Memo

Stantec

To:	Jim Hofmann Jr Rochester (2250) NY Office	From:	Bill Holthoff Rochester (2250) NY Office
File:	Revised Raised Inner Loop Benefit/Cost	Date:	March 24, 2010

Reference: Revised Raised Inner Loop - Simple Benefit/Cost Analysis

A simple cost benefit analysis was conducted to determine cost and benefits of raising the Inner Loop from Monroe Avenue to Charlotte Street. Major reconstruction of the existing Inner Loop will be needed at some point in the near future due to its age and condition (original construction circa 1950). This analysis is particularly based on information contained in a study conducted in the year 2000 of raising portions of the Inner Loop.

Construction Costs

The current estimated cost to raise this portion of the Inner Loop is estimated at $20.855 million. The 2000 study found that the cost of reconstructing the existing Inner Loop (in kind) would be 1.32 times greater than the cost to raise it. Thus, the overall construction costs of raising this portion of the Inner Loop would be less expensive than reconstructing the Inner Loop, as is.

Economic Growth Opportunities

Land Value

Raising this portion of the Inner Loop to grade was estimated in the 2000 study to open up approximately 9.2 acres of land for resale. The value of land in this area, based on City tax assessment varies around $225,000 per acre. Thus sale of this land would be expected to net over $2.0 million.

Re-development Size and Value

The 9.2 acres of vacated land would support 460,000 to 920,000 square feet of additional new development. With new development construction costs around $140 per square feet this would generate $64.4 to $128.8 million of investment in this area. Additionally this development would create 708 to 1,416 construction jobs (based on 11 jobs per million dollars invested).

Property Taxes – Non Homestead

County, City and School taxes are 0.533% of the value of development; thus, these new developments would result in an additional $3.5 to $6.87 million per year to these government agencies.

Transportation Benefits and Costs

Accident Reduction Benefit
A recent analysis of the reduction and severity of accidents that would result with raising the Inner Loop shows an accident reduction benefit of over $947,000 per year (estimated in a separate memo).

Sustainability - Addition Travel Delay Costs
Energy cost savings and reductions in vehicle emission benefits have not been calculated in this analysis; however, should not be disqualified. These benefits would be somewhat reduced by the additional travel delay that would result from raising the Inner Loop. During the evening peak hour, raising the Inner Loop would add 2.2 seconds of delay per vehicle on the system or 3.4 hours of additional delay. That delay factored by 10 for daily total delay, multiplied by 330 for yearly delay, and time cost of $24.50 per hour results in a travel delay cost of around $275,000 per year. Again, this is a small cost of the overall benefits that would be attained with reduced energy costs and vehicle emissions.

Hence, safety and travel time user benefits are estimated at $0.672 million dollars annually.

Benefit/Cost Ratio

Taking these possible benefits and costs distributed over 20 years after completion of raising the Inner Loop (assuming a 3.5% discount rate) demonstrates a positive benefit to cost ratio. Including the calculated user benefits, sale and reinvestment in land and new property tax revenue, a benefit/cost ratio of 2.33 to 3.82 is expected. This return on these variables is dependent on the square footage and type of redevelopment that occurs in the land vacated by the highway system. It also does not reflect these additional benefits not quantified at this time, such as:

- Reduced road maintenance (snow removal, street cleaning, etc.) and other normal repairs associated with having 4 lane miles less of road and shoulder, along with three (3) multi-span bridges and three (3) traffic signals;

- The need to rehabilitate or reconstruct two (2) multi-span bridges, plus retaining walls;

- Improved health due to improved air quality due to less vehicle emissions;
- Energy cost savings;
- Multi-modal improvements to access and circulation;
- Eliminating a long standing barrier and improving community cohesion; and
- Meeting overall community desires.

If these other benefits were factored into the benefit cost analysis, the benefits incurred by every dollar spent would be expected to be at least 2 if not over 4 dollars.

Conclusion

This simple benefit cost analysis clearly demonstrates that the benefits of raising the Inner Loop should be well over two to three times the cost of construction. In addition, new development on the vacated land would be expected to create an additional 708 to 1,416 construction jobs in the future.

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Reference: Revised Raised Inner Loop - Simple Benefit/Cost

Benefit - Cost High Estimate
in million of dollars

DESCRIPT	DISCOUNT RATE =	:	YEAR (n)	PRESENT COST Present Value	PRESENT WORTH FACTOR (P/F 3.5%	Present Worth
Inner Loop	0.035	:				
		:				
		Net	0	$20.86	1.0000	
Land sale	taxes	user benefit	1	$0.00	0.9662	
$1.00	$0.00	0.672	2	$1.67	0.9335	$1.56
$1.00	$0.50	0.672	3	$2.17	0.9019	$1.96
	$1.50	0.672	4	$2.17	0.8714	$1.89
	$2.50	0.672	5	$3.17	0.8420	$2.67
	$3.50	0.672	6	$4.17	0.8135	$3.39
	$4.50	0.672	7	$5.17	0.7860	$4.07
	$6.00	0.672	8	$6.67	0.7594	$5.07
	$6.87	0.672	9	$7.54	0.7337	$5.53
	$6.87	0.672	10	$7.54	0.7089	$5.34
	$6.87	0.672	11	$7.54	0.6849	$5.16
	$6.87	0.672	12	$7.54	0.6618	$4.99
	$6.87	0.672	13	$7.54	0.6394	$4.82
	$6.87	0.672	14	$7.54	0.6178	$4.66
	$6.87	0.672	15	$7.54	0.5969	$4.50
	$6.87	0.672	16	$7.54	0.5767	$4.35
	$6.87	0.672	17	$7.54	0.5572	$4.20
	$6.87	0.672	18	$7.54	0.5384	$4.06
	$6.87	0.672	19	$7.54	0.5202	$3.92
	$6.87	0.672	20	$7.54	0.5026	$3.79
	$6.87	0.672	21	$7.54	0.4856	$3.66
SUBTOTAL		:		$144.05		$79.58

	Benefit	**Cost**	**B/C**
B/C	**$79.58**	**$20.86**	**3.82**

Reference: Revised Raised Inner Loop - Simple Benefit/Cost

Benefit - Cost Low Estimate
in million of dollars

DESCRIPTION Raised Inner Loop	DISCOUNT RATE = 0.035	:	YEAR (n)	Present Value	Present Worth Factor (P/F 3.5% n)	Present Worth
	Benefits	:				
		Net	0	$20.86	1.0000	
Land sale	taxes	user benefi	1	$0.00	0.9662	
$1.00	$0.00	0.672	2	$1.67	0.9335	$1.56
$1.00	$0.50	0.672	3	$2.17	0.9019	$1.96
	$1.00	0.672	4	$1.67	0.8714	$1.46
	$1.50	0.672	5	$2.17	0.8420	$1.83
	$2.00	0.672	6	$2.67	0.8135	$2.17
	$2.50	0.672	7	$3.17	0.7860	$2.49
	$3.00	0.672	8	$3.67	0.7594	$2.79
	$3.00	0.672	9	$3.67	0.7337	$2.69
	$3.50	0.672	10	$4.17	0.7089	$2.96
	$3.50	0.672	11	$4.17	0.6849	$2.86
	$3.50	0.672	12	$4.17	0.6618	$2.76
	$3.50	0.672	13	$4.17	0.6394	$2.67
	$3.50	0.672	14	$4.17	0.6178	$2.58
	$3.50	0.672	15	$4.17	0.5969	$2.49
	$3.50	0.672	16	$4.17	0.5767	$2.41
	$3.50	0.672	17	$4.17	0.5572	$2.32
	$3.50	0.672	18	$4.17	0.5384	$2.25
	$3.50	0.672	19	$4.17	0.5202	$2.17
	$3.50	0.672	20	$4.17	0.5026	$2.10
	$3.50	0.672	21	$4.17	0.4856	$2.03
SUBTOTAL		:		$91.80		$46.54

	Benefit	**Cost**	**B/C**
B/C	**$46.54**	**$20.86**	**2.23**

Memo

Stantec

To:	Jim Hofmann Rochester, NY	From:	Bill Holthoff Rochester, NY
File:		Date:	March 25, 2010

Life Cycle Cost Comparison

A life cycle cost comparison was undertaken to compare the costs of maintaining the eastern portion of the Inner Loop to the alternative of raising the Inner Loop from Monroe Avenue to Charlotte Street. Costs included normal road and bridge maintenance practices as presented in the Modal Cost Comparison Matrix (June 2009), NYSDOT Region 4 over the presumed 75 year life for these types of facilities. It also included miscellaneous road maintenance, snow removal, and maintenance of traffic signals. Design and construction observation do not appear to be included in these costs, as such costs that the team estimated also do not include these soft costs.

These costs over 75 years were matched with maintenance costs associated with the age of the structure or roadway assuming an ETC 2015 (i.e. for a bridge that was built in the year 2000, the maintenance cycle starting 15 years after a bridge was built was used). The 2009 costs were then increased by 4% compounded per year to estimate the cost at ETC (a factor of 1.2655). Similarly the costs of snow removal, miscellaneous maintenance and traffic signal maintenance (using NYSDOT Permit Signal Fee) were also increased. These costs were extended to cover a 30 year period and brought back to 2015 dollars using a Present Worth Factor of 3.5% per year.

The results indicate over approximately $1.8 million dollars savings in 2015 by raising the Inner Loop ($21.9 million) versus maintaining the existing Inner Loop ($23.7 million) over 30 years. Thus, raising the Inner Loop is a better investment of public funds than maintaining the existing. Note that this savings most likely will be higher since the cost to reconstruct and maintain the existing Inner Loop is based on NYSDOT Region 4 typical cost per lane mile of road. In reality, costs to reconstruct and maintain an urban street are much higher. In addition, many of the costs to maintain the existing Inner Loop are not included for lack of information, like street lighting and water main repairs.

