Mamaroneck and Sheldrake Rivers

Flood Risk Management General Re-Evaluation Study (GRR)

Village of Mamaroneck

Public Information Session

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22 May 2014

US Army Corps of Engineers
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Purpose of Briefing

- Present to the public the project Alternative Analysis and Recommended Plan
- Seek public feedback on the Recommended Plan
- Path forward for implementation

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History

- From October 1877 – May 1968
  - 81 flood events (averaging approximately 1 flood event per year)
- 1971 – 2007
  - Additional 15 flood events (higher intensity storms)
- 6 flood events warranted Presidential Disaster Declarations

- The study was authorized under resolutions adopted September 14, 1955 and November 14, 1955 by the United States Senate Committee on Public Works, and resolution adopted June 13, 1956 by the United States House of Representatives Committee on Public Works.
- Water Resource Development Act of 1986 (WRDA 86) authorized the “tunnel” project for construction for $130M (presented at October 2012 price level)

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History (Continued)

- April 2007 Nor' Easter sustained over $50M in damages in the Village of Mamaroneck
- NYSDEC requests Army Corps of Engineers to re-evaluate flood risk in the Mamaroneck and Sheldrake river basin
- Subsequent to the issuance of the disaster declaration, the "U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007," was signed into law by the President as P.L. 110-28.
- March 2010 – Study Cost Sharing Agreement Executed (75% Federal / 25% non-Federal)

Study Partners

- NYSDEC
  - Primary Non Federal cost sharing partner through Design Agreement signed in March 2010
  - Provides 25% of Non Federal cost for study
- Westchester County
  - Signed agreement with State
  - Provides State with 50% of its share (12.5%)
- Village of Mamaroneck

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Project Implementation Process

Reconnaissance Study
1 year

Congress Authorizes

- 100% Federal Funding
- 905 (b) Analysis
- Project Management Plan Feasibility Study

Feasibility Cost Sharing Agreement

Feasibility Study
3 - 4 years

- 50%/50% Federal/Local Funding
- Feasibility Report & Envir. Compliance Documents
- Technical Reviews
- Washington Level Review Civil Works Review Board & State and Agency Review
- Chief of Engineers Report

Design Agreement

Pre-construction Engineering Design (PED)
2 years

- 75%/25% Federal/Local Funding
- Plans and Specs
- First construction contract

Project Partnership Agreement

Congress Authorizes and Funds

Construction
Duration Varies

O & M

- Cost Sharing (65%/35%)
- Sponsor Acquires Real Estate
- Local OMRR&R (varies)

General Investigations (Projects specifically authorized by Congress)

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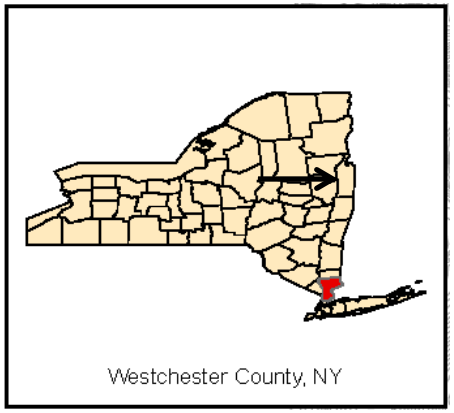
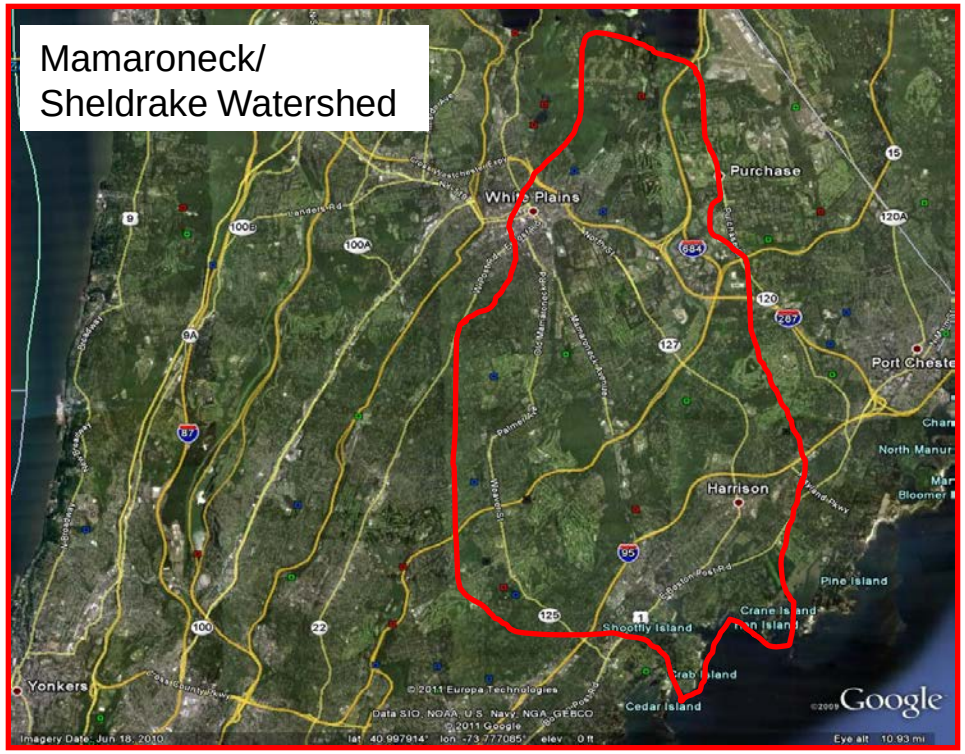
Project Description





►The study limits are defined by river flood damage areas located in the Village of Mamaroneck (does not include coastal flooding).

►Along the Mamaroneck River, the area extends from below the Rt. 1 bridge to above the Westchester County Joint Water Works Dam.

►On the Sheldrake River, the area extends from the confluence with the Mamaroneck River to the Village boundary at the New England Thruway (I-95) Bridge.

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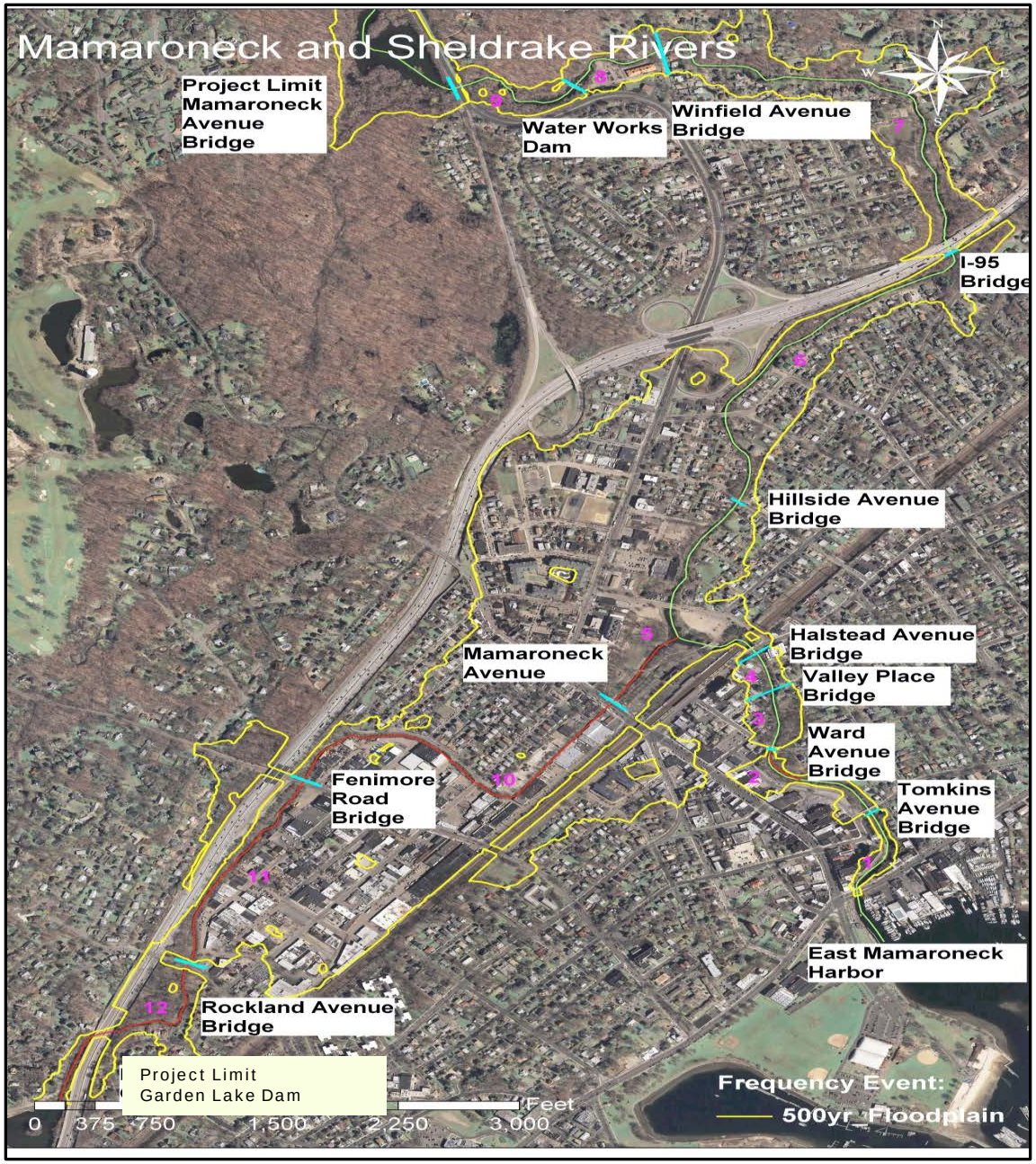

