McMAHON ASSOCIATES
350 Myles Standish Blvd., Suite 103
Taunton, MA 02780
p 508-823-2245 | f 508-823-2246

PRINCIPALS
Joseph W. McMahon, P.E.
Joseph J. DeSantis, P.E., PTOE
John S. DePalma
William T. Steffens
Casey A. Moore, P.E.
Gary R. McNaughton, P.E., PTOE

ASSOCIATES
John J. Mitchell, P.E.
Christopher J. Williams, P.E.
R. Trent Ebersole, P.E.
Matthew M. Kozsuch, P.E.
Maureen Chlebek, P.E., PTOE
Dean A. Carr, P.E.

October 19, 2018

Daniel Nason
Director of Public Works
Department of Public Works Building
275 Old Lancaster Road
Sudbury, MA 01766

RE: Melone Residential
Traffic Mitigation Memorandum
North Road, Sudbury, Massachusetts

Dear Mr. Nason:

McMahon Associates has prepared this summary memorandum to list possible traffic mitigation items to consider as part of the proposed residential development to be located on the Melone property on North Road (Route 117) in Sudbury, MA. These items are based on our Traffic Impact Study, dated October 2018, as well as coordination with Town of Sudbury officials on current areas of concern along the North Road (Route 117) corridor.

Overall recommendations

- Have the Proponent complete a traffic monitoring program (suggestion: 1 year out from a substantial occupancy rate) to document and review traffic conditions at the study area intersections. The data collected as part of the monitoring would be used to assess the impacts of the project and to determine if the mitigation included as part of the project is adequate or if further review or additional mitigation will be required.
- The Town may want to request the construction of a sidewalk on North Road to connect to the site to Davis Fields (or contribute to a fair share monetary donation).
- Transportation Demand Management (TDM) strategies should be employed by the project to offset single occupancy vehicle trips to/from the site. An example is providing such bike racks or secure bike locker storage areas on site.
- The project should construct a sidewalk on site to connect to North Road (Route 117), and allow a safe area for a school bus stop.
- The project could fund a corridor study on Route 117 through the Towns of Sudbury, Concord and Lincoln to study existing deficiencies, safety and identify possible short and long term solutions to improve traffic congestion along the corridor.

In addition to the overall project recommendations, the following specific traffic mitigation items can be considered for the following individual intersections along the Route 117 corridor.

North Road (Route 117) at Mossman Rd/Powder Mill Rd

- Short term signage and striping improvements could be implemented such as new stop lines and crosswalk lines and signs.
- Although the impacts from the proposed development at this intersection are limited, we recommend this intersection be evaluated for a future traffic signal with the Town to address existing operational issues as it currently meets warrants for signalization. The Proponent should work with the Town of Sudbury to make a fair share contribution to future improvements at this intersection.

North Road (Route 117) at Dakin Rd/Pantry Rd

- The existing traffic signal loops and their operation at the intersection of North Road at Dakin Road/Pantry Road should be evaluated. There may be a need to upgrade the vehicle detection at this signalized intersection as part of the residential project.
- The Proponent should implement revised traffic signal timings to offset slight increases in vehicle delays expected to result from the proposed development. Short-term signage and striping improvements to address existing safety deficiencies at this intersection should also be considered, such as installation of yield pavement markings or signal backplates. Pedestrian signal improvements and adaptive signal control can also be considered as a long term improvement to traffic operations.

North Road (Route 117) at Davis Fields

- Although this intersection was not studied as part of the Traffic Impact Study, the Town of Sudbury has concerns with traffic operations at this intersection during peak times when the field is in use (weekday afternoon and weekends). Turn lanes may be a possible solution to reduce congestion at this intersection during peak usage by minimizing delays for North Road through volumes, but turn lanes would require roadway widening. The Town could consider a fair share monetary contribution for this improvement.

North Road (Route 117) at 144 North Road

- Although this intersection was not studied as part of the Traffic Impact Study, the Town of Sudbury has concerns with traffic operations at this intersection during corridor peak times. Turn lanes may be a possible solution to reduce congestion at this intersection during peak usage and to minimize delays for North Road through volumes. Turn lanes would require roadway widening. The Town could consider a fair share monetary contribution for this improvement.

