



# Appendix A

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## *Planning Level Cost Estimates*



APPENDIX A

Planning Level Cost Estimates

Planning level cost estimates are listed in 2016 dollars for each improvement option. The planning level costs include estimates for right-of-way, preliminary engineering, construction engineering, construction, and indirect costs (IDC). In addition, an inflationary factor of 3 percent per year was applied to the planning level costs to account for estimated year of expenditure. Construction cost estimates were based on unit quantity estimates and price information determined from the MDT Preliminary Estimating Tool (PET) and MDT Road Design Cost Estimate Spreadsheet (Jan 2016). Cost ranges are provided in some cases, indicating unknown factors at the particular planning level stage.

**1. 15TH STREET NORTH INTERSECTION** **\$ 180,000 TOT**

LENGTH (FT)	400
WIDTH (FT)	12
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	1086.35	\$ 4,726
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	288.89	\$ 6,266
COVER - TYPE 1	SQYD	\$ 0.54	400.00	\$ 216
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	107.08	\$ 3,292
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	5.78	\$ 3,963
EMULS ASPHALT CRS-2P	TON	\$ 613.48	0.80	\$ 491
SIGNS - URBAN	MI	\$ 52,000.00	0.08	\$ 3,939
STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.08	\$ 1,515
DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.08	\$ 18,182
LIGHTS - URBAN	MI	\$ 175,000.00	0.08	\$ 13,258
GUARDRAIL-STEEL	LNFT	\$ 16.04	400.00	\$ 6,416
TRAFFIC CONTROL			5%	\$ 3,113
ESTIMATED RIGHT-OF-WAY	ACRE	\$ -	0.00	\$ -
	<i>Subtotal 1</i>			\$ 65,376
MISCELLANEOUS ITEMS <sup>(1)</sup>			15%	\$ 9,806
MOBILIZATION			10%	\$ 6,538
	<i>Subtotal 2</i>			\$ 81,720
CONTINGENCIES			20%	\$ 16,344
	<i>Subtotal 3</i>			\$ 98,064
MID-TERM INFLATION	% PER YEAR	3%	10	\$ 33,726
	<i>Subtotal 4</i>			\$ 131,790
CONSTRUCTION ENGINEERING (CE)			10%	\$ 13,179
PRELIMINARY ENGINEERING (PE)			10%	\$ 13,179
	<i>Subtotal 5</i>			\$ 158,148
INDIRECT COSTS (IDC)			10.91%	\$ 17,254
<b>TOTAL</b>				<b>\$ 175,402</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

**2. 19TH STREET NORTH INTERSECTION**

**ADVANCE SIGNING** **\$ 2,000 TOT**

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
SIGNS-ALUM SHEET INCR IV	SQFT	\$ 22.88	18.00	\$ 412
POLES-TREATED WOOD 4 IN	LNFT	\$ 11.12	28.00	\$ 311
	<i>Subtotal 1</i>			\$ 723
CONTINGENCIES			20%	\$ 145
	<i>Subtotal 2</i>			\$ 868
SHORT-TERM INFLATION	% PER YEAR	3%	5	\$ 138
	<i>Subtotal 3</i>			\$ 1,006
<b>TOTAL</b>				<b>\$ 1,144</b>

**RECTANGULAR RAPID FLASHING BEACON** **\$ 40,000 TOT**

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
RECTANGULAR RAPID FLASING BEACON	EACH	\$ 10,000.00	2.00	\$ 20,000
	<i>Subtotal 1</i>			\$ 20,000
CONTINGENCIES			30%	\$ 6,000
	<i>Subtotal 2</i>			\$ 26,000
SHORT-TERM INFLATION	% PER YEAR	3%	5	\$ 4,141
	<i>Subtotal 3</i>			\$ 30,141
<b>TOTAL</b>				<b>\$ 34,282</b>

**3. BIG STACK MOBILE HOME COURT APPROACH**

**REALIGNMENT** **\$ 900,000 TOT**

LENGTH (FT)	400
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AVERAGE HEIGHT (FT) 12

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	2133.33	\$ 9,280
RETAINING WALL	SQYD	\$ 491.75	533.33	\$ 262,267
DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.08	\$ 18,182
TRAFFIC CONTROL			5%	\$ 14,486
ESTIMATED RIGHT-OF-WAY	ACRE	\$ -	0.00	\$ -
	<i>Subtotal 1</i>			\$ 304,215
MISCELLANEOUS ITEMS <sup>(1)</sup>			15%	\$ 45,632
MOBILIZATION			10%	\$ 30,421
	<i>Subtotal 2</i>			\$ 380,269
CONTINGENCIES			20%	\$ 76,054
	<i>Subtotal 3</i>			\$ 456,322
MID-TERM INFLATION	% PER YEAR	3%	10	\$ 156,937
	<i>Subtotal 4</i>			\$ 613,259
CONSTRUCTION ENGINEERING (CE)			10%	\$ 61,326
PRELIMINARY ENGINEERING (PE)			10%	\$ 61,326
	<i>Subtotal 5</i>			\$ 735,911
INDIRECT COSTS (IDC)			10.91%	\$ 80,288
	<b>TOTAL</b>			<b>\$ 816,199</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