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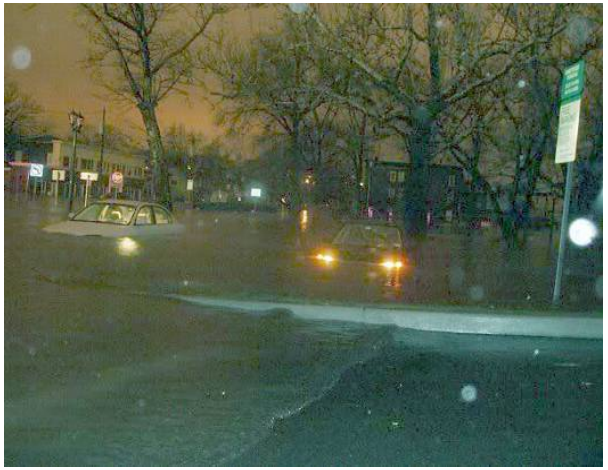
Future Without Project Conditions

- The region has experienced a recent series of storm years which can be expected to continue.
- The population is relatively stable.
- The basin is fairly developed and projected future development will have a small impact of future flows.
- Expected average annual damages are $3.4 million



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Flood Risk Management
Solution Measures Analyzed

Structural

- Diversion Tunnel
- Channel Modification
- Levees/Floodwalls/Retaining Walls

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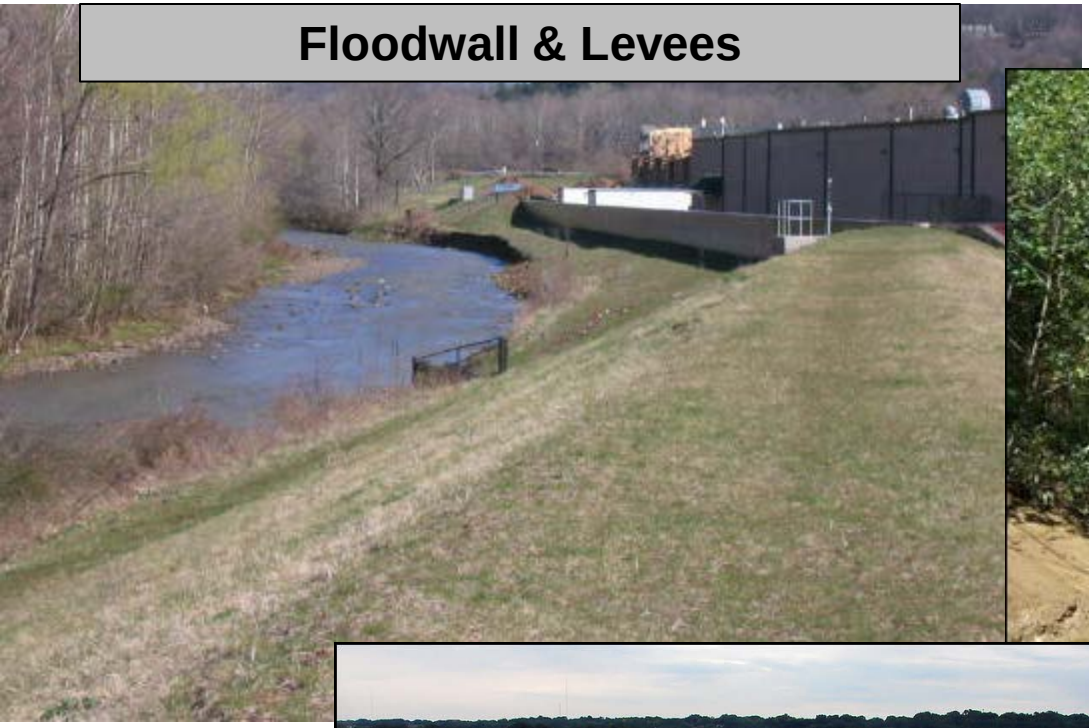
Structural Measures



Floodwall & Levees

Channel Modification

Channel Diversion

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Flood Risk Management
Solution Measures Analyzed

Non-Structural

- Structure Elevation (raising)
- Ringwalls / Structural Peripheral Wall
- Wet / Dry Flood Proofing
- Buyout / Acquisition
- Reservoir Management

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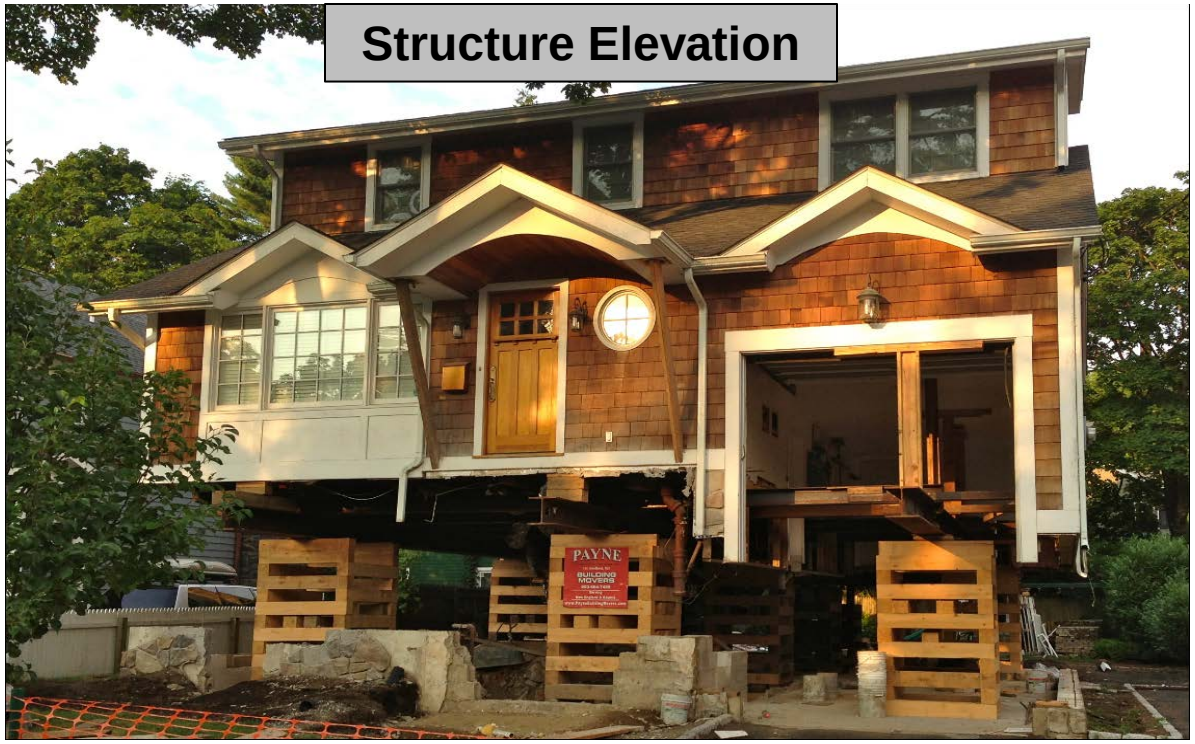
Non-Structural Measures



