



Maintaining the City's Water Supply

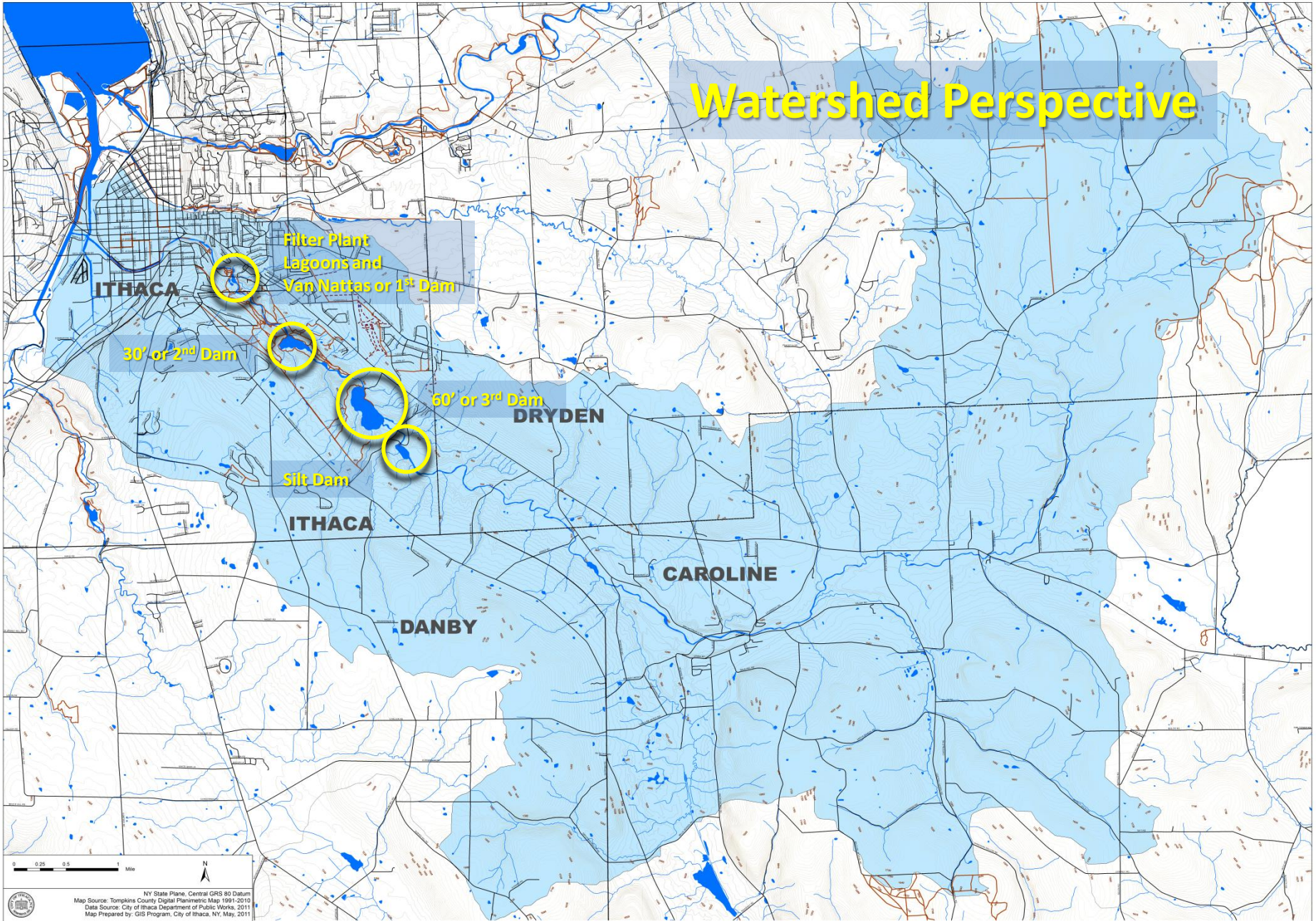
Roxanna Johnston
City of Ithaca Drinking Water Plant

