SOUTHWEST transitway

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Southwest LRT

Technical Memorandum No. 7A

CAPITAL COST EVALUATION

DRAFT

PRELIMINARY
FOR REVIEW ONLY

September 9, 2009

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1.0 INTRODUCTION

The purpose of this technical memorandum is to quantify the capital and operating costs of the Southwest LRT Project. As noted by the Federal Transit Administration (FTA), both capital and operating costs are an important part of New Starts Projects because they are both inputs required to calculate cost-effectiveness.

This evaluation is based upon the advanced conceptual engineering plans dated March 2009. The advance conceptual engineering plans used the AA conceptual engineering plans and applied the Central Corridor LRT Design Criteria dated July 2008. Project Memorandum #1: Definition of Alternatives contains detailed descriptions of the LRT alternatives under consideration.

A comparison to the AA cost estimate is included as part of this analysis.

Table 1-1 compares the total alignment costs of each alternative against those reported in the AA cost estimate. Tables 2-12–2-15 later in this memo compare the standard cost category (SCC) costs between the current estimate and the AA estimate for each alternative.

Table 1-1 Summary of Total Capital Cost Estimates

Alternative	Alternatives Analysis (thousands)		LPA Analysis (thousands)	
	Base Year Total (2006)	YOE (2015)	Base Year Total (2008)	YOE (2015)
LRT-1A	$680,143	$864,438	$749,417	$915,416
LRT-3A	$910,611	$1,157,355	$989,658	$1,209,510
LRT-3C	$1,106,326	$1,406,103	$1,408,732	$1,720,977
LRT-3C Sub	-	-	$1,473,062	$1,799,104

2.0 CAPITAL COSTS

2.1 Capital Cost Assumptions

Capital costs are defined as the one-time costs to construct the transitway, including the guideway (ballast, track and catenary system), stations, structures, right-of-way (ROW), engineering/design, administrative costs and contingencies. Capital cost estimates have been prepared using the FTA's format and procedures, as required for all FTA New Starts applications. The FTA methodology includes the use of SCC and groupings for organization of the data, and detailed spreadsheets for development of forecast year estimates and annualized capital costs. Appendix A includes the list of the FTA SCC categories and definitions and unit prices for the SCC Workbooks.

At this stage of project development, assumptions are made to establish costs for project elements that have not been designed or quantified in engineering plans. The Southwest LRT capital cost estimates are based upon the following assumptions:

Base Year – Year 2008 was used as the base year for definition of the unit prices and preparation of the capital cost estimates. The Southwest Transitway Alternatives Analysis (AA) used 2006 as the base year.

Forecast Year – Year 2015 was used as the forecast year for projecting base year capital costs estimates to the assumed midpoint of expenditure.

Escalation Factor – An annual escalation factor of 3.06% compounded was used to inflate capital cost estimates from the base year of 2008 to the forecast year of 2015. This escalation rate is consistent with the rate currently used by the Central Corridor LRT and is an average of the seven years presented in Table 1-2. The Southwest Transitway AA used a 2.7% escalation rate which was consistent with the rate being used by the Central Corridor LRT in 2006.

Table 1-2 Inflation Rates

Year	Escalation Factor
2009	1.5%
2010	2.92%
2011	3.45%
2012	3.5%
2013	3.5%
2014	3.5%
2015	3.5%

Annualization Factors – Annualization factors are used to convert base year capital cost estimates into annualized capital costs, which are used in calculation of cost effectiveness measures. The FTA-required Annualization factors (based upon a 7% internal rate of return) were used for these estimates.

Contingency – Contingencies are included in the capital costs in two categories, allocated and unallocated. Allocated contingencies vary from 25% to 35% and are applied to categories 10 through 50 in the SCC workbook. Right-of-way and professional services already include contingency in their methodology and do not have a separate allocated contingency in the workbook. An allocated contingency of 10% is applied to vehicles. An unallocated contingency of 10% is applied to the total project cost which includes line 80 for professional services. The Central Corridor LRT currently uses a 30% unallocated contingency. The Southwest Transitway AA used a 30% allocated contingency for items 10 through 50 in the SCC workbook, a 100% allocated contingency for line 60 right-of-way, and a 5% allocated contingency for line 70

vehicles. In addition, the Southwest Transitway AA used a 20% unallocated contingency for the total project costs inclusive of professional services.