**NEW CONNECTION TO 19TH STREET NORTH \$ 500,000 TOT**

LENGTH (FT) 750  
 WIDTH (FT) 24  
 SURFACING (IN) 4  
 BASE (IN) 18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	2501.31	\$ 10,881
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	1041.67	\$ 22,594
COVER - TYPE 1	SQYD	\$ 0.54	1750.00	\$ 945
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	374.79	\$ 11,521
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	20.24	\$ 13,877
EMULS ASPHALT CRS-2P	TON	\$ 613.48	3.20	\$ 1,963
STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.14	\$ 2,841
DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.14	\$ 34,091
CURB AND GUTTER-CONC	LNFT	\$ 18.15	1500.00	\$ 27,225
TRAFFIC CONTROL			5%	\$ 6,297
ESTIMATED RIGHT-OF-WAY	ACRE	\$ 50,000.00	0.79	\$ 39,256
	<i>Subtotal 1</i>			\$ 171,491
MISCELLANEOUS ITEMS <sup>(1)</sup>			15%	\$ 25,724
MOBILIZATION			10%	\$ 17,149
	<i>Subtotal 2</i>			\$ 214,363
CONTINGENCIES			30%	\$ 64,309
	<i>Subtotal 3</i>			\$ 278,672
MID-TERM INFLATION	% PER YEAR	3%	10	\$ 95,840
	<i>Subtotal 4</i>			\$ 374,512
CONSTRUCTION ENGINEERING (CE)			10%	\$ 37,451
PRELIMINARY ENGINEERING (PE)			10%	\$ 37,451
	<i>Subtotal 5</i>			\$ 449,414
INDIRECT COSTS (IDC)			10.91%	\$ 49,031
	<b>TOTAL</b>			<b>\$ 498,446</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

**4. BUSINESS DISTRICT ACCESS \$ 1,500,000 TOT**

LENGTH (FT) 1320  
 WIDTH (FT) <sup>(2)</sup> 52  
 SURFACING (IN) 5  
 BASE (IN) 18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	7895.32	\$ 34,345
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	4326.67	\$ 93,845
COVER - TYPE 1	SQYD	\$ 0.54	8067.00	\$ 4,356
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	2159.51	\$ 66,383
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	116.61	\$ 79,950
EMULS ASPHALT CRS-2P	TON	\$ 613.48	14.40	\$ 8,834
SIGNS - URBAN	MI	\$ 52,000.00	0.25	\$ 13,000
STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.25	\$ 5,000
DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.25	\$ 60,000
LIGHTS - URBAN	MI	\$ 175,000.00	0.25	\$ 43,750
SIDEWALK-CONCRETE 4"	SQYD	\$ 57.78	733.33	\$ 42,372
CURB AND GUTTER-CONC	LNFT	\$ 18.15	2640.00	\$ 47,916
GUARDRAIL-STEEL	LNFT	\$ 16.04	1320.00	\$ 21,173
TRAFFIC CONTROL			5%	\$ 26,046

ESTIMATED RIGHT-OF-WAY		ACRE	\$	-	0.00	\$	-
	<i>Subtotal 1</i>					\$	546,971
MISCELLANEOUS ITEMS <sup>(1)</sup>					15%	\$	82,046
MOBILIZATION					10%	\$	54,697
	<i>Subtotal 2</i>					\$	683,714
CONTINGENCIES					20%	\$	136,743
	<i>Subtotal 3</i>					\$	820,456
MID-TERM INFLATION		% PER YEAR		3%	10	\$	282,168
	<i>Subtotal 4</i>					\$	1,102,625
CONSTRUCTION ENGINEERING (CE)					10%	\$	110,262
PRELIMINARY ENGINEERING (PE)					10%	\$	110,262
	<i>Subtotal 5</i>					\$	1,323,150
INDIRECT COSTS (IDC)					10.91%	\$	144,356
	<b>TOTAL</b>					<b>\$</b>	<b>1,467,505</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

<sup>(2)</sup> Width includes bike lanes, two 12' driving lanes, and center left-turn lane.

### 5. 25TH STREET NORTH INTERSECTION

**TRAFFIC SIGNAL** **\$ 2,600,000 TOT**

LENGTH (FT)	1320
WIDTH (FT)	44
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	2992.48	\$ 13,017
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	3300.00	\$ 71,577
COVER - TYPE 1	SQYD	\$ 0.54	6014.00	\$ 3,248
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	1609.82	\$ 49,486
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	86.93	\$ 59,601
EMULS ASPHALT CRS-2P	TON	\$ 613.48	10.80	\$ 6,626
COLD MILLING	SQYD	\$ 1.42	1993.33	\$ 2,831
SIGNS - URBAN	MI	\$ 52,000.00	0.25	\$ 13,000
STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.25	\$ 5,000
DRAINAGE PIPE - URBAN <sup>(2)</sup>	MI	\$ 500,000.00	0.25	\$ 125,000
LIGHTS - URBAN	MI	\$ 175,000.00	0.25	\$ 43,750
GUARDRAIL-STEEL	LNFT	\$ 16.04	1320.00	\$ 21,173
SIGNALS	EACH	\$ 500,000.00	1.00	\$ 500,000
TRAFFIC CONTROL			5%	\$ 45,715
ESTIMATED RIGHT-OF-WAY	ACRE	\$ -	0.00	\$ -
	<i>Subtotal 1</i>			\$ 960,023
MISCELLANEOUS ITEMS <sup>(1)</sup>			15%	\$ 144,003
MOBILIZATION			10%	\$ 96,002
	<i>Subtotal 2</i>			\$ 1,200,029
CONTINGENCIES			20%	\$ 240,006
	<i>Subtotal 3</i>			\$ 1,440,034
MID-TERM INFLATION	% PER YEAR	3%	10	\$ 495,251
	<i>Subtotal 4</i>			\$ 1,935,286
CONSTRUCTION ENGINEERING (CE)			10%	\$ 193,529
PRELIMINARY ENGINEERING (PE)			10%	\$ 193,529
	<i>Subtotal 5</i>			\$ 2,322,343
INDIRECT COSTS (IDC)			10.91%	\$ 253,368
	<b>TOTAL</b>			<b>\$ 2,575,711</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

<sup>(2)</sup> Drainage costs were increased due to MS4 requirements and anticipated drainage concerns and constraints.

