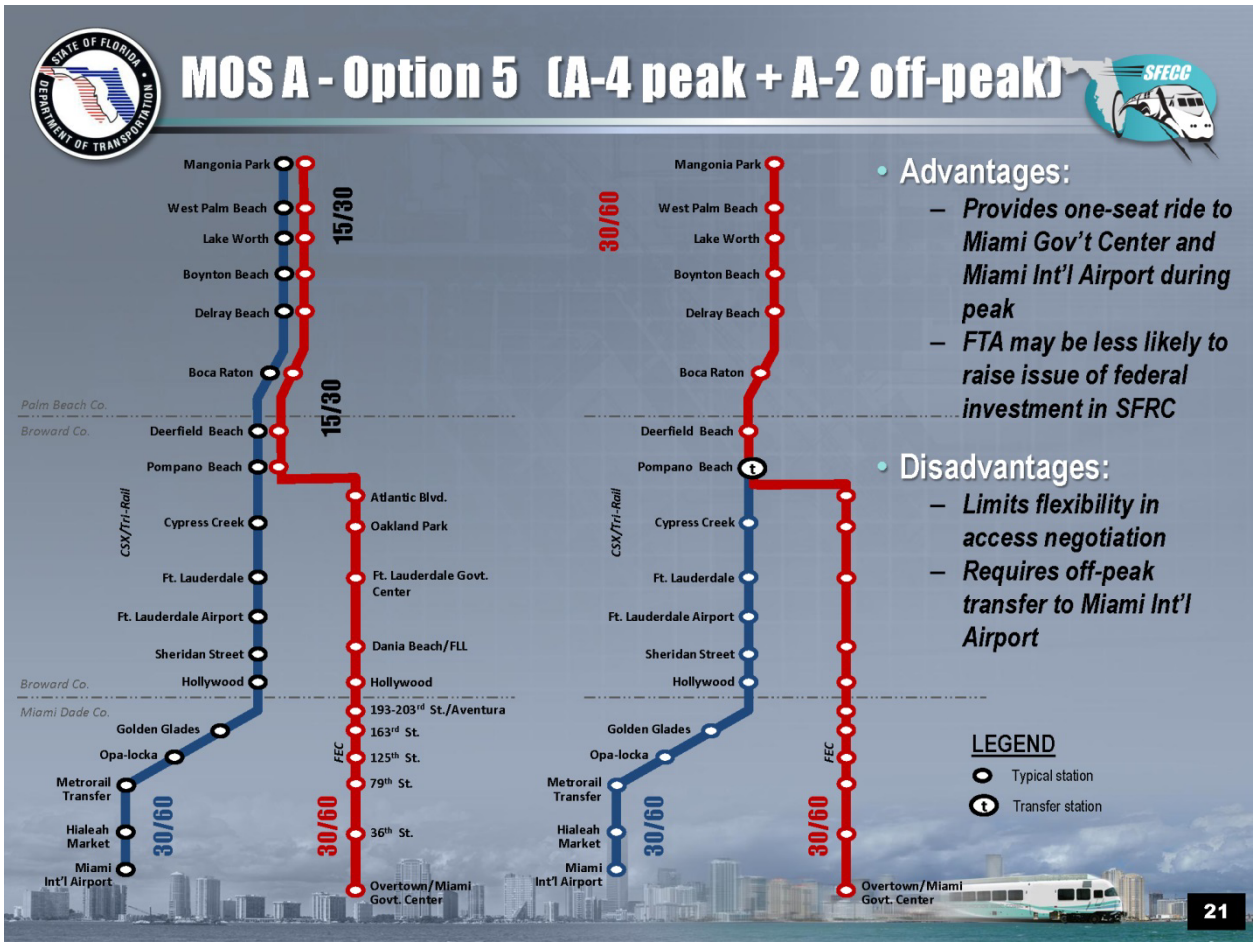


Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Exhibit A-4 – Tri-Rail Coastal Link Service Plan Options

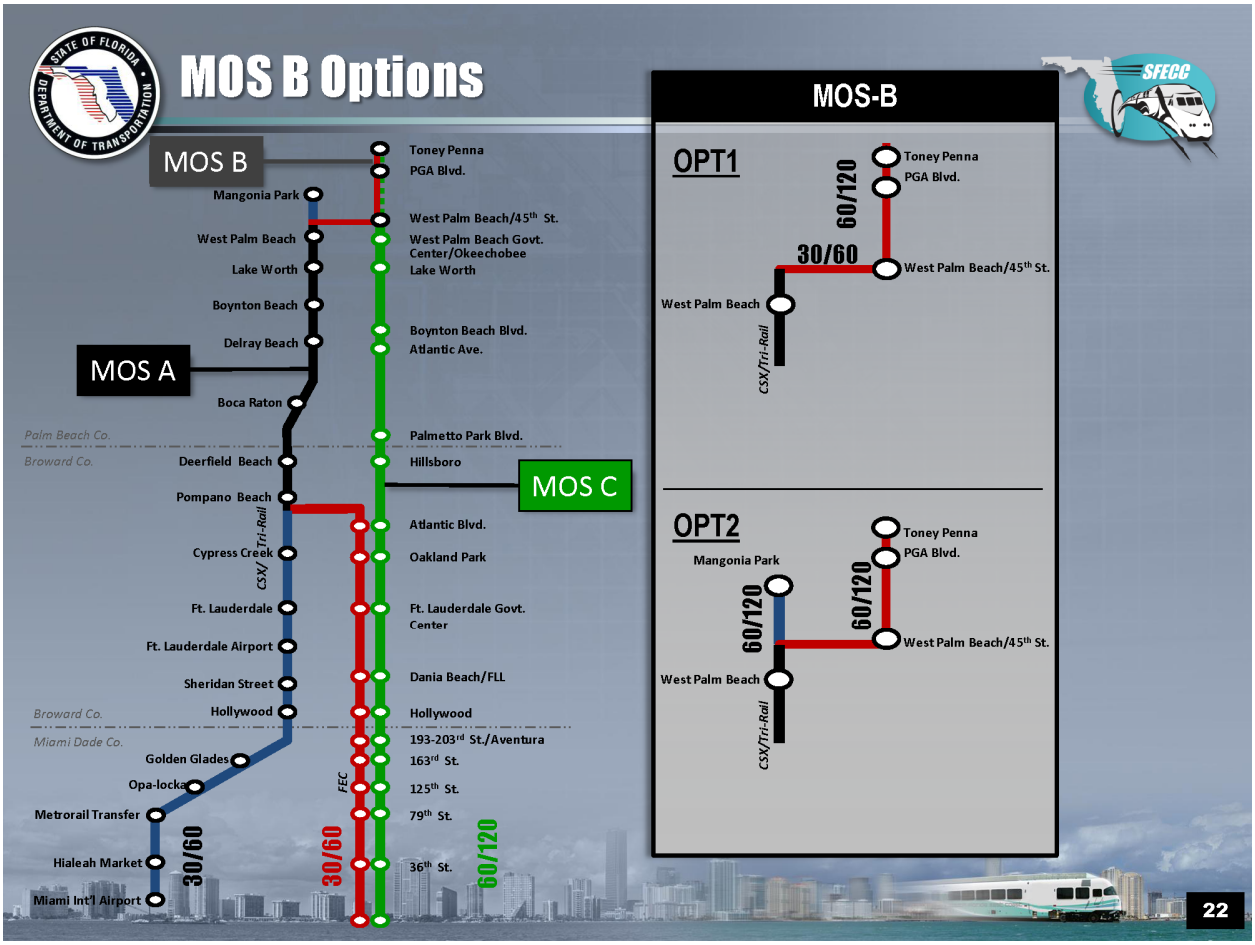
Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Exhibit A-5 – Tri-Rail Coastal Link Service Plan Options



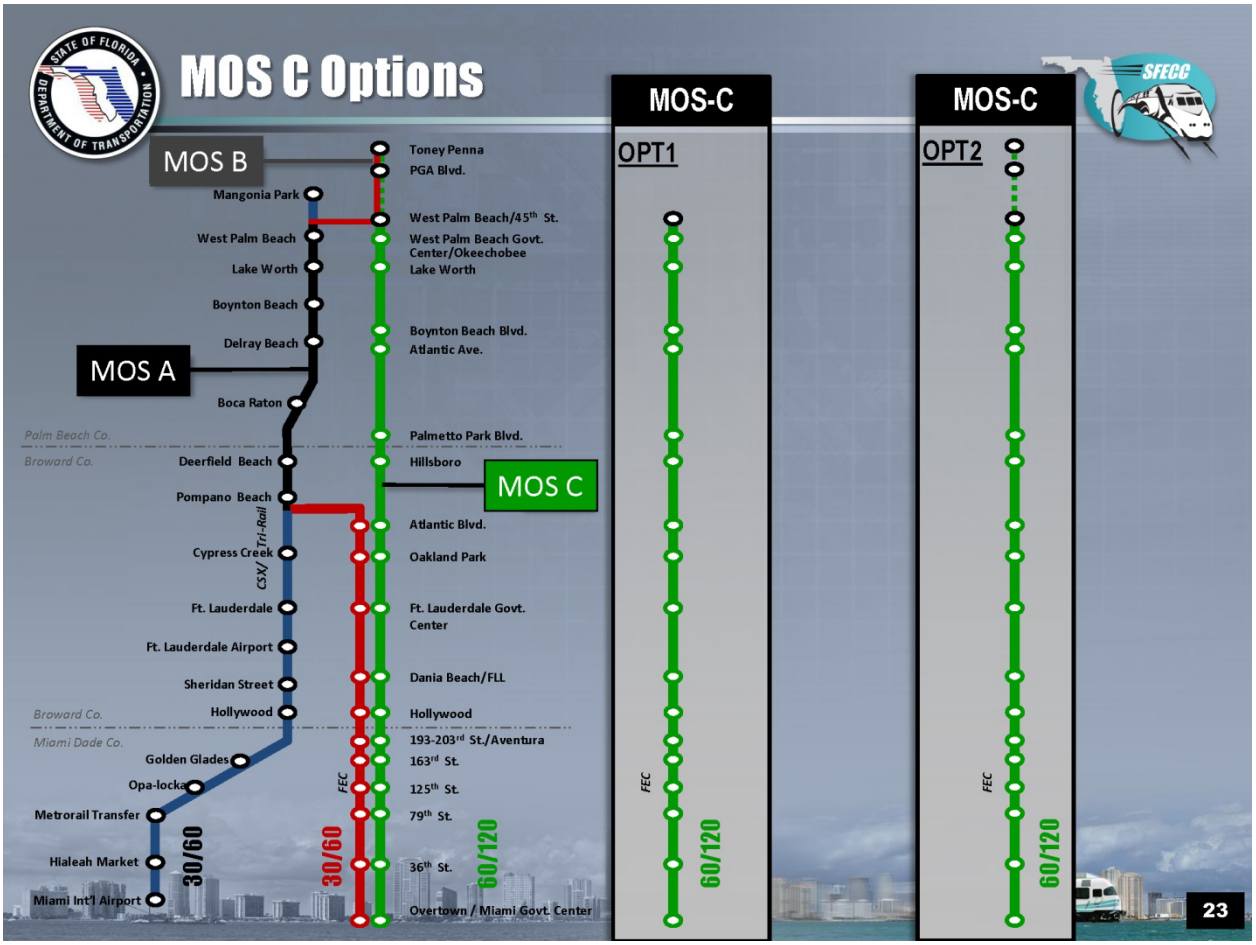
Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Exhibit A-6 – Tri-Rail Coastal Link Service Plan Options



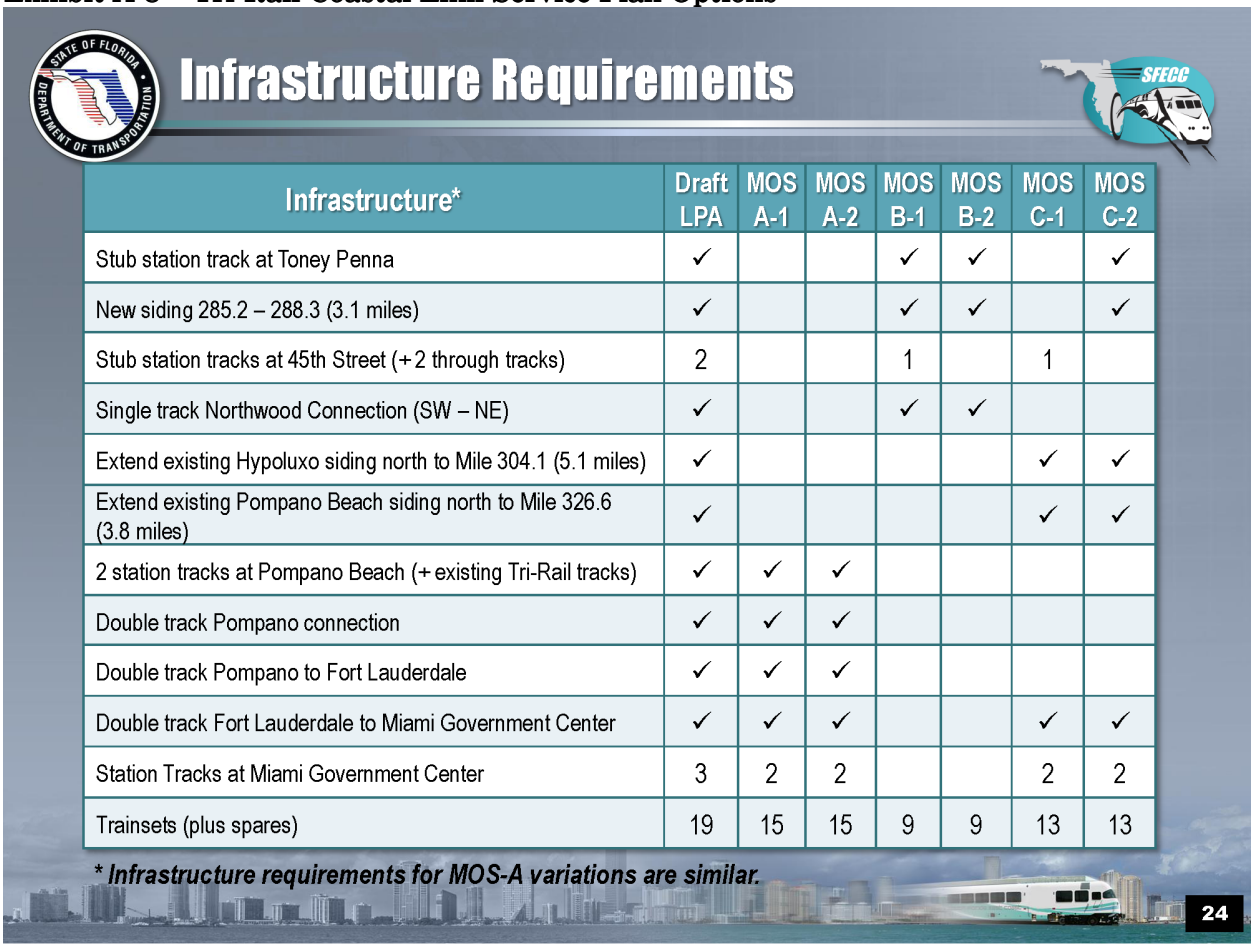
Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Exhibit A-7 – Tri-Rail Coastal Link Service Plan Options



Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Exhibit A-8 – Tri-Rail Coastal Link Service Plan Options



Infrastructure*	Draft LPA	MOS A-1	MOS A-2	MOS B-1	MOS B-2	MOS C-1	MOS C-2
Stub station track at Toney Penna	✓			✓	✓		✓
New siding 285.2 – 288.3 (3.1 miles)	✓			✓	✓		✓
Stub station tracks at 45th Street (+2 through tracks)	2			1		1	
Single track Northwood Connection (SW – NE)	✓			✓	✓		
Extend existing Hypoluxo siding north to Mile 304.1 (5.1 miles)	✓					✓	✓
Extend existing Pompano Beach siding north to Mile 326.6 (3.8 miles)	✓					✓	✓
2 station tracks at Pompano Beach (+ existing Tri-Rail tracks)	✓	✓	✓				
Double track Pompano connection	✓	✓	✓				
Double track Pompano to Fort Lauderdale	✓	✓	✓				
Double track Fort Lauderdale to Miami Government Center	✓	✓	✓			✓	✓
Station Tracks at Miami Government Center	3	2	2			2	2
Trainsets (plus spares)	19	15	15	9	9	13	13

* *Infrastructure requirements for MOS-A variations are similar.*

Source: Project Steering Committee presentation on 10/2/12; Service plan provided by AECOM.

Attachment B

O&M Cost Worksheets

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver	2011-2012 Cost Driver Value	Unit Cost
Operations Contract										
Train Operating Costs - T&E Crew, Road Foremen	$ 7,776,836	$ 6,960,937		$ 6,960,937	0%	$ -	$ 6,960,937	Revenue Train Hours	34,900	$ 199.4538
Train Operating Costs - Crew Callers & Ambassadors	$ 1,147,402	$ 1,027,023		$ 1,027,023	100%	$ 1,027,023	$ -	Fixed		
Trian Operating Costs - G&A	$ 836,115	$ 748,394		$ 748,394	0%	$ -	$ 748,394	Ops Train Ops Contractor Mgr	8	$ 93,549.30
Train Operating Costs - Corporate Services	$ 549,788	$ 492,107		$ 492,107	50%	$ 246,054	$ 246,054	Revenue Train Hours	34,900	$ 7.0502
Operating Profit	$ 685,606	$ 613,677		$ 613,677	0%	$ -	$ 613,677	Overall Growth in TOC		
Train Fuel	$ 8,750,000	$ 7,832,002		$ 7,832,002	0%	$ -	$ 7,832,002	Revenue Train Miles	1,038,611	$ 8.4375
Dispatching										
NRB Dispatcher	$ 2,664,902	$ 2,385,316	$ (2,385,316)	$ -	100%	$ -	$ -	Fixed		
CSX Bridge Tender/Dispatcher	$ 370,000	$ 331,182	$ -	$ 331,182	100%	$ 331,182	$ -	Fixed		
ALTERNATIVE DISPATCHING COST		$ -	$ 1,200,000	$ 1,200,000	100%	$ 1,200,000	$ -	Fixed		
Stations										
Utilities	$ 710,000	$ 635,511		$ 635,511	0%	$ -	$ 635,511	Stations	18	$ 35,306.17
Maintenance Contract	$ 2,327,284	$ 2,083,119		$ 2,083,119	0%	$ -	$ 2,083,119	Stations	18	$ 115,728.84
Maintenance of Equipment										
MoE Contracts (incl. DMU)	$ 13,755,370	$ 12,312,238	$ -	$ 12,312,238	0%	$ -	$ 12,312,238	Vehicles	47	$ 261,962.51
MoE for Build/Rev Miles								Revenue Vehicle Miles	NTD Unit Cost	$ 2.09
MoE for Build/Vehicles								Vehicles	NTD Unit Cost	$ 74,114.87
Feeder Bus Service	$ 5,708,325	$ 5,109,441		$ 5,109,441	100%	$ 5,109,441	$ -	Fixed		
Grand Total	**$ 47,574,960**	**$ 42,583,677**	**$ (1,185,316)**	**$ 41,398,361**		**$ 9,966,429**	**$ 31,431,931**			

Management Center	Build		Option A1		Option A2		Option A4		Option A5	
	Add'l Units	Variable Cost	Add'l Units	Variable Cost	Add'l Units	Variable Cost	Add'l Units	Variable Cost	Add'l Units	Variable Cost
Operations Contract										
Train Operating Costs - T&E Crew, Road Foremen	35,161	$ 7,012,994	20,627	$ 4,114,133	20,627	$ 4,114,133	27,451	$ 5,475,206	25,420	$ 5,070,115
Train Operating Costs - Crew Callers & Ambassadors										
Trian Operating Costs - G&A	1	$ 93,549	1	$ 93,549	1	$ 93,549	1	$ 93,549	1	$ 93,549
Train Operating Costs - Corporate Services	35,161	$ 247,894	20,627	$ 145,425	20,627	$ 145,425	27,451	$ 193,536	25,420	$ 179,217
Operating Profit		$ 489,057		$ 289,474		$ 289,474		$ 383,182		$ 355,292
Train Fuel	1,146,328	$ 9,672,143	514,842	$ 4,343,979	514,842	$ 4,343,979	966,669	$ 8,156,268	851,423	$ 7,183,878
Dispatching										
NRB Dispatcher										
CSX Bridge Tender/Dispatcher										
ALTERNATIVE DISPATCHING COST										
Stations										
Utilities	20	$ 706,123	11	$ 388,368	11	$ 388,368	11	$ 388,368	11	$ 388,368
Maintenance Contract	20	$ 2,314,577	11	$ 1,273,017	11	$ 1,273,017	11	$ 1,273,017	11	$ 1,273,017
Maintenance of Equipment										
MoE Contracts (incl. DMU)										
MoE for Build/Rev Miles	5,861,415	$ 12,241,824	2,059,366	$ 4,301,077	2,059,366	$ 4,301,077	5,142,750	$ 10,740,860	4,681,765	$ 9,778,073
MoE for Build/Vehicles	33	$ 2,445,791	22	$ 1,630,527	22	$ 1,630,527	33	$ 2,445,791	29	$ 2,149,331
Feeder Bus Service										
Grand Total		$ 35,748,513		$ 16,992,998		$ 16,992,998		$ 29,642,727		$ 26,943,513

Management Center	Option B1		Option B2		Option C1		Option C2	
	Add'l Units	Variable Cost	Add'l Units	Variable Cost	Add'l Units	Variable Cost	Add'l Units	Variable Cost
Operations Contract								
Train Operating Costs - T&E Crew, Road Foremen	(2,986)	$ (595,569)	(3,203)	$ (638,850)	17,521	$ 3,494,630	19,497	$ 3,888,750
Train Operating Costs - Crew Callers & Ambassadors								
Trian Operating Costs - G&A	-	$ -	-	$ -	1	$ 93,549	1	$ 93,549
Train Operating Costs - Corporate Services	(2,986)	$ (21,052)	(3,203)	$ (22,582)	17,521	$ 123,527	19,497	$ 137,459
Operating Profit		$ (41,004)		$ (43,984)		$ 246,822		$ 273,957
Train Fuel	91,643	$ 773,238	100,093	$ 844,535	539,843	$ 4,554,925	644,571	$ 5,438,568
Dispatching								
NRB Dispatcher								
CSX Bridge Tender/Dispatcher								
ALTERNATIVE DISPATCHING COST								
Stations								
Utilities	2	$ 70,612	3	$ 105,919	18	$ 635,511	20	$ 706,123
Maintenance Contract	2	$ 231,458	3	$ 347,187	18	$ 2,083,119	20	$ 2,314,577
Maintenance of Equipment								
MoE Contracts (incl. DMU)								
MoE for Build/Rev Miles	1,642,676	$ 3,430,801	1,676,476	$ 3,501,394	2,159,373	$ 4,509,946	2,578,285	$ 5,384,862
MoE for Build/Vehicles	-	$ -	-	$ -	15	$ 1,111,723	15	$ 1,111,723
Feeder Bus Service								
Grand Total		$ 3,848,484		$ 4,093,617		$ 17,176,611		$ 19,672,426

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs		Cost Driver 1	Unit Cost 1	Cost Driver 2	Unit Cost 2
Executive												
Management and Administration - Salaries	$ 1,693,872	$ 1,516,161		$ 1,516,161	100%	$ 1,516,161	$ -	Fixed				
Management and Administration - Misc.	$ 565,954	$ 506,577		$ 506,577	100%	$ 506,577	$ -	Fixed				
Security	$ 5,383,008											
Project Manager		$ 133,742		$ 133,742	100%	$ 133,742	$ -	Fixed				
Executive Officer		$ 108,545		$ 108,545	100%	$ 108,545	$ -	Fixed				
Investigator		$ 69,931		$ 69,931	100%	$ 69,931	$ -	Fixed				
Supervisors		$ 481,378		$ 481,378	100%	$ 481,378	$ -	Fixed				
Zone Patrol Units		$ 1,012,534		$ 1,012,534	100%	$ 1,012,534	$ -	Fixed				
Train Security/Fare Inspectors		$ 1,146,328		$ 1,146,328	100%	$ 1,146,328	$ -	Fixed				
Fixed Station Posts		$ 1,234,113		$ 1,234,113	100%	$ 1,234,113	$ -	Fixed				
Revenue Unit		$ 112,192		$ 112,192	100%	$ 112,192	$ -	Fixed				
Records Data Entry Clerk		$ 42,072		$ 42,072	100%	$ 42,072	$ -	Fixed				
Administration Officer		$ 70,791		$ 70,791	100%	$ 70,791	$ -	Fixed				
SFRTA HQ Facility		$ 189,324		$ 189,324	100%	$ 189,324	$ -	Fixed				
Patrol Units (10 vehicles)		$ 194,931		$ 194,931	100%	$ 194,931	$ -	Fixed				
Revenue Unit (1 vehicle)		$ 22,374		$ 22,374	100%	$ 22,374	$ -	Fixed				
Radios, Portable Hand-held Units		$ -		$ -	100%	$ -	$ -	Fixed				
Sub-Total	**$ 7,642,834**	**$ 6,840,993**		**$ 6,840,993**		**$ 6,840,993**	**$ -**					
Finance and IT Department												
Staff - Salaries	$ 2,149,197	$ 1,923,716		$ 1,923,716	100%	$ 1,923,716	$ -	Fixed				
Miscellaneous	$ 705,347	$ 631,346		$ 631,346	100%	$ 631,346	$ -	Growth in Staff within Dept	n/a			
AFC Technician				$ -	0%	$ -	$ -	AFC Technician	$ 57,728			
Sr. AFC Technician				$ -	0%	$ -	$ -	Sr. AFC Technician	$ 81,865			
Electronic Message Boards/GeoFocus	$ 165,000	$ 147,689		$ 147,689	33.33%	$ 49,230	$ 98,459	Stations	$ 2,734.98	Annual Boardings	$ 0.01292	
Telecommunications Expense	$ 247,000	$ 221,086		$ 221,086	100%	$ 221,086	$ -	Fixed				
Revenue Collection/TVM Maintenance	$ 405,000	$ 362,510		$ 362,510	66.21%	$ 240,000	$ 122,510	Annual Boardings	$ 0.03215			
Office Rent	$ 591,996	$ 529,887		$ 529,887	100.00%	$ 529,887	$ -	Fixed				
Insurance	$ 2,100,000	$ 1,879,680		$ 1,879,680	50%	$ 939,840	$ 939,840	Annual Boardings	$ 0.24666			
Additional Insurance			$ 200,000	$ 200,000	50%	$ 100,000	$ 100,000	Annual Boardings	$ 0.02624			
FDOT Share of Claims Payments			$ 138,075	$ 138,075	100%	$ 138,075	$ -	Fixed				
FDOT Claims Processing			$ 138,075	$ 138,075	100%	$ 138,075	$ -	Fixed				
Sub-Total	**$ 6,363,540**	**$ 5,695,915**	**$ 476,150**	**$ 6,172,065**		**$ 4,911,256**	**$ 1,260,809**					