Structure Elevation

Wet Proof

Dry Proof

Alternatives Evaluated

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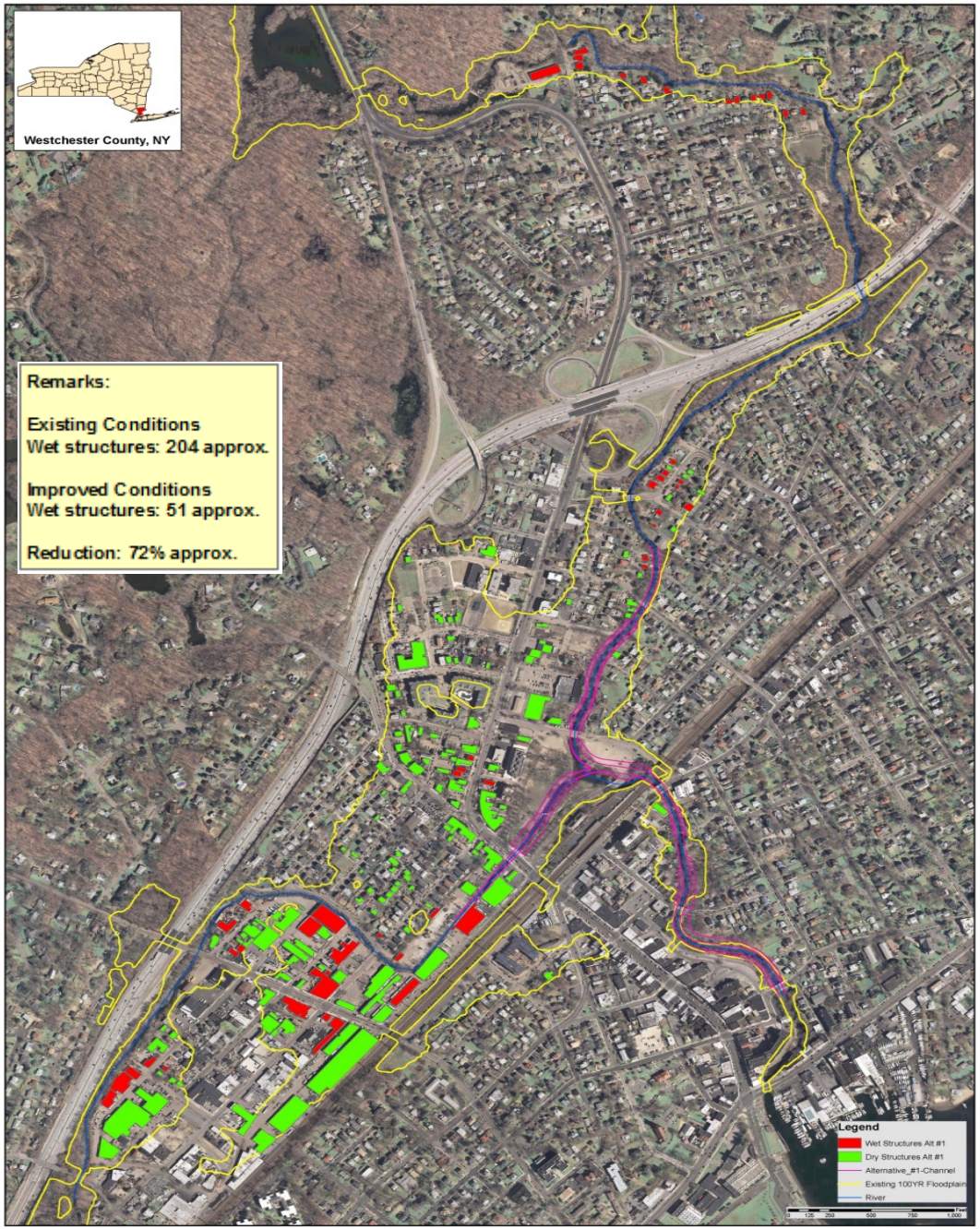

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New York District

100 YR Event || Alternative #1
Mamaroneck & Sheldrake
Westchester County, NY
July 2012

N

Alternative #1
(Downstream Only)

►Channel deepening and widening along both the Mamaroneck & Sheldrake Rivers.

►Five bridges will be modified or replaced.

►The river will also be realigned at the confluence and at the Ward Ave Bridge.

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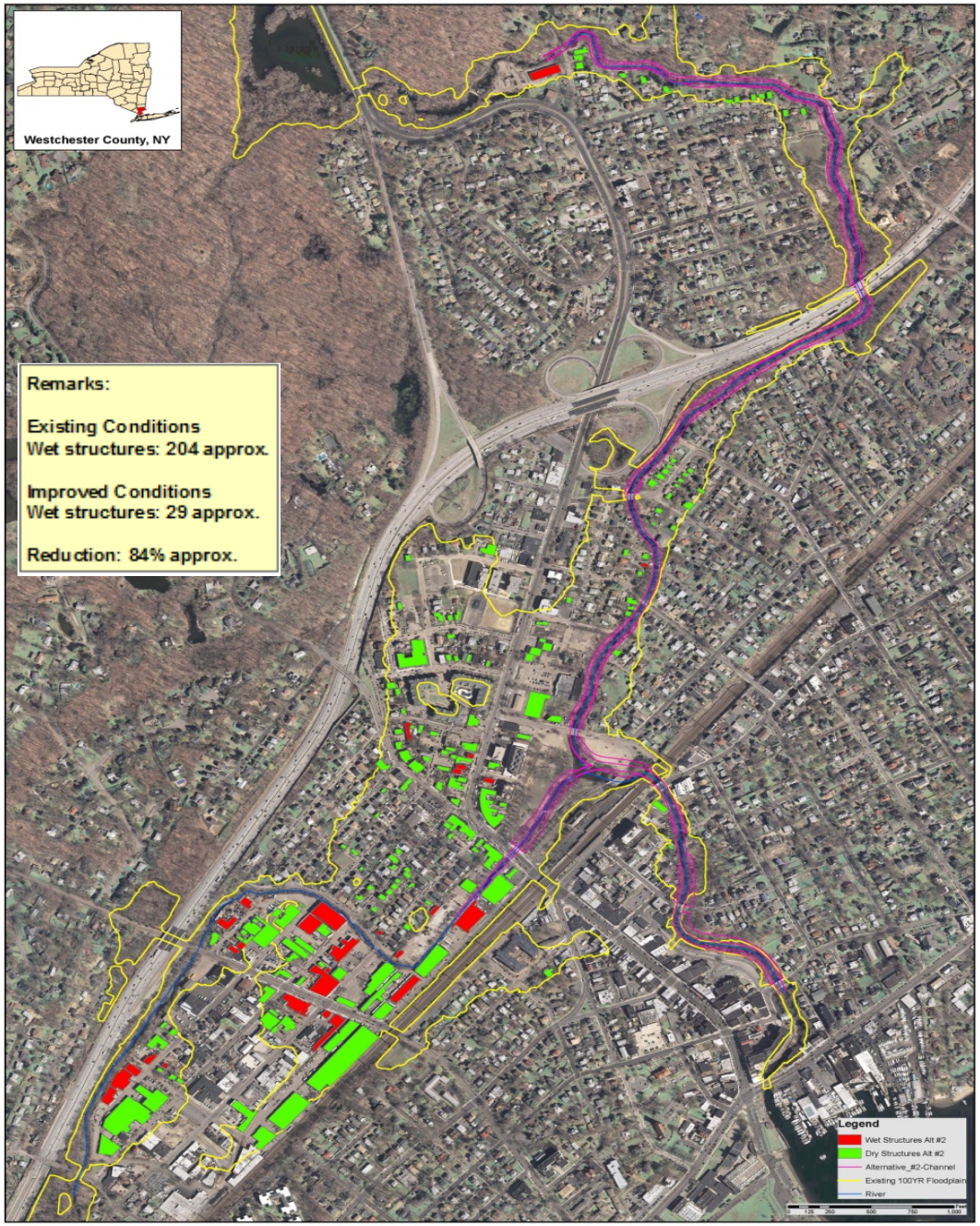

US Army Corps of Engineers
New York District

100 YR Event || Alternative #2
Mamaroneck & Sheldrake
Westchester County, NY
July 2012

N

Alternative #2
(Mamaroneck Only)

►Alternative #1 plus additional work along the Mamaroneck River up to the Winfield Ave. Bridge.