June 5, 2013

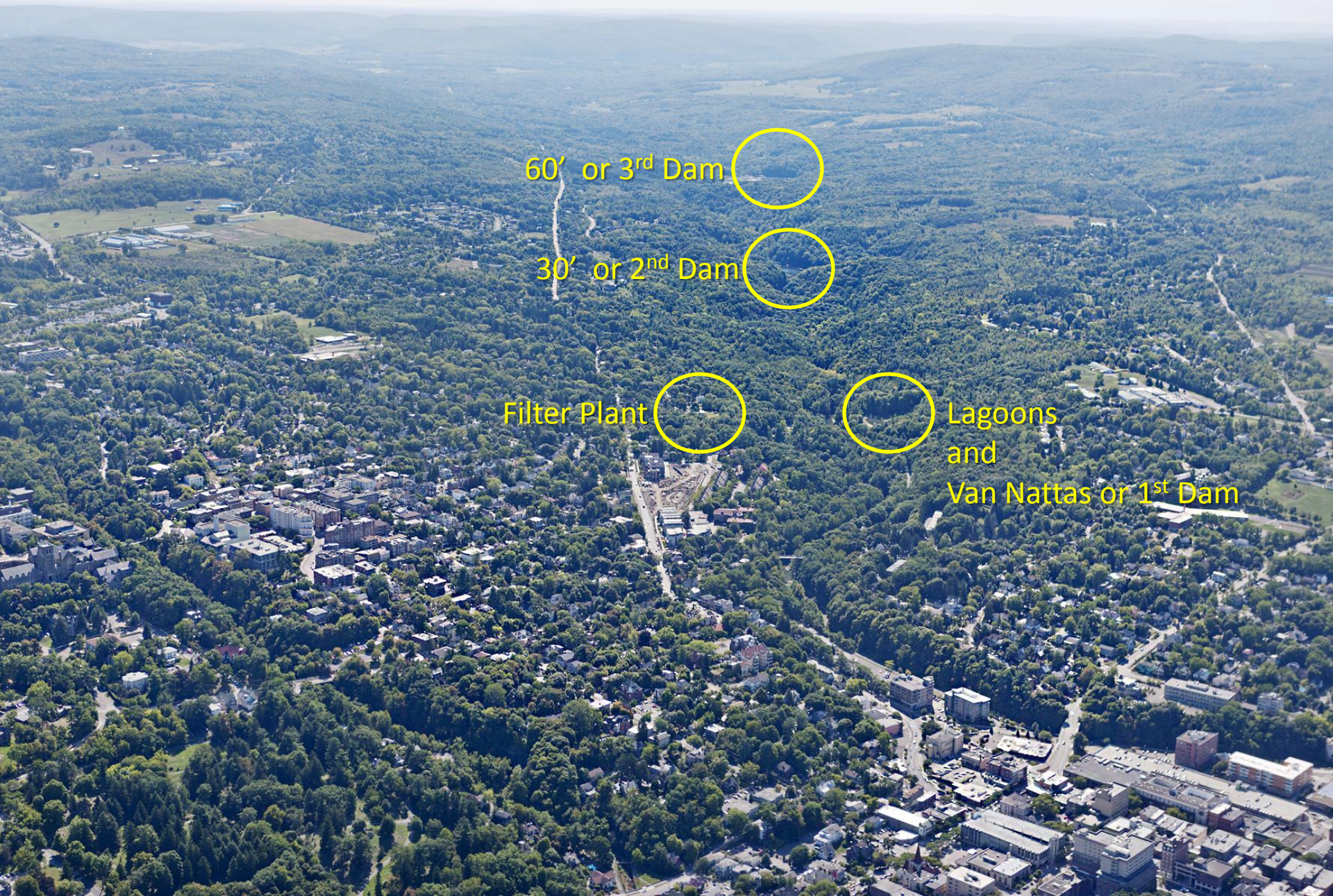
Falls on Sixmile creek. Brookton, N. Y.