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FD OT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver 1	Unit Cost 1	Cost Driver 2	Unit Cost 2
Legal Department											
Personnel Services	$ 448,167	$ 401,148		$ 401,148	100%	$ 401,148	$ -	Fixed			
Miscellaneous	$ 17,840	$ 15,968		$ 15,968	100%	$ 15,968	$ -	Fixed			
Legal Fees	$ 204,310	$ 182,875		$ 182,875	0%	$ -	$ 182,875	Annual Boardings	$ 0.02400	Revenue Train Miles	$ 0.08804
Sub-Total	**$ 670,317**	**$ 599,991**		**$ 599,991**		**$ 417,116**	**$ 182,875**				
Marketing Department											
Personnel Services	$ 1,490,934	$ 1,334,514		$ 1,334,514	100%	$ 1,334,514	$ -	Fixed			
Miscellaneous	$ 348,013	$ 311,502		$ 311,502	100%	$ 311,502	$ -	Fixed			
Marketing Contract	$ 500,000	$ 447,543		$ 447,543	50%	$ 223,771	$ 223,771	Stations	$ 12,432		
Marketing Customer Service Reps-PT				$ -	0%	$ -	$ -	Marketing Customer Service Re	$ 27,139		
Sub-Total	**$ 2,338,947**	**$ 2,093,559**		**$ 2,093,559**		**$ 1,869,787**	**$ 223,771**				
Planning & Capital Development											
Personnel Services	$ 1,099,319	$ 983,985		$ 983,985	100%	$ 983,985	$ -	Fixed			
Miscellaneous	$ 88,240	$ 78,982		$ 78,982	100%	$ 78,982	$ -	Fixed			
Sub-Total	**$ 1,187,559**	**$ 1,062,967**		**$ 1,062,967**		**$ 1,062,967**	**$ -**				
Procurement Department											
Personnel Services	$ 758,408	$ 678,840		$ 678,840	100%	$ 678,840	$ -	Fixed			
Miscellaneous	$ 127,357	$ 113,995		$ 113,995	100%	$ 113,995	$ -	Fixed			
Building Maintenance	$ 170,000	$ 152,165		$ 152,165	100%	$ 152,165	$ -	Fixed			
Sub-Total	**$ 1,055,765**	**$ 945,000**		**$ 945,000**		**$ 945,000**	**$ -**				
Human Resources											
Personnel Services	$ 306,016	$ 273,911		$ 273,911	100%	$ 273,911	$ -	Fixed			
Miscellaneous	$ 57,005	$ 51,024		$ 51,024	100%	$ 51,024	$ -	Fixed			
Sub-Total	**$ 363,021**	**$ 324,935**	**$ -**	**$ 324,935**		**$ 324,935**	**$ -**				
GRAND TOTAL	**$ 19,621,983**	**$ 17,563,361**	**$ 476,150**	**$ 18,039,511**		**$ 16,372,055**	**$ 1,667,456**				

Management Center	Build			Option A1			Option A2			Option A4		
	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost
Executive												
Management and Administration - Salaries												
Management and Administration - Misc.												
Security												
Project Manager												
Executive Officer												
Investigator												
Supervisors												
Zone Patrol Units												
Train Security/Fare Inspectors												
Fixed Station Posts												
Revenue Unit												
Records Data Entry Clerk												
Administration Officer												
SFRTA HQ Facility												
Patrol Units (10 vehicles)												
Revenue Unit (1 vehicle)												
Radios, Portable Hand-held Units												
Sub-Total			$ -			$ -			$ -			$ -
Finance and IT Department												
Staff - Salaries			$ -			$ -			$ -			$ -
Miscellaneous			$ 64,759			$ 45,813			$ 45,813			$ 45,813
AFC Technician	2		$ 115,457	1		$ 57,728	1		$ 57,728	1		$ 57,728
Sr. AFC Technician	1		$ 81,865	1		$ 81,865	1		$ 81,865	1		$ 81,865
Electronic Message Boards/GeoFocus	20	3,422,000	$ 98,912	11	2,035,500	$ 56,384	11	2,271,500	$ 59,433	11	2,773,000	$ 65,912
Telecommunications Expense			$ -			$ -			$ -			$ -
Revenue Collection/TVM Maintenance	3,422,000		$ 110,024	2,035,500		$ 65,446	2,271,500		$ 73,033	2,773,000		$ 89,158
Office Rent			$ -			$ -			$ -			$ -
			$ -			$ -			$ -			$ -
Insurance	3,422,000		$ 844,058	2,035,500		$ 502,069	2,271,500		$ 560,280	2,773,000		$ 683,978
Additional Insurance	3,422,000		$ 89,809	2,035,500		$ 53,421	2,271,500		$ 59,614	2,773,000		$ 72,776
FDOT Share of Claims Payments												
FDOT Claims Processing												
Sub-Total			**$ 1,404,884**			**$ 862,725**			**$ 937,767**			**$ 1,097,230**

Management Center	Build			Option A1			Option A2			Option A4		
	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost
Legal Department												
Personnel Services			$ -			$ -			$ -			$ -
Miscellaneous			$ -			$ -			$ -			$ -
Legal Fees	3,422,000	1,146,328	$ 183,040	2,035,500	514,842	$ 94,172	2,271,500	514,842	$ 99,836	2,773,000	966,669	$ 151,648
Sub-Total			**$ 183,040**			**$ 94,172**			**$ 99,836**			**$ 151,648**
Marketing Department												
Personnel Services			$ -			$ -			$ -			$ -
Miscellaneous			$ -			$ -			$ -			$ -
Marketing Contract	20		$ 248,635	11		$ 136,749	11		$ 136,749	11		$ 136,749
Marketing Customer Service Reps-PT	2		$ 54,278	2		$ 54,278	2		$ 54,278	2		$ 54,278
Sub-Total			**$ 302,913**			**$ 191,028**			**$ 191,028**			**$ 191,028**
Planning & Capital Development												
Personnel Services												
Miscellaneous												
Sub-Total			$ -			$ -			$ -			$ -
Procurement Department												
Personnel Services												
Miscellaneous												
Building Maintenance												
Sub-Total			$ -			$ -			$ -			$ -
Human Resources												
Personnel Services												
Miscellaneous												
Sub-Total			$ -			$ -			$ -			$ -
GRAND TOTAL			**$ 1,890,837**			**$ 1,147,925**			**$ 1,228,630**			**$ 1,439,906**

Management Center	Option A5			Option B1			Option B2			Option C1			Option C2		
	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost
Executive															
Management and Administration - Salaries															
Management and Administration - Misc.															
Security															
Project Manager															
Executive Officer															
Investigator															
Supervisors															
Zone Patrol Units															
Train Security/Fare Inspectors															
Fixed Station Posts															
Revenue Unit															
Records Data Entry Clerk															
Administration Officer															
SFRTA HQ Facility															
Patrol Units (10 vehicles)															
Revenue Unit (1 vehicle)															
Radios, Portable Hand-held Units															
Sub-Total			$ -			$ -			$ -			$ -			$ -
Finance and IT Department															
Staff - Salaries			$ -			$ -			$ -			$ -			$ -
Miscellaneous			$ 45,813			$ -			$ -			$ 64,759			$ 64,759
AFC Technician	1		$ 57,728	-		$ -	-		$ -	2		$ 115,457	2		$ 115,457
Sr. AFC Technician	1		$ 81,865	-		$ -	-		$ -	1		$ 81,865	1		$ 81,865
Electronic Message Boards/GeoFocus	11	2,271,500	$ 59,433	2	177,000	$ 7,757	3	118,000	$ 9,730	18	944,000	$ 61,426	20	1,091,500	$ 68,802
Telecommunications Expense			$ -			$ -			$ -			$ -			$ -
Revenue Collection/TVM Maintenance	2,271,500		$ 73,033	177,000		$ 5,691	118,000		$ 3,794	944,000		$ 30,352	1,091,500		$ 35,094
Office Rent			$ -			$ -			$ -			$ -			$ -
			$ -			$ -			$ -			$ -			$ -
Insurance	2,271,500		$ 560,280	177,000		$ 43,658	118,000		$ 29,105	944,000		$ 232,844	1,091,500		$ 269,225
Additional Insurance	2,271,500		$ 59,614	177,000		$ 4,645	118,000		$ 3,097	944,000		$ 24,775	1,091,500		$ 28,646
FDOT Share of Claims Payments															
FDOT Claims Processing															
Sub-Total			**$ 937,767**			**$ 61,751**			**$ 45,726**			**$ 611,477**			**$ 663,848**

Management Center	Option A5			Option B1			Option B2			Option C1			Option C2		
	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost	Add'l Units 1	Add'l Units 2	Variable Cost
Legal Department															
Personnel Services			$ -			$ -			$ -			$ -			$ -
Miscellaneous			$ -			$ -			$ -			$ -			$ -
Legal Fees	2,271,500	851,423	$ 129,468	177,000	91,643	$ 12,316	118,000	100,093	$ 11,644	944,000	539,843	$ 70,180	1,091,500	644,571	$ 82,940
Sub-Total			**$ 129,468**			**$ 12,316**			**$ 11,644**			**$ 70,180**			**$ 82,940**
Marketing Department															
Personnel Services			$ -			$ -			$ -			$ -			$ -
Miscellaneous			$ -			$ -			$ -			$ -			$ -
Marketing Contract	11		$ 136,749	2		$ 24,863	3		$ 37,295	18		$ 223,771	20		$ 248,635
Marketing Customer Service Reps-PT	2		$ 54,278	-		$ -	-		$ -	-		$ -	-		$ -
Sub-Total			**$ 191,028**			**$ 24,863**			**$ 37,295**			**$ 223,771**			**$ 248,635**
Planning & Capital Development															
Personnel Services															
Miscellaneous															
Sub-Total			**$ -**			**$ -**			**$ -**			**$ -**			**$ -**
Procurement Department															
Personnel Services															
Miscellaneous															
Building Maintenance															
Sub-Total			**$ -**			**$ -**			**$ -**			**$ -**			**$ -**
Human Resources															
Personnel Services															
Miscellaneous															
Sub-Total			**$ -**			**$ -**			**$ -**			**$ -**			**$ -**
GRAND TOTAL			**$ 1,258,262**			**$ 98,930**			**$ 94,665**			**$ 905,429**			**$ 995,423**

Management Center	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Opr Agr	Total	Fixed	Fixed Costs	Variable Costs	Cost Driver	2011-2012 Cost Driver Value	Unit Cost
Engineering										
Personnel Services	$ 784,337	$ 702,049		$ 702,049	100%	$ 702,049	$ -			
Miscellaneous	$ 192,480	$ 172,286		$ 172,286	100%	$ 172,286	$ -			
MoW - New River Bridge	$ 500,000	$ 447,543	$ (447,543)	$ -	100%	$ -	$ -			
Maintenance of Way			$ 14,400,000	$ 14,400,000	100%	$ 14,400,000	$ -			
On-call Environmental Clean-up			$ 100,000	$ 100,000	100%	$ 100,000	$ -			
GRAND TOTAL	$ 1,476,817	$ 1,321,878	$ 14,052,457	$ 15,374,335		$ 15,374,335	$ -			

	FY11-12 Budget	FY11-12 Estimated Actuals	SFOMA2/FDOT-SFRTA Opr Agr	No-Build Total	Build	MOS-A1	MOS-A2	MOS-A4	MOS-A5	MOS-B1	MOS-B2	MOS-C1	MOS-C2
Operations Department													
Operations - Personnel Services	$ 2,136,007	$ 1,911,910	$ -	$ 1,911,910	$ 488,576	$ 385,085	$ 385,085	$ 459,133	$ 440,246	$ -	$ -	$ 300,710	$ 300,710
Operations - Misc	$ 157,325	$ 140,819	$ -	$ 140,819	$ 35,985	$ 28,363	$ 28,363	$ 33,817	$ 32,426	$ -	$ -	$ 22,148	$ 22,148
Train Operations Contract	$ 10,995,747	$ 9,842,138	$ -	$ 9,842,138	$ 7,843,494	$ 4,642,582	$ 4,642,582	$ 6,145,474	$ 5,698,174	$ (657,625)	$ (705,416)	$ 3,958,528	$ 4,393,715
Train Fuel	$ 8,750,000	$ 7,832,002	$ -	$ 7,832,002	$ 9,672,143	$ 4,343,979	$ 4,343,979	$ 8,156,268	$ 7,183,878	$ 773,238	$ 844,535	$ 4,554,925	$ 5,438,568
Dispatching	$ 3,034,902	$ 2,716,498	$ (1,185,316)	$ 1,531,182	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Stations	$ 3,037,284	$ 2,718,630	$ -	$ 2,718,630	$ 3,020,700	$ 1,661,385	$ 1,661,385	$ 1,661,385	$ 1,661,385	$ 302,070	$ 453,105	$ 2,718,630	$ 3,020,700
MoE	$ 13,755,370	$ 12,312,238	$ -	$ 12,312,238	$ 14,687,614	$ 5,931,604	$ 5,931,604	$ 13,186,651	$ 11,927,405	$ 3,430,801	$ 3,501,394	$ 5,621,669	$ 6,496,585
Feeder Bus Service	$ 5,708,325	$ 5,109,441	$ -	$ 5,109,441	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sub-Total	**$ 47,574,960**	**$ 42,583,677**	**$ (1,185,316)**	**$ 41,398,361**	**$ 35,748,513**	**$ 16,992,998**	**$ 16,992,998**	**$ 29,642,727**	**$ 26,943,513**	**$ 3,848,484**	**$ 4,093,617**	**$ 17,176,611**	**$ 19,672,426**
Administration													
Executive													
Executive - Personnel Services	$ 1,693,872	$ 1,516,161	$ -	$ 1,516,161	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Executive - Misc.	$ 565,954	$ 506,577	$ -	$ 506,577	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Security	$ 5,383,008	$ 4,818,255	$ -	$ 4,818,255	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Finance and IT													
Finance and IT - Personnel Services	$ 2,149,197	$ 1,923,716	$ -	$ 1,923,716	$ 197,322	$ 139,593	$ 139,593	$ 139,593	$ 139,593	$ -	$ -	$ 197,322	$ 197,322
Finance and IT - Misc	$ 2,114,343	$ 1,892,519	$ -	$ 1,892,519	$ 273,696	$ 167,642	$ 178,279	$ 200,883	$ 178,279	$ 13,448	$ 13,523	$ 156,537	$ 168,655
Insurance	$ 2,100,000	$ 1,879,680	$ 200,000	$ 2,079,680	$ 933,867	$ 555,490	$ 619,894	$ 756,754	$ 619,894	$ 48,303	$ 32,202	$ 257,618	$ 297,871
Claims Payments	$ -	$ -	$ 138,075	$ 138,075	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Claims Processing	$ -	$ -	$ 138,075	$ 138,075	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Legal													
Legal - Personnel Services	$ 448,167	$ 401,148	$ -	$ 401,148	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Legal - Misc.	$ 222,150	$ 198,843	$ -	$ 198,843	$ 183,040	$ 94,172	$ 99,836	$ 151,648	$ 129,468	$ 12,316	$ 11,644	$ 70,180	$ 82,940
Marketing													
Marketing - Personnel Services	$ 1,490,934	$ 1,334,514	$ -	$ 1,334,514	$ 54,278	$ 54,278	$ 54,278	$ 54,278	$ 54,278	$ -	$ -	$ -	$ -
Marketing - Misc.	$ 848,013	$ 759,045	$ -	$ 759,045	$ 248,635	$ 136,749	$ 136,749	$ 136,749	$ 136,749	$ 24,863	$ 37,295	$ 223,771	$ 248,635
Planning and Capital													
Planning - Personnel Services	$ 1,099,319	$ 983,985	$ -	$ 983,985	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Planning - Misc.	$ 88,240	$ 78,982	$ -	$ 78,982	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Procurement													
Procurement - Personnel Services	$ 758,408	$ 678,840	$ -	$ 678,840	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Procurement - Misc.	$ 297,357	$ 266,160	$ -	$ 266,160	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Human Resources													
Human Resources - Personnel Service	$ 306,016	$ 273,911	$ -	$ 273,911	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Human Resources - Misc.	$ 57,005	$ 51,024	$ -	$ 51,024	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sub-Total	**$ 19,621,983**	**$ 17,563,361**	**$ 476,150**	**$ 18,039,511**	**$ 1,890,837**	**$ 1,147,925**	**$ 1,228,630**	**$ 1,439,906**	**$ 1,258,262**	**$ 98,930**	**$ 94,665**	**$ 905,429**	**$ 995,423**
Engineering													
Engineering - Personnel Services	$ 784,337	$ 702,049	$ -	$ 702,049	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Engineering - Misc.	$ 192,480	$ 172,286	$ 100,000	$ 272,286	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
MoW - New River Bridge	$ 500,000	$ 447,543	$ (447,543)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
MoW	$ -	$ -	$ 14,400,000	$ 14,400,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sub-Total	$ 1,476,817	$ 1,321,878	$ 14,052,457	$ 15,374,335	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
GRAND TOTAL	**$ 68,673,760**	**$ 61,468,916**	**$ 13,343,291**	**$ 74,812,207**	**$ 37,639,350**	**$ 18,140,923**	**$ 18,221,628**	**$ 31,082,633**	**$ 28,201,775**	**$ 3,947,414**	**$ 4,188,282**	**$ 18,082,040**	**$ 20,667,849**
		(a)	*(b)*	*(a)+(b)*									