►Six bridges will be modified or replaced.

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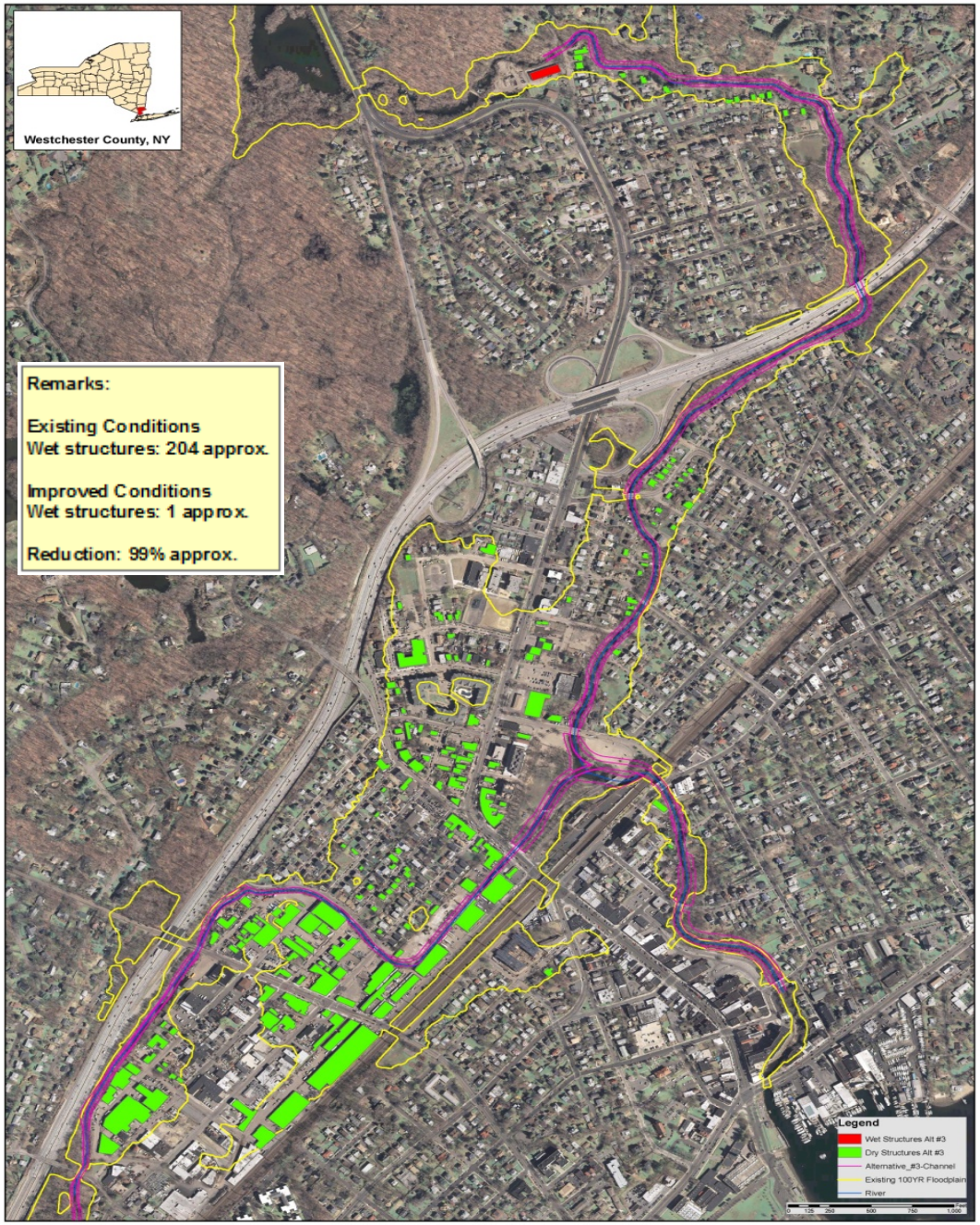

US Army Corps of Engineers
New York District

100 YR Event || Alternative #3
Mamaroneck & Sheldrake
Westchester County, NY
July 2012

N

Alternative #3 (Mamaroneck & Sheldrake Rivers)

►Alternative #2 plus additional work along the Sheldrake River.

►Eight bridges will be modified or replaced.

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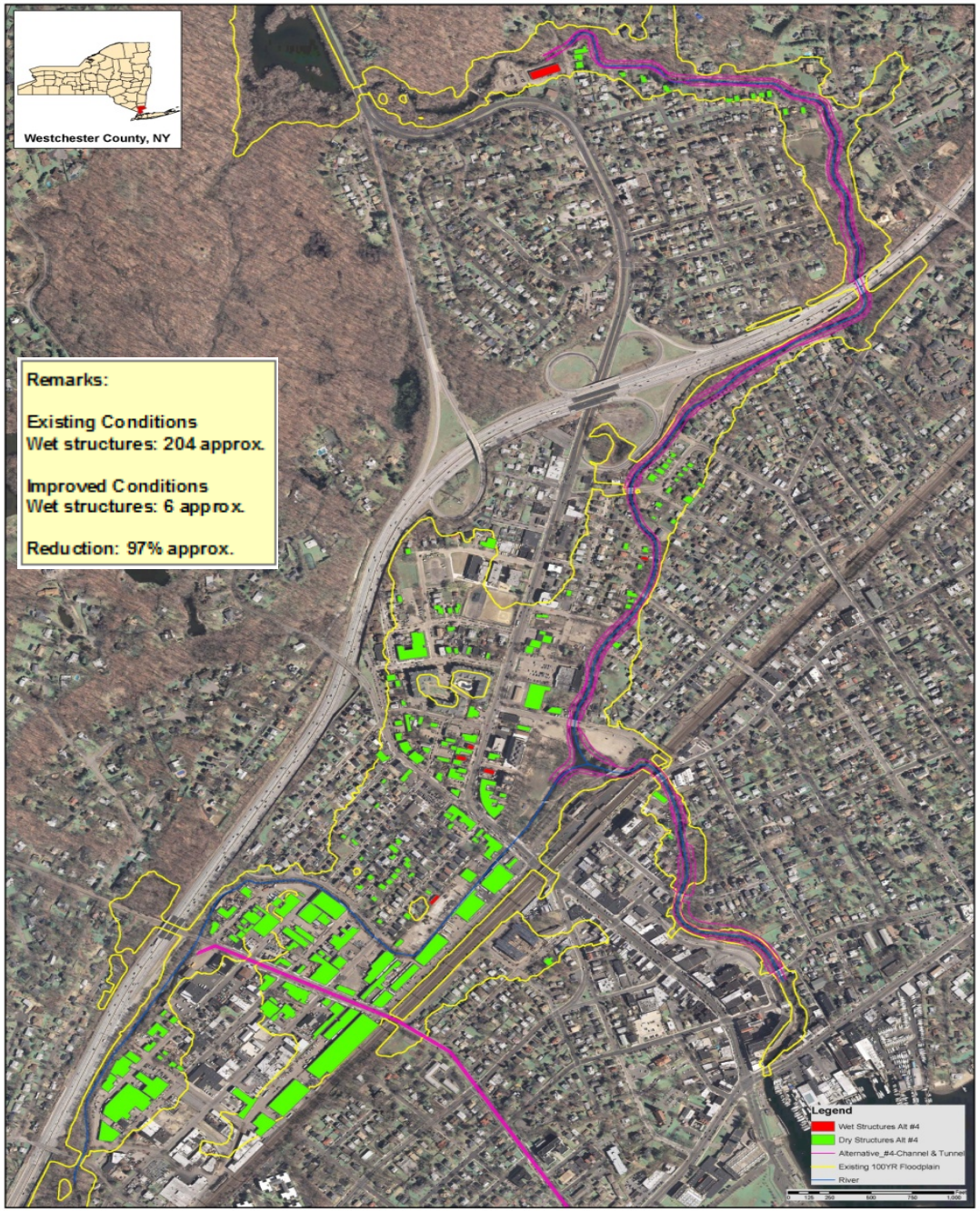

100 YR Event || Alternative #4
Mamaroneck & Sheldrake
Westchester County, NY
July 2012

US Army Corps of Engineers
New York District

N

Alternative #4
1989 Congressionally Authorized Plan

► Consists of a tunnel system running beneath Fenimore Rd. from the Sheldrake River to the West Basin of Mamaroneck Harbor.