2.2 Unit Prices

Construction costs are based on quantity measurements from the conceptual engineering plans. Unit costs for items are derived from the Central Corridor LRT cost estimates where appropriate and supplemented by the AA cost estimate (escalated to 2008 dollars).

Guideway (FTA SCC 10) – This category includes all of the construction costs associated with an LRT guideway and track installation. Guideway and structure prices are based on recent LRT cost estimates, including Central Corridor LRT (CC). Table 2-1 compares unit costs developed for this estimate with those developed for the AA cost estimate in 2006. The primary differences are attributed to increases in material prices above normal escalation rates, the use of CC LRT unit costs, and quantification of earthwork based on the vertical profile now available from the conceptual engineering plans.

Table 2-1 Base Year Unit Price Comparison - Guideway

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Guideway: At-Grade semi-exclusive - ballasted	TF	$225	TF	$100	AA utilized this item for all ballasted trackwork, including segments on retained fill. Current estimate utilizes this item for at-grade ballasted track segments only.
Guideway: At-Grade in mixed traffic - embedded	TF	$225	TF	$325	Current estimate based on CC unit cost.
Guideway: Aerial Structure – direct fixation	TF	$6,000	TF	$6,409	Escalated from AA.
Guideway: built up fill	Included in Guideway: at-grade semi-exclusive - ballasted		TF	$250	Unit cost for trackway on embankment. Includes material for fill and sloped sides.
Guideway: Underground cut & cover	TF	$12,000	TF	$12,817	Escalated from AA.
Guideway: retained cut & fill	Not included		TF	$1,550	Unit cost not included in AA or CC estimates. Includes trackway, excavation (if cut) or new material (if fill), and retaining walls.

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Track: Direct Fixation	TF	$350	TF	$374	Escalated from AA.
Track: Embedded	TF	$350	TF	$374	Escalated from AA.
Track: Ballasted	TF	$160	TF	$171	Escalated from AA.
Track: Special	EA	$195,000	EA	$220,000	CC estimate for all special trackwork.

Stations (FTA SCC 20) – Included in this category are costs for station elements which include platforms, canopies, parking structures, and elevators/escalators. The station costs vary based upon their design as at-grade, aerial or underground.

Table 2-2 Base Year Unit Price Comparison - Stations

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
At-Grade Stations	LS	$1,100,000	EA	$3,500,000	Unit cost from CC cost estimate.
Aerial Stations	Not included		EA	$7,000,000	Unit cost not included in CC cost estimate. Unit cost is averaged from other systems around the country.
Underground Stations	N/A		EA	$17,500,000	Unit cost from CC cost estimate.
Auto Parking Structure (per space)	EA	$13,000	EA	$13,885	Unit cost escalated from AA.
Elevators	LS	$890,000	EA	$950,607	Unit cost escalated from AA.

Support Facilities (FTA SCC 30) – In order to determine the size of the vehicle maintenance and storage facility, a calculation based upon the number of LRVs including spares and the cost of land was generated. An estimate of $750,000 per LRV is used which is combined with an

estimate of land acquisition of ½ acre per LRV at a price of $785,000 per acre. The costs for a heavy maintenance facility and a new operations and command center are not included because it is assumed that the Southwest LRT line will use the existing facilities for these functions.

Table 2-3 below lists the support facility unit costs for the current estimate with a comparison to the AA unit costs.

Table 2-3 Base Year Unit Price Comparison – Support Facilities

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Light Maintenance Facility	LS	$25,996,960	EA	$750,000 per LRV in initial operating fleet	Formula used to compute MSF size is based on CC estimate
Yard and yard track	LS	$12,998,480	EA	$350,000 per LRV in ultimate operating fleet	Formula used to compute yard track is based on CC estimate

Sitework (FTA SCC 40) – This category includes roadway reconstruction, roadway closures, roadway crossings of LRT tracks, and modifications to traffic signals. Roadway reconstruction includes demolition of existing pavement and construction of new pavement, curb, gutter, and sidewalk. The cost of roadway modifications is based on the number and scale. Areas of roadway reconstruction were measured from the conceptual engineering plans and include roadway widening for LRT, reconstruction of roadways for new bridges or grade crossings, and intersection modifications required to accommodate LRT tracks and stations.

