



RUSH LINE CORRIDOR PRE-PROJECT DEVELOPMENT STUDY  
LOCALLY PREFERRED ALTERNATIVE SELECTION REPORT

APPENDIX E: EVALUATION MATRIX

AUGUST 2017

DRAFT

PREPARED BY:

**AECOM**

Downtown Routing Options		Length (miles)	# of Stations	Average Weekday Ridership (Year 2040)	Travel Time (minutes)	Year 2021 Construction Cost (\$Millions)	O&M Costs (\$Millions in 2015 dollars)	Welland/Water Resources (acres within 400-foot buffer)	Noise/Vibration (# of Sensitive Receptors within mode specific buffers)	Parkland (acres within 400-foot buffer)	Cultural/Historic (# of sites within 400-foot buffer)	Traffic Safety (# of intersections with higher than expected crash rates)	Equitable Access (# of intersections with poverty level within 1/4 mi of stations)	Equitable Access (# of households below poverty level within 1/4 mi of stations)	Equitable Access (# of Population of Color Households within 1/4 mi of stations)	Bike/Pedestrian Access (# of Zero-Car walking/biking distance to stations)	Bike/Pedestrian Access (Population within comfortable routes to stations)	Roadway Access (# of access: cross-streets or driveways)	Traffic Operations (% of Alt Currently Congested)	Transit Connectivity (weighted # of routes within 1/4 mi of station)	Parking (# of Spaces)	Right of Way (% of corridor in constrained ROW areas)	Right of Way (# of parcels in constrained ROW areas)	Year 2040 Population Density (average people per sq. mi. around stations)	Year 2040 Employment (Employees within 1/4 mile of stations)	Development Potential (% of non-constrained land zoned TOD)	Development Potential Rank Based on Mode (3 = highest potential)		
																												PROJECT GOAL CATEGORIES	
1	DBRT via Phalen, Pennsylvania and Jackson	2.3	8	2,600-2,700	21	\$300	\$3.4M	1	25	3	6	3	7.6	13.7	2.5	65	13	30	0%	75	30	60%	20-40	10	69	63%	2		
2	DBRT or LRT via Phalen, Olive, Lafayette and East 7 <sup>th</sup>	2.1	6	2,600-2,700 <sup>4</sup>	16	\$270 (BRT)	\$2.6M (BRT)	1	5	3	4	3	6.3	11.7	1.8	47	11	40	0%	66	50	60%	20-30	10	55	56%	2		
				3,000-3,100 <sup>4</sup>		\$390 (LRT)	\$7.5M (LRT)														3								
3	DBRT or LRT via Phalen and East 7 <sup>th</sup> in Mixed Traffic	1.9	6	1,900	16	\$245 (BRT)	\$2.5M (BRT)	0	15	2 <sup>1</sup>	3 <sup>1</sup>	3	6	12.2	1.6	47	11	50 <sup>1</sup>	40%	86	70 <sup>1</sup>	100% <sup>1</sup>	50-60 <sup>1</sup>	11	50	59%	2		
				3,000-3,100		\$325 (LRT)	\$7.2M (LRT)														3								
4	ABRT via Arcade and East 7th Street	1.6	5	2,300-2,400	20	\$20	\$2.6M	0	5	2 <sup>1</sup>	3 <sup>1</sup>	3	4.5	8.4	1.4	46	9	40 <sup>1</sup>	90%	61	20	0%	0	11	49	62%	1		
5	DMU via Union Pacific RR	2.5	6	3,000-3,100	15	\$540	\$10.8M	1	6	1	3	0	5.9	11	1.6	47	11	0	0%	67	0	0%	0	10	52	57%	2		
6	DBRT or LRT or DMU via Swede Hollow	2.1	4	1,900 <sup>4</sup>	12	\$310 (BRT)	\$2.0M (BRT)	3	15	13	3	0	4.9	9	1.4	40	1	0	0%	59	0	0%	0	0%	0	11	49	62%	2
				3,100 <sup>4</sup>		\$370 (LRT)	\$5.6M (LRT)														3								
				3,100 <sup>4</sup>		\$350 (DMU)	\$7.8M (DMU)														3								
7	DBRT via E.7th St, Mounds, Kellogg and Gold Line	1.5	4	1,900 <sup>4</sup>	13	\$140	\$2.0M	0	20	1	1	4	5.7	11.6	1.5	44	11	50	50%	53	70	85%	50-60	11	47	66%	2		
8	LRT via Phalen, Olive, University, 12th, and Green Line <sup>3</sup>	2.0	8	3,800-4,700	19	\$240	\$8.4M	1	5	3	3	2	7.6	13	3	51	11	40	0%	129	50	55%	15-25	11	83	70%	3		