North Road (Route 117) at Melone Site Driveway

- Proposed operations for the primary site driveway appear to be adequate during peak periods. Based on the projected site volumes, turn lanes are not necessarily required, but may be desired by the Town of Sudbury to minimize disruption to the North Road corridor.
- We recommend that safe sight lines be provided for the driveways and recommend vegetation removal and/or landscaping as required to maintain safe sight lines. In addition, an intersection warning sign (W2-2) should also be installed on North Road in both directions to warn motorists of turning vehicles ahead.
- A traffic signal is not warranted at this intersection based on the site traffic projections at this time. The intersection should be included in the traffic monitoring program and if the future volumes coming from the site exceed the thresholds for traffic signal warrants, the Proponent should fund the installation of a new traffic signal.

North Road (Route 117) at Plainfield Road – Concord, MA

- Although this intersection was not studied as part of the Traffic Impact Study, the Town of Sudbury has concerns with traffic operations at this intersection during corridor peak times as it is a potential cut-through to Sudbury Road. Short term signage and striping improvements and vegetation trimming to improve sight lines can be considered as part of the project. Future long term roadway widening improvements may be considered in coordination with the Town of Concord. Turn lanes may be a possibility to reduce congestion at this intersection during peak usage while minimizing delays for the Route 117 corridor, but turn lanes would require roadway widening. Cut-through concerns could also be addressed if long term traffic signal improvements are considered at the Fitchburg Turnpike (Route 117) and Sudbury Road intersection.
- The Town could consider a fair share monetary contribution for the turn lane improvement.

Fitchburg Turnpike (Route 117) at Sudbury Road – Concord, MA

- This intersection had the highest occurrence of crashes out of all the study area intersections, however, the crash rate is still slightly under the average MassDOT crash rates. The majority of crashes are angle collisions, likely because of the lack of protected turning movements.
- At the intersection of Fitchburg Turnpike at Sudbury Rd, the Proponent should implement revised traffic signal timing or phasing to offset slight increases in vehicle delays from the proposed development. Short term signage and striping improvements could be implemented, such as yield pavement markings for the channelized left turns and new backplates at the signal.
- The Town of Concord may want to consider a fair share monetary contribution to address a long-term signal upgrade at this intersection, which could include adaptive signal control.

S Great Road (Route 117) and Concord Road (Route 126)

- Although this intersection was not studied as part of the Traffic Impact Study, the Town of Sudbury has concerns with traffic operations at this intersection during peak times as it

currently presents a pinch point. Short term traffic signal timing and phasing improvements can be considered and a long term improvement project may need to be considered to upgrade the intersection to current standards in coordination with the Town of Concord. The Town of Concord may want to consider a fair share monetary contribution to address a long-term signal upgrade at this intersection, which could include adaptive signal control.

We hope this comprehensive list of potential traffic mitigation items assists the Town of Sudbury with their review of the proposed project.

Please do not hesitate to contact us with questions.

Very truly yours,

Colleen Medeiros

Colleen Medeiros, P.E.
Project Manager

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Concept Estimate

Project: Melone Site
Location: Subdury, MA
Date: 11/20/2018

Overall Recommendations

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Bituminous Sidewalk	1500	SF	$ 7.11	$ 8.00		$ 12,000.00		
				Contingency	25%	$ 3,000.00		
				Total		$ 15,000.00	**SAY**	$ 15,000.00

Route 117 at Mossman Rd/Powder Mill Rd

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Warning - Regulatory + Route marker - Alum. Pane (type a)	66	SF	$ 12.00	$ 12.00		$ 792.00		
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	6	EA	$ 125.00	$ 125.00		$ 750.00		
Pavement Marking Lines	2501	LF	$ 5.00	$ 5.00		$ 12,505.00		
Traffic Signal Upgrade	1	LS	$ 200,000.00	$ 200,000.00		$ 200,000.00		
				Contingency	25%	$ 53,511.75		
				Total		$ 267,558.75	**SAY**	$ 270,000.00