**ROUNDABOUT** **\$ 4,000,000 TOT**

LENGTH (FT)	1320
WIDTH (FT)	44
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	2992.48	\$ 13,017
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	3300.00	\$ 71,577
COVER - TYPE 1	SQYD	\$ 0.54	6014.00	\$ 3,248
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	1609.82	\$ 49,486
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	86.93	\$ 59,601
EMULS ASPHALT CRS-2P	TON	\$ 613.48	10.80	\$ 6,626
COLD MILLING	SQYD	\$ 1.42	1993.33	\$ 2,831
SIGNS - URBAN	MI	\$ 52,000.00	0.25	\$ 13,000
STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.25	\$ 5,000
DRAINAGE PIPE - URBAN <sup>(2)</sup>	MI	\$ 500,000.00	0.25	\$ 125,000
LIGHTS - URBAN	MI	\$ 175,000.00	0.25	\$ 43,750

GUARDRAIL-STEEL	LNFT	\$	16.04	1320.00	\$	21,173
CONCRETE ROUNDABOUT - ONE LANE	EACH	\$	1,000,000.00	1.00	\$	1,000,000
TRAFFIC CONTROL				5%	\$	70,715
ESTIMATED RIGHT-OF-WAY	ACRE	\$	-	0.00	\$	-
	<i>Subtotal 1</i>				\$	1,485,023
MISCELLANEOUS ITEMS <sup>(1)</sup>				15%	\$	222,753
MOBILIZATION				10%	\$	148,502
	<i>Subtotal 2</i>				\$	1,856,279
CONTINGENCIES				20%	\$	371,256
	<i>Subtotal 3</i>				\$	2,227,534
MID-TERM INFLATION	% PER YEAR		3%	10	\$	766,086
	<i>Subtotal 4</i>				\$	2,993,620
CONSTRUCTION ENGINEERING (CE)				10%	\$	299,362
PRELIMINARY ENGINEERING (PE)				10%	\$	299,362
	<i>Subtotal 5</i>				\$	3,592,344
INDIRECT COSTS (IDC)				10.91%	\$	391,925
	<b>TOTAL</b>				<b>\$</b>	<b>3,984,269</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

<sup>(2)</sup> Drainage costs were increased due to MS4 requirements and anticipated drainage concerns and constraints.

## 6. EAGLE FALLS GOLF CLUB APPROACH

**WITHOUT LEFT-TURN LANE** **\$ 60,000 TOT**

				LENGTH (FT)	150	
				WIDTH (FT)	24	
				SURFACING (IN)	4	
				BASE (IN)	18	
	<b>TYPE</b>	<b>UNITS</b>	<b>UNIT PRICE</b>	<b>QUANTITY</b>	<b>COST</b>	
	EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	500.26	\$ 2,176	
	CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	208.33	\$ 4,519	
	COVER - TYPE 1	SQYD	\$ 0.54	350.00	\$ 189	
	PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	74.96	\$ 2,304	
	ASPHALT CEMENT PG 64-28	TON	\$ 685.62	4.05	\$ 2,777	
	EMULS ASPHALT CRS-2P	TON	\$ 613.48	0.70	\$ 429	
	SIGNS - URBAN	MI	\$ 52,000.00	0.03	\$ 1,477	
	STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.03	\$ 568	
	DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.03	\$ 6,818	
	TRAFFIC CONTROL			5%	\$ 1,063	
	ESTIMATED RIGHT-OF-WAY	ACRE	\$ -	0.00	\$ -	
	<i>Subtotal 1</i>				\$ 22,321	
	MISCELLANEOUS ITEMS <sup>(1)</sup>			15%	\$ 3,348	
	MOBILIZATION			10%	\$ 2,232	
	<i>Subtotal 2</i>				\$ 27,901	
	CONTINGENCIES			20%	\$ 5,580	
	<i>Subtotal 3</i>				\$ 33,481	
	MID-TERM INFLATION	% PER YEAR	3%	10	\$ 11,515	
	<i>Subtotal 4</i>				\$ 44,996	
	CONSTRUCTION ENGINEERING (CE)			10%	\$ 4,500	
	PRELIMINARY ENGINEERING (PE)			10%	\$ 4,500	
	<i>Subtotal 5</i>				\$ 53,995	
	INDIRECT COSTS (IDC)			10.91%	\$ 5,891	
	<b>TOTAL</b>				<b>\$ 59,886</b>	

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

**WITH LEFT-TURN LANE** **\$ 320,000 TOT**

				LENGTH (FT)	1000	
				WIDTH (FT)	12	
				SURFACING (IN)	5	
				BASE (IN)	18	
	<b>TYPE</b>	<b>UNITS</b>	<b>UNIT PRICE</b>	<b>QUANTITY</b>	<b>COST</b>	
	EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	2715.87	\$ 11,814	
	CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	722.22	\$ 15,665	
	COVER - TYPE 1	SQYD	\$ 0.54	1000.00	\$ 540	
	PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	267.71	\$ 8,229	
	ASPHALT CEMENT PG 64-28	TON	\$ 685.62	14.46	\$ 9,914	
	EMULS ASPHALT CRS-2P	TON	\$ 613.48	1.80	\$ 1,104	
	SIGNS - URBAN	MI	\$ 52,000.00	0.19	\$ 9,848	
	STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.19	\$ 3,788	
	DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.19	\$ 45,455	
	TRAFFIC CONTROL			5%	\$ 5,318	
	ESTIMATED RIGHT-OF-WAY	ACRE	\$ -	0.00	\$ -	
	<i>Subtotal 1</i>				\$ 111,676	
	MISCELLANEOUS ITEMS <sup>(1)</sup>			20%	\$ 22,335	
	MOBILIZATION			10%	\$ 11,168	