► Includes channel work in the Mamaroneck River.

► Sheldrake improvements extend from the Mamaroneck Ave. to I-95.

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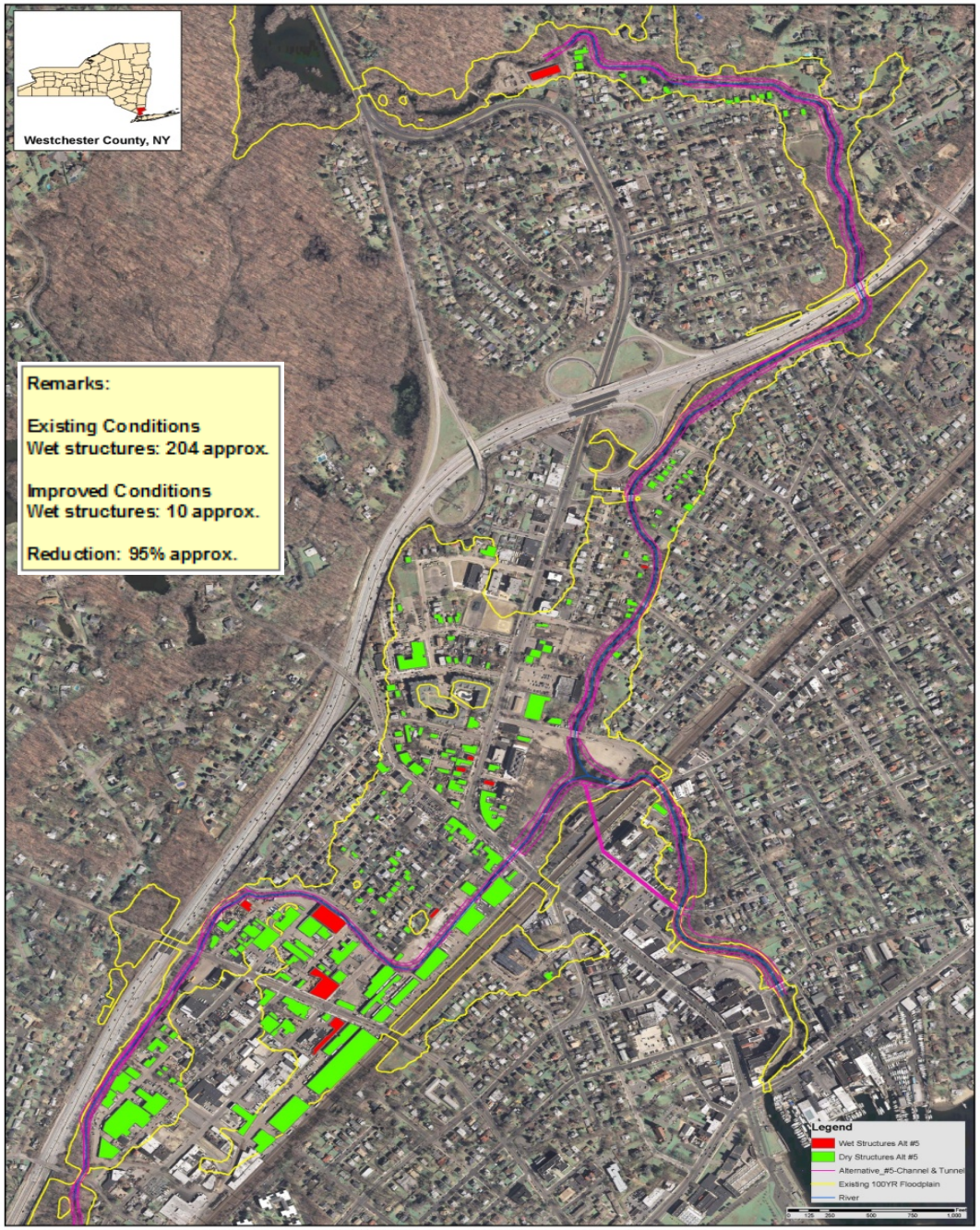

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100 YR Event || Alternative #5
Mamaroneck & Sheldrake
Westchester County, NY
July 2012

N

Alternative #5
Ward Tunnel

►Consists of a tunnel system running underneath the train station and Ward Ave from the confluence to the Ward Ave Bridge.

►Includes channel work in the Mamaroneck and Sheldrake Rivers without a realignment of the confluence.

►Five bridges will be modified or replaced.

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Alternative #6
Non-structural

- Non-structural analysis of three frequency events:
  - 100-year
  - 10-year
  - 2-yr

►There are eight different actions that could be applied to a structure. These include **raising** the structure, constructing a **ringwall** around the structure, **wet or dry flood proofing, relocating utilities** and other actions.

Frequency Event (yr)	Houses Inside Floodplain	# Houses requiring Non-structural Action	# Houses Flooded at Main Floor
100	632	363	204
10	298	210	155
2	116	79	66

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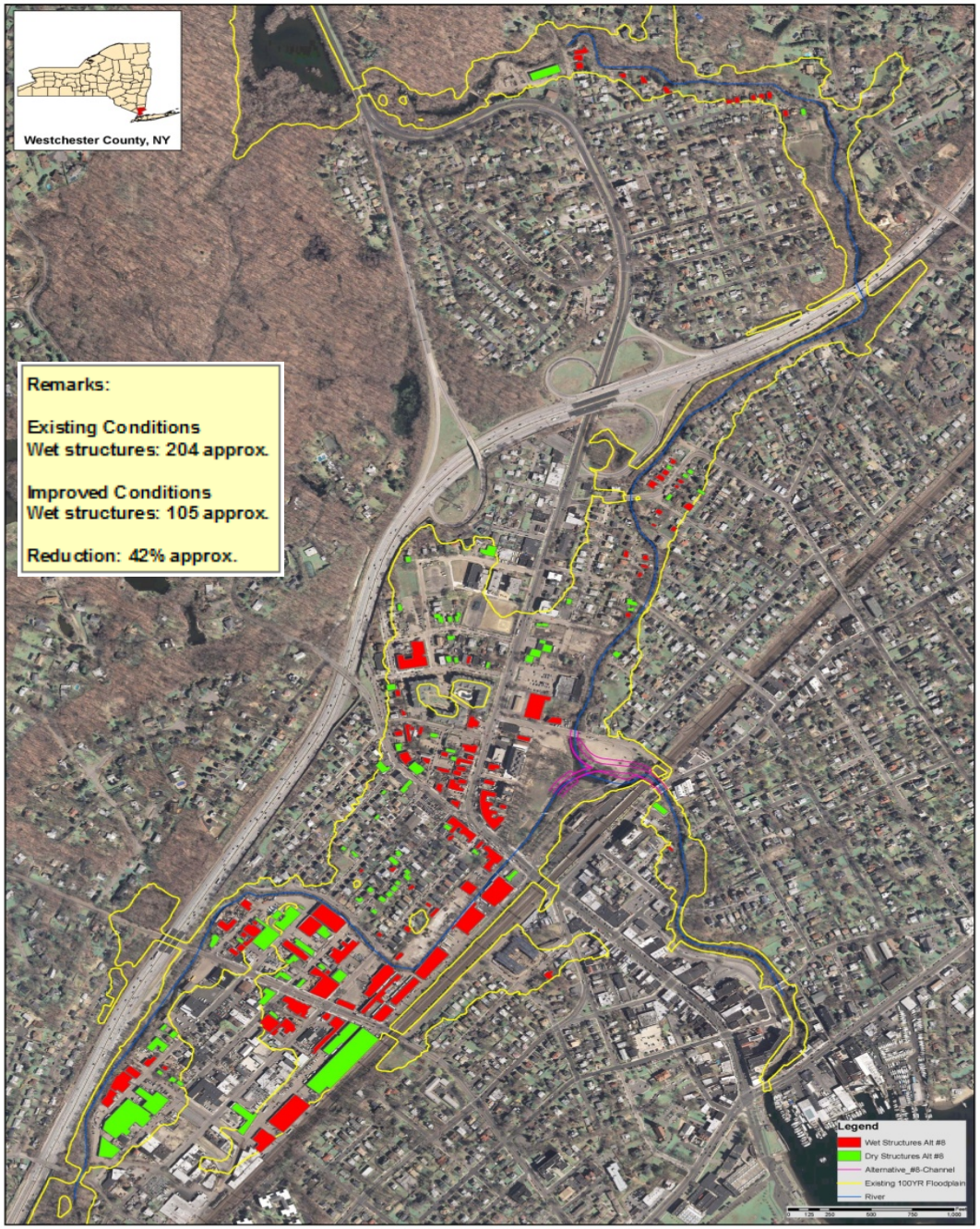

100 YR Event || Alternative #8
Mamaroneck & Sheldrake
Westchester County, NY
July 2012

US Army Corps of Engineers
New York District

N

Alternative #8 (8d)

►Locally Requested Plan proposed by NYSDEC, Westchester County (WC) and Village of Mamaroneck.