Tri-Rail Coastal Link Study

(formerly known as the South Florida East Coast Corridor Study)

Tri-Rail Coastal Link

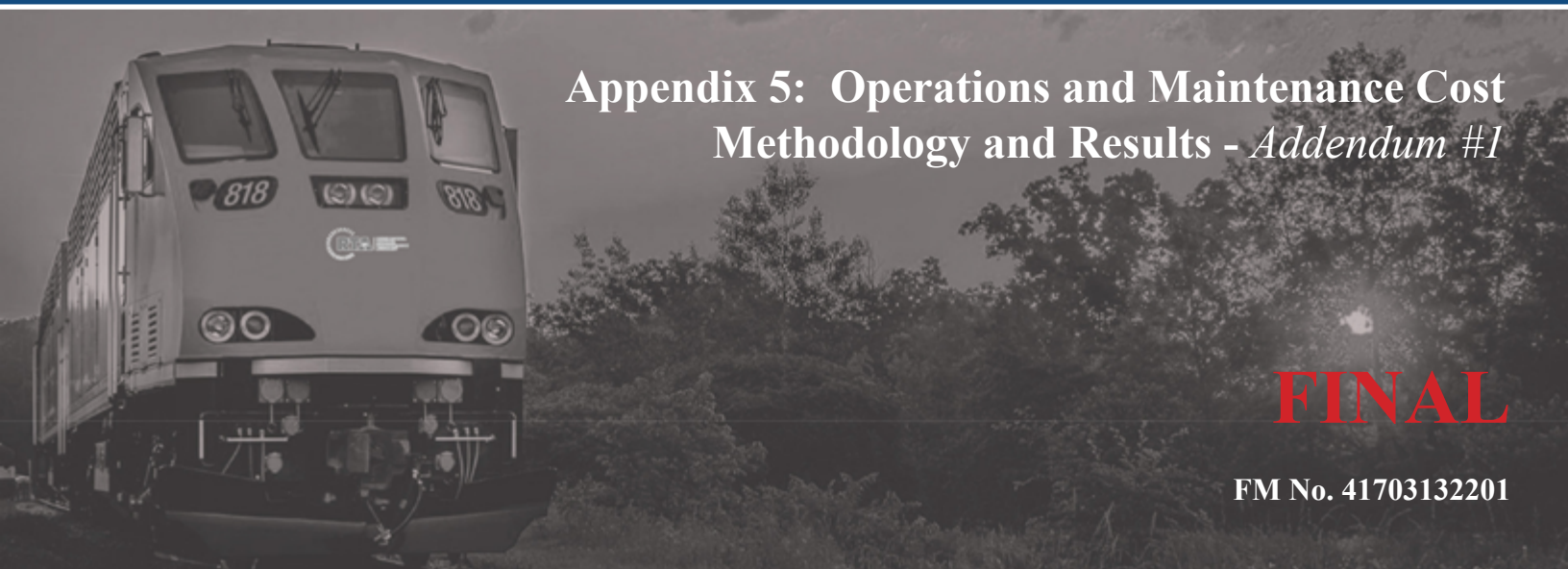
Getting Southeast Florida To Work

Miami-Dade
Broward
Palm Beach

Broward Metropolitan Planning Organization
Florida Department of Transportation
Miami-Dade Metropolitan Planning Organization
Palm Beach Metropolitan Planning Organization
Southeast Florida Transportation Council
South Florida Regional Planning Council
South Florida Regional Transportation Authority
Treasure Coast Regional Planning Council

Preliminary Project Development Report

April 2014



Appendix 5: Operations and Maintenance Cost Methodology and Results - *Addendum #1*

FINAL

FM No. 41703132201

Addendum #1 to the Technical Memorandum: Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study) Draft Operating and Maintenance (O&M) Cost Estimate for Full-Build and Proposed Build Alternatives

PREPARED FOR	Florida Department of Transportation (FDOT) – District 4
PREPARED BY	Ashok Sundararajan/CH2M HILL, David Solow/ CH2M HILL, Sunserea Dalton/CH2M HILL
DATE	October 18, 2013
PROJECT NUMBER	FMN: 417031-3-22-01

1.0 Introduction

The purpose of this addendum is to present the results from the application of the 2013 O&M Cost Model to estimate the Operations and Maintenance (O&M) cost estimates for Tri-rail Coastal Link Build alternatives. A separate technical memorandum[1], submitted to FDOT in June 2013, documents the inputs, methodology, assumptions of the 2013 O&M Cost Model. Unless otherwise stated, the assumptions and methodology in the 2013 O&M Cost Model remain unchanged. The reader is strongly advised to review the technical memorandum before reviewing this addendum.

2.0 Proposed and Full-Build Alternatives

As of October 2013, the service plan is based on ridership and operations modeling evaluations conducted during Phase 3 of the Tri-Rail Coastal Link study which involved coordination with the Project Steering Committee. The service plan for the Full Build Alternative is shown graphically in Exhibit A-1 in Appendix A with one-seat connectivity over the complete 81.6 mile FEC corridor from Jupiter to Miami Government Center. The Proposed Build Alternative illustrated graphically in Exhibit A-2 in Appendix A is anticipated to provide one-seat connectivity between Jupiter and Fort Lauderdale with a transfer in Fort Lauderdale required to reach downtown Miami. Existing Tri-Rail service will be maintained with a north extension to West Palm Beach that will alternate as the terminal station with Mangonia Park and the Red Line service that will provide an additional point of connectivity by providing a one-seat ride from the existing Pompano Beach Tri-Rail station on the SFRC to the new Miami Government Center (MGC) station along the FEC.

[1] *Technical Memorandum, Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study), Draft Operating and Maintenance (O&M) Cost Estimate for Project Alternatives, Prepared by CH2M Hill, Prepared for FDOT – District 4, June 28, 2013.*

3.0 Level of Service

The level of service for the Proposed Build and Full Build Alternatives are based on the operations analysis conducted by AECOM in October 2013. Exhibit 1 shows the level of service values for the Tri-Rail Coastal Link build alternatives.

Consistent with the 2013 O&M Model, the level of service values for the no-build alternative were based on the Fiscal Year (FY) 2010-2011 National Transit Database (NTD) report submitted by the South Florida Regional Transportation Agency (SFRTA), also called Tri-Rail. The vehicles for the no-build alternative were based on specific fleet retirement assumptions made by CH2M Hill and documented in the June 2013 technical memorandum.

Exhibit 1. LOS variables for Proposed and Full Build Alternatives

Input Variables	No-Build	Full-Build Alternative	Proposed Build Alternative	(incr. from No-Build) Full-Build Alternative	(incr. from No-Build) Proposed Build Alternative
Revenue Train Hours	34,900	69,920	63,904	35,020	29,004
Revenue Train Miles	1,038,611	2,182,688	2,004,382	1,144,077	965,771
Revenue Vehicle Miles	2,878,369	8,730,750	8,017,528	5,852,381	5,139,159
Annual Boardings	3,835,000	7,257,000	6,576,140	3,422,000	2,741,140
Vehicles[1]	47	84	88	37	41
Pass. Coaches and Cab Cars	29	64	67	35	38
Locomotives	18	20	21	2	3
Diesel Multiple Units	-	-	-	-	-
Stations	18	38	38	20	20

1- As compared to the technical memorandum, the build alternatives examined in this addendum require additional equipment than the build alternative analyzed in June 2013. The operating termini are slightly different in this Full-Build alternative when compared to the Build alternative from June 2013 and a proposed build alternative has been added that does not go the full length of the TRCL corridor. Detailed operations planning in the PD phase will address these issues.

For the full-build and proposed build alternatives, the annual boardings were computed by multiplying the average weekday boardings (provided by AECOM) by an annualization factor of 295 estimated using the NTD average weekday and annual ridership data reported by SFRTA. The revenue vehicle miles were computed by assuming an average train length of 4 (1 locomotive + 3 passenger coaches and cab cars). The vehicles include a 12.5% spare ratio.

The assumptions for additional staffing to support the full-build and proposed build alternatives are consistent with the approach that was developed and applied in the 2013 O&M Cost Model. For these two alternatives, the following additional staffing is assumed:

- Operations Managers, Mechanical and Train Operations – 2

- Station Agents, full-time – 4 (2 at Fort Lauderdale and 2 at MGC)
- AFC – 2 technicians and 1 senior technician
- Customer Service Representatives, part-time – 2

Assumptions on fully-loaded salaries for these positions are documented in the technical memorandum.

4.0 O&M Costs

The unit costs from the 2013 O&M Cost Model were applied to estimate the costs for the Build alternatives. Please note that these costs are incremental (in addition) to the no-build costs. The results are presented in Exhibit 2 below. The O&M Cost Worksheets are presented in Appendix B.

Exhibit 2. Incremental O&M Cost From No-Build Alternative (in millions)

Function	Full-Build Alternative (in millions)[2]	Proposed Build Alternative (in millions)[2]
Transportation	$17.99	$15.16
Vehicle Maintenance	$14.97	$13.77
Administration	$0.97	$0.91
Claims and Insurance	$0.93	$0.75
Non-vehicle Maintenance	$3.02	$3.02
Total [1]	**$37.88**	**$33.61**

1 – This estimate as well as those in the June 2013 technical memorandum do not include the FEC MoW, Access, and Dispatch costs which may have a significant impact on the O &M cost model results.

2 – Costs are incremental (or in addition) to No-Build costs.

In the technical memorandum, a separate section was devoted to risk assessment identifying the key risk elements and a qualitative assessment of the impact of risk elements on the O&M costs. All the risk items are still applicable to these estimates and the reader is advised to review these results in concert with the risk discussion from the technical memorandum. In addition, the following should be noted:

Item	Description
Consist Size	We assumed that all trains deployed in black, red, and green lines (refer charts in Appendix A) are of the same length of 4 (1 locomotive and 3 cars – passenger coaches and cab cars). Given the initiating and truncating of lines mid-corridor with these new alternatives, right sizing the consist size based on ridership demand and line length, could result in trains of different consist sizes and impact the number of vehicles required to operate revenue service and also revenue vehicle mile estimates, both of which impact the vehicle maintenance costs.