	<i>Subtotal 2</i>			\$	145,178
CONTINGENCIES				20%	\$ 29,036
	<i>Subtotal 3</i>			\$	174,214
MID-TERM INFLATION		% PER YEAR	3%	10	\$ 59,915
	<i>Subtotal 4</i>			\$	234,129
CONSTRUCTION ENGINEERING (CE)				10%	\$ 23,413
PRELIMINARY ENGINEERING (PE)				10%	\$ 23,413
	<i>Subtotal 5</i>			\$	280,955
INDIRECT COSTS (IDC)				10.91%	\$ 30,652
	<b>TOTAL</b>			<b>\$</b>	<b>311,607</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

**7. RAILROAD CROSSING REVIEW** **\$ 30,000 TOT**

	<i>Subtotal 1</i>			\$	25,000
SHORT-TERM INFLATION		% PER YEAR	3%	5	\$ 3,982
	<b>Total</b>			<b>\$</b>	<b>28,982</b>

**8. RIVER DRIVE NORTH RECONSTRUCTION**

**SEGMENT 1 - 15TH STREET NORTH TO 25TH STREET NORTH** **\$6,000,000 to \$8,000,000 TOT**

LENGTH (FT)	4500
WIDTH (FT) <sup>(2)</sup>	52 (TBC to TBC)
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST		
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	24999.19	\$	108,746	
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	13250.00	\$	287,393	
COVER - TYPE 1	SQYD	\$ 0.54	24500.00	\$	13,230	
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	6558.85	\$	201,619	
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	354.18	\$	242,833	
EMULS ASPHALT CRS-2P	TON	\$ 613.48	43.80	\$	26,870	
SIGNS - URBAN	MI	\$ 52,000.00	0.85	\$	44,318	
STRIPING & PAVEMENT MARKINGS - URBAN	MI	\$ 20,000.00	0.85	\$	17,045	
DRAINAGE PIPE - URBAN	MI	\$ 240,000.00	0.85	\$	204,545	
LIGHTS - URBAN	MI	\$ 175,000.00	0.85	\$	149,148	
SIDEWALK-CONCRETE 4"	SQYD	\$ 57.78	2500.00	\$	144,450	
CURB AND GUTTER-CONC	LNFT	\$ 18.15	9000.00	\$	163,350	
GUARDRAIL-STEEL	LNFT	\$ 16.04	3000.00	\$	48,120	
RETAINING WALL	SQYD	\$ 491.75	838.00	\$	412,087	
TRAFFIC CONTROL			5%	\$	103,188	
ESTIMATED RIGHT-OF-WAY	ACRE	\$ 50,000.00	0.98	\$	49,000	
	<i>Subtotal 1</i>			\$	2,215,942	
MISCELLANEOUS ITEMS <sup>(1)</sup>			15%	\$	332,391	
MOBILIZATION			10%	\$	221,594	
	<i>Subtotal 2</i>			\$	2,769,928	
CONTINGENCIES			20%	\$	553,986	
	<i>Subtotal 3</i>			\$	3,323,914	
						<b>MID-TERM</b>
						<b>LONG-TERM</b>
INFLATION		% PER YEAR	3%	\$	1,143,148	\$ 2,679,444
	<i>Subtotal 4</i>			\$	4,467,062	\$ 6,003,358
CONSTRUCTION ENGINEERING (CE)			10%	\$	446,706	\$ 600,336
PRELIMINARY ENGINEERING (PE)			10%	\$	446,706	\$ 600,336
	<i>Subtotal 5</i>			\$	5,360,474	\$ 7,204,029
INDIRECT COSTS (IDC)			10.91%	\$	584,828	\$ 785,960
	<b>TOTAL</b>			<b>\$</b>	<b>5,945,302</b>	<b>\$ 7,989,989</b>

<sup>(1)</sup> Miscellaneous items include unknown factors such as excavation, embankment, topsoil, utilities, slope treatments, ditch or channel excavation, temporary striping, erosion control, and public relations.

<sup>(2)</sup> Width includes 6' bike lanes on north and south side, two 12' driving lanes, and 16' TWLTL.

**SEGMENT 2 - 25TH STREET NORTH TO 38TH STREET NORTH** **\$8,500,000 to 11,400,000 TOT**

LENGTH (FT)	6000
WIDTH (FT)	52 (TBC to TBC)
SURFACING (IN)	5
BASE (IN)	18

TYPE	UNITS	UNIT PRICE	QUANTITY	COST		
EXCAVATION-UNCLASSIFIED	CUYD	\$ 4.35	33332.25	\$	144,995	
CRUSHED AGGREGATE COURSE	CUYD	\$ 21.69	17666.67	\$	383,190	
COVER - TYPE 1	SQYD	\$ 0.54	32667.00	\$	17,640	
PLANT MIX BIT SURF GR S-3/4 IN	TON	\$ 30.74	8745.14	\$	268,826	
ASPHALT CEMENT PG 64-28	TON	\$ 685.62	472.24	\$	323,777	
EMULS ASPHALT CRS-2P	TON	\$ 613.48	58.40	\$	35,827	
SIGNS - URBAN	MI	\$ 52,000.00	1.14	\$	59,091	