Structural items include a new bridge or modifications to an existing bridge. The cost of structures is based upon the type, number, size, and complexity. Each structure is identified on the conceptual engineering plans.

Area way chambers were investigated for each alternative and documented in a technical memorandum titled “Southwest LRT Corridor – Area Way Investigation, March 4, 2009”. The investigation was within the City of Minneapolis and revealed that Segment 1, Segment 3, and Segment A did not have any area way chambers along the alignments. LRT C in the Nicollet Avenue corridor is adjacent to 18 properties with area way chambers. Modifications to these area way chambers are included in the estimate and include reconstruction or bracing of area way chamber walls, ceilings, and floors. Refer to Appendix B for the Area way Investigation memo.

Major earthwork and retaining wall items are included in this category. The amount of embankment, deep excavation, or retaining wall required is measured for each alternative. Retaining walls are proposed in locations where sloped embankments cannot fit within the existing Hennepin County Regional Railroad Authority (HCRRA) ROW; or where slopes would

impact existing buildings or natural resources. The locations of retaining walls are indicated on the conceptual engineering plans.

Existing utilities were investigated for each LRT alternative. The utility investigation was divided into two categories: public utilities and private utilities. The public utility investigation included water, sewer, and storm drain facilities. The private utility investigation included electric, gas, fiber optic, and specialty facilities such as transformers and utility tunnels. The relocation of private utility facilities was assumed to be the responsibility of the owner. Public utilities relocation was assumed only in locations of road reconstruction. Low site utilities were assumed for less urban locations and high site utilities were assumed in locations that were more urban. Maps of each alternative were prepared showing the locations of utilities within 100' of the proposed LRT guideway and all major utility crossings. The utility impact cost per mile of each alternative was determined by a high or low allowance of utility impacts within the corridor based on the maps. Appendix C at the end of this document includes the detailed utility inventory.

The number of parking spaces at each park-and-ride have been carried forward from the AA and the costs for surface spaces are included under this SCC category (Tables 2-6 through 2-9 at the end of this document).

Table 2-4 contains the unit costs developed for the current estimate with a comparison to the AA unit costs.

Table 2-4 Base Year Unit Price Comparison – Sitework and Special Conditions

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Demolition	EA	$500,000	EA	$550,000	Meets allowance for station site work preparation. Unit cost escalated from AA.
Site Utilities – high allowance	RF	$670	RF	$714	Unit cost escalated from AA.
Site Utilities – low allowance	RF	$200	RF	$315	Unit cost averaged from low and medium prices and escalated from AA.
Hazardous Materials– high allowance	RF	$20			Included within contingencies for trackwork items in Category 10.
Hazardous Materials – low allowance	RF	$5			Included within contingencies for trackwork items in Category 10.
Environmental – high allowance	RF	$20			Included within contingencies for trackwork items in Category 10.
Environmental – medium allowance	RF	$10			Included within contingencies for trackwork items in Category 10.

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Environmental – low allowance	RF	$5			Included within contingencies for trackwork items in Category 10.
Walks, landscape					
Trail	LF	$85	LF	$91	Unit cost escalated from AA.
Pedestrian Bridge	LF	$1200	LF	$2,600	Unit cost from CC cost estimate.
Landscape	LF	$70	LF	$75	Unit cost escalated from AA.
Fence	LF	$30	LF	$32	Unit cost escalated from AA.
Streetscape	Not included		RF	$257	Unit price from CC cost estimate
Auto Road					
Road Demo	SF	$5	SF	$5	Unit cost escalated from AA.
Road Construction	SF	$15	SF	$16	Unit cost escalated from AA.
Sidewalk	SF	$10	SF	$8	Unit cost from CC cost estimate.
Road Landscaping	RF	$70	LF	$64	Unit cost from CC cost estimate.
Lighting	RF	$15	LF	$130	AA and CC cost estimates are based on track length. Current estimate is based on roadway reconstruction.
Roadway Traffic Control Allowances	LF	$100	LF	$0	Included in temporary facilities.
Cut and Cover Tunnel Traffic Control Allowances	RF	$100			Included in contingency.
Track Traffic Control Allowances	Not included				Included in contingency.
Roadway bridge demolition	SF	$50	SF	$53	Unit cost escalated from AA estimate.
Roadway Bridge Construction	SF	$100	SF	$107	Unit cost escalated from AA estimate.
Surface Park and ride stall	EA	$3,000	EA	$3,204	Unit cost escalated from AA estimate.
Temporary Facilities					