Six Mile Creek Watershed

Watershed Perspective



Landscape Characteristics



60' or 3rd Dam

30' or 2nd Dam

Filter Plant

Lagoons
and
Van Nattas or 1st Dam

Basic Infrastructure

GRAVITY SYSTEM	
A. OLD CLEAR WELL	550,000 GAL
B. NEW " "	950,000
TOTAL	1,500,000
DAILY CONSUMPTION	943,174 GAL PER DAY
RATIO	1.59

MILES OF WATER MAINS 32.1

EAST ITHACA PRES ZONE	
EAST ITHACA TANK	615,000 GAL
CAYUGA HEIGHTS TANK	498,000 "
TOTAL	1,113,000 "
DAILY CONSUMPTION	372,641 GAL PER DAY
RATIO	2.98

MILES OF WATER MAINS 9.98

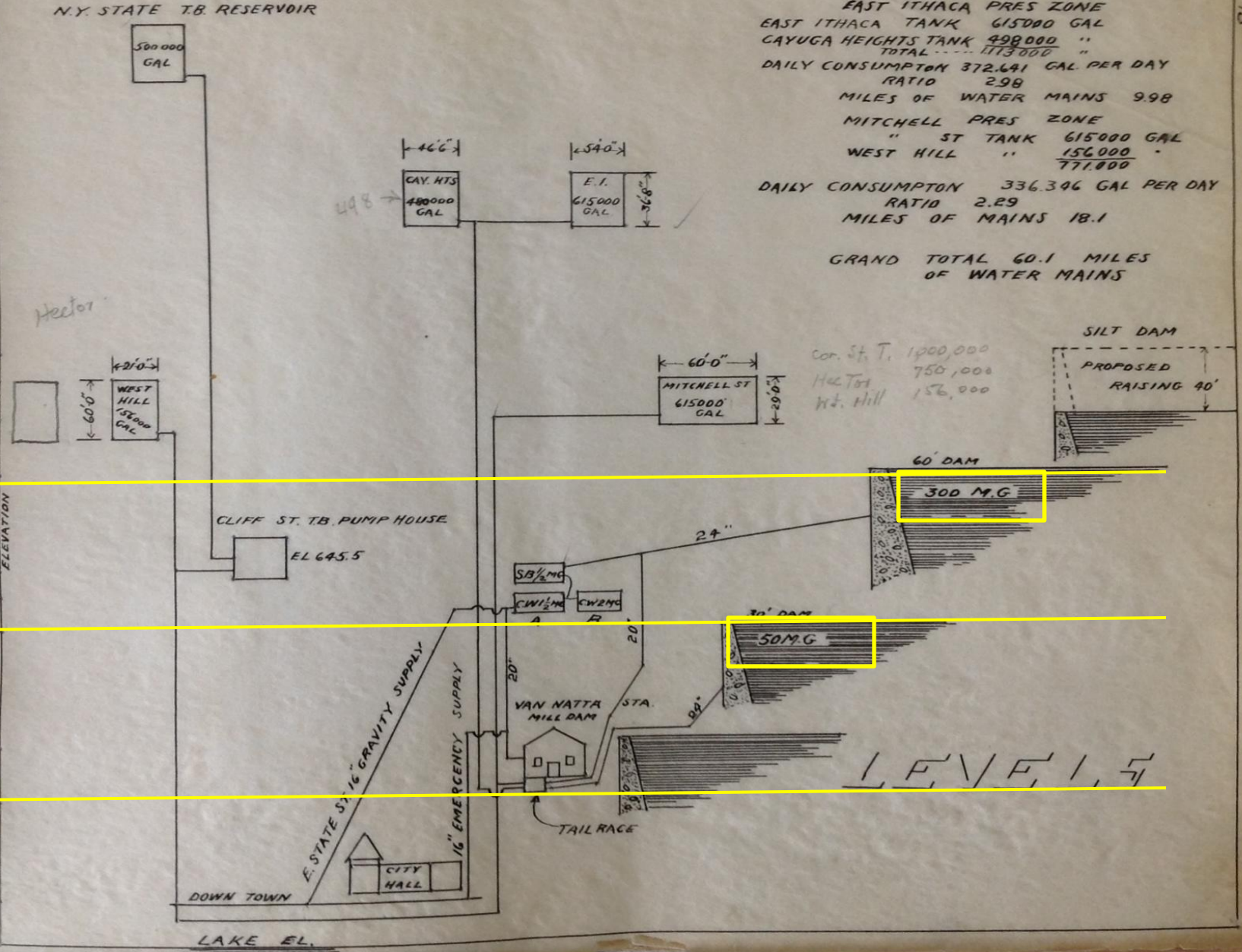
MITCHELL PRES ZONE	
" ST TANK	615,000 GAL
WEST HILL "	156,000 "
TOTAL	771,000
DAILY CONSUMPTION	336,346 GAL PER DAY
RATIO	2.29