# Appendix B

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## *25<sup>th</sup> Street North Intersection Operational Analysis*



**Intersection**

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	477	254	26	364	84	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	250	150	-	0	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	568	302	31	433	100	42

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	568
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.17
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.263
Pot Cap-1 Maneuver	-	-	980
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	980
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	25.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	234	513	-	-	980	-
HCM Lane V/C Ratio	0.427	0.081	-	-	0.032	-
HCM Control Delay (s)	31.4	12.6	-	-	8.8	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	2	0.3	-	-	0.1	-

**Intersection**

Int Delay, s/veh 2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	395	197	45	315	99	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	250	150	-	0	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	429	214	49	342	108	42

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	429
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.272
Pot Cap-1 Maneuver	-	-	1099
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1099
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	20.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	301	613	-	-	1099	-
HCM Lane V/C Ratio	0.358	0.069	-	-	0.045	-
HCM Control Delay (s)	23.5	11.3	-	-	8.4	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	1.6	0.2	-	-	0.1	-

**Intersection**

Int Delay, s/veh 6.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	494	256	54	622	100	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	250	150	-	0	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	568	294	62	715	115	32

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	568
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.245
Pot Cap-1 Maneuver	-	-	989
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	989
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	75.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	142	517	-	-	989	-
HCM Lane V/C Ratio	0.809	0.062	-	-	0.063	-
HCM Control Delay (s)	92.7	12.4	-	-	8.9	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	5.1	0.2	-	-	0.2	-

**Intersection**

Int Delay, s/veh 5.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	477	254	26	364	84	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	250	150	-	0	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	700	373	38	534	123	51

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	700
Stage 1	-	-	700
Stage 2	-	-	610
Critical Hdwy	-	4.17	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	-	2.263	3.563
Pot Cap-1 Maneuver	-	874	171
Stage 1	-	-	483
Stage 2	-	-	533
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	874	164
Mov Cap-2 Maneuver	-	-	164
Stage 1	-	-	483
Stage 2	-	-	510

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	56.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	164	431	-	-	874	-
HCM Lane V/C Ratio	0.752	0.119	-	-	0.044	-
HCM Control Delay (s)	73.8	14.5	-	-	9.3	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	4.7	0.4	-	-	0.1	-

**Intersection**

Int Delay, s/veh 6.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	395	197	45	315	99	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	250	150	-	0	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	580	289	66	462	145	57

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	580
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.272
Pot Cap-1 Maneuver	-	-	965
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	965
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	51
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	192	503	-	-	965	-
HCM Lane V/C Ratio	0.757	0.114	-	-	0.068	-
HCM Control Delay (s)	65.9	13.1	-	-	9	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	5	0.4	-	-	0.2	-

**Intersection**

Int Delay, s/veh 33.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	494	256	54	622	100	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	250	150	-	0	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	725	376	79	913	147	41

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	725
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.245
Pot Cap-1 Maneuver	-	-	864
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	864
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	\$ 407.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	79	420	-	-	864	-
HCM Lane V/C Ratio	1.857	0.098	-	-	0.092	-
HCM Control Delay (s)	\$ 517.9	14.5	-	-	9.6	-
HCM Lane LOS	F	B	-	-	A	-
HCM 95th %tile Q(veh)	12.8	0.3	-	-	0.3	-

**Notes**

-: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

# HCM 2010 Signalized Intersection Summary

## 6: 25th St N & River Drive

4/10/2016

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↙	↑	↖	↗		
Volume (veh/h)	477	254	26	364	84	35		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1776		
Adj Flow Rate, veh/h	568	302	31	433	100	42		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84		
Percent Heavy Veh, %	7	7	7	7	7	7		
Cap, veh/h	919	1249	300	919	524	468		
Arrive On Green	0.52	0.52	0.52	0.52	0.31	0.31		
Sat Flow, veh/h	1776	1509	604	1776	1691	1509		
Grp Volume(v), veh/h	568	302	31	433	100	42		
Grp Sat Flow(s),veh/h/ln	1776	1509	604	1776	1691	1509		
Q Serve(g_s), s	13.2	2.5	2.2	9.0	2.5	1.1		
Cycle Q Clear(g_c), s	13.2	2.5	15.4	9.0	2.5	1.1		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	919	1249	300	919	524	468		
V/C Ratio(X)	0.62	0.24	0.10	0.47	0.19	0.09		
Avail Cap(c_a), veh/h	919	1249	300	919	583	521		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	9.9	1.1	15.4	8.9	14.7	14.2		
Incr Delay (d2), s/veh	1.3	0.1	0.1	0.4	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	6.6	1.0	0.4	4.4	1.2	0.5		
LnGrp Delay(d),s/veh	11.2	1.2	15.5	9.3	14.8	14.3		
LnGrp LOS	B	A	B	A	B	B		
Approach Vol, veh/h	870			464	142			
Approach Delay, s/veh	7.7			9.7	14.7			
Approach LOS	A			A	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		23.0		35.0				35.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		20.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		4.5		15.2				17.4
Green Ext Time (p_c), s		0.3		6.7				6.1
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			9.0					
HCM 2010 LOS			A					