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Roadway Traffic Allowance 1% of Construction Cost	Not included		LS	1% of construction cost	Items not included in AA but 0.4% is used in CC.

Systems (FTA SCC 50) – This category includes train control signals, traction power substations, communication systems, ductbanks, fare collection, traffic signals, and grade crossing protection signals. Traction power substations are assumed for each alternative based on one traction power substation to be located every mile. Each site would be within 300 feet of the guideway and the average site will be 20 feet by 60 feet or 1200 square feet. In addition, no right-of-way was assumed to be needed in segments 1, 4, or A. For segments 3 and C where right-of-way is assumed the land costs equal to $40 per square foot in Minneapolis and $20 per square foot outside of Minneapolis.

Table 2-5 below contains the unit costs developed for the current estimate with a comparison to the AA unit costs. The AA cost estimate included allowances for systems elements which were changed to actual item costs in the current estimate.

Table 2-5 Base Year Unit Price Comparison - Systems

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Train Control	LF	$20	LF	$552	Unit cost from CC cost estimate.
Traffic Signals & Crossing Protection					
Roadway Grade Crossing Protection - gates	EA	$250,000	EA	$267,000	Unit cost escalated from AA estimate. Not included in CC cost estimate.
Minor traffic signals	EA	$110,000	EA	$100,000	Unit cost from CC cost estimate.
Major traffic signals	EA	$225,000	EA	$200,000	Unit cost from CC cost estimate.
Traction Power Supply	Not included		MI	$844,800	Unit cost from CC cost estimate.
Traction Power Distribution (Overhead Catenary System)	Not included		MI	$915,000	Unit cost from CC cost estimate.

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Communications	RF	$155	RF	$261	Unit cost from CC cost estimate.
Fare Collection	EA	$85,000	EA	$75,000	Unit cost from CC cost estimate.
Central Control	RF	$25	RF	$27	Unit cost escalated from AA estimate.
Substation Enclosure Allowance	RF	$30			Included in OCS cost above.
Substation Equipment Allowance	RF	$160			Included in OCS cost above
Ductbank Allowance	RF	$100			Included in OCS cost above.
Corrosion Control Allowance	RF	$15			Included in OCS cost above.
OCS Foundation Allowance	RF	$20			Included in OCS cost above.
OCS Simple Catenary Allowance	RF	$125			Included in OCS cost above.
OCS Single Contact Wire Allowance	RF	$140			Included in OCS cost above.

Light Rail Vehicles (FTA SCC 70) - The number of light rail vehicles (LRV) required was determined by service frequencies with the assumption of a two-car consist and 15% spare ratio per industry standards. Unit costs of LRVs are derived from the Central Corridor New Starts submittal (Sept 2008) SCC workbook and are estimated at $3,500,000 per LRV with an additional 5.4% of LRV costs for spare parts. Non-revenue vehicles used in support of the system are calculated at 2.2% of LRV costs, based on the Central Corridor SCC workbook.

Table 2-10 below contains the unit costs developed for the current estimate with a comparison to the AA unit costs.

Table 2-10 Base Year Unit Price Comparison – Vehicles

Description	Alternatives Analysis		LPA Analysis		Comments
	Unit	Base Year Unit Cost (2006)	Unit	Base Year Unit Cost (2008)	
Light rail vehicles	EA	$3,000,000	EA	$3,500,000	Unit cost based on CC cost estimate.
Standard Bus	EA	$352,042	EA	$384,439	Unit cost escalated from AA estimate.
Non revenue vehicles	RF	$30	LS	$2,156,000	Unit cost based on 2.2% of LRVs, from CC cost estimate methodology.
Light rail vehicle spare parts	EA	$500,000	LS	$5,292,000	Unit cost based on 5.4% of LRVs, from CC cost estimate methodology.
Bus spares	EA	$100,000	EA	$109,203	Unit cost escalated from AA estimate.