MILES OF MAINS 18.1

GRAND TOTAL 60.1 MILES OF WATER MAINS

SUBTRACT 1.8' FROM THESE ELEVATIONS FOR U.S. DATUM

- EL 1041
- E.L. 960
- EL. 816
- EL 725
- E.L. 705
- 626-85
- 612-83
- E.L. 584
- E.L. 50.39
- EL 463
- EL 412.19
- EL. 383.4

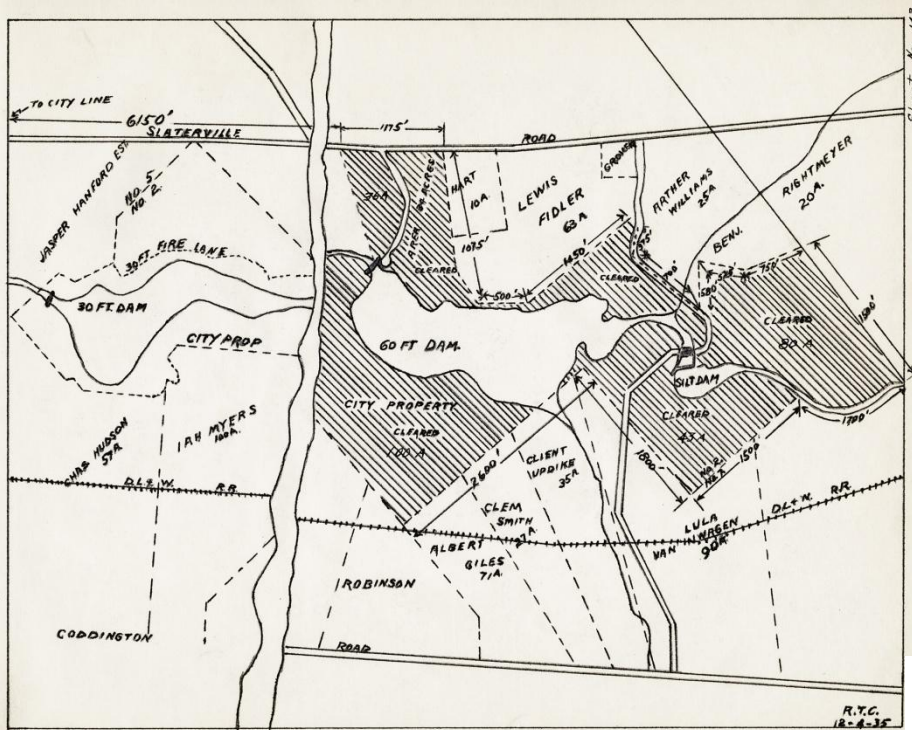


Cor. St. T. 1,000,000
Hector 750,000
Wt. Hill 156,000

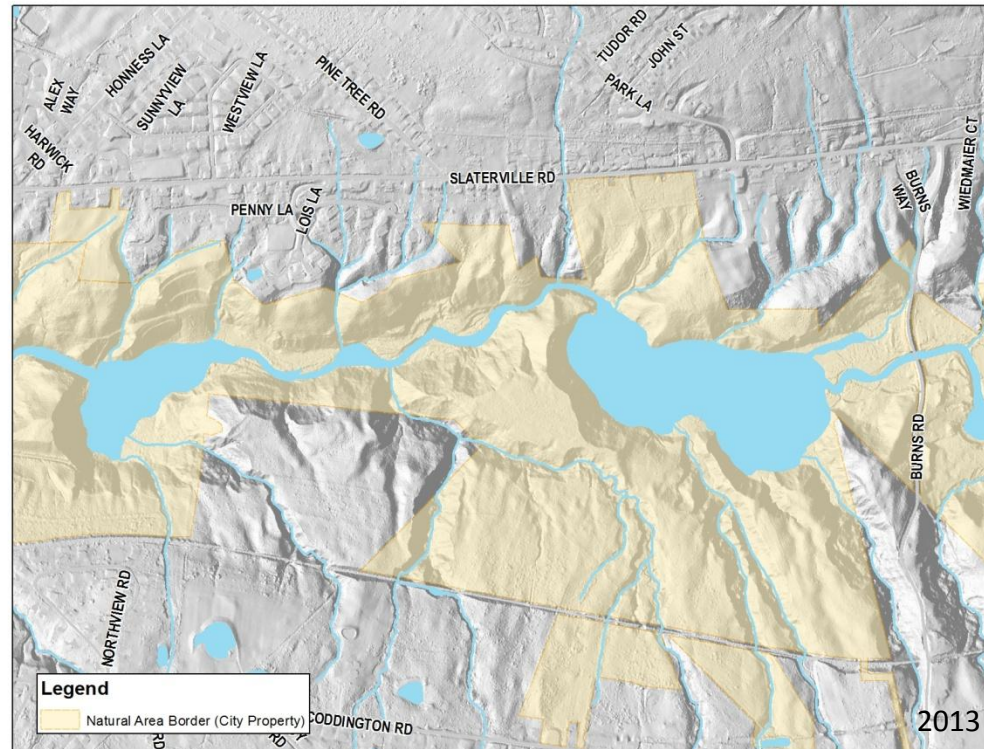
SILT DAM
PROPOSED
RAISING 40'

LEVELS

Buffering the Source



Land holdings have increased over the last 100 years to better protect the reservoirs and raw water line



Board of Public Works,
Ithaca, New York.

Gentlemen: Att. Prof. Wm. M. Sawdon,
Chairman, Water Committee

I herewith submit the 1934 Report of the Water Department. The work accomplished this year, together with the five previous years, is listed below.

Year	New Mains	New Valves	Service Leaks	New Hydrants	Manholes	New Services	
						Metered	New Taps
1930	12,631'	40	80	33	70	114	66
1931	4,080'	70	115	35	65	89	86
1932	12,711'	77	110	29	43	77	49
1933	6,829'	90	90	36	71	69	54
1934	16,894'	78	166	21	84	113	89
1935	5,842'	35	111	9	76	43	26

Another interesting comparison is the following;

Year	General Maintenance	New Construction	Revenues
1930	\$68,594.51	\$ 48,590.64	\$ 147,547.21
1931	72,440.61	58,758.90	137,139.95
1932	66,507.76	51,155.95	143,229.34
1933	65,158.97	36,427.10	139,437.00
1934	71,926.23	34,922.93	152,683.12
1935	64,758.37	46,408.92	143,853.88

The average General Maintenance for the five years preceding this year amounted to \$68,926.00. This year it was approximately \$4,000.00 less, and during any normal year it should not exceed \$60,000.00, provided, of course, we are not hampered by very severe cold weather or floods.