Route 117 at Dakin Rd/Pantry Rd

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Warning - Regulatory + Route marker - Alum. Pane (type a)	36	SF	$ 12.00	$ 12.00		$ 432.00		
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	4	EA	$ 125.00	$ 125.00		$ 500.00		
Loop Detector Lead In	16	LF	$ 7.00	$ 7.00		$ 112.00		
Pavement Marking Lines	2641	LF	$ 5.00	$ 5.00		$ 13,205.00		
Adaptive Signal Control upgrade	1	LS	$ 80,000.00	$ 80,000.00		$ 80,000.00		
Pedestrian Signal	1	LS	$ 10,000.00	$ 10,000.00		$ 10,000.00		
				Contingency	25%	$ 26,062.25		
				Total		$ 130,311.25	**SAY**	$ 131,000.00

Route 117 at Davis Fields

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Full depth	4800	SF	$ 14.38	$ 15.00		$ 72,000.00		
Pavement Micromilling and Overlay	9600	SF	$ 2.44	$ 3.00		$ 28,800.00		
Pavement Marking Lines	1200	LF	$ 5.00	$ 5.00		$ 6,000.00		
Utility Pole Relocation	2	EA	$ 25,000.00	$ 25,000.00		$ 50,000.00		
Guy wire	1	EA	$ 5,000.00	$ 5,000.00		$ 5,000.00		
				Contingency	25%	$ 40,450.00		
				Total		$ 202,250.00	**SAY**	$ 203,000.00

Route 117 at 144 North Rd

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Full depth	4800	SF	$ 14.38	$ 15.00		$ 72,000.00		
Pavement Micromilling and Overlay	9600	SF	$ 2.44	$ 3.00		$ 28,800.00		
Pavement Marking Lines	1200	LF	$ 5.00	$ 5.00		$ 6,000.00		
Utility Pole Relocation	2	EA	$ 25,000.00	$ 25,000.00		$ 50,000.00		
				Contingency	25%	$ 39,200.00		
				Total		$ 196,000.00	**SAY**	$ 196,000.00

Route 117 at Melone Site Driveway

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Warning - Regulatory + Route marker - Alum. Pane (type a)	18	SF	$ 12.00	$ 12.00		$ 216.00		
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	2	EA	$ 125.00	$ 125.00		$ 250.00		
Clear vegetation	1	LS	$ 2,000.00	$ 2,000.00		$ 2,000.00		
Full depth	4800	SF	$ 14.38	$ 15.00		$ 72,000.00		
Pavement Micromilling and Overlay	9600	SF	$ 2.44	$ 3.00		$ 28,800.00		
Pavement Marking Lines	1200	LF	$ 5.00	$ 5.00		$ 6,000.00		
Utility Pole Relocation	3	EA	$ 25,000.00	$ 25,000.00		$ 75,000.00		
				Contingency	25%	$ 46,066.50		
				Total		$ 230,332.50	**SAY**	$ 231,000.00

Route 117 at Plainfield Rd

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Warning - Regulatory + Route marker - Alum. Pane (type a)	18	SF	$ 12.00	$ 12.00		$ 216.00		
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	2	EA	$ 125.00	$ 125.00		$ 250.00		
Tree Triming	3	EA	$ 300.00	$ 300.00		$ 900.00		
Clearing and grubbing	1	LS	$ 301.00	$ 301.00		$ 301.00		
Full depth	4800	SF	$ 14.38	$ 15.00		$ 72,000.00		
Pavement Micromilling and Overlay	9600	SF	$ 2.44	$ 3.00		$ 28,800.00		
Pavement Marking Lines	1200	LF	$ 5.00	$ 5.00		$ 6,000.00		
Utility Pole Relocation	3	EA	$ 25,000.00	$ 25,000.00		$ 75,000.00		
				Contingency	25%	$ 45,866.75		
				Total		$ 229,333.75	**SAY**	$ 230,000.00

Route 117 at Subdury Rd

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Warning - Regulatory + Route marker - Alum. Pane (type a)	81	SF	$ 12.00	$ 12.00		$ 972.00		
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	6	EA	$ 125.00	$ 125.00		$ 750.00		
Pavement Marking Lines	2935	LF	$ 5.00	$ 5.00		$ 14,675.00		
Traffic Signal Upgrade	1	LS	$ 200,000.00	$ 200,000.00		$ 200,000.00		
				Contingency	25%	$ 54,099.25		
				Total		$ 270,496.25	**SAY**	$ 271,000.00

Route 117 at Concord Rd

Item	Quantity	Unit	Cost	Rounded Cost		Total		
Traffic Signal Upgrade	1	LS	$ 200,000.00	$ 200,000.00		$ 200,000.00		
				Contingency	25%	$ 50,000.00		
				Total		$ 250,000.00	**SAY**	$ 250,000.00

Total	$	1,797,000.00
SAY	$	1,797,000.00

Concept Estimate Back Up Quantities

Project: Melone Site
Location: Subdury, MA
Date: 11/20/2018

Overall Recommendations

Item	Quantity		
Bituminous Sidewalk	1500	SF	Assume 5 ft wide bituminous sidewalk times sidewalk length of 300 ft on site to connect to North Road.