Right of Way, Land, Existing Improvements (FTA SCC 60) - To estimate the Right of Way (ROW) acquisitions and displacements required for the Southwest LRT the conceptual engineering drawings were used to determine land requirements. Next the extent of acquisition, full or partial, was determined based upon the degree of impact to the property. Once the degree of acquisition was determined, estimated costs based upon the assessed value and various multipliers ranging from 150% to 175% were used. In addition, relocation costs were added for those properties that would be eligible. Refer to the Right of Way (ROW) Technical Memorandum for detailed analysis and results. Refer to Technical Memorandum No. 8 Other Factors – Technical Memorandum 8A Right of Way (ROW) for the ROW Acquisition and Relocation Summary Tables.

Freight Rail Modifications - Modifications to freight rail operations were not separately quantified in the LRT alternative cost estimates. The relocation of TC&W near Louisiana Avenue is not considered a cost of any LRT alternative in this project. Minor shoofly alignments associated with bridge construction are included in the cost of the bridge in this estimate.

Professional Services (FTA SCC 80) - The percentage of construction for professional services is shown in the table below and is the same as those used in the Central Corridor LRT September 2008 New Starts submittal.

Table 2-11 Professional Services

Professional Service	Percentage
Preliminary Engineering	10%
Final Design	8%
Project Management	11%

Construction Management	3%
Permits	0.1%
Survey	0.3%
Startup	0.3%
TOTAL	32.7%

Tables 2-12- 2-15 below compare each SCC cost between the AA and current estimate. There is one table per alternative. The costs are reported in current year dollars and year of expenditure (YOE).

Table 2-12 LRT 1A Category Comparison Summary

SCC Category	AA Base Year Total (thousands)	AA YOE (thousands)	CE Base Year Total (thousands)	CE YOE (thousands)	Comments
10 Guideway & Track Elements	$81,991	$104,208	$109,253	$135,485	Cost of built-up track embankment included in CE estimate
20 Stations, Stops, Terminals, Intermodal	$35,601	$45,247	$82,896	$102,799	Station unit cost difference between AA and CE
30 Support Facilities: Yards, Shops, Admin. Bldgs	$50,694	$64,430	$30,063	$37,281	Cost of VMSF based on number of LRV vehicles
40 Sitework & Special Conditions	$86,417	$109,833	$82,015	$101, 707	Lengths of roadway and intersection improvements measured in CE estimate
50 Systems	$100,718	$128,009	$121,394	$150,541	
60 ROW, Land Existing Improvements	$33,982	$43,190	$37,780	$46,851	ROW quantified in CE estimate instead of allowance per route foot
70 Vehicles	$86,163	$109,510	$78,709	$97,608	LRV unit cost difference between AA and CE estimate
80 Professional Services	$91,220	$115,938	$139,178	$158,657	Based on % of construction cost
Unallocated Contingency	$113,357	$144,073	$68,129	$84,487	CE estimate using 10% of total
Total	$680,143	$864,438	$749,417	$915,416	

Table 2-13 LRT 3A Category Comparison Summary

SCC Category	AA Base Year Total (thousands)	AA YOE (thousands)	CE Base Year Total (thousands)	CE YOE (thousands)	Comments
10 Guideway & Track Elements	$130,033	$165,267	$146,730	$181,960	Within approx 10% of AA estimate
20 Stations, Stops, Terminals, Intermodal	$52,735	$67,024	$110,396	$136,902	Station unit cost difference between AA and CE
30 Support Facilities: Yards, Shops, Admin. Bldgs	$50,694	$64,430	$35,000	$43,404	Cost of VMSF based on number of LRV vehicles
40 Sitework & Special Conditions	$112,949	$143,554	$100,269	$124,343	Lengths of roadway and intersection improvements measured in CE estimate
50 Systems	$121,242	$154,094	$150,185	$186,245	Systems unit cost differences between AA and CE
60 ROW, Land Existing Improvements	$62,492	$79,425	$92,262	$114,948	ROW quantified in CE estimate instead of allowance per route foot
70 Vehicles	$106,341	$135,156	$86,995	$107,882	LRV unit cost difference between AA and CE estimate
80 Professional Services	$122,357	$155,512	$177,423	$202,255	Based on % of construction cost
Unallocated Contingency	$151,768	$192,893	$89,969	$111,571	CE estimate using 10% of total
Total	$910,611	$1,157,355	$989,658	$1,209,510	