This year comparatively little pipe was laid due to the fact that concentrated efforts were made to correct conditions at the Filtration Plant.

Valves and hydrants were operated and serviced the same this year as heretofore.

WATERSHED

The Watershed was inspected this year at considerably less expense than theretofore, due to the fact that it is done by the regular Water Department employees.

Watershed Rules and Regulations from the 1920's and are in need of revision

Maintenance and Inspections

Maintenance has been minimal for the last 2+ decades while debating the future of the existing facility. It was decided to rebuild on-site. Work in the watershed is already underway. The new facility will be started next year.

-2-

Mr. Charles A. Holmquist

Another thing of interest was that all the privies, that we had been after people to clean up, were thoroughly cleaned out by the flood, and consequently the result for finding fewer violations this year.

VIOLATIONS

Dead cats	2
Dead horses	1
Dead hens	52
Dead sheep	2
Dead woodchucks	5
Dead rabbits	3
Swill and refuse dumped in creek	4
Piles of litter	4
Swimmers	1 (Fewer this year than 1934)
Total	72

George D. Carpenter

Violations still tracked, priorities have changed

WTP Annual Report of Operations

SIX MILE CREEK - VIOLATIONS @ 60' RESERVOIR & UPSTREAM

(NYSDOH - Watershed Requirement)

TYPE OF VIOLATION

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Hiking	59	39	27	no data	51	67	72	66	61	
Swimming	0	19	11	no data	0	1	0	6		
Fishing	19	18	5	no data	1	3	4	5	2	
Bikes	0	1	0	no data	1	5	0	3		
Boats	4	12	0	no data	0	0	0			
Other	0	1	2	no data	1	0	0		10	
Fatalities			1	no data			0			

Data from 2009 primarily from VN to 30': Rangers did not separate data by area.