1. Arterial BRT and mixed traffic options will operate on existing roadways and will likely not impact resources outside of the roadway footprint.  
2. Cost effectiveness only calculated based on entire corridor ridership and cost. Not appropriate to apply to only parts of the alignment. Will be summarized when End-to-End Alternatives are being considered.  
3. Includes two Green Line stations (10th Street, Central)  
4. Representative ridership based on limited ridership downtown model runs

Higher Benefit	>3,500	<15 minutes	<\$150M	<\$3M	0 acres	<10 receptors	<2 acres	1 site	No Locations	>7k	>12k	>2k	>=50k	>12k	<5 access	0%	>80	0 spaces	0%	0 to 10 parcels	>10k	>65k	>65%	3 rank
Medium Benefit	2,000-3,500	15-20 minutes	\$150M-\$300M	\$3M-\$7M	1 to 2	10 to 19 receptors	2 to 5 acres	2 to 3 sites	1 to 3 locations	5k to 7k	9k to 12k	1k to 2k	40 k to 50k	5-11K	5 to 40 access	0% to 25%	60 to 80	1 to 30 spaces	1% to 60%	10 to 40 parcels	2.5k to 10k	55k to 65k	60% to 65%	2 rank
Lower Benefit	<2,000	>20 minutes	>\$300M	>\$7M	>2 acres	>=20 receptors	>5 acres	4 sites	4 locations	<5k	<9k	<1k	<=40k	<5k	<40 access	>25%	<60	>30 spaces	>60%	>40 parcels	<2.5k	<55k	<60%	1 rank