These results are based on a number of factors and assumptions. They are:

1. The raised Inner Loop would consist of 3.8 lane miles of road and three (3) traffic signals;

2. The existing Inner Loop consists of 8.4 lane miles of road and six (6) traffic signals;

3. Either the Inner Loop is raised in 2015 or both the poorly rated East Avenue and Broad Street bridges are replaced. Also in 2015, that all the guide rails would be replaced as well as the four (4) traffic signals associated with these two bridges;

4. 50% of the retaining wall would be rehabilitated in the 2025 at a cost of $2.4 million (2015 $$). The remaining half would be rehabilitated in 2040, the year in which the walls will be 75 years old or at the end of their useful life, at the same cost in 2015 $$;

5. Traffic signals would be replaced every 15 years at a 2015 cost of $151,860 per signal;

6. Once bridges or pavements were replaced, the normal maintenance activities for the first 30 years after they were replaced would be followed;

7. Since the Monroe Avenue bridge was replaced in the year 2000, maintenance activities for this bridge would follow those that would occur for a 15 year bridge through one that would be 45 years old;

8. Since the Inner Loop was constructed in 1965 and the existing pavement would exceed its useful life of 75 years prior the 30 year period being analyzed, thus it is assumed that the pavement would be reconstructed in the year 2040 at a cost of $1,581,875 per lane mile (2015 $$);

9. NYSDOT Traffic Signal Permit Fee of $1,250 was used to determine traffic signal annual maintenance and increased to $1,582 to reflect 2015 costs;

10. The present net worth off these activities would be based upon a 3.5% value. This is a similar value to the interest rate on a 10 year treasury bond;

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Existing Inner Loop Expressway Alternative - NO BUILD
Existing Pavement, Inner Loop,Service Rd, and Ramps

Yr.	Year	Per lane Mile	2009	2015 4% per year	2015 Snow	2015 misc.	2015 Total Per Mile Lane Mile	Total 8.4 Lane Miles	$1,250 Traffic Signal Maintenance 6 Signals	2015 Present Value	Present Worth Factor (P/F 3.5% n)	**Pavement and Signals Present Worth**
0	2015	Mill-and-Fill (3 inch)	$150,000	$189,825	$823	$1,266	$191,913	$1,612,070	$607,440	$2,219,510	1.0000	$2,219,510
1	2016			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.9662	$26,117
2	2017			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.9335	$25,234
3	2018	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.9019	$38,762
4	2019			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.8714	$23,556
5	2020			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.8420	$22,759
6	2021	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.8135	$34,961
7	2022			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.7860	$21,246
8	2023			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.7594	$20,528
9	2024	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.7337	$31,533
10	2025			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.7089	$19,163
11	2026			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.6849	$18,515
12	2027			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.6618	$17,889
13	2028	Thick Overlay	$75,000	$94,913	$823	$1,266	$97,001	$814,805	$9,491	$824,296	0.6394	$527,058
14	2029			$0	$823	$1,266	$2,088	$17,540	$911,160	$928,700	0.6178	$573,734
15	2030			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.5969	$16,135
16	2031	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.5767	$24,785
17	2032			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.5572	$15,062
18	2033			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.5384	$14,552
19	2034	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.5202	$22,354
20	2035			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.5026	$13,585
21	2036			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.4856	$13,126
22	2037	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.4692	$20,162
23	2038			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.4533	$12,253
24	2039			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.4380	$11,838
25	2040	Reconstruction	$1,250,000	$1,581,875	$823	$1,266	$1,583,963	$13,305,290	$9,491	$13,314,781	0.4231	$5,634,110
26	2041			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.4088	$11,051
27	2042			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.3950	$10,678
28	2043	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$9,491	$42,976	0.3817	$16,402
29	2044			$0	$823	$1,266	$2,088	$17,540	$9,491	$27,031	0.3687	$9,968
30	2045	Cracksealing	$1,500	$1,898	$823	$1,266	$3,986	$33,485	$911,160	$944,645	0.3563	$336,557
										$19,046,357		**$9,803,182**
				1.2655 times 2009 cost to detemine 2015 cost or 4% per year								Part 1 of 2
											At	3.50%

Year	Monroe Avenue Bridge	2009 Bridges Monroe 4889 sf	2015 Bridges Monroe 4889 sf	2015 cost per Sq. Ft.	2015 Monroe Ave Bridge 8000 sq. ft.
2015			$0	$0.00	$0
2016	Washing	$3,000	$3,797	$0.78	$6,212
2017			$0	$0.00	$0
2018	Washing	$3,000	$3,797	$0.78	$6,212
2019			$0	$0.00	$0
2020	Washing	$3,000	$3,797	$0.78	$6,212
2021			$0	$0.00	$0
2022	Washing	$3,000	$3,797	$0.78	$6,212
2023			$0	$0.00	$0
2024	Deck Inlay/Jo	$380,000	$480,890	$98.36	$786,893
2025			$0	$0.00	$0
2026	Washing	$3,000	$3,797	$0.78	$6,212
2027			$0	$0.00	$0
2028	Washing	$3,000	$3,797	$0.78	$6,212
2029			$0	$0.00	$0
2030	Washing	$3,000	$3,797	$0.78	$6,212
2031			$0	$0.00	$0
2032	Washing	$3,000	$3,797	$0.78	$6,212
2033			$0	$0.00	$0
2034	Deck Sealing,	$9,000	$11,390	$2.33	$18,637
2035			$0	$0.00	$0
2036	Painting	$60,000	$75,930	$15.53	$124,246
2037			$0	$0.00	$0
2038	Washing	$3,000	$3,797	$0.78	$6,212
2039			$0	$0.00	$0
2040	Washing	$3,000	$3,797	$0.78	$6,212
2041			$0	$0.00	$0
2042	Washing	$3,000	$3,797	$0.78	$6,212
2043			$0	$0.00	$0
2044	Washing	$3,000	$3,797	$0.78	$6,212
2045			$0	$0.00	$0
					$1,004,324

East and Broad Street Bridges	2009	2015	Bridge 2015 $$ per sq. ft	2015 East Ave Bridge 7000 sq. ft.	2015 Broad Street Bridge 9900 sq. ft.	2015 Guide Rail Wall Rehap	2015 Total Bridges Walls, Rail Present Value	Present Worth Factor (P/F 3.5% n)	Bridges, Wall, Rail Present Worth
Replace				$3,375,000	$4,640,000	$923,000	$8,938,000	1.0000	$8,938,000
		$0	$0.00	$0	$0		$6,212	0.9662	$6,002
		$0	$0.00	$0	$0		$0	0.9335	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.9019	$17,440
		$0	$0.00	$0	$0		$0	0.8714	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.8420	$16,280
		$0	$0.00	$0	$0		$0	0.8135	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.7860	$15,198
		$0	$0.00	$0	$0		$0	0.7594	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$800,017	0.7337	$586,997
		$0	$0.00	$0	$0	$2,436,000	$2,436,000	0.7089	$1,726,926
Deck Sealing/Washing	$9,000	$11,390	$2.33	$16,307	$23,063		$45,583	0.6849	$31,222
		$0	$0.00	$0	$0		$0	0.6618	$0
Painting	$60,000	$75,930	$15.53	$108,715	$153,755		$268,683	0.6394	$171,797
		$0	$0.00	$0	$0		$0	0.6178	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.5969	$11,541
Joint Repair/Bearing Lu	$100,000	$126,550	$25.88	$181,192	$256,258		$437,450	0.5767	$252,280
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.5572	$10,774
		$0	$0.00	$0	$0		$0	0.5384	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$31,760	0.5202	$16,520
		$0	$0.00	$0	$0		$0	0.5026	$0
Deck Inlay/Washing	$223,000	$282,207	$57.72	$404,059	$571,455		$1,099,761	0.4856	$534,012
		$0	$0.00	$0	$0		$0	0.4692	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.4533	$8,765
		$0	$0.00	$0	$0		$0	0.4380	$0
Painting	$60,000	$75,930	$15.53	$108,715	$153,755	$2,436,000	$2,704,683	0.4231	$1,144,478
Structure Rehabilitation	$200,000	$253,100	$51.77	$362,385	$512,516		$874,901	0.4088	$357,692
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.3950	$7,638
		$0	$0.00	$0	$0		$0	0.3817	$0
Washing	$3,000	$3,797	$0.78	$5,436	$7,688		$19,336	0.3687	$7,130
		$0	$0.00	$0	$0		$0	0.3563	$0
				$4,610,733	$6,387,679	$5,795,000	$23,592,736		**$13,860,693**
									Part 2 of 2
				$153,691.09	$212,922.64				
Total Present Worth Pavement, Bridges, Walls, Rail and Signals (Part 1 and 2) =									**$23,663,875**

Raised Inner Loop Alternative

Yr.	Year	Per lane Mile		2009 Snow	2009 misc.	2009 otal Per Mil	2015 Total per Lane Miles	$2,015 Cost per lane mile 3.8	$1,582 Traffic Signal Maintenance 3	Total 2015 Present Value	Present Worth Factor (P/F 3.5% n)	2015 Present Worth
0	2015	Reconstruction	$0	$0	$0	$0	$0		$0	$20,798,681	1.0000	$20,798,681
1	2016			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.9662	$12,252
2	2017			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.9335	$11,837
3	2018	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$4,746	$19,894	0.9019	$17,943
4	2019			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.8714	$11,050
5	2020			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.8420	$10,676
6	2021	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$4,746	$19,894	0.8135	$16,184
7	2022			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.7860	$9,967
8	2023			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.7594	$9,630
9	2024	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$4,746	$19,894	0.7337	$14,597
10	2025			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.7089	$8,989
11	2026			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.6849	$8,685
12	2027	Thin Overlay	$50,000	$650	$1,000	$51,650	$65,363	$248,380	$4,746	$253,125	0.6618	$167,514
13	2028			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.6394	$8,108
14	2029			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.6178	$7,834
15	2030	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$455,580	$470,728	0.5969	$280,973
16	2031			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.5767	$7,313
17	2032			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.5572	$7,066
18	2033	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$4,746	$19,894	0.5384	$10,710
19	2034			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.5202	$6,596
20	2035			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.5026	$6,373
21	2036	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$4,746	$19,894	0.4856	$9,660
22	2037			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.4692	$5,949
23	2038			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.4533	$5,748
24	2039			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.4380	$5,553
25	2040	Mill-and-Fill (1.5 inch)	$100,000	$650	$1,000	$101,650	$128,638	$488,825	$4,746	$493,570	0.4231	$208,853
26	2041			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.4088	$5,184
27	2042			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.3950	$5,009
28	2043	Cracksealing	$1,500	$650	$1,000	$3,150	$3,986	$15,148	$4,746	$19,894	0.3817	$7,593
29	2044			$650	$1,000	$1,650	$2,088	$7,935	$4,746	$12,680	0.3687	$4,676
30	2045			$650	$1,000	$1,650	$2,088	$7,935	$455,580	$463,515	0.3563	$165,140
										$22,852,588		**$21,856,341**

1.2655 times 2009 cost to detemine 2015 cost or 4% per year

At 3.50% per year

	$2,009	2015
Traffic signal Maintenace	$1,250	$1,581.88
Traffic signals	$120,000	$151,860.00

Memo

Inner Loop – ***Accident History***

Date:	August 11, 2009
To:	Bill Holthoff, Stantec
From:	Paula Benway, Stantec

Inner Loop Accident Data

The following information covers accident history for the Inner Loop (Rt. 940T) from the Monroe Avenue interchange to approximately Charlotte Street. The most recent Information available represents a 38-month period between January 1, 2005 and March 7, 2008. The accident history identified a total of 40 accidents occurred along the Inner Loop in this area. The reportable accidents accounted for 26 (65%) of the total accidents and the non-reportable accidents accounted for 14 (35%) of the total accidents. The following list summarizes the type and number of accidents.