TYPE OF VIOLATION

	2010	2011	2012
Hiking	18	59	114
Swimming	2	267	
Fishing		1	
Bikes			
Boats			
Other		91	
Fatalities			

On one of the following sheets is a copy of a map which was printed in the Ithaca Journal on July 26th, which graphically shows how the rain hit this community.

Also, following are a great many flood pictures taken in and around Ithaca.

As stated above the Water Department was lucky in that the Six Mile Creek Watershed was off to one side from the center of the storm, with the result that no serious damage was done, other than washing out part of the earth banks of the Silt Dam. A great deal of difficulty was encountered at the Filtration Plant early Monday morning due to the turbidity going from 200 P.P.M. to over 7,000 P.P.M.; with the result that it was necessary to increase the alum from approximately 200 pounds per day to almost 3,000 pounds, and both chlorinators had to be used in order to make sure that nothing but sterile water went into the water mains.

Had no water mains affected within the City. The mains leading to the T.B. Hospital and the Odd Fellow's Home, at the Stone House, were washed out. The 4" main was washed out on Overlook Road in Cayuga Heights Village, and the 6" main on North Sunset Drive in Cayuga Heights was broken in two places. These leaks were all repaired within two days after the storm. Over 300 feet of main on upper Cliff Street was uncovered, which required several hundred loads of dirt to cover. The 6" Universal pipe line on the Lake Street Fall Creek bridge was cracked so that it had to be replaced and the insulation on eight bridges had to be taken off, dried, and replaced.

Considerable work had to be done just below the 60 Foot Dam, as shown in the pictures. It should be mentioned here that the weir house at the Weir Dam was washed away. This had a registering apparatus, borrowed from the University, which was lost in the flood and will have to be replaced to them when they desire it.

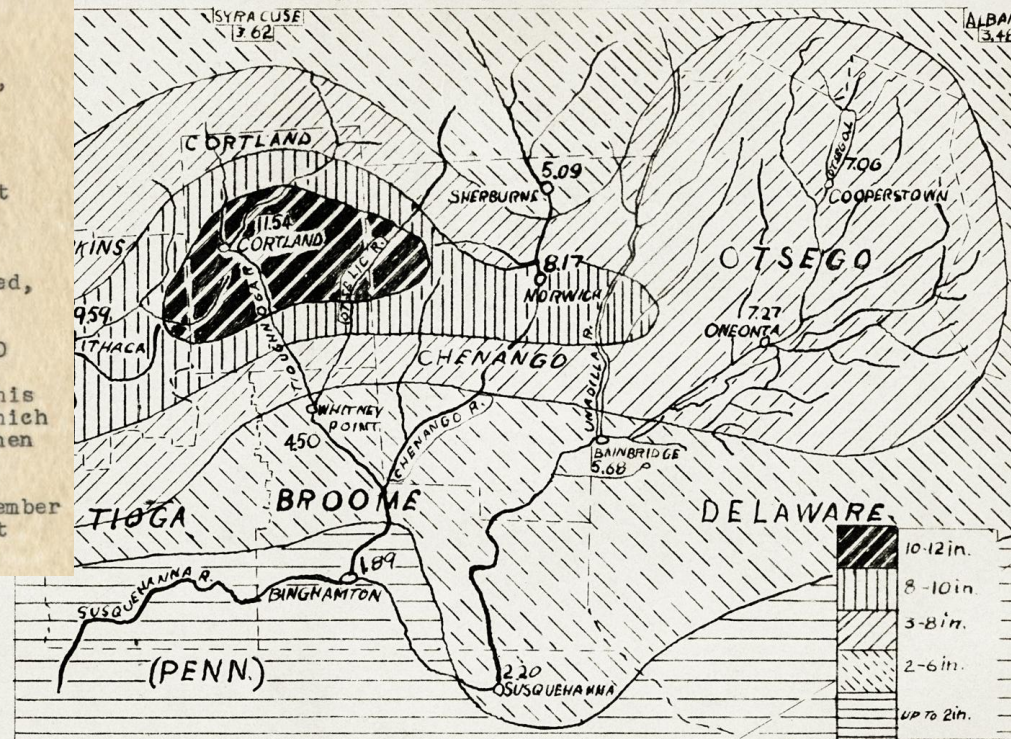
The total cost of this repair work was, upto November first, \$2,886.43, and includes everything but the replacement of the Silt Dam.