►This alternative was been subdivided by parts:

- Alt #8a: a larger Mamaroneck Reservoir with modifications to the Water Works Dam,
- Alt #8b: a larger Sheldrake Lake/Larchmont Reservoir with modification to the dam,
- Alt #8c: Bridge Modifications and/or Removal plan

•**Alt #8d**: Combination of all the above Plans

•Alt #8e: Plan 8d plus other small storage area changes

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Environmental Compliance

Environmental Studies Conducted

- Electrofishing Surveys
  - Species found are pollution tolerant species such American Eel, Redbreast Sunfish, Tessellated Darter, and White Sucker most common
  - Project would not have significant impact on fish
- Stream Assessment Surveys
  - Evaluation included physical assessment, *in situ* water quality, and visual assessment of in-stream and riparian habitat.
  - Project would not have significant impact to stream quality
- Invertebrate Surveys
  - Project would not have significant impact to invertebrate community

Cultural Resources

- Impacts to Works Progress Administration (WPA) bridges and retaining walls

NEPA Compliance

- Public Scoping meeting conducted in June 2010
- Release of Draft EIS for public review public meeting anticipated for Feb 2015

Alternative Annual Costs and Benefits & Identification of TSP

Plan	Description	Flood Damages Without Project	Flood Damages With Project	Annual Benefits	First Costs	Total Investment Cost	Annual cost	Net Excess Benefits	BCR
Alt 1	**Downstream channel only**	**$3,410,330**	**$735,720**	**$3,596,476**	**$55,353,000**	**$58,435,693**	**$2,808,400**	**$788,100**	**1.28**
Alt 2	Full Mamaroneck channel	$3,410,330	$470,100	$4,146,842	$75,750,000	$81,487,007	$3,902,100	$244,700	1.06
Alt 3	Alts 1&2 + Sheldrake	$3,410,330	$84,440	$4,570,673	$91,711,000	$100,539,818	$4,797,000	($226,300)	0.95
Alt 4	Fenimore Ave Tunnel (GDM)	$3,410,330	$77,070	$3,914,507	$137,241,000	$154,481,142	$7,410,200	($3,495,700)	0.53
Alt 5	Ward Ave Tunnel	$3,410,330	$159,590	$3,607,928	$81,601,500	$89,457,151	$4,260,300	($652,400)	0.85
Alt 6	Non Structural	$3,410,330	$704,640	$2,705,690	$85,731,600	$87,292,216	$4,061,700	($1,356,000)	0.67
Alt 8d	Locally preferred	$3,410,330	$1,136,030	$3,226,271	$77,997,000	$82,635,659	$3,990,200	($763,900)	0.81

Optimization of Tentatively Selected Plan & Locally Preferred Plan

Plan	Flood Damages With Project	Annual Benefits	Total Investment Cost	Total Annual cost	Net Excess Benefits	BCR
Alt 1	$766,000	$3,600,000	$58,436,000	$2,808,000	$790,000	1.28
Alt 1S	$ 769,800	$3,225,000	$50,026,000	$2,383,000	$845,000	1.35
Alt 1M[1]	$446,900	**$3,600,000**	**$59,260,000**	**$2,820,000**	**$770,000**	**1.27**
Alt 1L	$349,100	$4,300,000	$86,250,000	$4,137,000	$200,000	1.05
Alt 1F[2]	$557,400	**$3,500,000**	**$53,765,000**	**$2,565,000**	**$904,000**	**1.35**

1. Locally Preferred Plan (LPP)
2. National Economic Development (NED) Plan

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NED (1F) versus LPP (1M)

- Below the confluence of the Mamaroneck River and Sheldrake River, both plans are identical.

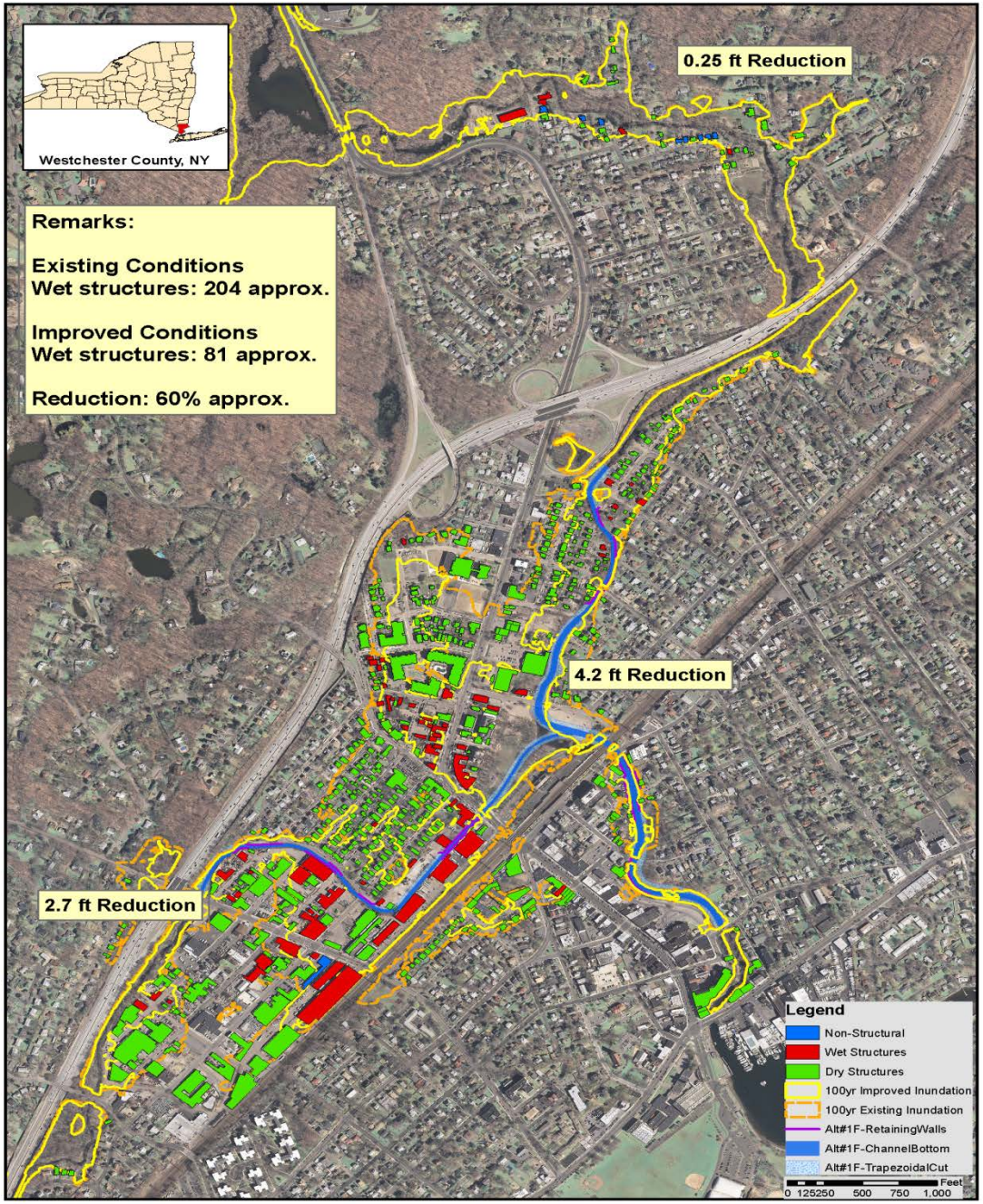
- Mamaroneck River in the area of the confluence: LPP (1M) is 5 to 15 feet wider than the NED (1F) with the same bottom elevation.