Table 2-14 LRT 3C Category Comparison Summary

SCC Category	AA Base Year Total (thousands)	AA YOE (thousands)	CE Base Year Total (thousands)	CE YOE (thousands)	Comments
10 Guideway & Track Elements	$210,455	$267,482	$296,131	$367,233	Increased cut-and-cover guideway quantity in CE
20 Stations, Stops, Terminals, Intermodal	$60,808	$77,284	$167,244	$207,399	Station unit cost difference between AA and CE
30 Support Facilities: Yards, Shops, Admin. Bldgs	$50,694	$64,430	$46,500	$57,665	Cost of VMSF based on number of LRV vehicles
40 Sitework & Special Conditions	$142,905	$181,627	$126,982	$157,471	Lengths of roadway and intersection improvements measured in CE estimate
50 Systems	$134,838	$171,375	$156,957	$194,643	Systems unit cost differences between AA and CE
60 ROW, Land Existing Improvements	$49,470	$62,875	$102,997	$127,727	ROW quantified in CE estimate instead of allowance per route foot
70 Vehicles	$121,184	$154,021	$124,278	$154,118	LRV unit cost difference between AA and CE estimate
80 Professional Services	$151,584	$192,658	$259,577	$295,907	Based on % of construction cost
Unallocated Contingency	$184,388	$234,351	$128,067	$158,816	CE estimate using 10% of total
Total	$1,106,326	$1,406,103	$1,408,732	$1,720,977	

Table 2-15 LRT 3C Sub Alternative Category Comparison Summary

SCC Category	AA Base Year Total * (thousands)	AA YOE * (thousands)	CE Base Year Total (thousands)	CE YOE (thousands)	Comments
10 Guideway & Track Elements	$210,455	$267,482	$310,279	$384,778	Increased cut-and-cover guideway quantity in CE
20 Stations, Stops, Terminals, Intermodal	$60,808	$77,284	$171,850	$213,111	Station unit cost difference between AA and CE
30 Support Facilities: Yards, Shops, Admin. Bldgs	$50,694	$64,430	$42,875	$53,169	Cost of MSF based on number of LRV vehicles
40 Sitework & Special Conditions	$142,905	$181,627	$144,612	$179,334	Lengths of roadway and intersection improvements measured in CE estimate
50 Systems	$134,838	$171,375	$174,512	$216,413	Systems unit cost differences between AA and CE
60 ROW, Land Existing Improvements	$49,470	$62,875	$102,997	$127,727	ROW quantified in CE estimate instead of allowance per route foot
70 Vehicles	$121,184	$154,021	$115,993	$143,843	LRV unit cost difference between AA and CE estimate
80 Professional Services	$151,584	$192,658	$276,030	$314,662	Based on % of construction cost
Unallocated Contingency	$184,388	$234,351	$133,915	$166,068	CE estimate using 10% of total
Total	$1,106,326	$1,406,103	$1,473,062	$1,799,104	

** Uses LRT 3C for AA Base Year Total and AA YOE.*

Table 2-6 Park-and-Rides

LRT 1A				
Station	Type	Station Vertical Circulation	Park and Ride (# of spaces)	
			Surface	Structured
TH 5	At-Grade	N/A	400	785
TH 62	At-Grade	N/A	200	0
Rowland Road	At-Grade	N/A	50	0
Shady Oak Road	At-Grade	N/A	230	0
Hopkins	At-Grade	N/A	90	0
Blake Road	At-Grade	N/A	305	0
Louisiana Avenue	Elevated	Yes	40	0
Wooddale Avenue	At-Grade	N/A	85	0
Beltline Boulevard	At-Grade	N/A	25	0
West Lake Street	At-Grade	N/A	150	0
21st Street	At-Grade	N/A	30	0
Penn Avenue	At-Grade	Yes	70	0
Van White Boulevard	At-Grade	N/A	0	0
Royalston Avenue	At-Grade	N/A	0	0