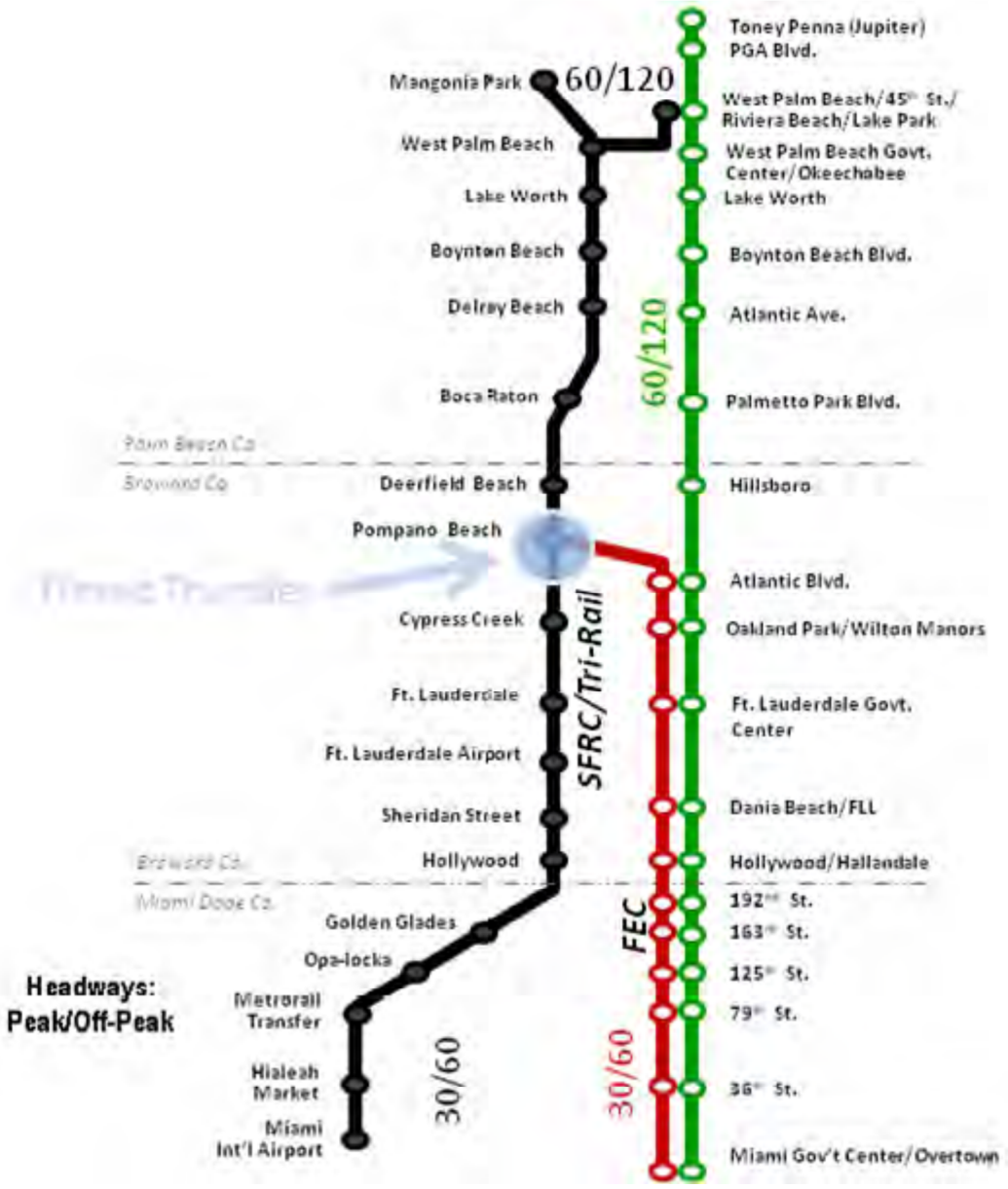
Consist Planning

Currently Tri-rail operations are relatively straight forward. There is only one line that operates between Miami and Mangonia Park. However, for the two Build alternatives, different terminal points are contemplated for the red, green, and black lines. Based on the servicing facility available at these terminal points and the need to accommodate maintenance schedules, these trains may have to be moved to/from the maintenance facilities incurring deadhead miles and hours. Deadheading requires the train crew to move the train and hence impacts train operations costs and moving trains back and forth results in additional wear and tear on the equipment impacting maintenance costs. The impact of deadheading will be assessed during the project development phase when additional consist planning data is anticipated.

Attachment A

Proposed Tri-Rail Coastal Link Build Alternative

Exhibit A-1 – Service Plan for Full Build Alternative



Source: AECOM (September 2013)

Exhibit A-2 – Service Plan for Proposed Build Alternative

Source: AECOM (September 2013)

Attachment B

O&M Cost Worksheets

Cost Center	Cost Driver	Unit Cost	Full Build # Units	Full Build O&M Cost	Proposed Build # Units	Proposed Build O&M Cost
Operations						
Train Operations Contract Costs						
Train Operations Cost (TOC)	Revenue Train Hours	$ 206.50	35,020	$ 7,231,771	29,004	$ 5,989,443
Ops Train Ops Contractor Mgr	# of staff	$ 93,549.30	1	$ 93,549	1	$ 93,549
TOC - Profit	% of TOC	6.65%		$ 487,121		$ 404,508
Operations Personnel						
Operations Project Manager - Operations	# of staff	$ 93,933.14	2	$ 187,866	2	$ 187,866
Operations Project Manager - Mechanical	# of staff	$ 93,933.14	1	$ 93,933	1	$ 93,933
Station Agents - FT	# of staff	$ 51,694.20	4	$ 206,777	4	$ 206,777
Operations - Misc Expenses	% Growth in Ops Personnel	na		$ 35,985		$ 35,985
Train Fuel	Revenue Train Miles	$ 8.44	1,144,077	$ 9,653,146	965,771	$ 8,148,694
Station Maintenance and Utilities	Stations	$ 151,035.01	20	$ 3,020,700	20	$ 3,020,700
Maintenance of Equipment	Revenue Vehicle Miles	$ 2.0885	5,852,381	$ 12,222,956	5,139,159	$ 10,733,361
Maintenance of Equipment	Vehicles	$ 74,114.87	37	$ 2,742,250	41	$ 3,038,710
Finance and IT						
Fare Collection						
AFC Technician	# of staff	$ 57,728.33	2	$ 115,457	2	$ 115,457
Sr. AFC Technician	# of staff	$ 81,864.87	1	$ 81,865	1	$ 81,865
Finance - Misc Expenses	% Growth in Finance Personn	na		$ 64,759		$ 64,759
Revenue Collection/TVM Maintenance	Annual Boardings	$ 0.0322	3,422,000	$ 110,024	2,741,140	$ 88,133
Insurance	Annual Boardings	$ 0.2729	3,422,000	$ 933,867	2,741,140	$ 748,059
Electronic Message Boards/GeoFocus	Stations	$ 5,469.97	20	$ 109,399	20	$ 109,399
Marketing						
Marketing Contract	Stations	$ 12,431.75	20	$ 248,635	20	$ 248,635
Marketing Customer Service Reps-PT	# of staff	$ 27,139.13	2	$ 54,278	2	$ 54,278
Legal						
Legal Fees	Annual Boardings	$ 0.0240	3,422,000	$ 82,119	2,741,140	$ 65,780
Legal Fees	Revenue Train Miles	$ 0.0880	1,144,077	$ 100,723	965,771	$ 85,025
TOTAL				**$ 37,877,180**		**$ 33,614,918**

Tri-Rail Coastal Link Study

(formerly known as the South Florida East Coast Corridor Study)

Tri-Rail Coastal Link

Getting Southeast Florida To Work

Miami-Dade
Broward
Palm Beach

Broward Metropolitan Planning Organization
Florida Department of Transportation
Miami-Dade Metropolitan Planning Organization
Palm Beach Metropolitan Planning Organization
Southeast Florida Transportation Council
South Florida Regional Planning Council
South Florida Regional Transportation Authority
Treasure Coast Regional Planning Council

Preliminary Project Development Report

April 2014

Appendix 5: Operations and Maintenance Cost Methodology and Results - *Addendum #2*

FINAL

FM No. 41703132201

Addendum #2 to the Technical Memorandum: Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study) Update to Draft Operating and Maintenance (O&M) Cost Estimate for Interim Build Alternative v2, Build Alternative Option A, and Build Alternative Option B

PREPARED FOR	Florida Department of Transportation (FDOT) – District 4
PREPARED BY	Ashok Sundararajan/CH2M HILL, David Solow/ CH2M HILL, Sunserea Dalton/CH2M HILL
DATE	February 24, 2014
PROJECT NUMBER	FMN: 417031-3-22-01

1.0 Introduction

The purpose of this addendum is to present the results from the application of the 2013 O&M Cost Model to estimate the Operations and Maintenance (O&M) cost estimates for Tri-Rail Coastal Link build alternatives. A separate Technical Memorandum[1], submitted to FDOT in June 2013, documented the inputs, methodology, and assumptions of the 2013 O&M Cost Model. Subsequently, Addendum 1 (circulated in October 2013) updated the O&M cost estimates for the Interim Build v2 Alternative (formerly known as (fka) the Full Build Alternative) and Build Alternative Option A (fka Proposed Build Alternative). This Addendum 2 provides another update to the O&M cost estimates for the Interim Build v2 Alternative, Build Alternative Option A, and Build Alternative Option B (fka Alternative A6C5, v11.1)[2] based on updated level of service (LOS) assumptions from the most recent operations planning analyses.

Unless otherwise stated, the assumptions, methodology, and risks in the 2013 O&M Cost Model and Addendum 1 remain unchanged. The reader is strongly advised to review those documents along with this addendum. As indicated in the reader's note at the beginning of Appendix 5, the alternatives naming convention for this study was revised in December 2013. The O&M Technical Memorandum and Addendum 1 reflect the previous naming convention, while Addendum 2 has been updated to reflect those names in the main Preliminary Project Development Report.

The estimates presented here are intended to provide a way to compare the O&M cost between alternatives. These estimates should not be used for financial planning, financial feasibility or budget planning purposes.

[1] *Technical Memorandum, Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study), Draft Operating and Maintenance (O&M) Cost Estimate for Project Alternatives, Prepared by CH2M Hill, Prepared for FDOT – District 4, June 28, 2013.*

[2] Attachment A contains an illustration of the three alternatives

2.0 Level of Service

The levels of service for the three alternatives are based on data provided by AECOM. Exhibit 1 shows the level of service values for the TRCL Build alternatives.

Consistent with the 2013 O&M Model, the level of service values for the No-Build alternative were based on the Fiscal Year (FY) 2010-2011 National Transit Database (NTD) report submitted by the South Florida Regional Transportation Agency (SFRTA), also called Tri-Rail. The vehicles for the no-build alternative were based on specific fleet retirement assumptions made by CH2M HILL and documented in the June 2013 technical memorandum.

Exhibit1. LOS Variables for Alternatives

Input Variables	No-Build	Interim Build v2	Build Option A	Build Option B	(Increase from No-Build) Interim Build v2	Build Option A	Build Option B
Revenue Train Hours	34,900	69,920	63,904	69,226	35,020	29,004	34,326
Revenue Train Miles	1,038,611	2,182,688	2,004,382	2,113,265	1,144,077	965,771	1,074,654
Revenue Vehicle Miles	2,878,369	8,730,750	8,017,528	8,453,060	5,852,381	5,139,159	5,574,691
Annual Boardings	3,835,000	7,257,000	6,549,000	6,490,000	3,422,000	2,714,000	2,655,000
Vehicles	47	91	91	104	44	44	57
Pass. Coaches and Cab Cars	29	68	68	78	39	39	49
Locomotives	18	23	23	26	5	5	8
Stations	18	38	38	38	20	20	20

For the alternatives, the annual boardings were computed by multiplying the average weekday boardings (provided by AECOM) by an annualization factor of 295 estimated using the NTD average weekday and annual ridership data reported by SFRTA. The revenue vehicle miles were computed by assuming an average train length of 4 (1 locomotive + 3 passenger coaches and cab cars). The estimate of vehicles includes a 12.5% spare ratio.

3.0 O&M Costs

The unit costs from the 2013 O&M Cost Model were applied to estimate the costs for the build alternatives. Exhibit 2 shows the cost estimates in FY11-12 dollars, the base year SFRTA operating budget, used to develop the cost estimate*s.* These estimates do not

include the FEC MoW, Access, and Dispatch costs which may have a significant impact on the O&M cost model results. The O&M Cost Worksheets are presented in Attachment B.

Exhibit 2. O&M Cost Estimates in FY11-12 dollars

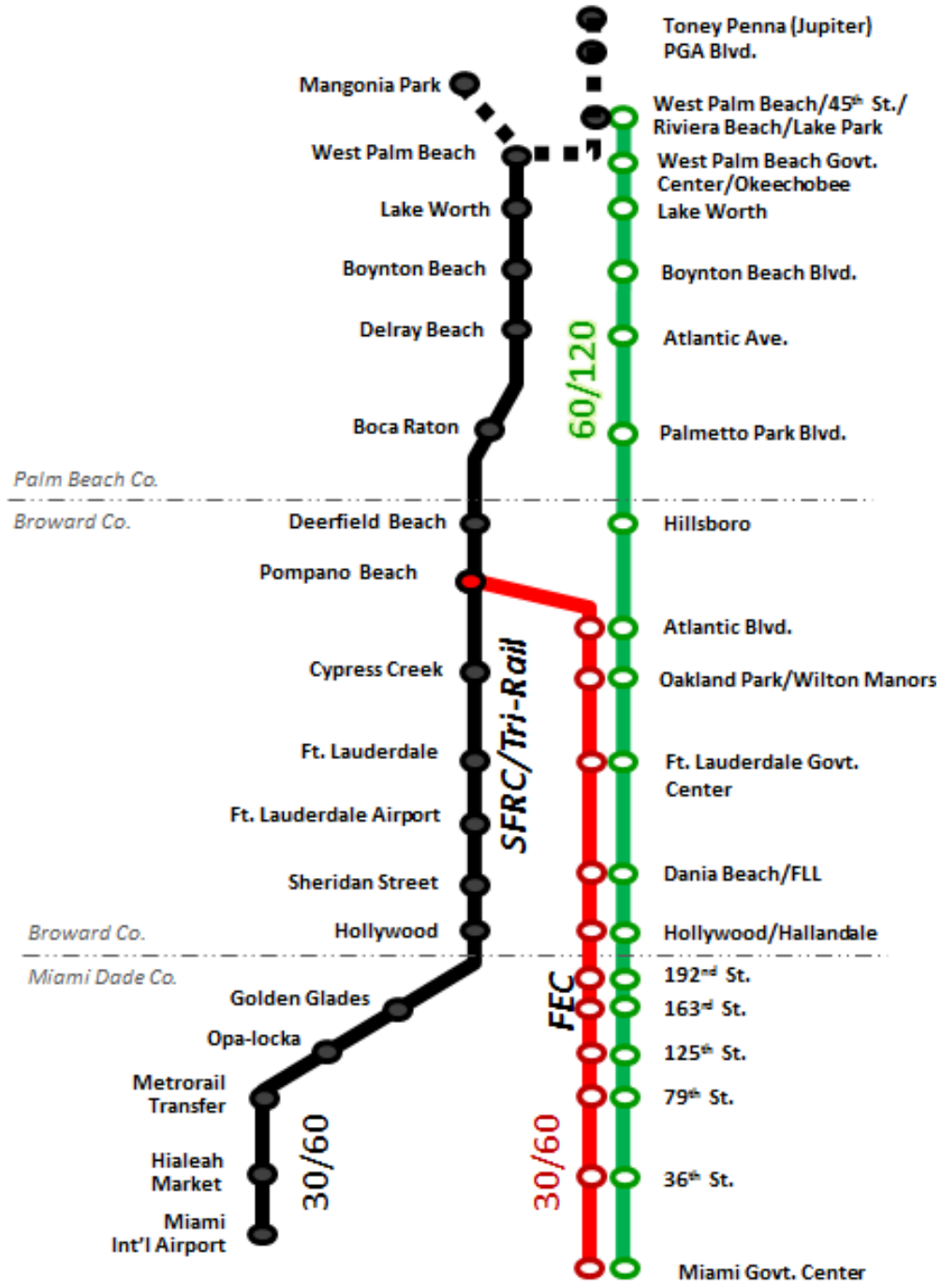
	Annual O&M Costs (in millions)				Incremental from No-Build (in millions)		
Function	**No-Build**	**Interim Build v2**	**Build Option A**	**Build Option B**	**Interim Build v2**	**Build Option A**	**Build Option B**
Transportation	$26.37	$44.36	$41.53	$43.62	$17.99	$15.16	$17.25
Vehicle Maintenance	$12.31	$27.79	$26.30	$28.18	$15.48	$13.99	$15.87
Administration	$10.87	$11.84	$11.78	$11.79	$0.97	$0.91	$0.92
Claims and Insurance	$2.36	$3.29	$3.10	$3.08	$0.93	$0.74	$0.72
Non-vehicle Maintenance	$18.09	$21.11	$21.11	$21.11	$3.02	$3.02	$3.02
Security	$4.82	$4.82	$4.82	$4.82	$0	$0	$0
Total	**$74.82**	**$113.21**	**$108.64**	**$112.60**	**$38.39**	**$33.82**	**$37.78**

The reader is advised to refer to the O&M Technical Memorandum and Addendum 1 in concert with reviewing these costs to understand the risk elements and assumptions. These estimates should not be used for financial planning or financial feasibility or budget planning purposes.