# HCM 2010 Signalized Intersection Summary

## 6: 25th St N & River Drive

4/10/2016

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↙	↑	↖	↗		
Volume (veh/h)	395	197	45	315	99	39		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1759	1759	1759	1759	1759		
Adj Flow Rate, veh/h	429	214	49	342	108	0		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	8	8	8	8	8	8		
Cap, veh/h	880	1246	371	880	558	498		
Arrive On Green	0.50	0.50	0.50	0.50	0.33	0.00		
Sat Flow, veh/h	1759	1495	740	1759	1675	1495		
Grp Volume(v), veh/h	429	214	49	342	108	0		
Grp Sat Flow(s),veh/h/ln	1759	1495	740	1759	1675	1495		
Q Serve(g_s), s	9.7	1.7	2.8	7.2	2.8	0.0		
Cycle Q Clear(g_c), s	9.7	1.7	12.5	7.2	2.8	0.0		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	880	1246	371	880	558	498		
V/C Ratio(X)	0.49	0.17	0.13	0.39	0.19	0.00		
Avail Cap(c_a), veh/h	880	1246	371	880	558	498		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	9.9	1.0	14.0	9.3	14.3	0.0		
Incr Delay (d2), s/veh	0.4	0.1	0.2	0.3	0.2	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.8	2.0	0.6	3.5	1.3	0.0		
LnGrp Delay(d),s/veh	10.3	1.0	14.2	9.6	14.4	0.0		
LnGrp LOS	B	A	B	A	B			
Approach Vol, veh/h	643			391	108			
Approach Delay, s/veh	7.2			10.2	14.4			
Approach LOS	A			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		35.0				35.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		20.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		4.8		11.7				14.5
Green Ext Time (p_c), s		0.2		5.5				5.1
Intersection Summary								
HCM 2010 Ctrl Delay			8.9					
HCM 2010 LOS			A					



HCM 2010 Signalized Intersection Summary  
6: 25th St N & River Drive

4/10/2016

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↖	↑	↖	↗		
Volume (veh/h)	494	256	54	622	100	28		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810		
Adj Flow Rate, veh/h	568	294	62	715	115	32		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Percent Heavy Veh, %	5	5	5	5	5	5		
Cap, veh/h	905	1282	288	905	574	513		
Arrive On Green	0.50	0.50	0.50	0.50	0.33	0.33		
Sat Flow, veh/h	1810	1538	621	1810	1723	1538		
Grp Volume(v), veh/h	568	294	62	715	115	32		
Grp Sat Flow(s),veh/h/ln	1810	1538	621	1810	1723	1538		
Q Serve(g_s), s	13.7	2.4	4.9	19.6	2.9	0.8		
Cycle Q Clear(g_c), s	13.7	2.4	18.6	19.6	2.9	0.8		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	905	1282	288	905	574	513		
V/C Ratio(X)	0.63	0.23	0.22	0.79	0.20	0.06		
Avail Cap(c_a), veh/h	905	1282	288	905	574	513		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	10.9	1.0	17.7	12.4	14.3	13.6		
Incr Delay (d2), s/veh	1.4	0.1	0.4	4.8	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.1	3.0	0.9	10.7	1.4	0.4		
LnGrp Delay(d),s/veh	12.3	1.1	18.1	17.2	14.5	13.7		
LnGrp LOS	B	A	B	B	B	B		
Approach Vol, veh/h	862			777	147			
Approach Delay, s/veh	8.5			17.3	14.3			
Approach LOS	A			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		35.0				35.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		20.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		4.9		15.7				21.6
Green Ext Time (p_c), s		0.3		8.3				5.6
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			12.8					
HCM 2010 LOS			B					

# HCM 2010 Signalized Intersection Summary

## 6: 25th St N & River Drive

4/10/2016

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↙	↑	↖	↗		
Volume (veh/h)	477	254	26	364	84	35		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1776	1776	1776	1776	1776	1776		
Adj Flow Rate, veh/h	700	373	38	534	123	51		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	7	7	7	7	7	7		
Cap, veh/h	888	1258	207	888	564	503		
Arrive On Green	0.50	0.50	0.50	0.50	0.33	0.33		
Sat Flow, veh/h	1776	1509	499	1776	1691	1509		
Grp Volume(v), veh/h	700	373	38	534	123	51		
Grp Sat Flow(s),veh/h/ln	1776	1509	499	1776	1691	1509		
Q Serve(g_s), s	19.5	3.3	4.1	12.9	3.1	1.4		
Cycle Q Clear(g_c), s	19.5	3.3	23.6	12.9	3.1	1.4		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	888	1258	207	888	564	503		
V/C Ratio(X)	0.79	0.30	0.18	0.60	0.22	0.10		
Avail Cap(c_a), veh/h	888	1258	207	888	564	503		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	12.4	1.1	22.1	10.7	14.4	13.8		
Incr Delay (d2), s/veh	4.8	0.1	0.4	1.1	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	10.5	4.1	0.6	6.5	1.5	0.6		
LnGrp Delay(d),s/veh	17.2	1.2	22.5	11.9	14.6	13.9		
LnGrp LOS	B	A	C	B	B	B		
Approach Vol, veh/h	1073			572	174			
Approach Delay, s/veh	11.6			12.6	14.4			
Approach LOS	B			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		35.0				35.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		20.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		5.1		21.5				25.6
Green Ext Time (p_c), s		0.4		5.6				3.3
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			12.2					
HCM 2010 LOS			B					