Table 2-7 Park-and-Rides

LRT 3A				
Station	Type	Station Vertical Circulation	Park and Ride (# of spaces)	
			Surface	Structured
Mitchell Road	At-Grade	N/A	400	420
Southwest Metro Station	At-Grade	N/A	0	370
Eden Prairie Town Center	At-Grade	N/A	0	655
Golden Triangle	At-Grade	N/A	70	0
City West	At-Grade	N/A	0	100
Opus	At-Grade	N/A	80	0
Shady Oak Road	At-Grade	N/A	255	0
Hopkins	At-Grade	N/A	90	0
Blake Road	At-Grade	N/A	330	0
Louisiana Avenue	Elevated	Yes	40	0
Wooddale Avenue	At-Grade	N/A	90	0
Beltline Boulevard	At-Grade	N/A	25	0
West Lake Street	At-Grade	N/A	145	0
21st Street	At-Grade	N/A	30	0
Penn Avenue	At-Grade	Yes	70	0
Van White Boulevard	At-Grade	N/A	0	0
Royalston Avenue	At-Grade	N/A	0	0

Table 2-8 Park-and-Rides

LRT 3C (Nicollet Mall)				
Station	Type	Station Vertical Circulation	Park and Ride (# of spaces)	
			Surface	Structured
Mitchell Road	At-Grade	N/A	400	395
Southwest Metro Station	At-Grade	N/A	0	360
Eden Prairie Town Center	At-Grade	N/A	0	640
Golden Triangle	At-Grade	N/A	70	0
City West	At-Grade	N/A	0	100
Opus	At-Grade	N/A	80	0
Shady Oak Road	At-Grade	N/A	250	0
Hopkins	At-Grade	N/A	90	0
Blake Road	At-Grade	N/A	320	0
Louisiana Avenue	Elevated	Yes	40	0
Wooddale Avenue	At-Grade	N/A	90	0
Beltline Boulevard	At-Grade	N/A	25	0
West Lake Street	At-Grade	N/A	145	0
Uptown	Open Cut	Yes	0	0
Lyndale Avenue	Open Cut	Yes	0	0
28th Street	Subway Station	Yes	0	0
Franklin Avenue	Subway Station	Yes	0	0
12th Street	At-Grade	N/A	0	0
8th Street	At-Grade	N/A	0	0
4th Street	At-Grade	N/A	0	0

Table 2-9 Park-and-Rides

LRT 3C (11th/12th Sub-alternative)				
Station	Type	Station Vertical Circulation	Park and Ride (# of spaces)	
			Surface	Structured
Mitchell Road	At-Grade	N/A	400	395
Southwest Metro Station	At-Grade	N/A	0	360
Eden Prairie Town Center	At-Grade	N/A	0	640
Golden Triangle	At-Grade	N/A	70	0
City West	At-Grade	N/A	0	100
Opus	At-Grade	N/A	80	0
Shady Oak Road	At-Grade	N/A	250	0
Hopkins	At-Grade	N/A	90	0
Blake Road	At-Grade	N/A	320	0
Louisiana Avenue	Elevated	Yes	40	0
Wooddale Avenue	At-Grade	N/A	90	0
Beltline Boulevard	At-Grade	N/A	25	0
West Lake Street	At-Grade	N/A	145	0
Uptown	Open Cut	Yes	0	0
Lyndale Avenue	Open Cut	Yes	0	0
28th Street	Subway Station	Yes	0	0
Franklin Avenue	Subway Station	Yes	0	0
12th Street	At-Grade	N/A	0	0
Hennepin (at 11th Street)	At-Grade	N/A	0	0
Hennepin (at 12th Street)	At-Grade	N/A	0	0
Royalston Avenue	At-Grade	N/A	0	0