- Fixed Object – 18 (45%)
- Rear End – 10 (25%)
- Sideswipe – 6 (15%)
- Head On – 2 (0.05%)
- Overtaking – 1 (0.025%)
- Right Angle – 1 (0.025%)
- Head-on – 1 (0.025%)
- Unknown – 1 (0.025%)

The accident severity included 13 injuries (32%) and 27 (68%) property damage only. Fifty three percent of all accidents occurred during evening hours with 55% occurring on dry pavement conditions. As indicated above, 45% of the accidents involved collision with fixed objects (guide rail, curbing, abutment, debris). Only four of the 40 accidents occurred at a merge/diverge ramp locations. The accident rate for the corridor was calculated and compared to statewide accident rates for Principal Arterial expressways. The current accident rate is 2.15 accidents per million vehicle miles (acc/mvm) which is below the statewide average of 2.72 acc/mvm. Collision diagrams, detailed accident history, and rate calculations are attached.

An extended study area was also reviewed that included at grade adjacent corridors including Pitkin Street and Union Street. The following table summarizes the number of reportable accidents and the calculated accident rates for the corridor including intersections for each adjacent roadway.

Locations experiencing above state or county wide accident rates are highlighted in red. The Inner Loop expressway (Monroe to Charlotte) is experiencing accident occurrences below the statewide average rates. Each of the adjacent corridors is further assessed below.

ACCIDENT RATES

Intersection	Number of Accidents	State/County Rate	Actual Rate	
Intersection Rate (excludes midblock accidents)				
Pitkin Street @ *East Ave*	8	0.34 / 0.22	**0.44**	ACC/MEV
Pitkin Street @ *Broad Street*	4	0.34 / 0.22	**0.66**	ACC/MEV
Pitkin Street @ *Monroe/Chestnut*	7	0.34 / 0.22	0.26	ACC/MEV
Union Street @ *East Ave*	17	0.34 / 0.22	**1.13**	ACC/MEV
Union Street @ *Broad St*	3	0.19 / 0.22	**0.71**	ACC/MEV
Monroe Avenue @ *Howell St.*	5	0.34 / 0.22	0.34	ACC/MEV
Link Rate				
Inner Loop - 940T *Monroe-Charlotte*	26	2.72	2.15	ACC/MVM

NOTE: accident rate calculations include "reportable" accidents only.

Pitkin Street corridor – 14 accidents occurred over the 38-month period. There were 5(36%) rear-end accidents, 5(36%) right angle, 1(8%) right turn, 1(8%) overtaking, 1(8%) pedestrian, 1(8%) overtaking, 1(8%) unknown accident. Ninety three percent of the accidents involved property damage only, with 64% occurring during daylight hours, and with 64% occurring on dry pavement conditions. The East Avenue and Broad Street intersections with Pitkin Street are experiencing accident rates above the state/county wide average rates. Review of the accidents occurring at either intersection does not show a predominant accident pattern.

Union Street corridor – 33 accidents (reportable and non-re-portable) occurred over a 38-month period. There were 13(37%) right angle, 4(11%) rear-end, 4(11%) fixed object, 3(9%) right turn, and 3(8%) unknown, 2(6%) left turn, 2(6%) backing up, and 2(6%) sideswipe accidents. Eighty nine percent of the accidents involved property damage only and occurred throughout the daylight/evening hours with 74% occurring on dry pavement conditions. Further review of the actual reports suggests that the rear end accidents were primarily a result of following too closely. The East Avenue intersection with Union Street is experiencing accident occurrences above the state/county wide average rate.

> *East Avenue Intersection* – of the 17 accidents that occurred at this intersection, 12(71%) were right angle accidents. These accidents are attributable to driver inattention and possible visibility constraints related to the bridge railing over the Inner Loop and the building on the southeast quadrant.

Safety Benefits Evaluation

Safety benefits can be derived by calculating the projected reduction in accidents as a direct result of the proposed improvements or project, and the severity distribution is checked for significance as compared to the statewide norm (this is an important statistical assessment step). Then the safety benefits are calculated by comparing before accident experience with the after projection. Accident costs are updated periodically (6/13/2008) by the NYSDOT, which were used in this calculation.

The safety benefits evaluation methodology is documented in the New York State Department of Transportation "Highway Safety Improvement Program Procedures & Techniques". Form TE 164 has been used and prepared for this project.

Consideration was given to the unique nature of this project. The TE 164 form and evaluation methodology was developed for more straight forward highway safety projects, hence, liberty was taken to extrapolate the methodology to resemble this project. Calculating estimated accident costs for the year 2035 with no improvement (base condition) is pretty straight forward. However considering the Inner Loop project is eliminating an expressway, it's ramps/merge/diverge points of access and creating a brand new arterial/boulevard with significantly geometric characteristics, assumptions were made in developing a reasonable estimate. The following basic assumptions for the three corridors were made:

Pitkin Street – for purposes of estimating safety benefits, Pitkin Street will most likely be converted into an alley way to provide access to adjacent existing and potential new developments in the area only. Major signalized intersections at East Avenue and at Broad Street will be eliminated. No connection south/west of Broad Street is anticipated. With these changes, it was assumed that all the accident patterns observed would be reduced. The significance check of severity distribution for current accident occurrences indicates "no" significance. So based on average accident costs, an Estimated Annual Safety Benefit of $184,304 may result.

Inner Loop & Union Street – for purposes of estimating safety benefits, the statistical data for both the Inner Loop and Union Street were combined. The proposed improvement includes bringing the current Inner Loop (limited access, high speed, expressway) to an at grade configuration along the Union Street corridor. Union Street will be converted to a two-way arterial, all on/off access ramps will be eliminated, and improved geometric intersection alignments are assumed with left turn lanes, medians, and possible roundabouts along the new Union Street corridor. Considering this new arterial maybe a hybrid of both corridors, current ADT estimates and number of accidents for both the Inner Loop expressway and Union Street were combined. Accident reduction includes only the expressway/ramps accidents will be eliminated. No other reductions are assumed considering the improved geometric characteristics will reduce accidents, however higher volumes and two way operations may off-set any reductions. The significance check of severity distribution for current accident occurrences indicates "no" significance. Based on average accident costs, an Estimated Annual Safety Benefit of $762,934 may result.

The combined total project ***Estimated Annual Safety Benefits*** of ***$947,238*** is anticipated.

STANTEC CONSULTING SERVICES INC.

Attachments: Safety Benefits Evaluation Form

TE 164

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TRAFFIC AND SAFETY DIVISION
SAFETY BENEFITS
EVALUATION FORM

TRAFFIC & SAFETY IDENTIFICATION NUMBER			
EVALUATION OF ALTERNATE NO:			
STUDY PERIOD	From	To	No. of Yrs.
	1/1/2008	3/7/2008	3.16

LOCATION

Route No. or Street Name	State Highway No.	From or At Reference Marker
NEW AT-GRADE ARTERIAL (IL + Union)		Howell Street Off - Ramp
At Intersection with (if applicable)	State Highway No.	To Reference Marker
		Charlotte Street

PROJECT DATA

PROPOSED IMPROVEMENT:

The proposed improvement includes bringing the current Inner Loop (limited access, high speed, expressway) to at grade configuration along the Union Street corridor. All on/off access ramps will be eliminated in this section. Improved geometric intersection alignments are assumed with Lt. lanes, medians and possible roundabouts. Union Street will be converted from one-way to a two way arterial.

Present AADT: 12070 Future AADT: 15910 Volume Correction Factor (VCF): 1.16

REDUCTION CALCULATION

METHOD I (From Reduction Factor Table)
Average Reduction Factor _____%

METHOD II (Engineering Analysis)

a. Total Accidents: 73
b. Accidents Reduced: 40
C. Calculated RF (b/a): 55%

METHOD III (For General Upgradings)

a. Existing Accidetn Rate:
b. Future Accident Rate:
c. Difference (a-b): 0
d. Calculated RF (c/a): #DIV/0! %

BRIEFLY EXPLAIN HOW EXPECTED REDUCTION WAS DERIVED:

For this analysis method current ADT and # of accidents for both the Inner Loop expressway and Union Street were combined. Accident reduction includes only the express/ramps accidents are will be eliminated. No other reductions are assumed considering the improved geometric characteristics will reduce accidents, however higher volumes and two way operations my off-set any reductions.

SIGNIFICANCE CHECK OF SEVERITY DISTRIBUTION

	FATAL	INJURY	F & I	PDO	TOTAL
a. % by severity	0.41%	38.26%	38.67%	61.33%	100%
b. actual	0.0	16.0	16.0	57.0	73.0
c. expected	0.3	27.9	28.2	44.8	73.0
d. difference	-0.3	-11.9	-12.2	12.2	0.0
e. significance	no	no	no		

BEFORE COST PER ACCIDENT CALCULATION

TYPE	NO. ACC.		COST/ACC		ACC. COST
Fatal	0	x	3446800	=	0
Injury	0	x	93100	=	0
F & I	0	x	128500	=	0
PDO	0	x	3800	=	0
Total	0			$	0

BEFORE COST/ACC (Tot. Acc. Cost/ Tot. Acc.) #DIV/0!