# HCM 2010 Signalized Intersection Summary

## 6: 25th St N & River Drive













4/10/2016

	→	↘	↙	←	↖	↗		
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations	↑	↗	↙	↑	↖	↗		
Volume (veh/h)	395	197	45	315	99	39		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1759	1759	1759	1759	1759		
Adj Flow Rate, veh/h	580	289	66	462	145	57		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	8	8	8	8	8	8		
Cap, veh/h	880	748	272	880	558	498		
Arrive On Green	0.50	0.50	0.50	0.50	0.33	0.33		
Sat Flow, veh/h	1759	1495	599	1759	1675	1495		
Grp Volume(v), veh/h	580	289	66	462	145	57		
Grp Sat Flow(s),veh/h/ln	1759	1495	599	1759	1675	1495		
Q Serve(g_s), s	14.8	7.2	5.5	10.7	3.8	1.6		
Cycle Q Clear(g_c), s	14.8	7.2	20.3	10.7	3.8	1.6		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	880	748	272	880	558	498		
V/C Ratio(X)	0.66	0.39	0.24	0.53	0.26	0.11		
Avail Cap(c_a), veh/h	880	748	272	880	558	498		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	11.2	9.3	18.8	10.2	14.6	13.9		
Incr Delay (d2), s/veh	1.8	0.3	0.5	0.6	0.2	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	7.5	3.0	1.0	5.3	1.8	0.7		
LnGrp Delay(d),s/veh	13.0	9.6	19.2	10.7	14.8	14.0		
LnGrp LOS	B	A	B	B	B	B		
Approach Vol, veh/h	869			528	202			
Approach Delay, s/veh	11.9			11.8	14.6			
Approach LOS	B			B	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		35.0				35.0
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		20.0		30.0				30.0
Max Q Clear Time (g_c+I1), s		5.8		16.8				22.3
Green Ext Time (p_c), s		0.5		6.7				4.6
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			12.2					
HCM 2010 LOS			B					

# HCM 2010 Signalized Intersection Summary

## 6: 25th St N & River Drive

4/10/2016

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Volume (veh/h)	494	256	54	622	100	28		
Number	4	14	3	8	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1810	1810	1810	1810	1810	1810		
Adj Flow Rate, veh/h	725	376	79	913	147	41		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	5	5	5	5	5	5		
Cap, veh/h	971	825	224	971	533	475		
Arrive On Green	0.54	0.54	0.54	0.54	0.31	0.31		
Sat Flow, veh/h	1810	1538	495	1810	1723	1538		
Grp Volume(v), veh/h	725	376	79	913	147	41		
Grp Sat Flow(s),veh/h/ln	1810	1538	495	1810	1723	1538		
Q Serve(g_s), s	20.1	9.7	9.5	30.6	4.2	1.2		
Cycle Q Clear(g_c), s	20.1	9.7	29.6	30.6	4.2	1.2		
Prop In Lane		1.00	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	971	825	224	971	533	475		
V/C Ratio(X)	0.75	0.46	0.35	0.94	0.28	0.09		
Avail Cap(c_a), veh/h	979	832	226	979	533	475		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	11.6	9.2	23.0	14.0	16.9	15.9		
Incr Delay (d2), s/veh	3.2	0.4	0.9	16.3	0.3	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	10.7	4.2	1.4	19.4	2.0	0.5		
LnGrp Delay(d),s/veh	14.8	9.6	24.0	30.3	17.2	16.0		
LnGrp LOS	B	A	C	C	B	B		
Approach Vol, veh/h	1101			992	188			
Approach Delay, s/veh	13.0			29.8	16.9			
Approach LOS	B			C	B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		25.0		39.7				39.7
Change Period (Y+Rc), s		5.0		5.0				5.0
Max Green Setting (Gmax), s		20.0		35.0				35.0
Max Q Clear Time (g_c+I1), s		6.2		22.1				32.6
Green Ext Time (p_c), s		0.4		9.8				2.2
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			20.6					
HCM 2010 LOS			C					

# MOVEMENT SUMMARY

 Site: 25th St N & River Drive AM 2015 w RT Bypass

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: 25th St N											
3	L2	100	7.1	0.193	7.0	LOS A	0.6	15.7	0.49	0.49	31.4
18	R2	42	11.5	0.193	7.0	LOS A	0.6	15.7	0.49	0.49	30.8
Approach		142	8.4	0.193	7.0	LOS A	0.6	15.7	0.49	0.49	31.3
East: River Drive											
1	L2	31	11.1	0.426	7.8	LOS A	1.8	48.9	0.27	0.15	32.2
6	T1	434	8.1	0.426	7.8	LOS A	1.8	48.9	0.27	0.15	32.4
Approach		465	8.3	0.426	7.8	LOS A	1.8	48.9	0.27	0.15	32.4
West: River Drive											
2	T1	569	8.0	0.490	8.5	LOS A	2.4	64.6	0.16	0.06	32.3
12	R2	303	3.0	0.249	5.2	LOS A	0.9	24.2	0.12	0.04	33.4
Approach		871	6.3	0.490	7.4	LOS A	2.4	64.6	0.14	0.05	32.6
All Vehicles		1478	7.1	0.490	7.5	LOS A	2.4	64.6	0.22	0.13	32.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: 25th St N & River Drive Noon 2015 w RT Bypass