Attachment A

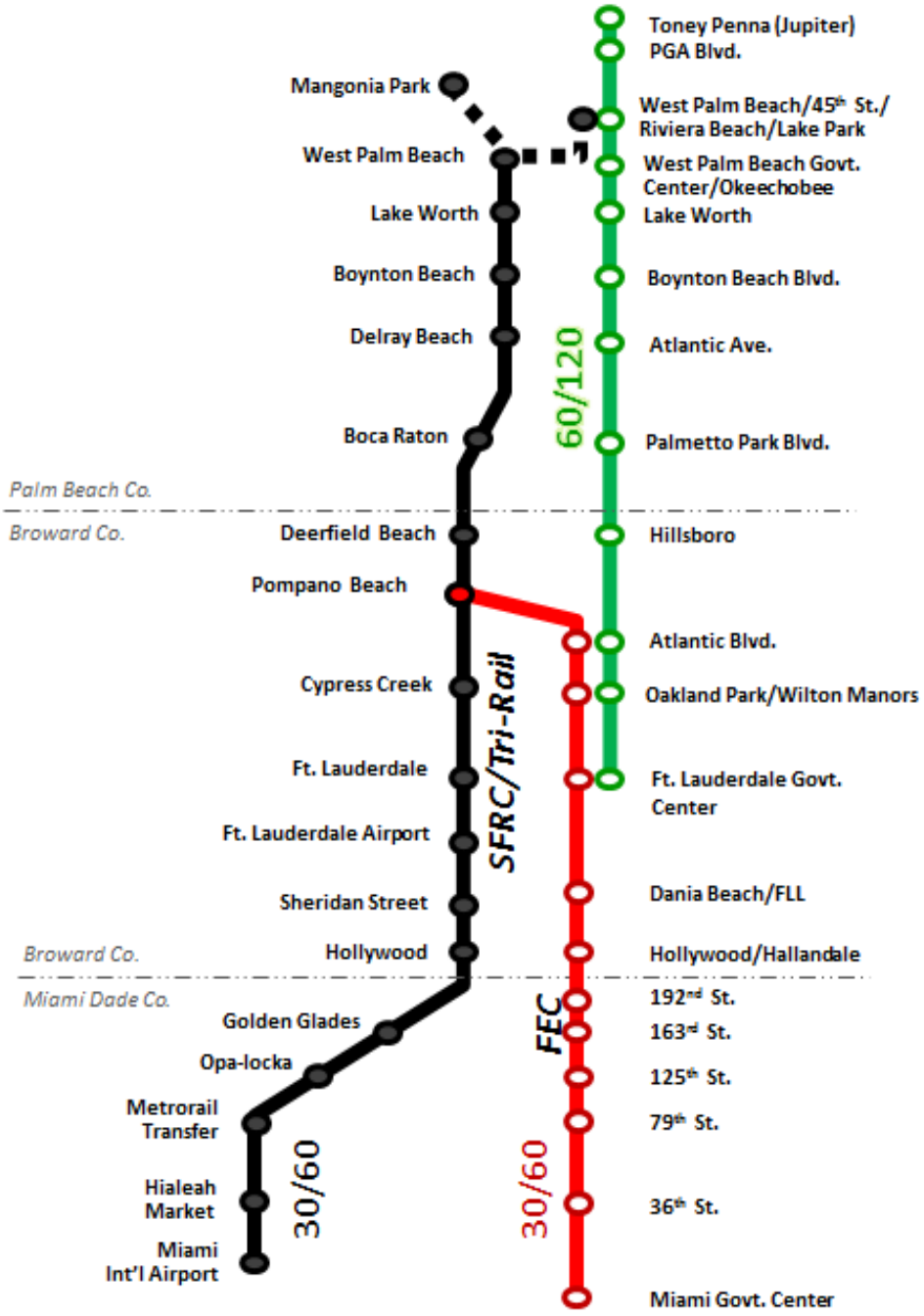
Proposed Tri-Rail Coastal Link Alternatives

Exhibit A-1 –Interim Build Alternative v2



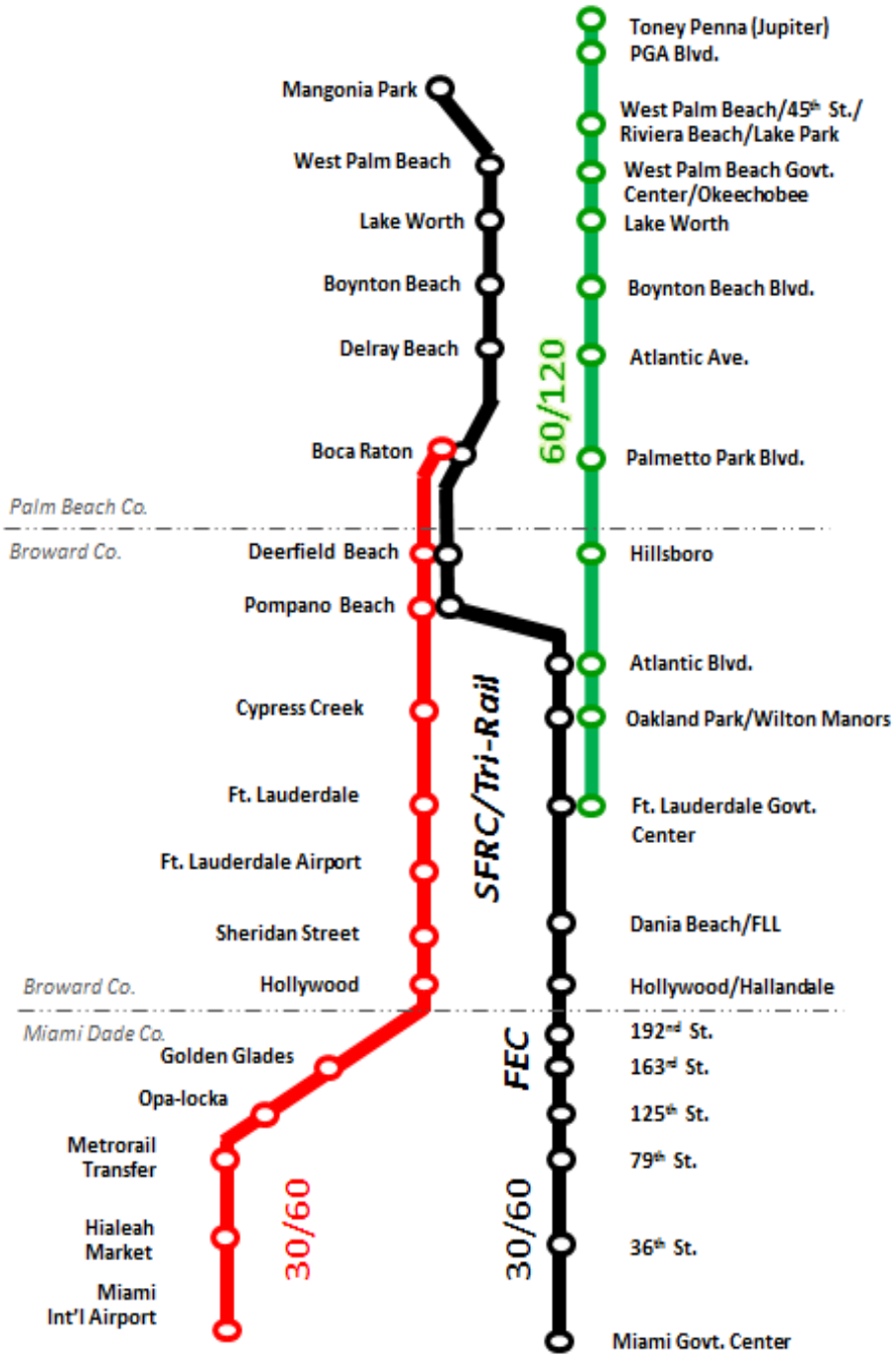
Source: AECOM (September 2013)

Exhibit A-2 –Build Alternative Option A



Source: AECOM (February 2014)

Exhibit A-3 –Build Alternative Option B



Source: AECOM (February 2014)

Attachment B

O&M Cost Worksheet

			Incremental Level of Service and O&M Costs (In Addition to No-Build)					
			Interim Build v2		Build Option A		Build Option B	
Cost Center	Cost Driver	Unit Cost	# Units	O&M Cost	# Units	O&M Cost	# Units	O&M Cost
Operations								
Train Operations Contract Costs								
Train Operations Cost (TOC)	Revenue Train Hours	$ 206.50	35,020	$ 7,231,771	29,004	$ 5,989,443	34,326	$ 7,088,457
Ops Train Ops Contractor Mgr	# of staff	$ 93,549.30	1	$ 93,549	1	$ 93,549	1	$ 93,549
TOC - Profit	% of TOC	6.65%		$ 487,121		$ 404,508		$ 477,591
Operations Personnel								
Operations Project Manager - Operations	# of staff	$ 93,933.14	2	$ 187,866	2	$ 187,866	2	$ 187,866
Operations Project Manager - Mechanical	# of staff	$ 93,933.14	1	$ 93,933	1	$ 93,933	1	$ 93,933
Station Agents - FT	# of staff	$ 51,694.20	4	$ 206,777	4	$ 206,777	4	$ 206,777
Operations - Misc Expenses	% Growth in Ops Personnel	na		$ 35,985		$ 35,985		$ 35,985
Train Fuel	Revenue Train Miles	$ 8.44	1,144,077	$ 9,653,146	965,771	$ 8,148,694	1,074,654	$ 9,067,393
Station Maintenance and Utilities	Stations	$ 151,035.01	20	$ 3,020,700	20	$ 3,020,700	20	$ 3,020,700
Maintenance of Equipment	Revenue Vehicle Miles	$ 2.0885	5,852,381	$ 12,222,956	5,139,159	$ 10,733,361	5,574,691	$ 11,642,988
Maintenance of Equipment	Vehicles	$ 74,114.87	44	$ 3,261,054	44	$ 3,261,054	57	$ 4,224,548
Finance and IT								
Fare Collection								
AFC Technician	# of staff	$ 57,728.33	2	$ 115,457	2	$ 115,457	2	$ 115,457
Sr. AFC Technician	# of staff	$ 81,864.87	1	$ 81,865	1	$ 81,865	1	$ 81,865
Finance - Misc Expenses	% Growth in Finance Personne	na		$ 64,759		$ 64,759		$ 64,759
Revenue Collection/TVM Maintenance	Annual Boardings	$ 0.0322	3,422,000	$ 110,024	2,714,000	$ 87,261	2,655,000	$ 85,364
Insurance	Annual Boardings	$ 0.2729	3,422,000	$ 933,867	2,714,000	$ 740,653	2,655,000	$ 724,552
Electronic Message Boards/GeoFocus	Stations	$ 5,469.97	20	$ 109,399	20	$ 109,399	20	$ 109,399
Marketing								
Marketing Contract	Stations	$ 12,431.75	20	$ 248,635	20	$ 248,635	20	$ 248,635
Marketing Customer Service Reps-PT	# of staff	$ 27,139.13	2	$ 54,278	2	$ 54,278	2	$ 54,278
Legal								
Legal Fees	Annual Boardings	$ 0.0240	3,422,000	$ 82,119	2,714,000	$ 65,129	2,655,000	$ 63,713
Legal Fees	Revenue Train Miles	$ 0.0880	1,144,077	$ 100,723	965,771	$ 85,025	1,074,654	$ 94,611
TOTAL				**$ 38,395,985**		**$ 33,828,332**		**$ 37,782,420**

Tri-Rail Coastal Link Study

(formerly known as the South Florida East Coast Corridor Study)

Tri-Rail Coastal Link

Getting Southeast Florida To Work

Miami-Dade
Broward
Palm Beach

Broward Metropolitan Planning Organization
Florida Department of Transportation
Miami-Dade Metropolitan Planning Organization
Palm Beach Metropolitan Planning Organization
Southeast Florida Transportation Council
South Florida Regional Planning Council
South Florida Regional Transportation Authority
Treasure Coast Regional Planning Council

Preliminary Project Development Report

April 2014

Appendix 5: Operations and Maintenance Cost Methodology and Results - *Addendum #3*

FINAL

FM No. 41703132201

Addendum #3 to the Technical Memorandum: Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study) Update to Draft Operating and Maintenance (O&M) Cost Estimate for Build Alternative Option A and Build Alternative Option B

PREPARED FOR	Florida Department of Transportation (FDOT) – District 4
PREPARED BY	Ashok Sundararajan/CH2M HILL, David Solow/ CH2M HILL, Sunserea Dalton/CH2M HILL
DATE	April 14, 2014
PROJECT NUMBER	FMN: 417031-3-22-01

1.0 Introduction

The purpose of this addendum is to present the results from the application of the 2013 O&M Cost Model to estimate the Operations and Maintenance (O&M) cost for Tri-Rail Coastal Link (TRCL) build alternatives. A separate Technical Memorandum[1], submitted to FDOT in June 2013, documented the inputs, methodology, and assumptions of the 2013 O&M Cost Model. Subsequently, Addendum 1 (circulated in October 2013) updated the O&M cost estimates for the Interim Build (fka Full Build) and Build Option A (fka Proposed Build) Alternatives. Subsequently, Addendum 2 (circulated in February 2014) updated the O&M cost estimates for the Interim Build, Build Option A, and Build Option B Alternatives[2] based on updated level of service (LOS) assumptions from the most recent operations planning analyses. This Addendum 3 documents changes to the O&M model assumptions and updates the O&M cost estimates for Build Option A and Build Option B (fka A6C5 v.11.1) Alternatives based on updated LOS from recent operations planning analyses.