SAFETY BENEFITS

A. ESTIMATED ANNUAL ACCIDENT COST WITH NO IMPROVEMENT:

ACC/YR 23.10 X VCF 1.16 X BEFORE COST/ACCIDENT $52,000 = $1,392,353.68

B. ESTIMATED ANNUAL ACCIDENT COST WITH PROPOSED IMPROVEMENT:

ACC/YR 23.10 X VCF 1.16 X (1.00- 0.55 RF) X AVG. COST/ACC. $ 52,000 = $ 629,420.15

ESTIMATED ANNUAL SAFETY BENEFITS (A-B) = $ 762,934

TE 164

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TRAFFIC AND SAFETY DIVISION
SAFETY BENEFITS
EVALUATION FORM

TRAFFIC & SAFETY IDENTIFICATION NUMBER			
EVALUATION OF ALTERNATE NO:			
STUDY PERIOD	From	To	No. of Yrs.
	1/1/2008	3/7/2008	3.16

LOCATION

Route No. or Street Name	State Highway No.	From or At Reference Marker
Pitkin Street		Charlotte Street Off - Ramp
At Intersection with (if applicable)	State Highway No.	To Reference Marker
		Monroe Ave Intersection

PROJECT DATA

PROPOSED IMPROVEMENT:

The proposed improvement includes bringing the current Inner Loop (limited access, high speed, expressway) to at grade configuration along the Union Street corridor. All on/off access ramps will be eliminated in this section. Pitkin Street will most likely be converted into an alley way to provide access to adjacent existing and potential new developments in the area only. Major signalized intersections at East Avenue and at Broad Street will be eliminated. No connection south/west of Broad Street anticipated.

Present AADT: 2800 Future AADT: 1680 Volume Correction Factor (VCF): 0.80

REDUCTION CALCULATION

METHOD I (From Reduction Factor Table)
Average Reduction Factor _____%

METHOD II (Engineering Analysis)

a. Total Accidents: 14
b. Accidents Reduced: 14
C. Calculated RF (b/a): 100%

METHOD III (For General Upgradings)

a. Existing Accidetn Rate:
b. Future Accident Rate:
c. Difference (a-b): 0
d. Calculated RF (c/a): #DIV/0! %

BRIEFLY EXPLAIN HOW EXPECTED REDUCTION WAS DERIVED:

Pitkin Street will be converted into an alley way to provide access to adjacent properties. Major signalized intersections at East Avenue and Broad Street will be eliminated. No connection south/west of Broad Street anticipated.

SIGNIFICANCE CHECK OF SEVERITY DISTRIBUTION

	FATAL	INJURY	F & I	PDO	TOTAL
a. % by severity	0.41%	38.26%	38.67%	61.33%	100%
b. actual	0	1	1	13	14
c. expected	0	5	5	9	14
d. difference	0	-4	-4	4	0
e. significance	no	no	no		

BEFORE COST PER ACCIDENT CALCULATION

TYPE	NO. ACC.		COST/ACC		ACC. COST
Fatal	0	x	3446800	=	0
Injury	0	x	93100	=	0
F & I	0	x	128500	=	0
PDO	0	x	3800	=	0
Total	0			$	0

BEFORE COST/ACC (Tot. Acc. Cost/ Tot. Acc.) #DIV/0!

SAFETY BENEFITS

A. ESTIMATED ANNUAL ACCIDENT COST WITH NO IMPROVEMENT:

ACC/YR 4.43 X VCF 0.8 X BEFORE COST/ACCIDENT $52,000 = $184,303.80

B. ESTIMATED ANNUAL ACCIDENT COST WITH PROPOSED IMPROVEMENT:

ACC/YR 4.43 X VCF 0.8 X (1.00- 1 RF) X AVG. COST/ACC. $ 52,000 = $ -

ESTIMATED ANNUAL SAFETY BENEFITS (A-B) = $ 184,304

WATTS ARCHITECTURE & ENGINEERING, P.C.
95 Perry Street, Suite 300
p: 716.206.5100
f: 716.206-5199
w: www.watts-ae.com
architecture | engineering | environmental

March 22, 2010

Mr. James Hofmann, P.E.
Stantec
2250 Brighton-Henrietta Town Line Road
Rochester NY 14623-2706

Re: Rochester Inner Loop Improvement Project
REVISED Preliminary Cost Estimate
Watts Project Y9182

Dear Mr. Hofmann:

As you requested, we have revised our preliminary cost estimate for the Inner Loop Improvement Project to reflect your comments from March 17, 2010. As we submitted before, descriptions of the three requested options follow, along with our estimate for each of these. Details of our calculations are also attached.

Please take a look and let me know if you have any questions or would like us to make revisions.

DESCRIPTIONS AND ESTIMATE OF THE THREE OPTIONS

Basic Project

This option envisions reconstructing the Inner Loop from under the Clinton Street bridge to under the East Main St. Bridge. Components estimated for this project include:

- Reconstruct the Inner Loop (5-lane section) from under the Clinton Street Bridge to an at-grade intersection with Monroe Ave.
- Construct an at-grade 5-lane roadway from Monroe Ave. to a new at-grade roundabout at the intersection of Howell St. with South Union St.
- Construct an at-grade 5-lane roadway from the Howell St. roundabout to a new roundabout at Charlotte St.
- Re-construct the Inner loop from the new Charlotte St. roundabout to the existing Inner Loop under the East Main St. bridge.
- Remove the existing structures at Monroe Ave., Broad St. and East Ave.
- Fill the abandoned portions of the Inner Loop right-of-way, landscape and build new east-west cross-street connections at Canfield St., Broad St., East Ave. and Charlotte St.
- Construct traffic signals at the intersection of the relocated Inner Loop roadway with Monroe Ave. Broad St., and East Ave.

- Remove Pitkin St. from Monroe Ave. to Broad St.
- Replace public utilities as required.
- Reconstruct Pitkin St. (2 lanes) from Broad St. to Main St.

The estimated cost for this project, in 2010 dollars, is $20,855,000.

Center Portion Project

This option would be identical to the basic project from the new roundabout at Howell St. to East Main St.

The option would begin at the existing Inner Loop under Monroe Ave. Components of this project include:

- Reconstruct the Inner Loop from under the Monroe Ave. structure to a new at-grade roundabout at the intersection of Howell St. with South Union St.
- The balance of work on this project is identical to the other bullets under the Basic Project above.

The estimated cost for this project, in 2010 dollars, is $18,160,000.

Connecting Ramp Project

This option is to provide a new connecting ramp from Route 490 westbound to the eastbound Inner Loop. This project cannot be constructed unless the basic project is constructed first or concurrently because of conflicts with the existing off-ramp from the eastbound Inner Loop to Monroe Ave. Components of this project include:

- Constructing a new deceleration lane on westbound Route 490 beginning at a point approximately under the existing Clinton Street structure.
- Construct a new 1-lane connecting ramp merging with the existing ramp connecting Route 490 eastbound with the Inner Loop.
- Replace the eastbound deck on the impacted ramp structure near Clinton St. to accommodate the new lane and superelevation.
- Construct new traffic signal at Monroe Ave. and Howell St.

The estimated cost for this project, in 2010 dollars, is $2,285,000.

Sincerely
WATTS ARCHITECTURE & ENGINEERING, P.C.

John C. Honan, P.E.

Basic Project Summary	Unit	Cost
Five Lane Roadway, Clinton Street to East Main Street	4430 ft	2,800,054
" " Drainage		609,770
Side Streets (Monroe, South Union, Canfield, Broad, East, Charlotte, Pitkin)	3350 ft	1,449,224
" " Drainage		471,627
Retaining walls (Charlotte to East Main)		583,500
Waterlines		681,504
Lighting		701,444
Landscape		387,617
Fill		2,485,333
Roundabouts		480,000
Structure Removals		720,000
Wall Removals		640,917
Signing and Striping		99,845
Misc (field office & temp concrete barrier)		148,000
Traffic Signals (Monroe, Broad, East)	3 at 120000	360,000
Removal of south portion of Pitkin St		43,750
Basic Contract Items Total		12,662,585

Additional Contract Costs		
Mobilization (4%)		506,503
Survey (3%)		379,878
MPOT (8%)		1,013,007
General Contingency Items (20%)		2,532,517
Total Construction Contract Cost		17,094,490

Additional Costs		
Design (12%)		2,051,339
Construction Inspection (10%)		1,709,449

Total Basic Project Cost		$ 20,855,278

Center Portion Project Summary	Unit	Cost
Five Lane Roadway, Monroe Avenue to East Main Street	3800 ft	2,401,852
" " Drainage		523,053
Side Streets (Monroe, South Union, Canfield, Broad, East, Charlotte, Pitkin)	3350 ft	1,449,224
" " Drainage		471,627
Retaining walls (Charlotte to East Main)		976,900
Waterlines		629,630
Lighting		659,284
Landscape		358,112
Fill		1,642,667
Roundabouts		480,000
Structure Removals		503,000
Wall Removals		448,642
Signing and Striping		79,876
Misc (field office & temp concrete barrier)		118,400
Traffic Signals (Broad, East)	2 at 120,000	240,000
Removal of south portion of Pitkin St		43,750
Basic Contract Items Total		11,026,016

Additional Contract Costs		
Mobilization (4%)		441,041
Survey (3%)		330,780
MPOT (8%)		882,081
General Contingency Items (20%)		2,205,203
Total Construction Contract Cost		14,885,122

Additional Costs		
Design (12%)		1,786,215
Construction Inspection (10%)		1,488,512

Total Basic Project Cost		$18,159,849

Connecting Ramp Summary	Unit	Quantity	Price	Amount
Deceleration Lane on Route 490 (convert existing right lane to aux lane)	lf	600	186	111,600
Develop 3rd lane westbound after new ramp divergence.(mill,pave,regrade)	lf	500	125	62,500
Ramp to Inner Loop	lf	420	311	130,620
Ramp embankment				25,000
Revise existing ramp guide railing	lf	600	25	15,000
Place new cantilever signs	ea	2	50000	100,000
Remove existing bridge rail	lf	120	60	7,200
Remove existing deck (100x70/9)	sy	778	90	70,020
Remove existing back walls (2x60x4x2/27)	cy	36	750	27,000
Place new backwalls	cy	36	1000	36,000
Place new deck (100x60/9)	sy	667	700	466,900
Place new sidewalk (100*10/9)	sy	111	40	4,440
Place new bridge rail	lf	120	130	15,600
Place new bridge joint system	lf	140	75	10,500
Remove and replace approach pavement	lf	200	258	51,600
Remove and regrade Howell Street ramp to Monroe Ave	lf	650		25,000
Add new traffic signal at intersection of Howell and Monroe	ea	1		125,000
Reconstruct existing 2 lane ramp. Taper from 2 lanes to 1 lane	lf	300	311	93,300
Miscellaneous new signs, etc for ramp divergence, 3rd lane development				10,000
Basic Contract Items Total				1,387,280