End Point to End Point Summary		Length (miles)	# of Stations	Average Weekday Ridership (Year 2040)	% of New Transit Riders	% of Ridership Transit Dependent Users	Travel Time (minutes)	Year 2021 Construction Cost (\$Millions)	O&M Costs (\$Millions in 2015 dollars)	FTA Cost Effectiveness Calculation	FTA Cost Effectiveness Ranking 4	Wetland/Water Resources (acres within 400-foot buffer)	Noise/Vibrator (ft of Sensitive Receptors within mode specific buffers)	Parkland (acres within 400-foot buffer)	Cultural/Historic (ft of Sensitive Receptors within 400-foot buffer)	Traffic Safety (ft of intersections with higher than expected crash rates)	Equitable Access (ft of households with higher poverty level within 1/4 mi of stations)	Equitable Access (ft of Population of Color Households within 1/4 mi of stations)	Equitable Access (ft of Zero-Car households within 1/4 mi of stations)	Bike/Pedestrian Access (Population within walking distance to stations)	Bike/Pedestrian Comfort (Population within comfortable routes for walking/biking to stations)	Roadway Access (ft of access, cross-streets or driveways)	Traffic Operations (% of Access, cross-congested)	Transit Connectivity (weighted # of routes within 1/4 mi of station)	Parking (ft of Spaces)	Right of Way (% of corridor in constrained ROW areas)	Right of Way (# of parcels in constrained ROW area)	Year 2040 Population Density (average people per sq. mi. around stations)	Year 2040 Employment (average 1/4 mile of stations)	Development Potential (Employees within constrained land zoned TOD)	Development Potential (% of non-Mode 3 = highest potential)	Development Potential Rank Based on (avg. Development Points of Market Activity per Station)
PROJECT GOAL CATEGORIES		TRAVEL TIME/RIDERSHIP				COST				ENVIRONMENTAL				EQUITY				PED/BIKE CONNECTIVITY		ON-STREET PARKING/ACCESS, EXISTING TRANSIT SERVICE				RIGHT-OF-WAY		EMPLOYMENT/DEVELOPMENT POTENTIAL						
11	<b>1 Ded. BRT to Forest Lake (CityRail ROW)</b>	25.3	20	6000-6100	66%	18%	65	\$1,100	\$14.1M	\$21.99 to \$22.35	Low	30	425	27	9	3	11.8	23.9	4.1	158	77	90	0%	91	30	4%	20-40	7.5	7.5	49%	2	13.6
12	2 via Phalen, Olive, Lafayette and E 7 <sup>th</sup>	25.1	18	6000-6100	66%	18%	60	\$1,050	\$13.6M	\$21.13 to \$21.48	Low	30	405	27	7	3	9.8	21.2	2.8	140	75	100	0%	82	50	4%	20-30	5.5	5.5	45%	2	13.2
13	3 via Phalen and East 7 <sup>th</sup> in mixed traffic	24.9	18	6000-6100	66%	18%	60	\$1,050	\$13.5M	\$20.68 to \$21.02	Low	29	415	24	6	3	9.3	21.1	2.5	140	75	60	3%	102	20	0%	0	5.2	5.2	46%	2	14.1
3	<b>2A LRT to White Bear Lake (CityRail ROW)</b>	11.4	15	6400-9500	62%	19%	37	\$1,300	\$24.6M	\$30.86 to \$31.34	Low	13	355	19	6	3	9.6	21.1	2.7	123	52	65	0%	79	50	11%	20-30	6.7	6.7	46%	3	12.6
5	2 via Phalen, Olive, Lafayette and East 7 <sup>th</sup> 2	11.2	15	6400-9500	62%	19%	37	\$1,250	\$25.5M	\$29.6 to \$30.06	Low	12	365	16	4	3	9.2	21.0	2.5	123	52	25	7%	99	20	0%	0	6.3	6.3	48%	3	13.7
4	3 via Phalen and East 7 <sup>th</sup> in mixed traffic 2	11.3	17	6400-9500	62%	19%	42	\$1,200	\$22.9M	\$19.74 to \$29.31	Low	13	355	19	5	2	10.9	22.5	3.9	127	52	65	0%	142	50	10%	15-25	9.0	9.0	54%	3	18.5
1	<b>2B DMU to White Bear Lake (CityRail ROW)</b>	10.9	14	6400-6500	62%	19%	32	\$1,500	\$27.8M	\$32.58 to \$33.09	Low	13	356	17	5	0	9.2	20.3	2.5	123	52	25	0%	80	0	0%	0	6.4	6.4	41%	2	2
16	<b>2C Ded. BRT to White Bear (CityRail ROW)</b>	11.6	17	5300-5400	65%	20%	42	\$650	\$10.0M	\$16.35 to \$16.66	Low	13	375	19	8	3	11.6	23.8	4.0	141	54	55	0%	88	30	7%	20-40	9.0	9.0	51%	2	16.0
17	2 via Phalen, Olive, Lafayette and E 7 <sup>th</sup>	11.4	15	5300-5400	65%	20%	37	\$650	\$9.5M	\$15.38 to \$15.67	Low	13	355	19	6	3	9.6	21.1	2.7	123	52	65	0%	79	50	7%	20-30	6.7	6.7	46%	2	15.8
18	3 via Phalen and East 7 <sup>th</sup> in mixed traffic	11.2	15	5300-5400	65%	20%	37	\$600	\$9.4M	\$14.87 to \$15.15	Low/Medium-Low	12	365	16	5	3	18.2	21.0	2.5	123	52	25	7%	99	20	0%	0	6.3	6.3	48%	2	16.9
21	<b>3A Ded. BRT to White Bear Lake (WBA)</b>	13.6	23	4800-4900	70%	22%	51	\$900	\$11.8M	\$23.29 to \$23.78	Low	13	265	8	7	12	15.5	31.3	5.0	165	66	250	25%	123	50	51%	210-280	8.2	8.2	55%	2	10.3
22	2 via Phalen, Olive, Lafayette and E 7 <sup>th</sup>	13.4	21	4800-4900	70%	22%	46	\$850	\$11.3M	\$22.22 to \$22.69	Low	13	245	8	5	12	13.4	28.6	3.7	147	64	260	25%	114	70	51%	220-270	6.2	6.2	52%	2	9.7
23	3 via Phalen and East 7 <sup>th</sup> in mixed traffic	13.2	21	4800-4900	70%	22%	46	\$850	\$11.2M	\$21.66 to \$22.11	Low	12	255	5	4	12	13.0	28.5	3.4	147	64	220	32%	134	20	59%	250-310	5.9	5.9	53%	2	10.5
7	<b>3B LRT to White Bear Lake (WBA)</b>	13.4	21	6500-6600	59%	21%	46	\$1,700	\$29.2M	\$38.49 to \$39.08	Low	13	355	8	5	12	13.4	28.6	3.7	147	64	260	25%	114	70	51%	220-270	6.2	6.2	52%	3	9.7
9	3 via Phalen and East 7 <sup>th</sup> in mixed traffic 2	13.2	21	6500-6600	59%	21%	46	\$1,650	\$28.8M	\$37.21 to \$37.78	Low	12	365	5	6	12	13.0	28.5	3.4	147	64	220	32%	134	20	59%	250-310	5.9	5.9	53%	3	10.5
8	8 via Phalen, Olive, Univ., 12th, & Green Ln <sup>3</sup>	13.3	23	6400-9500	59%	21%	51	\$1,550	\$28.5M	\$25.31 to \$37.57	Low	13	355	8	4	11	14.8	30.0	4.9	151	64	260	26%	177	70	51%	215-275	8.2	8.2	57%	3	14.3
26	<b>4 Arterial BRT to White Bear Lk (WBA)</b>	13.2	24	5700-6000	34%	26%	56	\$75	\$10.1M	\$6.61 to \$6.96	Medium	25 <sup>1</sup>	535 <sup>1</sup>	9	4	18	15.7	32.1	4.9	161	64	540 <sup>1</sup>	46%	125	20	55%*	0	7.4	7.4	54%	1	9.3