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: 25th St N											
3	L2	108	9.8	0.182	6.3	LOS A	0.6	15.0	0.43	0.38	31.7
18	R2	42	9.0	0.182	6.3	LOS A	0.6	15.0	0.43	0.38	31.2
Approach		150	9.6	0.182	6.3	LOS A	0.6	15.0	0.43	0.38	31.5
East: River Drive											
1	L2	49	14.7	0.356	6.9	LOS A	1.4	37.7	0.26	0.15	32.4
6	T1	342	5.7	0.356	6.9	LOS A	1.4	37.7	0.26	0.15	32.9
Approach		391	6.8	0.356	6.9	LOS A	1.4	37.7	0.26	0.15	32.8
West: River Drive											
2	T1	429	6.6	0.372	6.8	LOS A	1.6	41.1	0.18	0.08	33.1
12	R2	214	6.2	0.185	4.7	LOS A	0.6	16.3	0.14	0.06	33.5
Approach		643	6.5	0.372	6.1	LOS A	1.6	41.1	0.16	0.07	33.2
All Vehicles		1185	7.0	0.372	6.4	LOS A	1.6	41.1	0.23	0.14	32.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: 25th St N & River Drive PM 2015 W RT Bypass

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: 25th St N											
3	L2	115	7.8	0.198	7.0	LOS A	0.6	16.2	0.48	0.48	31.3
18	R2	32	13.0	0.198	7.0	LOS A	0.6	16.2	0.48	0.48	30.7
Approach		147	8.9	0.198	7.0	LOS A	0.6	16.2	0.48	0.48	31.1
East: River Drive											
1	L2	62	5.6	0.680	13.0	LOS B	5.0	127.5	0.47	0.30	30.1
6	T1	715	1.9	0.680	13.0	LOS B	5.0	127.5	0.47	0.30	30.3
Approach		777	2.2	0.680	13.0	LOS B	5.0	127.5	0.47	0.30	30.3
West: River Drive											
2	T1	568	4.5	0.486	8.4	LOS A	2.5	64.3	0.23	0.11	32.4
12	R2	294	3.9	0.250	5.3	LOS A	0.9	24.0	0.17	0.08	33.3
Approach		862	4.3	0.486	7.3	LOS A	2.5	64.3	0.21	0.10	32.7
All Vehicles		1786	3.8	0.680	9.8	LOS A	5.0	127.5	0.35	0.22	31.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: 25th St N & River Drive AM 2035 w RT bypass

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: 25th St N											
3	L2	123	7.1	0.264	8.7	LOS A	0.8	21.9	0.55	0.55	30.7
18	R2	51	11.5	0.264	8.7	LOS A	0.8	21.9	0.55	0.55	30.1
Approach		174	8.4	0.264	8.7	LOS A	0.8	21.9	0.55	0.55	30.5
East: River Drive											
1	L2	38	11.1	0.532	9.8	LOS A	2.6	70.2	0.35	0.22	31.3
6	T1	533	8.1	0.532	9.8	LOS A	2.6	70.2	0.35	0.22	31.6
Approach		571	8.3	0.532	9.8	LOS A	2.6	70.2	0.35	0.22	31.6
West: River Drive											
2	T1	699	8.0	0.607	10.9	LOS B	3.7	97.6	0.22	0.09	31.2
12	R2	373	3.0	0.309	5.8	LOS A	1.3	32.2	0.14	0.05	33.0
Approach		1072	6.3	0.607	9.1	LOS A	3.7	97.6	0.19	0.08	31.8
All Vehicles		1816	7.1	0.607	9.3	LOS A	3.7	97.6	0.27	0.17	31.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



# MOVEMENT SUMMARY

 Site: 25th St N & River Drive Noon 2035 w RT bypass

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: 25th St N											
3	L2	145	9.8	0.277	8.2	LOS A	0.9	23.7	0.51	0.51	30.8
18	R2	57	9.0	0.277	8.2	LOS A	0.9	23.7	0.51	0.51	30.4
Approach		201	9.6	0.277	8.2	LOS A	0.9	23.7	0.51	0.51	30.7
East: River Drive											
1	L2	66	14.7	0.496	9.1	LOS A	2.3	61.8	0.36	0.25	31.4
6	T1	461	5.7	0.496	9.1	LOS A	2.3	61.8	0.36	0.25	31.8
Approach		527	6.8	0.496	9.1	LOS A	2.3	61.8	0.36	0.25	31.8
West: River Drive											
2	T1	577	6.6	0.508	8.9	LOS A	2.6	67.8	0.25	0.13	32.1
12	R2	288	6.2	0.252	5.5	LOS A	0.9	24.0	0.18	0.09	33.1
Approach		865	6.5	0.508	7.8	LOS A	2.6	67.8	0.23	0.12	32.4
All Vehicles		1593	7.0	0.508	8.3	LOS A	2.6	67.8	0.31	0.21	32.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: 25th St N & River Drive PM 2035 w RT bypass

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: 25th St N											
3	L2	147	7.8	0.285	9.1	LOS A	0.9	24.0	0.56	0.56	30.4
18	R2	40	13.0	0.285	9.1	LOS A	0.9	24.0	0.56	0.56	29.8
Approach		187	8.9	0.285	9.1	LOS A	0.9	24.0	0.56	0.56	30.3
East: River Drive											
1	L2	78	5.6	0.889	26.5	LOS D	15.1	385.1	0.93	0.74	25.5
6	T1	911	1.9	0.889	26.5	LOS D	15.1	385.1	0.93	0.74	25.7
Approach		989	2.2	0.889	26.5	LOS D	15.1	385.1	0.93	0.74	25.6
West: River Drive											
2	T1	724	4.5	0.627	11.4	LOS B	4.1	106.1	0.34	0.18	31.1
12	R2	375	3.9	0.323	6.2	LOS A	1.3	33.8	0.21	0.11	32.8
Approach		1099	4.3	0.627	9.6	LOS A	4.1	106.1	0.29	0.16	31.6
All Vehicles		2275	3.8	0.889	16.9	LOS C	15.1	385.1	0.59	0.44	28.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.