Additional Contract Costs				
Mobilization (4%)				55,491
Survey (3%)				41,618
MPOT (8%)				110,982
				0
				0
General Contingency Items (20%)				277,456
				0
Total Construction Contract Cost				1,872,828

Additional Costs				
Design (12%)				224,739
Construction Inspection (10%)				187,283

Total Connecting Ramp Project Cost				2,284,850

Full Project (From Inner Loop under Clinton Street to Inner Loop under East Main Street)												
			Length			Cost Per Foot ($)						Section
Roadway Section	From	To	Roadway	Ret Walls	No of Lanes	Roadway	Storm	Ret Wall	Road cost	Storm cost	Wall Cost	Cost
Relocated Inner Loop	Clinton St	Monroe Ave	630	0	5	$ 632	$ 138	$ 389	$ 398,202	$ 86,717	$ -	484,918
	Monroe Ave	Howell St	750		5	$ 632	$ 138		$ 474,050	$ 103,234	$ -	577,284
	Howell St	Charlotte St	2300		5	$ 632	$ 138		$ 1,453,753	$ 316,585	$ -	1,770,337
	Charlotte St	East Main St	750	1500	5	$ 632	$ 138	$ 389	$ 474,050	$ 103,234	$ 583,500	1,160,784
Pitkin	Broad	Main	1700	0	2	$ 321	$ 131		$ 545,814	$ 223,383	$ -	769,197
Monroe Ave			400		4/5*	$ 632	$ 138		$ 252,827	$ 55,058	$ -	307,885
Canfield St			300		2	$ 321	$ 131		$ 96,320	$ 39,421	$ -	135,741
Broad St			150		4	$ 539	$ 135		$ 80,813	$ 20,179	$ -	100,992
East Ave			200		4	$ 539	$ 135		$ 107,751	$ 26,905	$ -	134,656
Charlotte St			300		2	$ 321	$ 131		$ 96,320	$ 39,421	$ -	135,741
S. Union St	Monroe Ave	Howell St	500		4	$ 539	$ 135		$ 269,378	$ 67,262	$ -	336,640
Total Roadway, Drainage and Retaining Wall Cost			7980									5,914,175

Center Portion Project (From Inner Loop under Monroe Avenue to Inner Loop under East Main Street)												
			Length			Cost Per Foot ($)						Section
Roadway Section	From	To	Roadway	Ret Walls	No of Lanes	Roadway	Storm	Ret Wall	Road cost	Storm cost	Wall Cost	Cost
Relocated Inner Loop	Monroe Ave	Howell St	750	1400	5	$ 632	$ 138	$ 281	$ 474,050	$ 103,234	$ 393,400	970,684
	Howell St	Charlotte St	2300		5	$ 632	$ 138		$ 1,453,753	$ 316,585	$ -	1,770,337
	Charlotte St	East Main St	750	1500	5	$ 632	$ 138	$ 389	$ 474,050	$ 103,234	$ 583,500	1,160,784
Pitkin	Broad	Main	1700	0	2	$ 321	$ 131		$ 545,814	$ 223,383	$ -	769,197
Monroe Ave			400		4/5*	$ 632	$ 138		$ 252,827	$ 55,058	$ -	307,885
Canfield St			300		2	$ 321	$ 131		$ 96,320	$ 39,421	$ -	135,741
Broad St			150		4	$ 539	$ 135		$ 80,813	$ 20,179	$ -	100,992
East Ave			200		4	$ 539	$ 135		$ 107,751	$ 26,905	$ -	134,656
Charlotte St			300		2	$ 321	$ 131		$ 96,320	$ 39,421	$ -	135,741
S. Union St	Monroe Ave	Howell St	500		4	$ 539	$ 135		$ 269,378	$ 67,262	$ -	336,640
Total Roadway, Drainage and Retaining Wall Cost												5,822,656

Inner Loop Cost Estimating

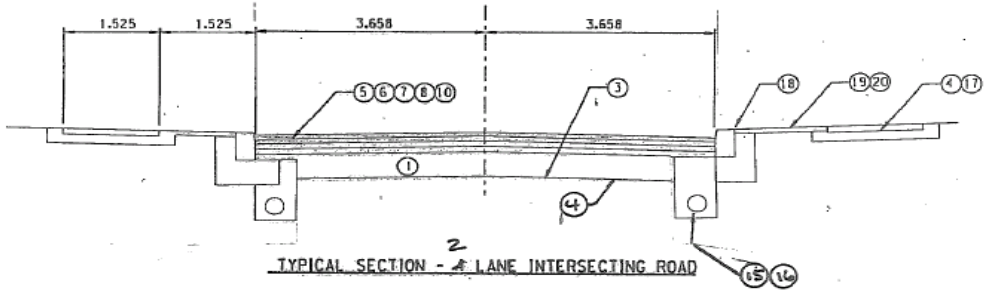
Roadway Summaries

Computation Worksheet HMA 2-Lane Intersecting Road

Intersecting Road, 4 Lane	Type	Unit	Depth	Width Top	Width Avg	HMA Factor	Units / Meter	Price .	Amount/ Meter	Remarks
Top Course	HMA	MT	0.04	7.316		2.392	0.69999	85	59.499565	Edit depth as required
Binder Course	HMA	MT	0.065	7.316		2.392	1.13749	80	90.999334	" " " "
Base Course	HMA	MT	0.2	7.316		2.243	3.28196	75	246.14682	" " " "
Tack Coat	dna	L	dna	7.316		0.18	5.26752	1.1	5.794272	Assumes 4 applications
Total Pavement Depth (DPAV)			0.305							DPAV
Subbase Depth (DSUV)			0.3							DSUB
Total Depth (DTOT)			0.605							DPav++DSUB
Excavation, roadway		CM	0.605	7.916			4.78918	16	76.62688	
" , sidewalk		CM	0.25	3.048			0.762	16	12.192	
Geotextile		SM	dna	7.316			7.316	4	29.264	Under subbase
Curb		M	dna				2	65	130	Two sides
Sidewalk		CM	0.1	3.048			0.3048	500	152.4	" "
Underdrain Pipe	152 mm	M	dna	dna			2	9	18	" "
Filter Material (.15 below subgrade)	Type 2	CM	dna	0.45			0.315	46	14.49	" "
Establishing Turf		SM	dna	1.524			3.048	0.5	1.524	" "
Topsoil		CM	0.1	1.524			0.3048	50	15.24	" "
Subbase, roadway		CM	0.3	7.316			2.1948	50	109.74	
Subbase, sidewalk		CM	0.15	6.096			1.8288	50	91.44	Two sides
							Cost / Meter		1053.3569	
							Cost / Foot		$ 321.07	

Assume depth of excavation is the same as the new depth plus 0.3 m outside of EP
Assumed 2 curb lanes at 14' (4.267) and 2 passing lanes at 12' (3.658)
Assumed snow storage and sidewalks at 5' (1.524) each.

Inner Loop Cost Estimating	
IR-2	**HMA 2-Lane Intersecting Road**



TYPICAL SECTION - ~~4~~ 2 LANE INTERSECTING ROAD

	ITEM	DESCRIPTION	UNIT
1	203.02	UNCLASSIFIED EXCAVATION	CM
2	203.03	EMBANKMENT IN PLACE	CM
3	207.10	GEOTEXTILE BEDDING	CM
4	304.12	SUBBASE COURSE, TYPE 2	CM
5	402.12XX	SUPERPAVE HMA	MT
6	402.25XX	SUPERPAVE HMA, 25.0 mm	MT
7	402.37XX	SUPERPAVE HMA, 37.5 mm	MT
8	407.01	TACK COAT	L
9	490.10	PRODUCTION COLD MILLING BITUMINOUS CONCRETE	SM
10	18502.03	CEMENT TREATED PERMEABLE BASE COURSE	CM
11	502.0101	CEMENT CONCRETE PAVEMENT	CM
12	502.20	TRANSVERSE JOINT SUPPORTS	EA
13	502.30	LONGITUDINAL JOINT TIES	EA
14	18502.7596	RUBBLIZING EXISTING CONCRETE PAVEMENT	SM
15	605.1001	UNDERDRAIN FILTER MATERIAL, TYPE 2	CM
16	605.1502	PERF. CORR. POLYETHYLENE UNDERDRAIN TUBE, 152 mm D	M
17	608.0101	CONCRETE SIDEWALKS & DRIVEWAYS	CM
18	609.04	CAST-IN-PLACE CONCRETE CURB	M
19	610.0203	ESTABLISHING TURF	SM
20	613.0101	TOPSOIL	CM

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Inner Loop Cost Estimate

2 ~~4~~-LANE INTERSECTING ROAD

IR-4 | NTS | JANUARY 2010

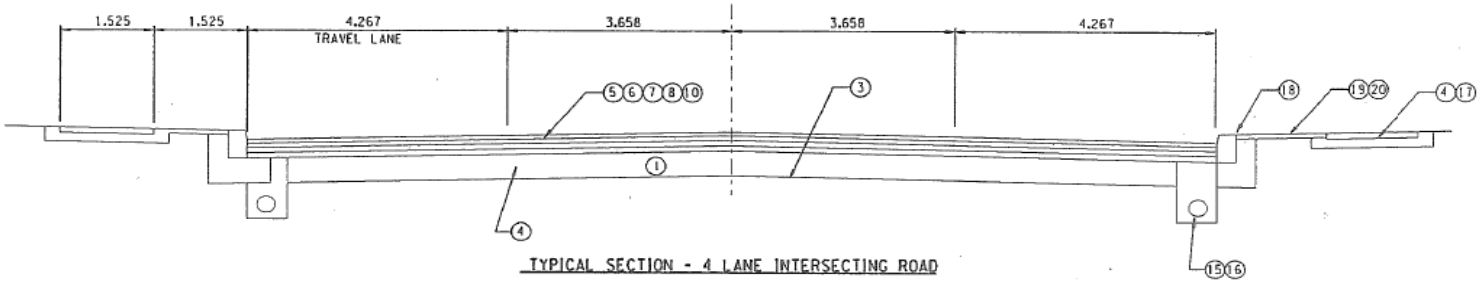
Computation Worksheet HMA 4-Lane Intersecting Road