Unless otherwise stated, the assumptions, methodology, and risks documented in the Technical Memorandum and addenda remain unchanged. The reader is strongly advised to review those documents along with this addendum. As indicated in the reader's note at the beginning of Appendix 5, the alternatives naming convention for this study was revised in December 2013. The O&M Technical Memorandum and Addendum 1 reflect the previous naming convention. Addendum 2 was updated to reflect those names in the main Pre-Project Development Report. Addendum 3 uses the same naming convention as Addendum 2.

The estimates presented here are intended to provide a way to compare the O&M cost between alternatives. Because of the nature and limits of this model and the fact that not all O&M costs have been identified, these estimates should not be used for financial planning, financial feasibility or budget planning purposes.

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[1] *Technical Memorandum, Tri-Rail Coastal Link Service (South Florida East Coast (SFECC) Study), Draft Operating and Maintenance (O&M) Cost Estimate for Project Alternatives, Prepared by CH2M HILL, Prepared for FDOT – District 4, June 28, 2013.*

[2] Attachment A contains an illustration of the three alternatives

2.0 O&M Model Changes

The cost drivers and unit costs for certain cost components in the O&M model were updated to reflect the comments from the FDOT and the South Florida Regional Transportation Authority (SFRTA) team resulting from the latest operations planning analysis. The study team expressed the desire to capture the cost of deadhead moves planned to move the equipment between terminal stations and yards due to a significant increase in deadhead moves in the latest alternatives. The direction received from the Operations Meeting on April 2nd 2014, attended by SFRTA, FDOT, and consultants, resulted in revising the O&M assumptions. The agreements from that meeting are documented below.

- **Train Operations Costs** - Continue to apply revenue train hours as the cost driver and unit cost per revenue train hour to estimate the cost of train operations. The model is not detailed enough to estimate crew cost based on operating rules and crew turns. No changes were made to the O&M model.
- **Train Fuel Costs** - Change the cost driver for train fuel costs from revenue train miles to total train miles to reflect the addition of deadhead miles. Note this change does not change the unit costs, which were computed as a product of diesel fuel cost ($ per gallon) and consumption rate (gallons consumed per train mile). What changes is the application of that unit cost to total train miles instead of revenue train miles.
- **Vehicle Maintenance Costs** - Change the cost driver for maintenance of equipment (MoE) costs from revenue vehicle miles to total vehicle miles again to reflect the addition of deadhead miles. This results in a change from unit cost per revenue vehicle mile to unit cost per revenue train mile. To summarize, continue to drive MoE cost using two cost drivers – 50% of costs driven by total vehicles (unit cost per vehicle) and 50% of costs driven by total vehicle miles (unit cost per total vehicle mile). The change is summarized in Exhibit 1.

Exhibit 1. Summary of Changes to MoE Costs in O&M Model

Previous Cost Driver	Previous Unit Cost	Updated Cost Driver	Updated Unit Cost
Vehicles (incl. spares)	$74,117.87	No Change - Vehicles (incl. spares)	$74,117.87
Revenue Vehicle Miles	$2.0885	Total Vehicle Miles	$1.8338

Finally, part of the legal fees from the Legal Department, which were driven by revenue vehicle miles, were also updated to be driven by total train miles. This resulted in changing the unit cost of 8.8 cents per revenue vehicle mile to 8.5 cents per total vehicle mile.

3.0 Current Equipment Available for TRCL Operations

SFRTA updated its fleet plan in March 2014 and directed the Project Team to update the fleet assumptions for no-build, current fleet available at TRCL opening, and vehicle needs for the TRCL alternatives. Exhibit 2 shows the SFRTA fleet summary, which is directly reproduced here from the TRCL Fleet Plan developed by the SFRTA.

Exhibit 2. SFRTA Fleet Summary (reproduced from SFRTA Fleet Plan)

	Legacy Fleet (2010)	New Additions (2011-2013)	Planned Retirements	Fleet available for TRCL
Locomotives	16	12	4	24
DMUs[1]	4	0	0	4
Cab Cars	11	10	0	21
Trailer Coaches[2]	17	14	0	31

Notes:
1 - DMUs offer the unique flexibility to substitute as a locomotive, cab car or trailer coach
2 - Includes two trailer cars that were delivered with the DMUs in 2006.

SFRTA proposes that the DMUs will be operated in a 3-car train consisting of two powered DMUs and one trailer car. One powered DMU is equivalent to a locomotive and a trailer car and the second powered DMU is equivalent to a cab car. Effectively, the equivalent current fleet available to run 3-car trains for TRCL is 26 locomotives, 23 cab cars, and 33 trailer coaches.

The current fleet available at SFRTA is more than the equipment required to meet the current or the No-Build service needs. The previous fleet plan noted that SFRTA's initial plan was to retire much of the existing fleet. Due to the TRCL project, SFRTA reevaluated that course of action and decided to store most (and rehab some) of the older units in anticipation of the TRCL expansion.

4.0 Level of Service Summary

Consistent with the 2013 O&M Model, the level of service values for the No-Build alternative were based on the Fiscal Year (FY) 2010-2011 National Transit Database (NTD) report submitted by SFRTA, excluding ridership and vehicles. Ridership data is based on modeling results and the number of vehicles is based on the new SFRTA fleet plan.

The level of service for the two Build alternatives are based on data provided by AECOM, except fleet related assumptions, which were based on the SFRTA Fleet Plan. For the alternatives, the annual boardings were computed by multiplying the average weekday boardings (provided by AECOM) by an annualization factor of 295, estimated using the NTD average weekday and annual ridership data reported by SFRTA.

Exhibit 3 shows the level of service values for the TRCL build alternatives.

Exhibit 3. LOS Variables for Alternatives

Input Variables	FY2010-11 Value	No-Build	Build Option A	Build Option B	(Increase from No-Build) Build Option A	(Increase from No-Build) Build Option B
Revenue Train Hours	34,900 [1]	34,900	63,904	67,772	29,004	32,872
Total Train Miles	1,073,885 [1]	1,073,885	2,134,814	2,216,229	1,060,929	1,142,344
Total Vehicle Miles	2,976,534 [1]	2,976,534	8,642,026	9,027,559	5,665,492	6,051,025
Annual Boardings	3,810,323 [1]	3,835,000	6,549,000	6,490,000	2,714,000	2,655,000
Vehicles (incl. spares)	48 [2]	48 [2]	97	106	49	58
Stations	18	18	38	38	20	20

Notes:
1 – Source National Transit Database
2 – Source: SFRTA Fleet Plan, Legacy Fleet (2010)

5.0 O&M Costs

The updated unit costs from the 2013 O&M Cost Model were applied to estimate the costs for the build alternatives. Exhibit 4 shows the cost estimates in FY11-12 dollars, the base year SFRTA operating budget was used to develop the cost estimate*s.* These estimates do not include the FEC maintenance of way (MoW), access, and dispatch costs which may have a significant impact on the O&M cost model results; therefore, we do not recommend these figures be used for financial planning purposes.

The MoE estimates for the No-Build Alternative do not include the ongoing cost of mothballing excess equipment or any maintenance cost for bringing mothballed equipment back to revenue service for TRCL. In addition, the cost of rehabbing current equipment to make it available at TRCL opening is also not included in any of the estimates below. SFRTA directed that the cost of rehabbing equipment will not be a TRCL project expense and will be paid for using other available funding sources.

The O&M Cost Worksheet is presented in Appendix B.

Exhibit 4. O&M Cost Estimates in FY11-12 dollars

	Annual O&M Costs (in millions)			Increase from No-Build (in millions)	
Function	**No-Build**	**Build Option A [1]**	**Build Option B [1]**	**Build Option A [1]**	**Build Option B [1]**
Transportation	$26.37	$42.33	$43.87	$15.96	$17.50
Vehicle Maintenance [3]	$12.31 [2]	$26.33	$27.71	$14.02	$15.40
Administration	$10.87	$11.79	$11.79	$0.92	$0.92
Claims and Insurance	$2.36	$3.10	$3.08	$0.74	$0.72
Non-vehicle Maintenance	$18.09	$21.11	$21.11	$3.02	$3.02
Security	$4.82	$4.82	$4.82	$0.00	$0.00
Total	**$74.82**	**$109.48**	**$112.38**	**$34.66**	**$37.56**

Notes:
1 – Estimates do not include the FEC MoW, Access, and Dispatch costs
2 – No-build estimate for MoE is based on SFRTA maintaining 48 vehicles (fleet at year 2010-2011) to operate existing service.
3 – Estimates do not include the cost of rehabbing current equipment, which should be a capital expense. Estimates do not include the cost for mothballing excess equipment until TRCL opening and any required maintenance to bring mothballed equipment back to revenue service.

The estimates presented above are intended to provide a way to compare the O&M cost between alternatives. These estimates should not be used for financial planning, financial feasibility or budget planning purposes.

6.0 O&M Cost Estimate Risks

The 2013 O&M Cost Model is built around a set of assumptions that were known to the study team at the time of model development. Any change in these assumptions will have an impact on the O&M costs for the build alternatives. In this addendum, we have combined and presented all the risk items discussed in the O&M Technical Memorandum and subsequent addenda. The key risk areas, a brief description, and impact on O&M costs (where possible) are presented in Exhibit 5.

Exhibit 5. O&M Cost Estimate Risks

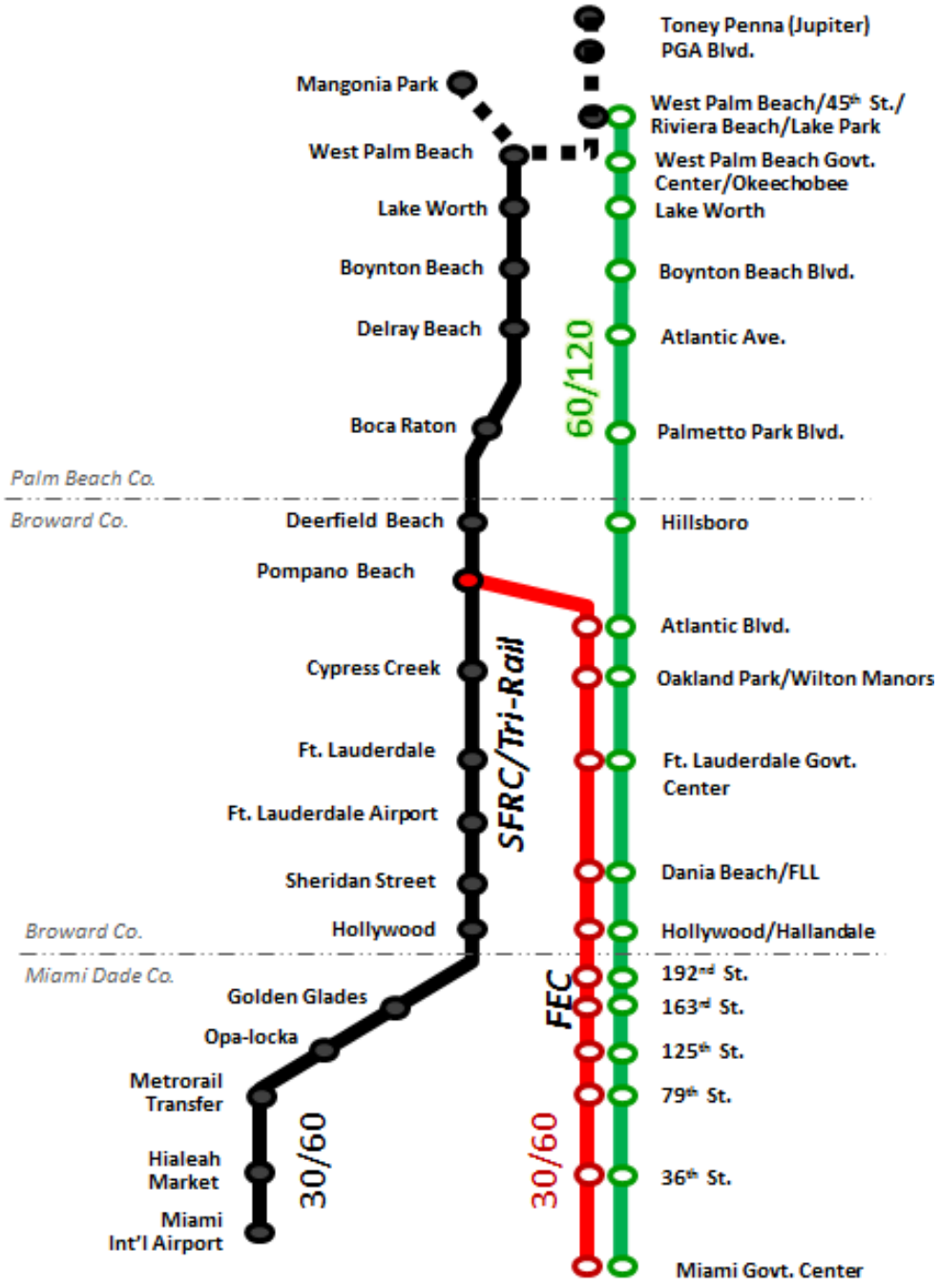
Item	Description
Fixed costs	The 2013 O&M Cost Model assumes certain SFRTA O&M expenses to be fixed. These assumptions are based on input provided by SFRTA staff and their assessment of how much cost SFRTA is able to absorb with an increase in service levels. Re-assigning these or part of these to variable costs and assigning a cost driver, as currently required by FTA, will materially increase the O&M cost estimates.
Additional staffing	Future staffing levels to support new service for project alternatives and the fixed cost assumptions for SFRTA were provided as input by SFRTA. The study team did not conduct a separate assessment or an analysis to make that determination. Increasing or reducing the staffing levels will impact the O&M cost estimates.
Security contract	SFRTA management advised that it intends to propose to re-assign current security staff and spread them across both lines, which are located in relative close proximity. This assumption results in no net increase in security costs beyond the existing expenditure levels. Changing this assumption will materially impact the O&M cost estimate for the project alternatives.
Dispatch	SFRTA intends to gain cost efficiencies, by consolidating the dispatch contracts, resulting in net savings, once the South Florida Operations and Management Agreement (SFOMA) is implemented. If the dispatch contracts are not consolidated, then the current expense levels will continue and savings will not be realized in the No-Build Alternative. Dispatch costs on the FEC are not included in the O&M cost estimates. They will be included in the MoW fee negotiations with FEC.
MoW and Potential Access Fees on FEC	These expenses are not included in the O&M estimate. They will be based on negotiations with FEC.
Procurement of Contracts	SFRTA currently procures contracts individually for operations, maintenance, security, station maintenance, and dispatching. Combining these contracts and procuring them from a turnkey vendor might result in cost efficiencies, assuming the scope of the contracts does not significantly change. These may result in higher/lower O&M unit costs and hence higher/lower than estimated O&M costs for the project alternatives.
MoE Costs	MoE costs for the No-Build (based on current contract costs) and build alternatives (based on NTD peer data) use two (2) different methodologies. Preferably, this should be reconciled in the Project Development phase based on discussions with SFRTA.