1. Arterial BRT and mixed traffic options will operate on existing roadways and will likely not impact resources outside of the roadway footprint.  
2. Ridership assumes interlining with future Riverview Transit Corridor  
3. Includes two Green Line stations (10th Street, Central)  
4. FTA Cost Effectiveness Break Points: High = <\$4.00, Medium-High = \$4.00-\$5.99, Medium = \$6.00-\$9.99, Medium-Low = \$10.00-\$14.99, Low = >\$15.00

Higher Benefit	>8000	>65%	>20%	<30 minutes	<\$750M	<\$10M	<\$5.99	High to Medium-High	<10 acres	<300 receptors	<10 acres	<4 sites	No Locations	>10k	>25k	>3k	>=140k	>70k	<100 access	0%	>100	<=20 spaces	0%	0 to 50 parcels	>6k	>7k	>50%	3 rank	>15.0
Medium Benefit	5000 - 8000	45%-65%	15%-20%	30-50 minutes	\$750M - \$1,200M	\$10M-\$20M	\$6.00-\$14.99	Medium to Medium-Low	10 to 20 acres	300 to 400 receptors	10-20 acres	4-6 sites	1-10 locations	5k to 10k	10k to 25k	2 to 3k	100k to 140k	50-70k	100 to 200 access	1% to 25%	50 to 100	20-60 spaces	1% to 40%	50 to 200 parcels	4k to 6k	5k to 7k	25% to 50%	2 rank	10.0 to 15.0
Lower Benefit	<5000	<45%	<15%	>50 minutes	>\$1,200M	>\$20M	>\$15.00	Low	>20 acres	>400 receptors	>20 acres	>6 sites	>10 locations	<3k	<9k	<2k	<100k	<50k	>200 access	>25%	<50	>60 spaces	>40%	>200 parcels	<4k	<5k	<25%	1 rank	<10.0

Based on high end of range

Based on FTA Cost Effectiveness Breakpoints<sup>4</sup>