Intersecting Road, 4 Lane	Type	Unit	Depth	Width Top	Width Avg	HMA Factor	Units / Meter	Price .	Amount/ Meter	Remarks
Top Course	HMA	MT	0.04	15.85		2.392	1.51653	85	128.90488	Edit depth as required
Binder Course	HMA	MT	0.065	15.85		2.392	2.46436	80	197.14864	" " " "
Base Course	HMA	MT	0.2	15.85		2.243	7.11031	75	533.27325	" " " "
Tack Coat	dna	L	dna	15.85		0.18	11.412	1.1	12.5532	Assumes 4 applications
Total Pavement Depth (DPAV)			0.305							DPAV
Subbase Depth (DSUV)			0.3							DSUB
Total Depth (DTOT)			0.605							DPav++DSUB
Excavation, roadway		CM	0.605	16.45			9.95225	16	159.236	
" , sidewalk		CM	0.25	3.048			0.762	16	12.192	
Geotextile		SM	dna	15.85			15.85	4	63.4	Under subbase
Curb		M	dna				2	65	130	Two sides
Sidewalk		CM	0.1	3.048			0.3048	500	152.4	" "
Underdrain Pipe	152 mm	M	dna	dna			2	9	18	" "
Filter Material (.15 below subgrade)	Type 2	CM	dna	0.45			0.315	46	14.49	" "
Establishing Turf		SM	dna	1.524			3.048	0.5	1.524	" "
Topsoil		CM	0.1	1.524			0.3048	50	15.24	" "
Subbase, roadway		CM	0.3	15.85			4.755	50	237.75	
Subbase, sidewalk		CM	0.15	6.096			1.8288	50	91.44	Two sides

Cost / Meter	1767.552
Cost / Foot	$ 538.76

Assume depth of excavation is the same as the new depth plus 0.3 m outside of EP
Assumed 2 curb lanes at 14' (4.267) and 2 passing lanes at 12' (3.658)
Assumed snow storage and sidewalks at 5' (1.524) each.

Inner Loop Cost Estimating	
IR-4	HMA 4-Lane Intersecting Road



TYPICAL SECTION - 4 LANE INTERSECTING ROAD

	ITEM	DESCRIPTION	UNIT
1	203.02	UNCLASSIFIED EXCAVATION	CM
2	203.03	EMBANKMENT IN PLACE	CM
3	207.10	GEOTEXTILE BEDDING	CM
4	304.12	SUBBASE COURSE, TYPE 2	CM
5	402.12XX	SUPERPAVE HMA	MT
6	402.25XX	SUPERPAVE HMA, 25.0 mm	MT
7	402.37XX	SUPERPAVE HMA, 37.5 mm	MT
8	407.01	TACK COAT	L
9	490.10	PRODUCTION COLD MILLING BITUMINOUS CONCRETE	SM
10	18502.03	CEMENT TREATED PERMEABLE BASE COURSE	CM
11	502.0101	CEMENT CONCRETE PAVEMENT	CM
12	502.20	TRANSVERSE JOINT SUPPORTS	EA
13	502.30	LONGITUDINAL JOINT TIES	EA
14	18502.7596	RUBBLIZING EXISTING CONCRETE PAVEMENT	SM
15	605.1001	UNDERDRAIN FILTER MATERIAL, TYPE 2	CM
16	605.1502	PERF. CORR. POLYETHYLENE UNDERDRAIN TUBE, 152 mm Ø	M
17	608.0101	CONCRETE SIDEWALKS & DRIVEWAYS	CM
18	609.04	CAST-IN-PLACE CONCRETE CURB	M
19	610.0203	ESTABLISHING TURF	SM
20	613.0101	TOPSOIL	CM

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Inner Loop Cost Estimate

4-LANE INTERSECTING ROAD

IR-4 | NTS | JANUARY 2010

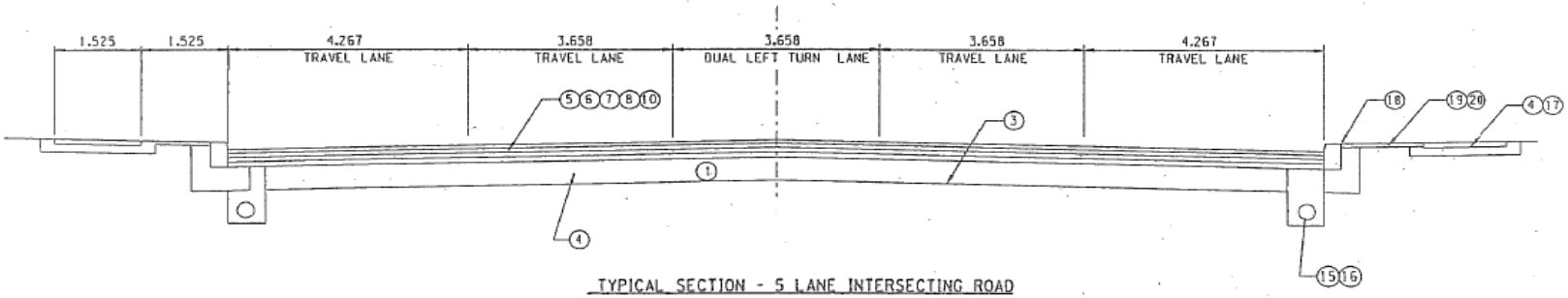
Computation Worksheet HMA 5-Lane Intersecting Road

Intersecting Road, 5 lane	Type	Unit	Depth	Width Top	Width Avg	HMA Factor	Units / Meter	Price	Amount/ Meter	Remarks
Top Course	HMA	MT	0.04	19.508		2.392	1.86653	85	158.65466	Edit depth as required
Binder Course	HMA	MT	0.065	19.508		2.392	3.0331	80	242.64831	" " " "
Base Course	HMA	MT	0.2	19.508		2.243	8.75129	75	656.34666	" " " "
Tack Coat	dna	L	dna	19.508		0.18	14.0458	1.1	15.450336	Assumes 4 applications
Total Pavement Depth (DPAV)			0.305							DPAV
Subbase Depth (DSUV)			0.3							DSUB
Total Depth (DTOT)			0.605							DPav++DSUB
Excavation, roadway		CM	0.605	20.108			12.1653	16	194.64544	
" , sidewalk		CM	0.25	3.048			0.762	16	12.192	
Geotextile		SM	dna	19.508			19.508	4	78.032	Under subbase
Curb		M	dna				2	65	130	Two sides
Sidewalk		CM	0.1	3.048			0.3048	500	152.4	" "
Underdrain Pipe	152 mm	M	dna	dna			2	9	18	" "
Filter Material (.15 below subgrade)	Type 2	CM	dna	0.45			0.315	46	14.49	" "
Establishing Turf		SM	dna	1.524			3.048	0.5	1.524	" "
Topsoil		CM	0.1	1.524			0.3048	50	15.24	" "
Subbase, roadway		CM	0.3	19.508			5.8524	50	292.62	
Subbase, sidewalk		CM	0.15	6.096			1.8288	50	91.44	Two sides

Cost / Meter	2073.6834
Cost / Foot	$ 632.07

Assume depth of excavation is the same as the new depth plus 0.3 m outside of EP
Assumed 2 curb lanes at 14' (4.267), 2 passing lanes at 12' (3.658) and a dual left turn lane at 12' (3.658)
Assumed snow storage and sidewalks at 5' (1.524) each.

Inner Loop Cost Estimating	
IR-5	HMA 5-Lane Intersecting Road



TYPICAL SECTION - 5 LANE INTERSECTING ROAD

	ITEM	DESCRIPTION	UNIT
1	203.02	UNCLASSIFIED EXCAVATION	CM
2	203.03	EMBANKMENT IN PLACE	CM
3	207.10	GEOTEXTILE BEDDING	CM
4	304.12	SUBBASE COURSE, TYPE 2	CM
5	402.12XX	SUPERPAVE HMA	MT
6	402.25XX	SUPERPAVE HMA, 25.0 mm	MT
7	402.37XX	SUPERPAVE HMA, 37.5 mm	MT
8	407.01	TACK COAT	L
9	490.10	PRODUCTION COLD MILLING BITUMINOUS CONCRETE	SM
10	18502.03	CEMENT TREATED PERMEABLE BASE COURSE	CM
11	502.0101	CEMENT CONCRETE PAVEMENT	CM
12	502.20	TRANSVERSE JOINT SUPPORTS	EA
13	502.30	LONGITUDINAL JOINT TIES	EA
14	18502.7596	RUBBLIZING EXISTING CONCRETE PAVEMENT	SM
15	605.1001	UNDERDRAIN FILTER MATERIAL, TYPE 2	CM
16	605.1502	PERF. CORR. POLYETHYLENE UNDERDRAIN TUBE, 152 mm.D	M
17	608.0101	CONCRETE SIDEWALKS & DRIVEWAYS	CM
18	609.04	CAST-IN-PLACE CONCRETE CURB	M
19	610.0203	ESTABLISHING TURF	SM
20	613.0101	TOPSOIL	CM

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Inner Loop Cost Estimate

5-LANE INTERSECTING ROAD

IR-5 | NTS | JANUARY 2016

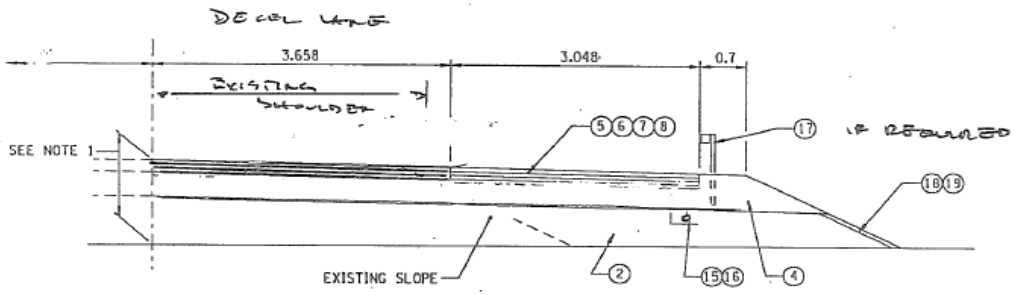
Computation Worksheet Auxiliary Roadway, Existing Roadway To Remain