Route 117 at Mossman Rd/Powder Mill Rd

Item	Quantity		
Warning - Regulatory + Route marker - Alum. Pane (type a)	66	SF	Assume 6 (W11-2,W16-9P, W16-7p)
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	6	EA	Assume 6 sign post
Pavement Marking Lines	2501	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 4 X (400 ft SWL +200 ft SDYL) + 1 X (36 SL + 65 CW)

Route 117 at Dakin Rd/Pantry Rd

Item	Quantity		
Warning - Regulatory + Route marker - Alum. Pane (type a)	36	SF	4 way intersection Assumed Misceleanous sings 36 sf
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	4	EA	Assume 4 sign post
Pedestrian Signal	16	EA	Assume 4 loop per lane
Pavement Marking Lines	2641	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 4 X (400 ft SWL +200 ft SDYL) + 1 X (45 SL + 196 CW)
Pedesrian Signal	1	LS	See pedestrian crossing signal summary sheet for lump sum price

Route 117 at Davis Fields

Item	Quantity		
Full depth	4800	SF	Assume 4800 SF road widening to accommodate a 24 ft wide and 200 ft long left turning lane
Pavement Micromilling and Overlay	9600	SF	Assume 9600 SF of micromilling. 2 X (24 ft wide * 200 ft long)
Pavement Marking Lines	1200	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 2X(400 ft SWL +200 ft SDYL)
Utility pole relocation	2	EA	200 ft widening assumption requires relocation of 2 Utility poles on the E.B approach
Guy wire	1	EA	Assume one guy wire for utility pole at new location

Route 117 at 144 North Rd

Item	Quantity		
Full depth	4800	SF	Assume 4800 SF road widening to accommodate a 24 ft wide and 200 ft long left turning lane
Pavement Micromilling and Overlay	9600	SF	Assume 9600 SF of micromilling. 2 X (24 ft wide * 200 ft long)
Pavement Marking Lines	1200	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 2X(400 ft SWL +200 ft SDYL)
Utility pole relocation	2	EA	200 ft widening assumption requires relocation of 2 Utility poles near the intersection

Route 117 at Melone Site Dw

Item	Quantity		
Warning - Regulatory + Route marker - Alum. Pane (type a)	18	SF	Assume 2 (W2-2) 3 way intersection warnign signs
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	2	EA	Assume 2 sign post
Pavement Marking Lines	1200	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 2X(400 ft SWL +200 ft SDYL)
Full depth	4800	SF	Assume 4800 SF road widening to accommodate a 24 ft wide and 200 ft long left turning lane
Pavement Micromilling and Overlay	9600	SF	Assume 9600 SF of micromilling. 2 X (24 ft wide * 200 ft long)
Pavement Marking Lines	1200	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 2X(400 ft SWL +200 ft SDYL)
* Utility pole relocation	3	EA	* 200 ft widening assumption requires potential relocation of 3 Utility poles near site driveway. However, All widening may be accomplish onto the melone development site, if so utility pole relocation may not be necessary.

Route 117 at Plainfield Rd

Item	Quantity		
Warning - Regulatory + Route marker - Alum. Pane (type a)	18	SF	Assume 2 (W2-2) Signs - 3 way intersection warnign signs
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	2	EA	Assume 2 sign post
Pavement Marking Lines	1200	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 2X(400 ft SWL +200 ft SDYL)
Tree Triming	3	EA	About 3 trees needs to be cut to improve sight distance
Full depth	4800	SF	Assume 4800 SF road widening to accommodate a 24 ft wide and 200 ft long left turning lane
Pavement Micromilling and Overlay	9600	SF	Assume 9600 SF of micromilling. 2 X (24 ft wide * 200 ft long)
Pavement Marking Lines	1200	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 2X(400 ft SWL +200 ft SDYL)
Utility pole relocation	3	EA	200 ft widening assumption requires relocation of 3 Utility poles at the vicinity of the intersection

