LJA **Leonard Jackson Associates** **Consulting Engineers**

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January 21, 2008

Village of Mamaroneck
123 Mamaroneck Avenue
Mamaroneck, New York 10543

Att: Leonard M. Verrastro, Village Manager

Re: **Proposal "B" Mamaroneck Reservoir Dam; Item # 1**
LJA #07049

Dear Mr. Verrastro:

Leonard Jackson Associates was retained to evaluate the potential reduction in flood discharges and elevations that could be achieved through the utilization of the Mamaroneck Reservoir Dam as a detention facility.

An hydrologic analysis was performed based upon the assumption that the dam could be restored to meet New York State Department of Environmental Conservation (NYSDEC) safety requirements. The hydrologic analyses also presumed that, to maximize flood reduction benefits, the lake upstream of the dam was either lowered prior to a storm or kept at its lowest practicable elevation (near empty) with an orifice at the base of the dam.

Under these conditions, which are presumed to exist at the beginning of a 100-year storm event, the hydrologic analysis determined that the existing 100-year peak discharge of 3,763 cubic feet per second emanating from a contributory drainage basin area of at the dam or 15.43 square miles, would be reduced to 3,672 cubic feet per second which, would reduce downstream 100-year flood elevations by an average of approximately 0.01 feet of a flood depth averaging about 15 feet. This flood reduction is not meaningful, hence this flood control alternative measure is nearly ineffective on the Mamaroneck River and need not be pursued further.

The following attachments support this conclusion.

1. Drainage Area Map
2. HEC-1 input data
3. HEC-1 Hydrologic Analysis
4. HEC-RAS Analysis of the Mamaroneck River
5. Hydraulic profiles of the Mamaroneck River for Existing & "Developed" conditions

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Mamaroneck River Flood JOB #: 07049 BY: BG
LOCATION: Village of Mamaroneck DATE: 9-Jan-08

Mark One: Present Developed

To Design Point: Confluence
Time of Concentration thru Sub-Area: Sheldrake River Drainage Area

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic or description of flow segments.

Sheet Flow:

	Segment ID:				
1. Surface description (table 3-1).....		Grass			
2. Manning's Roughness Coeff., n (table 3-1).....		0.15			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		200			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.2			
5. Land Slope, S.....(ft./ft.)		0.010			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$ Compute T_t = ...(hr.)		0.38		=	0.38 (hrs.)

Shallow Concentrated Flow:

	Segment ID:				
1. Surface description (paved or unpaved).....		paved	unpaved		
2. Flow Length, L .....(ft.)		0	1628		
3. Watercourse Slope, s.....(ft./ft.)		#DIV/0!	0.011		
4. Average Velocity, V (figure 3-1)..... (ft./s)		1.4	1.7		
6. $T_t = \frac{L}{3600\,V}$ Compute T_t = ...(hr.)		0.00	0.27	=	0.27 (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)		
Flow Length, L:	*40142*	*7.603*		
	(Start)	(End)	(Change in ft.)	
Elevation Change:	*290.0*	*20.0*	*270.0*	
$T_t = (11.9L^3/H)^{0.385}$				
T_t =	**3.13**			= 3.130 (hrs.)

Total Tc = **3.77** (hrs.)
226.3 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Mamaroneck River Flood JOB #: 07049 BY: BG
LOCATION: Village of Mamaroneck DATE: 9-Jan-08

Mark One: Present Developed

To Design Point: Confluence
Time of Concentration thru Sub-Area: Mamaroneck River Drainage Basin Between Dam & Confluence

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic or description of flow segments.

Sheet Flow:

	Segment ID:	162-155			
1. Surface description (table 3-1).....		Grass			
2. Manning's Roughness Coeff., n (table 3-1).....		0.15			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		100			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.2			
5. Land Slope, S.....(ft./ft.)		0.070			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$	Compute T_t = ...(hr.)	0.10		=	0.10 (hrs.)

Shallow Concentrated Flow:

	Segment ID:		505-440		
1. Surface description (paved or unpaved).....		paved	unpaved		
2. Flow Length, L .....(ft.)		0	2528		
3. Watercourse Slope, s.....(ft./ft.)		#DIV/0!	0.026		
4. Average Velocity, V (figure 3-1)..... (ft./s)		1.4	2.6		
6. $T_t = \frac{L}{3600\,V}$	Compute T_t = ...(hr.)	0.00	0.27	=	0.27 (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)			
Flow Length, L:	*10388*	*1.967*			
	(Start)	(End)	(Change in ft.)		
Elevation Change:	*90.0*	*20.0*	*70.0*		
$T_t = (11.9L^3/H)^{0.385}$					
T_t =	1.10			=	1.105 (hrs.)

Total Tc = **1.47** (hrs.) / **88.4** (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Mamaroneck River Flood JOB #: 07049 BY: BG
LOCATION: Village of Mamaroneck DATE: 9-Jan-08

Mark One: Present Developed

To Design Point: Confluence
Time of Concentration thru Sub-Area: Sheldrake River Drainage Area

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic or description of flow segments.

Sheet Flow:

	Segment ID:	310-308			
1. Surface description (table 3-1).....		Grass			
2. Manning's Roughness Coeff., n (table 3-1).....		0			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		200			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.2			
5. Land Slope, S.....(ft./ft.)		0.010			
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$	Compute T_t = ...(hr.)	0.00		=	0.00 (hrs.)

Shallow Concentrated Flow:

	Segment ID:		505-440		
1. Surface description (paved or unpaved).....		paved	unpaved		
2. Flow Length, L ..... (ft.)		0	0		
3. Watercourse Slope, s.....(ft./ft.)		#DIV/0!	#DIV/0!		
4. Average Velocity, V (figure 3-1)..... (ft./s)		1.4	3.5		
6. $T_t = \frac{L}{3600\,V}$	Compute T_t = ...(hr.)	0.00	0.00	=	0.00 (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*8271*	*1.566*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*45.0*	*20.0*	*25.0*
$T_t = (11.9L^3/H)^{0.385}$			
T_t =	**1.26**		

= **1.262** (hrs.)

Total Tc = **1.26** (hrs.)
75.7 (min.)