Item	Type	Unit	Depth	Width Top	Width Avg	HMA Factor	Units / Meter	Price	Amount/ Meter
Top Course	HMA	MT	0.04	6.706		2.392	0.64	85	54.54
Binder Course	HMA	MT	0.065	6.906		2.392	1.07	80	85.90
Base Course	HMA	MT	0.2	7.106		2.243	3.19	75	239.08
Plant quality adjustment (.05x$70)									17.15
Tack Coat	dna	L	dna	6.906		0.18	4.97	1.1	5.47
Total Pavement Depth (DPAV)			0.4						
Subbase Depth (DSUV)			0.3						
Total Depth (DTOT)			0.7						
Excavation		CM	0.533	3.749	4.282		2.28	16	36.52
Geotextile		SM					8.51	4	34.02
Subbase Course		CM		7.106	7.806		2.34	50	117.10
Filter Material	Type 2	CM		0.45			0.20	46	9.32
Underdrain Pipe	152 mm	M	dna	dna			1	9	9.00
						Cost / Meter			608.09
						Cost / Foot			185.35

Item Data	Unit	Price
Excavation	CM	16
Embankment	CM	10
Guide Railing	M	110
Establishing Turf	SM	0.8
Topsoil	CM	50

Inner Loop Cost Estimating

Connecting Ramp From 490



PROPOSED TYPICAL SECTION
AUXILIARY LANE, EXISTING ROADWAY TO REMAIN

	ITEM	DESCRIPTION	UNIT
1	203.02	UNCLASSIFIED EXCAVATION	CM
2	203.03	EMBANKMENT IN PLACE	CM
3	207.10	GEOTEXTILE BEDDING	CM
4	304.12	SUBBASE COURSE, TYPE 2	CM
5	402.12XX	SUPERPAVE HMA	MT
6	402.25XX	SUPERPAVE HMA, 25.0 mm	MT
7	402.37XX	SUPERPAVE HMA, 37.5 mm	MT
8	407.01	TACK COAT	L
9	490.10	PRODUCTION COLD MILLING BITUMINOUS CONCRETE	SM
10	18502.03	CEMENT TREATED PERMEABLE BASE COURSE	CM
11	502.0101	CEMENT CONCRETE PAVEMENT	CM
12	502.20	TRANSVERSE JOINT SUPPORTS	EA
13	502.30	LONGITUDINAL JOINT TIES	EA
14	18502.7596	RUBBLIZING EXISTING CONCRETE PAVEMENT	SM
15	605.1001	UNDERDRAIN FILTER MATERIAL, TYPE 2	CM
16	605.1502	PERF. CORR. POLYETHYLENE UNDERDRAIN TUBE, 152 mm D	M
17	606.10	BOX BEAM GUIDE RAILING	M
18	610.0203	ESTABLISHING TURF	SM
19	613.0101	TOPSOIL	CM

NOTES:

1. USE DEPTH FROM TGL TO EXISTING GROUND TO DETERMINE QUANTITIES FOR EMBANKMENT, GUIDE RAILING, TOPSOIL AND ESTABLISHMENT OF TURF.
2. EXISTING RIGHT LANE TO REMAIN.
3. EXISTING SHOULDER TO BE REMOVED.

THIS SECTION MODIFIED TO PROVIDE HMA DECELERATION LANE ADDED TO INNER LOOP

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Inner Loop Cost Estimate
AUXILIARY LANE

AUX-1	NTS	JANUARY 2010

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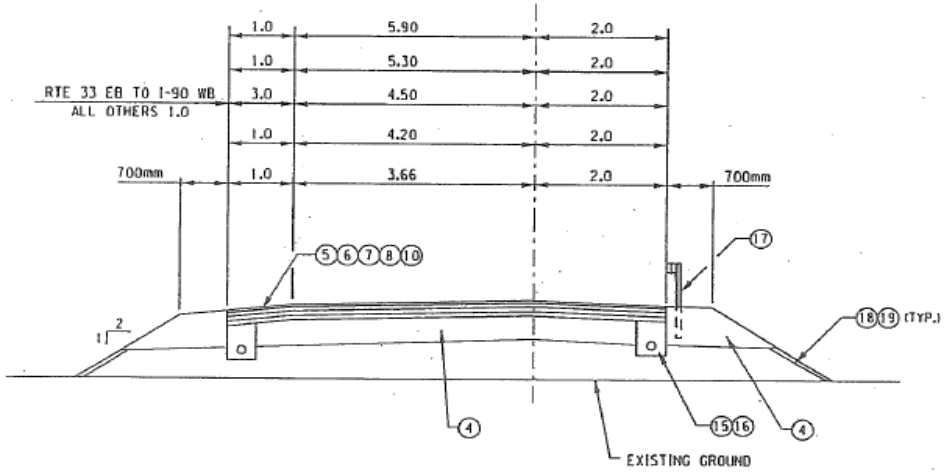
Computation Worksheet For HMA Ramps
Basic Section

Above Subgrade	Type	Unit	Depth	Width Top	Avg	HMA Factor	Units / Meter	Price .	Amount/ Meter
Top Course	HMA	MT	0.04	7.00		2.39	0.67	85.00	56.95
Binder Course	HMA	MT	0.07	7.20		2.39	1.12	80.00	89.52
Base Course	HMA	MT	0.20	7.40		2.24	3.32	75.00	249.00
Plant Quality Adjustment (.05x$70)									17.89
Mountable curb		M					1.00		
Tack Coat	dna	L	dna	7.20		0.18	5.18	1.10	5.70
Total Pavement Depth (DPAV)			0.41						
Subbase Depth (DSUV)			0.30						
Total Depth (DTOT)			0.71						
Excavation			0.71	8.40			5.92	16.00	94.75
Geotextile		SM					11.22	4.00	44.88
Subbase Course		CM		8.40	9.81		4.08	50.00	204.05
Filter Material	Type 2	CM		0.45			0.41	46.00	18.63
Underdrain Pipe	152 mm	M	dna	dna			2.00	9.00	14.00
Cost per meter for each extra meter of width				111.07	Cost / Meter Above Subgrade				795.37
Use 9.0 meter width	9.0-7.0 x 111.07=222.14								222.14
							Cost/ meter		1017.51
							Cost/ foot		$ 310.14

Inner Loop Cost Estimating

Connecting Ramp



PROPOSED TYPICAL SECTION
HMA 1 LANE RAMPS

	DESCRIPTION	UNIT
1	UNCLASSIFIED EXCAVATION AND DISPOSAL	CM
2	EMBANKMENT IN PLACE	CM
3	GEOTEXTILE BEDDING	SM
4	SUBBASE COURSE, TYPE 2	CM
5	SUPERPAVE HMA	NT
6	25mm SUPERPAVE HMA	NT
7	37.5mm SUPERPAVE HMA	NT
8	TACK COAT	L
9	PRODUCTION COLD MILLING BITUMINOUS CONCRETE	SM
10	CEMENT TREATED PERMEABLE BASE COURSE	CM
11	CEMENT CONCRETE PAVEMENT	SM
12	TRANSVERSE JOINT SUPPORTS	EA
13	LONGITUDINAL JOINT TIES	EA
14	RUBBLIZING EXISTING CONCRETE PAVEMENT	SM
15	UNDERDRAIN FILTER MATERIAL, TYPE 2	CM
16	PERFORATED, CORRUGATED POLYETHYLENE UNDERDRAIN TUBING 152mm DIAMETER	M
17	BOX BEAM GUIDE RAILING	M
18	ESTABLISHING TURF	SM
19	TOPSOIL	CM

NOTES:

1. SEE TABLE RW-1 FOR OF RAMP WIDTHS AND LOCATIONS.
2. SEE TABLE HMA (C) FOR COST COMPUTATIONS.

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WATTS ENGINEERS

I-90/ I-290/ ROUTE 33 INTERCHANGE
INTERCHANGE CORRIDOR STUDY
HMA LANE RAMPS

HMA-1	NTS	MARCH 2006

Closed Drainage System													
	Roadway "W"			Pipe "L"			Excavation "L" x 1.8w			Fill			Frame &
Location	4-Lane	5-Lane	7-Lane	4-Lane	5-Lane	7-Lane	4-Lane	5-Lane	7-Lane	4-Lane	5-Lane	7-Lane	Grate
Transverse	15.85	19.508	26.824	14.05	17.708	25.024	24.75	31.3344	44.5032	20.8588	26.4079	37.5063	
Longitudinal				60	60	60	108	108	108	91.02	91.02	91.02	
Drop Inlet							20.72	20.72	20.72	15.91	15.91	15.91	
F&G													0.705
Total				74.05	77.708	85.024	153.47	160.054	173.223	127.789	133.338	144.436	

			Quantity			Amount			
Item	Unit	Price	4-Lane	5-Lane	7-Lane	4-Lane	5-Lane	7-Lane	2-Lane
Pipe	m	105	74.05	77.708	85.024	7775.25	8159.34	8927.52	
Excavation	cm	35	153.47	160.054	173.223	5371.45	5601.9	6062.81	
Select Fill	cm	50	127.789	133.338	144.436	1000	1000	1000	
Drop Inlet	m	2800	3.7	3.7	3.7	10360	10360	10360	
Frame & Gr	sm	1400	1.41	1.41	1.41	1974	1974	1974	
Total cost for each 60 meter section of intersecting roadway						26480.7	27095.2	28324.3	25,866
Total cost for each foot of intersecting roadway						134.524	137.646	143.889	131.402

The closed drainage system is estimated based on lateral connections at 60 meter (200 ft) intervals.
The estimated quantities are for a 60 meter (200 ft) section of intersecting roadway