Route 117 at Subdury Rd

Item	Quantity		
Warning - Regulatory + Route marker - Alum. Pane (type a)	81	SF	Assume 3 (R3-7) signs - left lane must turn left + 27sf of miscleneous signs
Sign Sup (N/Guide)+Rte Mkr W/1 Brkway Post Assembly - Steel	6	EA	Assume 2 sign post
Pavement Marking Lines	2935	LF	Assume 200 ft restriping from the intersecton per pavement marking stripe per legs 4 X (400 ft SWL+100 ft SWLL +200 ft SDYL) + 1 X (135 SL)
Traffic signal upgrade	1	LS	Assume $200000.00 for signal upgrade

Route 117 at Concord Rd

Item	Quantity		
Traffic Signal Upgrade	1	LS	Assume $200000.00 for signal upgrade

Concept Estimate Pavement Micromilling and Overlay Unit Cost

Item: Pavement Micromilling and Overlay

Input:

Micromilling Depth	2	IN
Overlay Depth	2	IN
Leveling Depth	1	IN
Structures	5	EA
Width	46	FT
No. HMA Layers	2	

Components:

										Unit Cost	Cost/SF
Pavement Micromilling: 935.0400	Base Depth	Full Depth	Adjustment	SY/SF					Unit Cost	$ 4.00	$ 0.44
	2	2	$ 1.00	0.1111					$/SY		
Asphalt Emulsion for Tack Coat: 403.0300	Length							Total (SY)	Unit Cost	$ 0.50	$0.11
	1	SF	/	9	(SY/SF)	X	2	0.22222	$/SY		
Class 12.5 HMA leveling: 401.2002	Depth (in)	Convet	SY/SF	T/SF	% Area				Unit Cost	$ 100.00	$ 0.31
	1	0.056	0.1111	0.0062216	50%				$/TON		
Class 9.5 HMA: 401.3000	Depth (in)	Convert	SY/SF	T/SF					Unit Cost	$ 115.00	$ 1.43
	2	0.056	0.1111	0.0124432					$/TON		
Structure Adjustment:	Count	Length	Struct/LF	Width	Struct/SF				Unit Cost	$ 380.00	$ 0.14
	5	300	0.01666667	46	0.00036232				$/EA		
									COST/SF	2.44	

Concept Estimate Full Depth Pavement Unit Cost

Item: Full Depth Pavement

Input:

No. HMA Layers	2	
Surface Course Depth	2	IN
Intermediate Course Depth	2	IN
Base Course Depth	6	IN
Crushed Stone	4	IN
Gravel Borrow	8	IN
Unclassified Excavation	26	IN
Structures	0	EA
Width	0	FT

Components:

											Unit Cost	Cost/SF
Structural Excavation Unclassified: 203.0400	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF					Unit Cost	$ 50.00	$ 4.01
	26	2.1666667	0.7222222	0.1111	0.0802389					$/CY		
Class 9.5 HMA: 401.3000	Base Depth	Convet	SY/SF	T/SF						Unit Cost	$ 115.00	$ 1.43
	2	0.056	0.1111	0.0124432						$/TON		
Asphalt Emulsion for Tack Coat: 403.0300	Length							Total (SY)		Unit Cost	$ 0.50	$ 0.11
	1	SF	/	9	(SY/SF)	X	2	0.22		$/SY		
Class 12.5 HMA: 401.2000	Depth (in)	Convert	SY/SF	T/SF						Unit Cost	$ 175.00	$ 2.18
	2	0.056	0.1111	0.0124432						$/TON		
Superpave Base Course	Depth (in)	Convert	SY/SF	T/SF						Unit Cost	$ 100.00	$ 3.73
	6	0.056	0.1111	0.0373296						$/TON		
Crushed Stone: 301.0300	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF					Unit Cost	$ 65.00	$ 0.80
	4	0.3333333	0.1111111	0.1111	0.0123444					$/CY		
Gravel Borrow: 202.0800	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF					Unit Cost	$ 65.00	$ 1.60
	8	0.6666667	0.2222222	0.1111	0.0246889					$/CY		
Full Depth Sawcut: 932.0200	Length							Total (SY)		Unit Cost	$ 2.30	$ 0.51
	1	SF	/	9	(SY/SF)	X	0	0.22		$/SY		