An Enduring Obstacle

Storm flows

	ELEV.		ELEV.
ALBANY	18	NORWICH	1015
BRINBRIDGE	972	ONEONTA	1036
BINGHAMTON RIVER 831	865	SYRACUSE	905
CORTLAND	1114	SHERBURNE	1071
COOPERSTOWN LAKE 1194	1225	SUSQUEHANNA	910
ITHACA	381	WHITNEY POINT	960

How the Deluge of July 7-8 Came to New York State



This map shows the extent and intensity of the heavy rainfall in the Southern Tier of New York State, precipitated by a storm that began brewing in the far west of the United States and Canada. The rainfall floods -

shown here fell between July 6 and July 11. Greatest intensity was in the Cortland area, 11.54 inches fell. Note the accidental concentration in a few narrow watersheds. That's what cau

FLOOD DAMAGE TO SILT DAM IN SIX MILE CREEK

July 1935



View looking northwest, showing top of Silt Dam "A" and "B", and embankment, left, which was protected by the core wall.

If the core wall had been put in the whole length, we would have lost all the dirt embankment.



View of 30' Dam 24" Pipe line around turn above Van Natt's, showing foundation washed out by flood.

Sheet No. 97

Sheet No. 96

Co-existing with Nature



FIGURE 35.—CRUMPLED GLACIAL-LAKE CLAY IN THE MORAINIC AREA OF SIXMILE CREEK.



FIGURE 37.—GLACIAL-LAKE CLAY IN THE MORAINIC AREA OF SIXMILE CREEK. Jointed by shrinkage from drying. Contains small scratched pebbles.