Pavement and Drainage Unit Prices

Price List			
Item Number	Description	Unit	Price Used
203 . 02	Unclassified Excavation	CM	$ 16.00
203 . 03	Embankment in place	CM	$ 16.00
203 . 07	Select Fill	CM	$ 50.00
206 . 02	Trench and Culvert Excavation	CM	$ 35.00
207 . 10	Geotextile Bedding	CM	$ 4.00
304 . 12	Subbase Course, Type 2	CM	$ 50.00
402 . 125201	Superpave HMA, 12.0 mm, Top Course	MT	$ 85.00
402 . 255901	Superpave HMA, 25.0 mm, Binder Course	MT	$ 80.00
402 . 377901	Superpave HMA, 37.5 mm, Base Course	MT	$ 75.00
407 . 01	Tack Coat	L	$ 1.10
603 . 05	Corr Steel Pipe, 600mm Diameter	M	$ 105.00
604 . 50	Type T Drop Inlet	M	$ 1,800.00
605 . 1001	Underdrain Filter Type 2	CM	$ 45.00
605 . 1502	Perforated Corrugated Polyethylene Underdrain Tube, 152 mm	M	$ 9.00
606 . 10	Box Beam Guide Railing	M	$ 110.00
606 . 3051	Single Slope Concrete Median Barrier	M	$ 475.00
608 . 0101	Concrete Sidewalks and Driveways	CM	$ 500.00
609 . 0401	Granite Curb	M	$ 65.00
610 . 0203	Establishing Turf	SM	$ 0.80
613 . 0101	Topsoil	CM	$ 50.00
655 . 02	Frames and Grates, #16	SM	$ 1,400.00

Inner Loop
Preliminary estimate

Waterlines

Total Length of Main Run	3630 feet	From Monroe ave to University Ave
Total Length of all side streets	1625 feet	Assume 13 side streets at 125' each

Assume main run will be 12" waterline and side streets will be 8" waterline
Use bid histories for ecent projects (similar setting)

ITEM #	DESCRIPTION	UNIT	UNIT COST	QTY TOTAL	COST TOTAL	Comment
09.106	6" - Ductile Iron Pipe	LF	$ 75.00	692	$ 51,924	Use at hydrants and commercial services
09.108	8" - Ductile Iron Pipe	LF	$ 67.50	1625	$ 109,688	
09.112	12" - Ductile Iron Pipe	LF	$ 82.50	3630	$ 299,475	
09.31212	12" x 12" Tapping Sleeve and Valve	EA	$ 8,000.00	3	$ 24,000	
09.506	Water Valve and Boxes - 6" Dia.	EA	$ 1,000.00	28	$ 27,693	Assume 1 per hydrant and at commercial services
09.508	Water Valve and Boxes - 8" Dia.	EA	$ 1,200.00	26	$ 31,200	Assume 2 per side street
09.512	Water Valve and Boxes - 12" Dia.	EA	$ 2,100.00	26	$ 54,600	Assume 2 per side street
09.71X	Corporation Stop/Tap - Installed	EA	$ 400.00	20	$ 8,000	mostly commercial services
09.72X	Curb Stop - Installed	EA	$ 150.00	20	$ 3,000	
09.73X	Water Service Pipe - Installed (3/4" and 1" Copper)	LF	$ 30.00	750	$ 22,500	
09.814	Water Service Box - Complete Installed	EA	$ 250.00	20	$ 5,000	
09.910	Fire Hydrant	EA	$ 3,500.00	13	$ 44,425	assume 1 per 350' + more at sidestreets
	TOTAL				$ 681,504	

$/foot $ 129.69

Inner Loop
Preliminary estimate

Lighting

Total Length of Main Run	5030 feet	From Monroe ave to University Ave + approaches at north and south
Total Length of all side streets	1625 feet	Assume 13 side streets at 125' each
TOTAL	6655 feet	

Use bid histories for recent projects (similar setting) - use decorative lighting (i.e. not NYSDOT style)

ITEM #	DESCRIPTION	UNIT	UNIT COST	QTY TOTAL	COST TOTAL	Comment
670.0112	FOUNDATION FOR LIGHT STANDARDS 4 FT. LONG	EA	$ 1,000.00	84	$ 84,188	Assume lights at 80' spacing
670.1001--05	LIGHT STANDARD, SPECIAL	EA	$ 5,000.00	84	$ 420,938	
670.2602	RIGID PLASTIC CONDUIT	LF	$ 6.00	13310	$ 79,860	assume full length conduit on both sides
670.3001	PULLBOXES LESS THAN 5 CF, INSIDE VOLUME (LIGHTING)	EA	$ 700.00	28	$ 19,644	assume 1 pullbox for every 3 lights
670.80	REMOVE AND STORE LAMPPOST ASSEMBLY	EA	$ 350.00	84	$ 29,466	assume equal number of removals
670.82	REMOVE LAMPPOST FOUNDATION	EA	$ 300.00	84	$ 25,256	
	HANDHOLE	EA	$ 500.00	84	$ 42,094	one for each light
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
					$ -	
	TOTAL				$ 701,444	
	$/foot				$ 105.40	

Inner Loop
Preliminary estimate

Landscape Items

Total Length of Main Run	3630 feet	From Monroe ave to University Ave + approaches at north and south
Total Length of all side streets	1625 feet	Assume 13 side streets at 125' each
TOTAL	5255 feet	

Use bid histories for recent projects (similar setting)

ITEM #	DESCRIPTION	UNIT	UNIT COST	QTY TOTAL	COST TOTAL	Comment
611.010101	PLANTING - MAJOR DECIDUOUS TREE SPECIES	EA	$ 500.00	66	$ 32,844	Assume 80' spacing
611.020101	PLANTING - MINOR DECIDUOUS TREE SPECIES	EA	$ 375.00	53	$ 19,706	assume 100' spacing
613.02	PLACING TOPSOIL - TYPE A	CY	$ 50.00	1775	$ 88,733	re-seed whole fill area
614.0334	TREE REMOVAL 24" TO 35"	EA	$ 1,000.00	25	$ 25,000	
615.04020008	TREE/ VEGATATION PROTECTION BARRIER	LF	$ 5.00	1000	$ 5,000	
610.0203	Establishing turf	SY	$ 2.50	16133	$ 40,333	re-seed whole fill area
	Trash receptacles	EA	$ 1,200.00	10	$ 12,000	
	Benches	EA	$ 1,500.00	12	$ 18,000	
	Bike Rack	EA	$ 3,500.00	4	$ 14,000	
05608.0102	Color tinted crosswalks	CY	$ 500.00	264	$ 132,000	
					$ -	
	TOTAL				$ 387,617	

$/foot $ 73.76

Inner Loop
Preliminary estimate

Fill Volume

Use 15' clearance at bridges to determine wall heights using Google Street View = 18' fill height at bridges
Divide into sections as shown below

Section	Plan Area (ft^2)	Avg. Wall Height (ft)	Volume (CY)	
Clinton to Monroe	36000	10	13,333	reduce this section by 1/3 for ramp up to Monroe
Monroe to Roundabout at S. Union	50000	10	18,519	to where S. Union tangent point
Roundabout to Canfield	23000	2	1,704	
Canfield to E. Broad St.	54000	9.5	19,000	
E. Broad St. to East Ave.	47000	18	31,333	stays deep in this section
East Ave. to Charlotte Roundabout	93000	13	44,778	includes side slopes
Charlotte roundabout to Main St. E.	160000	4.5	26,667	minimal fill here - intent is to leave Main St. bridge intact
		sum	155,333	CY
	Item 203.03	unit cost	$ 16.00	per CY
			$2,485,333.33	Cost

Inner Loop
Preliminary estimate

Roundabouts

The 5-lane pavement section was carried in the estimate through the roundabout areas @ about $90K per roundabout.
Per WaDOT, the typical cost of a two-lane roundabout is $330K. Therefore add $240K per roundabout.
This will cover cost of additional curbs, paver apron, pavement, etc.

Item	Cost	
Roundabouts - 2	$ 480,000.00	

Inner Loop
Preliminary estimate

Structure Removals

Per Stantec, use removal costs from Draft Summary reports

Bridge	**Cost**	
Monroe Ave	$ 217,000	
Broad Street	$ 282,000	
Steam Pipe	$ 23,000	
East Ave	$ 198,000	
East Main Street	$ -	Stays intact
All others listed below stay intact		
Cost	$ 720,000	

BIN	Feature Carried/Crossed	Bridge Removal Cost (2015 $)
1093890	Ramp LB over I-490	$ 399,000
1077580	South Clinton Avenue over I-490	-
1050139	Inner Loop over Ramp LB	$ 302,000
1077590	South Clinton Avenue over Inner Loop	$ 627,000
1021630	Monroe Avenue over Inner Loop	$ 217,000
1050149	Broad Street over Inner Loop	$ 282,000
1050150	Steam Pipe Bridge over Inner Loop	$ 23,000
1035240	East Avenue over Inner Loop	$ 198,000
1050160	East Main Street over Inner Loop	$ 230,000
1073830	Ramp to E. Main Street over Inner Loop	$ 105,000
	Total Bridge Removal Cost (2015 $) =	**$ 2,383,000**

Inner Loop
Preliminary estimate

Wall and Rail Removals

Total Length of Main Run	4100	feet	Likely length where rail will be impacted
Total Length of walls	2325	feet	Lenth of walls (& rail on walls) - for one side
TOTAL	6425	feet	

ITEM #	DESCRIPTION	UNIT	UNIT COST	QTY TOTAL	COST TOTAL	Comment
606.73	Rail removal - box beam	ft	$ 5.00	12850	$ 64,250	qty reflects 2 runs of median rail, and along all walls
580.01	Removal of Structural Concrete (use low unit cost since work is not precise)	CY	$ 150.00	3444	$ 516,667	assume 5' depth x 4' width x length (2 sides)
606.10	box beam railing	ft	$ 60.00	1000	$ 60,000	add in some railing for new project (misc. locations)
	TOTAL				$ 640,917	

$/foot $ 99.75

Inner Loop
Preliminary estimate

Sign and Striping

Total Length of Main Run	5255 feet	Total impacted length for signs
TOTAL	5255 feet	

ITEM #	DESCRIPTION	UNIT	UNIT COST	QTY TOTAL	COST TOTAL	Comment
606.73	Signs and striping	ft	$ 19.00	5255	$ 99,845	use $17/ft based prorated based on 2 recent Buffalo projects
	TOTAL				$ 99,845	

$/foot $ 19.00

Inner Loop
Preliminary estimate

Misc

Total Length of Main Run	5255	feet	Total impacted length for signs
TOTAL	5255	feet	

ITEM #	DESCRIPTION	UNIT	UNIT COST	QTY TOTAL	COST TOTAL	Comment
	temp concrete barrier	ft	$ 20.00	2000	$ 40,000	Assume som ewill be needed for wall removals
	engineer's offcie	MO	$ 3,000.00	36	$ 108,000	
	TOTAL				$ 148,000	

$/foot $ 28.16