COST/SF	$ 14.38
SAY	$ 15.00

Concept Estimate Bituminous Sidewalk Unit Cost

Item: Bituminous Sidewalk

Input:

No. HMA Layers	2	
Hot Mix Depth	3	IN
Gravel Borrow Depth	8	IN
Unclassified Excavation Depth	11	IN

Components:

										Unit Cost	Cost/SF
Structural Excavation Unclassified: 203.0400	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF				Unit Cost	$ 50.00	$ 1.85
	12	1	0.3333333	0.1111	0.0370333				$/CY		
Gravel Borrow: 202.0800	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF				Unit Cost	$ 65.00	$ 1.60
	8	0.6666667	0.2222222	0.1111	0.0246889				$/CY		
Trimming and Fine Grading: 204.0100	SY/SF								Unit Cost	$ 7.50	$ 0.83
	0.1111								$/SY		
Class 9.5 HMA: 401.3000	Depth (in)	Convet	SY/SF	T/SF					Unit Cost	$ 115.00	$ 1.07
	1.5	0.056	0.1111	0.0093324					$/TON		
Asphalt Emulsion for Tack Coat: 403.0300	Length							Total (SY)	Unit Cost	$ 0.50	$ 0.11
	1	SF	/	9	(SY/SF)	X	2	0.22	$/SY		
Class 12.5 HMA: 401.2000	Depth (in)	Convet	SY/SF	T/SF					Unit Cost	$ 175.00	$ 1.63
	1.5	0.056	0.1111	0.0093324					$/TON		

COST/SF	$ 7.11

Concept Estimate Granite Curb Unit Cost

Item: Granite Curb

Input:

Granite Curb Depth	18	IN
Cement Conc Curb Lock Depth	8.5	IN
Gravel Borrow Depth	8	IN

Components:

							Unit Cost		Cost/LF
							Straight	Circular	
Granite Curb, Quarry Split Straight & Circular, Standard 7.3.0: 906.0110, 906.0111	% Curved (assumed)					Unit Cost	$ 55.00	$ 65.00	$ 57.00
	20%					$/LF			
Trimming and Fine Grading: 204.0100	SY/SF					Unit Cost	$ 7.50	$ 0.83	
	0.1111					$/SY			
Class XX Portland Cement Concrete: 601.0200	Depth (in)	Depth (ft)	Width (ft)	Area (SF)	Area (SY)	Unit Cost	$ 200.00	$ 7.87	
	8.5	0.7083333	0.5	0.3541667	0.0393519	$/SY			
Gravel Borrow: 202.0800	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF	Unit Cost	$ 65.00	$ 1.60	
	8	0.6666667	0.2222222	0.1111	0.0246889	$/CY			
Strucutural Excavation unclassified: 203.0400	Depth (in)	Depth (ft)	Depth (yd)	SY/SF	CY/SF	Unit Cost	$ 50.00	$ 4.01	
	26	2.1666667	0.7222222	0.1111	0.0802389	$/CY			

COST/FT	$ 71.32

Concept Estimate Pavement Marking Unit Cost

Item: Pavement Marking

Input:

STOP LINE	12	IN
CROSSWALK	12	IN
SWL	6	IN
SDYL	6	IN

Components:

			Unit Cost	Cost/LF
6 in reflectorized thermoplastic white line	Unit Cost	$/FT	$ 1.00	$ 1.00
6 in reflectorized thermoplastic yellow line	Unit Cost	$/FT	$ 3.00	$ 3.00
12 in reflectorized thermoplastic white line	Unit Cost	$/FT	$ 1.00	$ 1.00
		COST/FT	$	5.00

McMAHON
TRANSPORTATION ENGINEERS & PLANNERS

Pedestrian Crossing Signal

Description	Unit Cost	Quantity		Cost
Ped Pedestals, Bases and Fdn*	$2,000	2	LS	$4,000
Pedestrian Signal Head, Single Section (LED)	$1,200	2	EA	$2,400
APS Push Button Assembly	$600	2	EA	$1,200
Signal Controller Adjustment	$1,000	1	LS	$1,000

Subtotal =	$8,600
15% Contingency =	$1,290
Total =	$9,890
SAY	**$10,000**