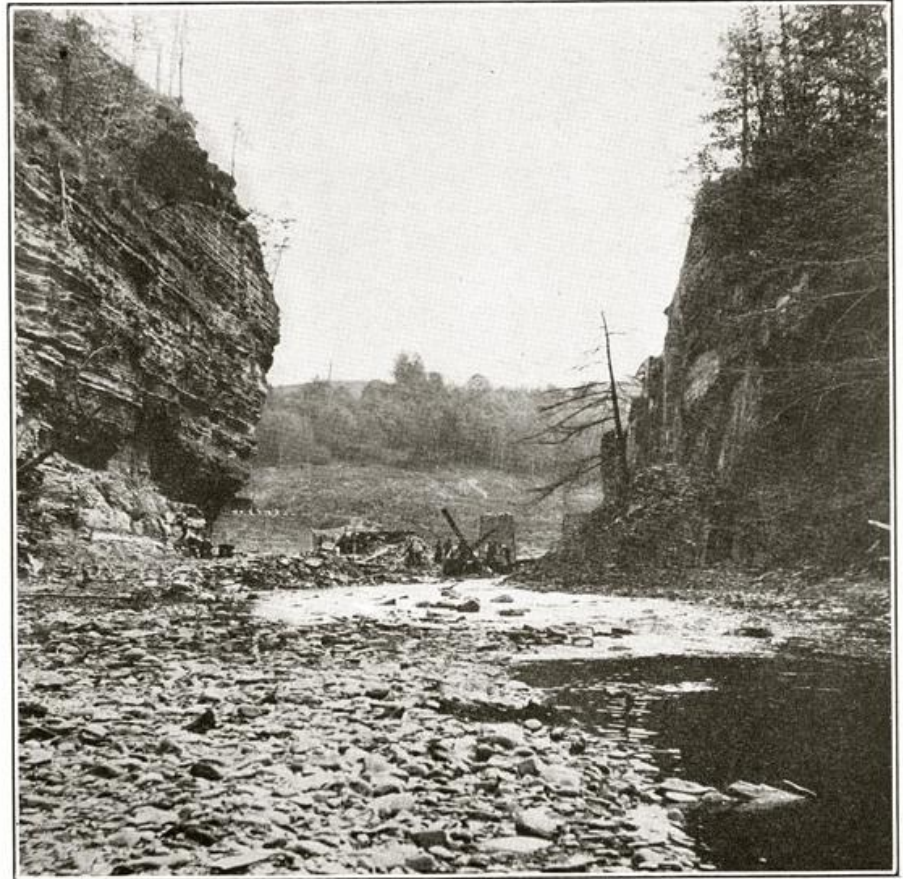


FIGURE 36.—POSTGLACIAL GORGE OF SIXMILE CREEK ABOVE ITHACA. The stream flows through the gap from one section of the old buried valley to another. Site for dam and reservoir under construction.

Six Mile Creek will 'Always' be Turbid

WTP Annual Report: Comparison Data

Raw Water: Turbidity : NTU

Yr.	Avg.	Annual Daily Avg. Max.	Annual Daily Avg. Min.	Yr.	Avg.	Annual Daily Avg. Max.	Annual Daily Avg. Min.
1990	35	1200	5	2000	43	900	2
1991	20	220	1	2001	19	350	2
1992	34	1120	3	2002	19	200	3
1993	32	720	2	2003	34	521	5
1994	42	750	3	2004	37	364	5
1995	19	298	4	2005	40	1000	4
1996	83	1335	5	2006	54	911	9
1997	40	575	8	2007	37	714	6
1998	38	601	6	2008	33	617	7
1999	37	915	4	2009	24	524	6
Avg.	38	773	4	Avg.	34	610	5

Raw Water: Turbidity : NTU

Yr.	Avg.	Annual Daily Avg. Max.	Annual Daily Avg. Min.	Yr.	Avg.	Annual Daily Avg. Max.	Annual Daily Avg. Min.
2010	49	652	6				
2011	61	1500	14				
2012	30	522					

Treating the Water has a Cost

Chemical Usage:

	2007	2008	2009	2010	2011	2012	
Pri. Coag. (gal.)	61686	72488	50,178	40,707	42,288	37,466	
Coag. Aid (gal.)	2953	2292	1082	389	214	0	
KMnO4 (lb)	2419	2520	2819	1691	1923	2489	
NaOCl (gal.)	37873	35490	36753	33751	27,094	27,598	
Filter Aid (lb)	1343	1318	1275	393	0	0	
NaOCl (gal) V.H.	276	276	231	141	296	227	(Gals. Of solution)
SO2 (lb)	2341	2520	2983	3095	2002	2516	
Corr. Inhib.(gal.)				2398	2504	2556	

Costs to Produce 1 MG of Filtered Water (@ the WTP)

Year	(\$) Expended	Filt. H2O (MG)	Cost/MG	Rate Cost/MG
2001	1,074,216	1,453	\$739	\$3,100
2002	1,045,183	1,381	\$757	\$3,290
2003	1,153,943	1,411	\$818	\$3,380
2004	1,229,981	1,374	\$895	\$3,380
2005	1,193,697	1,339	\$892	\$3,580
2006	1,253,486	1,422	\$882	\$3,690
2007	1,180,451	1,483	\$796	\$3,770
2008	1,158,678	1,635	\$709	\$3,890
2009	1,382,623	1,631	\$848	\$4,030
2010	1,468,274	1,699	\$864	\$4,440
2011	1,754,951	1,446	\$1,214	\$5,050
2012	1,654,496	1,510	\$1,096	\$6,020

* 2006 expended: not a finalized number, due to encumbrances not finalized, assuming at this point will be spent
 2008: tot. exp. Are a preliminary expense - did not have a final number yet.

Protecting the City of Ithaca's drinking water means

- Keeping the soil on the land
- Keeping contaminants out of the water
- Controlling bacterial growth (cooler water)
 - Maintaining a stable supply of water

All of which is compatible with

- Better stream conditions for native fish
 - Better habitat
- Minimal stormwater erosion, aka property damage
 - Aquifer recharge, aka private wells

*Thanks to the Six Mile Creek Volunteer Monitors and the
Town of Caroline for your efforts*