Item	Description
Reconciling Budget to Actuals	Since actual costs by cost center were not available from SFRTA, the study team applied an across the board reduction, roughly ten percent (10%) in cost center budget to match SFRTA's Consolidated Annual Financial Report (CAFR) actuals. In reality, the actual costs by cost centers may have increased or decreased disproportionately by cost center and an across the board reduction may not accurately represent the estimated O&M costs.
Consist Size	All trains are of the same length (1 locomotive and 3 cars – passenger coaches and cab cars). Given the initiating and truncating of lines mid-corridor with these new alternatives, right sizing the consist size based on ridership demand and line length, could result in trains of different consist sizes and impact the number of vehicles required to operate revenue service and also train mile and vehicle mile estimates, which impact the vehicle maintenance costs.
Deadheading	Currently Tri-Rail operations are relatively straight forward. There is only one line that operates between Miami and Mangonia Park. However, for the two build alternatives, different terminal points are contemplated for the various lines. Based on the servicing facility available at these terminal points and the need to accommodate maintenance schedules, these trains will be moved to/from the maintenance facilities incurring deadhead miles and hours. Deadheading requires the train crew to move the train and hence impacts train operations costs and moving trains back and forth results in additional wear and tear on the equipment impacting maintenance costs. The impact of deadheading on train fuel and vehicle maintenance is addressed in the current version of the cost model and the estimates. However, the impact of deadheading on train crew needs was not addressed in the current cost model and estimates. This will be further assessed during the Project Development phase when additional planning data on crew turns becomes available.
Equipment Storage and Mothball	SFRTA's current plan is to mothball excess equipment. Prior to induction into revenue service, mothballed equipment will require some level of maintenance. Those costs are yet to be identified and not included in the cost estimates. It is unclear if such costs are capital or operating and represent a project (TRCL) cost or current Tri-Rail system cost. This will be addressed in the Project Development phase.

Attachment A

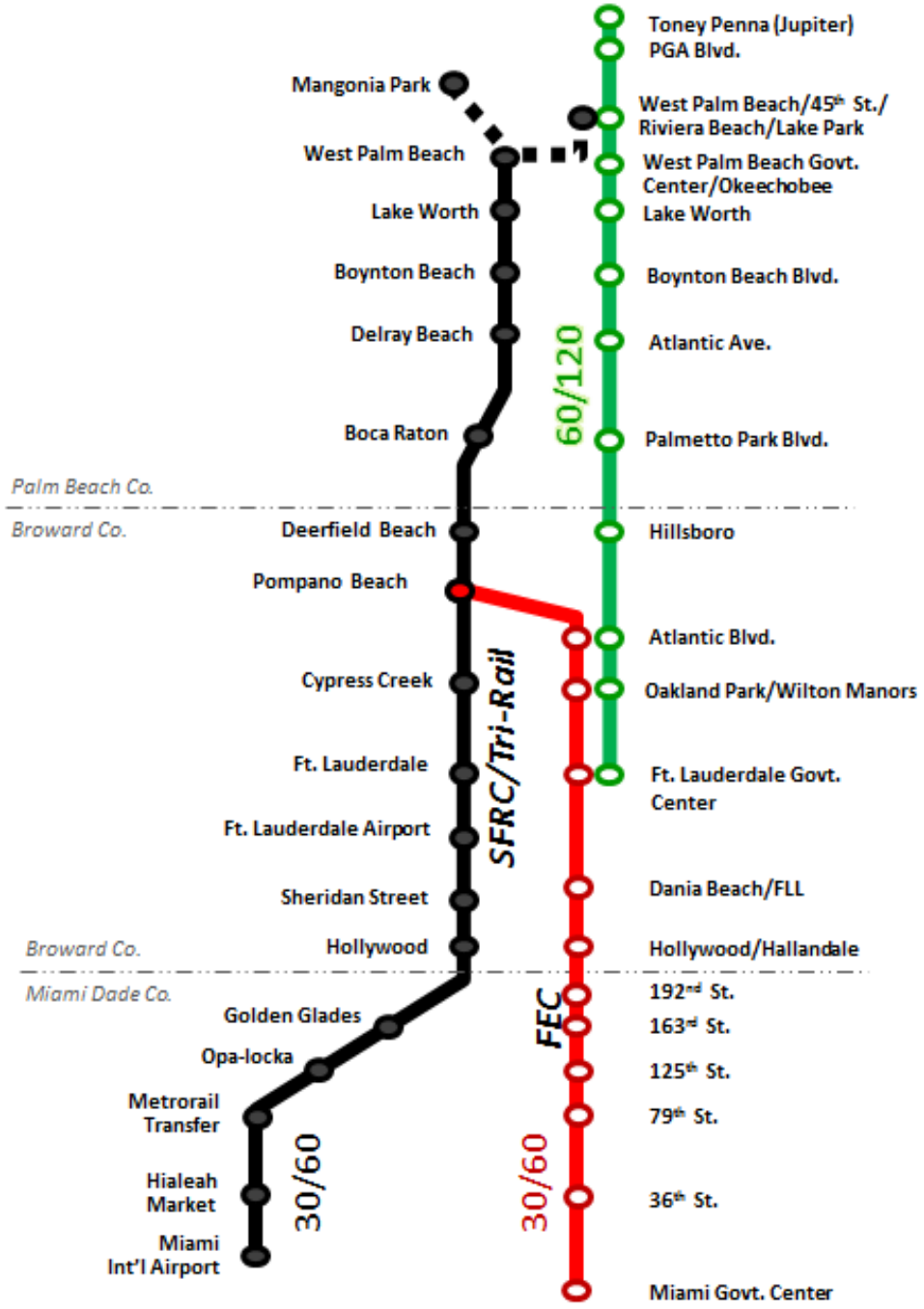
Proposed Tri-Rail Coastal Link Alternatives

Exhibit A-1 –Interim Build Alternative



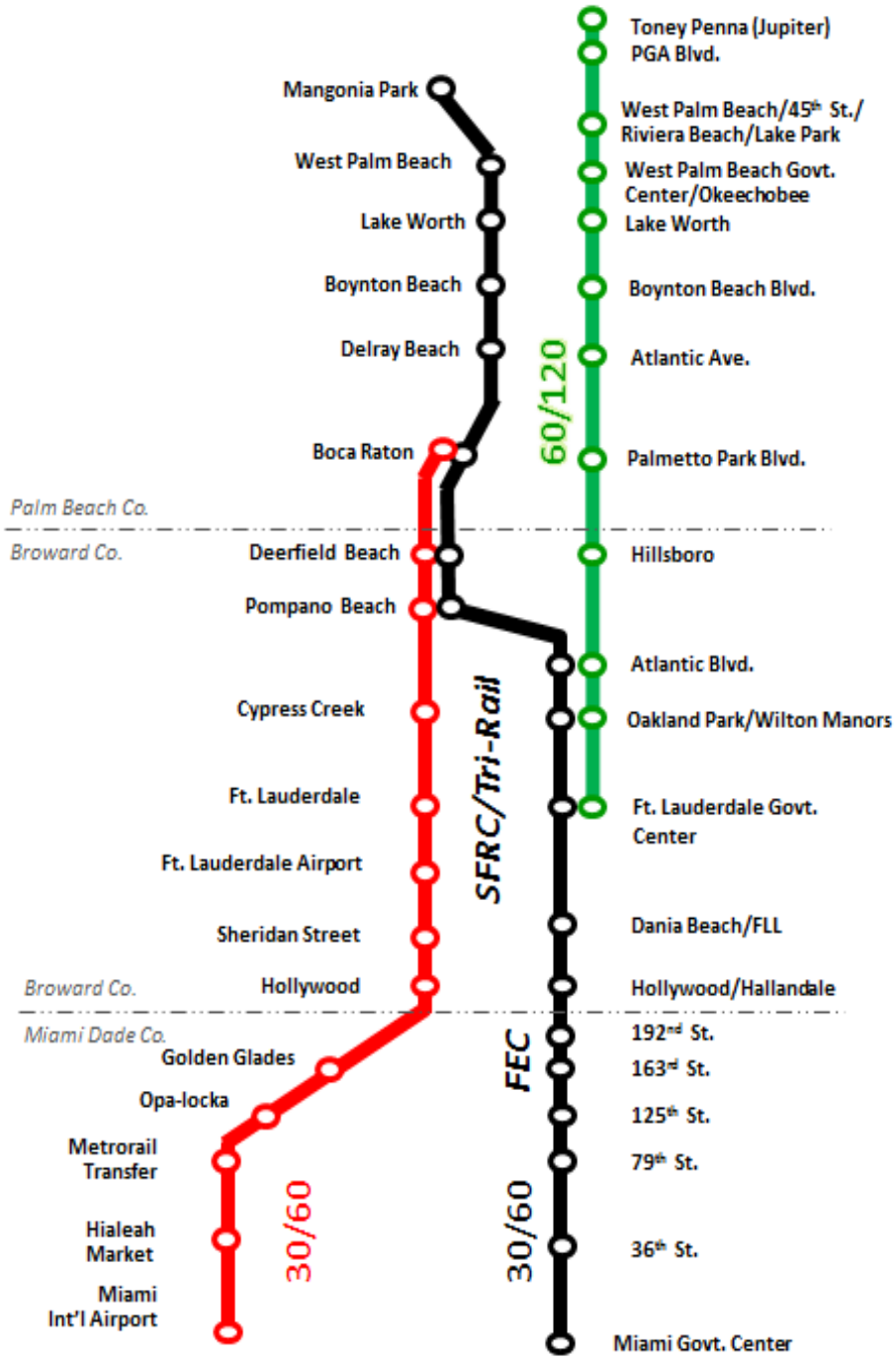
Source: AECOM (September 2013)

Exhibit A-2 – Build Option A Alternative



Source: AECOM (February 2014)

Exhibit A-3 –Build Option B Alternative



Source: Study Team Presentation (April 2014)

Attachment B

O&M Cost Worksheet

			Incremental Level of Service and O&M Costs (In Addition to No-Build)			
			Build Option A		Build Option B	
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Train Operations Contract Costs						
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Ops Train Ops Contractor Mgr	# of staff	$ 93,549.30	1	$ 93,549	1	$ 93,549
TOC - Profit	% of TOC	6.65%		$ 404,508		$ 457,624
Operations Personnel						
Operations Project Manager - Operations	# of staff	$ 93,933.14	2	$ 187,866	2	$ 187,866
Operations Project Manager - Mechanical	# of staff	$ 93,933.14	1	$ 93,933	1	$ 93,933
Station Agents - FT	# of staff	$ 51,694.20	4	$ 206,777	4	$ 206,777
Operations - Misc Expenses	% Growth in Ops Personnel	na		$ 35,985		$ 35,985
Train Fuel	Total Train Miles	$ 8.44	1,060,929	$ 8,951,588	1,142,344	$ 9,638,528
Station Maintenance and Utilities	Stations	$ 151,035.01	20	$ 3,020,700	20	$ 3,020,700
Maintenance of Equipment	Total Vehicle Miles	$ 1.8338	5,665,492	$ 10,389,379	6,051,025	$ 11,096,369
Maintenance of Equipment	Vehicles (spares incl.)	$ 74,114.87	49	$ 3,631,629	58	$ 4,298,663
Finance and IT						
Fare Collection						
AFC Technician	# of staff	$ 57,728.33	2	$ 115,457	2	$ 115,457
Sr. AFC Technician	# of staff	$ 81,864.87	1	$ 81,865	1	$ 81,865
Finance - Misc Expenses	% Growth in Finance Personne	na		$ 64,759		$ 64,759
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Marketing Contract	Stations	$ 12,431.75	20	$ 248,635	20	$ 248,635
Marketing Customer Service Reps-PT	# of staff	$ 27,139.13	2	$ 54,278	2	$ 54,278
Legal						
Legal Fees	Annual Boardings	$ 0.0240	2,714,000	$ 65,129	2,655,000	$ 63,713
Legal Fees	Total Train Miles	$ 0.0851	1,060,929	$ 90,334	1,142,344	$ 97,267
TOTAL				**$ 34,663,128**		**$ 37,563,483**