- In Harbor Heights, Plan 1M has a small short channel, while 1F contains about 8 Non-structural treatments.

- In the Lower Sheldrake River, Plan 1M is about 5 feet wider and up to 1.5 feet deeper than NED Plan 1F

- LPP (1M) provides an 84% reduction in flood risk and NED (1F) provides a 75% reduction in flood risk for the 100-yr event (average annual exceedance).

- LPP (1M) provides an 92% reduction in flood risk and NED (1F) provides a 89% reduction in flood risk for the 50-yr event (average annual exceedance)



1% Annual Risk of Flooding (100 YR) || Alternative #1F
Mamaroneck & Sheldrake
Westchester County, NY
May 2014

N

US Army Corps of Engineers
New York District

National Economic Development Plan 1F 100 year

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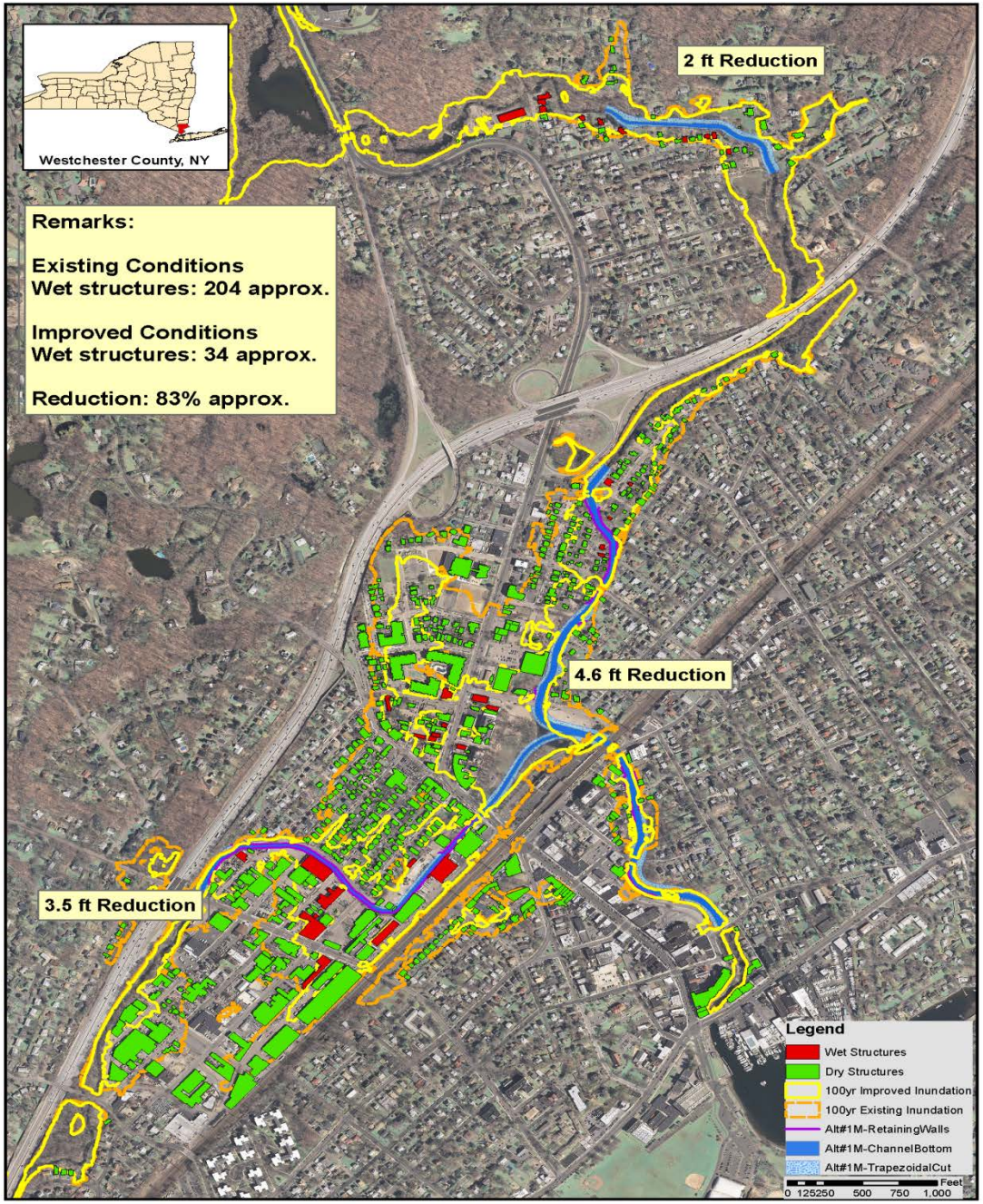

1% Annual Risk of Flooding (100 YR) || Alternative #1 M
Mamaroneck & Sheldrake
Westchester County, NY
May 2014

N

US Army Corps of Engineers
New York District

Locally Preferred Plan
1M
100 year

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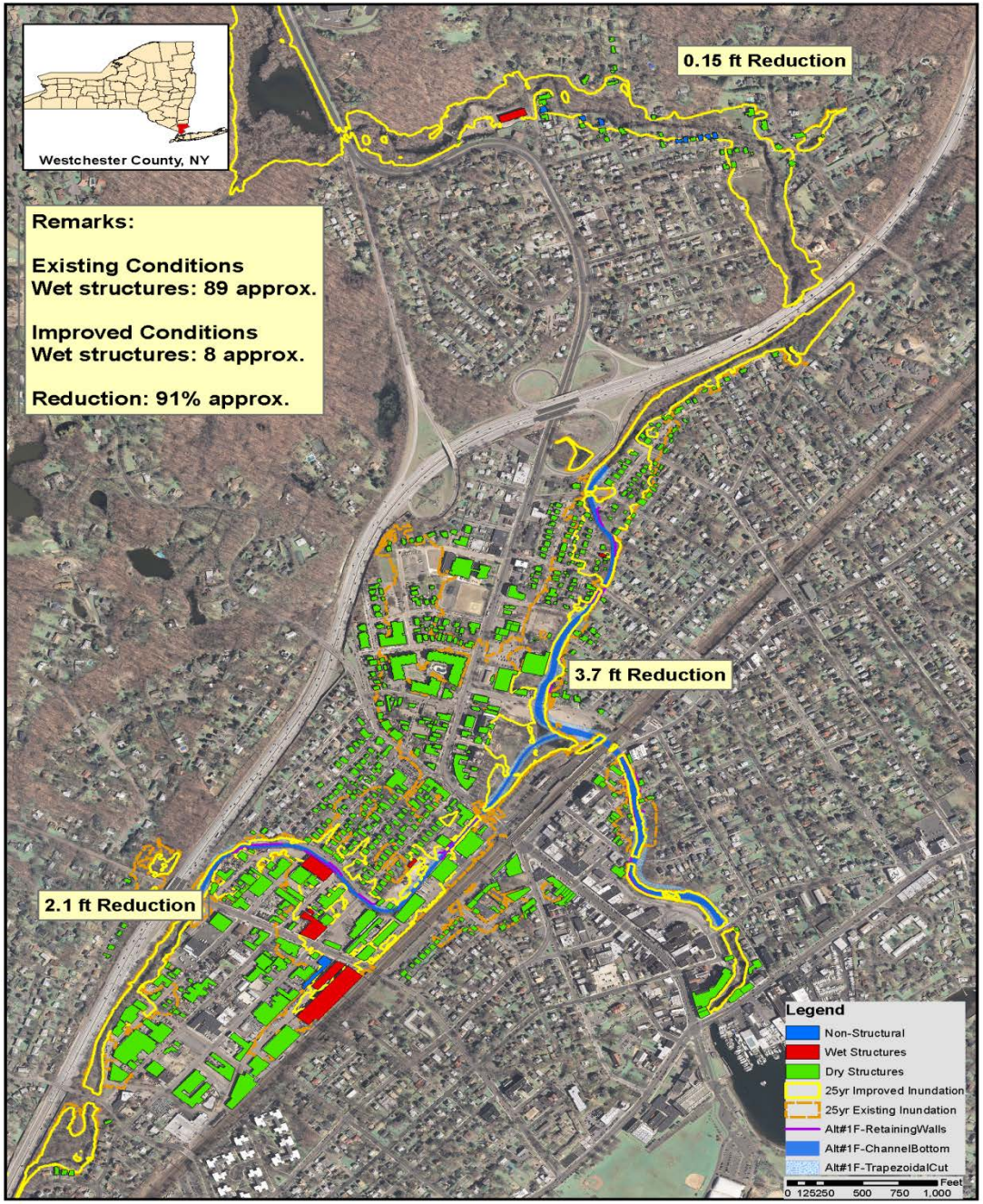

4% Annual Risk of Flooding (25 YR) || Alternative #1F
Mamaroneck & Sheldrake
Westchester County, NY
May 2014

N

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New York District

National Economic Development Plan 1F 25 year

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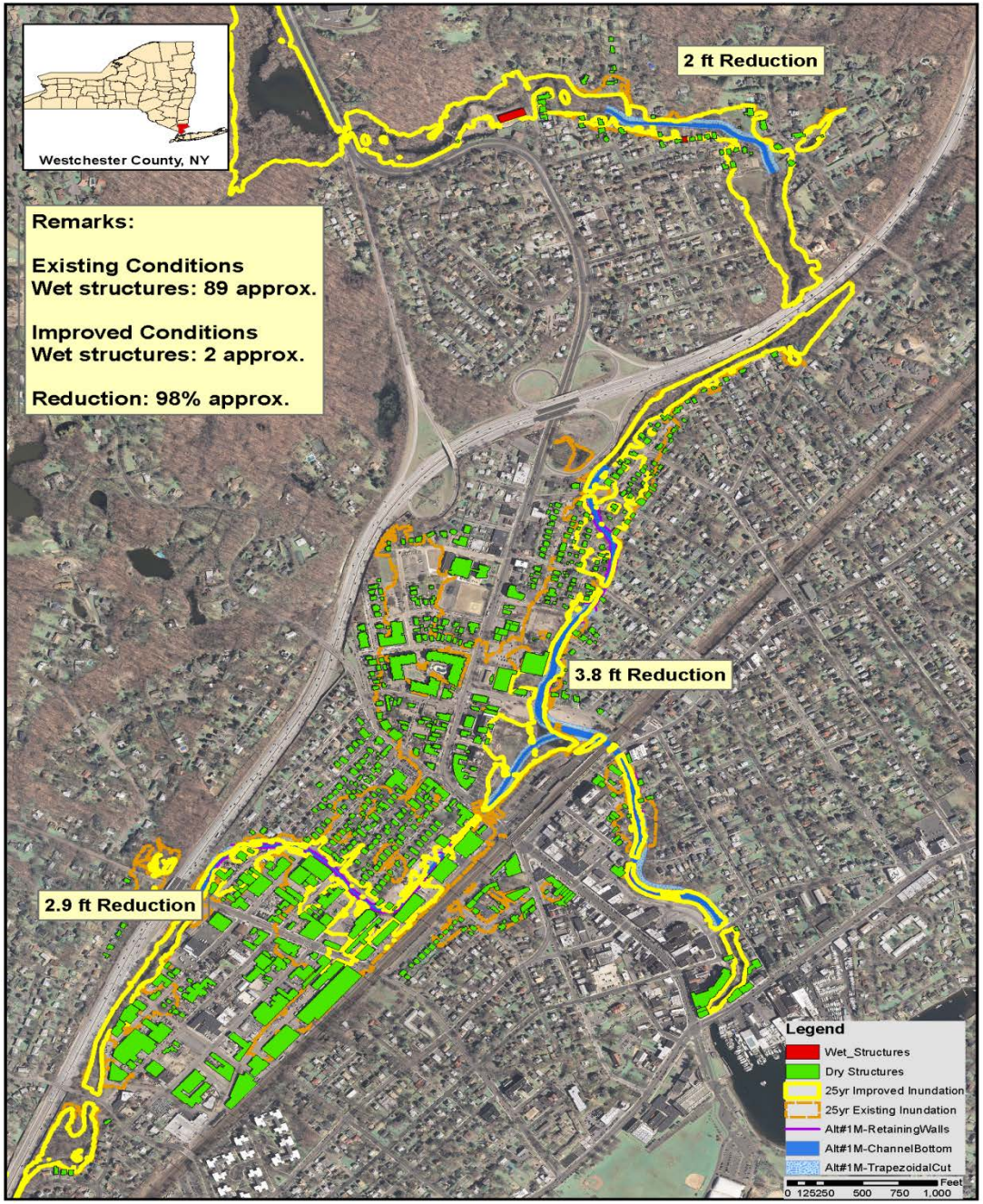

4% Annual Risk of Flooding (25 YR) || Alternative #1 M
Mamaroneck & Sheldrake
Westchester County, NY
May 2014

US Army Corps of Engineers
New York District

Locally Preferred Plan
1M
25 year

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Study Timeline

Schedule for Report Approval – Chief's Report

- Public Meeting – Village of Mamaroneck – May 22, 2014
- Internal Quality Review (DQC) Draft Report– September 2014
- Exterior Reviews (ATR/IEPR) & non-Federal Review – October 2014
- USACE Vertical Team Review – December 2014
- Public Review (draft Report/draft EIS) – February 2015
- Chief's Report (Recommend Project) – September 2015
- WRDA Authorization (Congressional Authorization of the Recommended Project)
- Construction Appropriation (Initiate Construction)

Contacts

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QUESTIONS?

SUMMARY OF TSP OPTIMIZATION ALTERNATIVES

Bridges	Alt. #1		Alt. #1S		Alt. #1M		Alt. #1L		Alt. #1F		Units
Ward Ave.	Remove/replace		No action		Remove		Remove		Remove		-
Halstead Ave.	Remove/replace		No action		No action		Remove/replace		No action		-
Station Plaza	Remove/replace		Remove/replace		Remove/replace		Remove/replace		Remove/replace		-
Waverly Place	No action		Remove/replace		Remove/replace		Remove/replace		Remove/replace		-
Centre Ave. Footbridge	Remove		Remove		Remove		Remove		Remove		-
Footbridge #1 (near confluence)	Remove		Remove		Remove		Remove		Remove		-
Footbridge #2	Remove		Remove		Remove		Remove		Remove		-
Channel Work Length:											-
Harbor Heights	N/A		N/A		1,340.00		N/A		N/A		ft
Mamaroneck Upstream	1,800.00		2,400.00		2,400.00		2,400.00		2,400.00		ft
Mamaroneck Downstream	2,400.00		2,400.00		2,400.00		2,400.00		2,400.00		ft
Sheldrake	1,400.00		3,470.00		3,470.00		3,470.00		3,470.00		ft
Channel Width Size:											
Harbor Heights	N/A		N/A		25.00 - 35.00		N/A		N/A		ft
Mamaroneck Upstream	45		30.00 - 40.00		45		45		30.00 - 40.00		ft
Mamaroneck Downstream	45		45		45		45		45		ft
Sheldrake	30		20.00 - 30.00		25.00 - 30.00		30		20.00 - 30.00		ft
Channel Cut Depth (max.):											
Harbor Heights	N/A		N/A		1.1		N/A		N/A		ft
Mamaroneck Upstream	2.3		2.3		2.3		3.2		2.3		ft
Mamaroneck Downstream	4.2		4.2		4.2		4.3		4.2		ft
Sheldrake	3.4		1.8		3.4		4.2		1.8		ft
Channel Cut Volume (Soil/Rock)	47,000.00	10,000.00	60,990.00	11,250.00	89,210.00	11,250.00	87,230.00	11,250.00	60,990.00	11,250.00	cyd
Walls (average height/Length)	8.5	4,955.00	8.4	4,085.00	8.5	4,360.00	8.7	7,210.00	8.4	4,085.00	ft
Non-Structural	No action		No action		No action		9 structures		9 structures		-