ENVIRONMENTAL GEOLOGY AND HYDROLOGY OF ONEONTA AREA

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Cumulative Mileage	Miles from Last Point	Route Description
0.0	0.0	Morris Hall, SUCO Campus. Exit area for Ravine Parkway.
0.4	0.4	Turn RIGHT at stop sign onto Ravine Parkway and drive through campus.
0.8	0.4	Bear RIGHT at fork.
1.0	0.2	Straight through traffic light.
1.5	0.5	Turn LEFT at stop sign onto East Street.
3.1	1.6	Bear LEFT at fork onto Wilber Lake Road.
4.5	1.4	Wilber Lake Dam on right.
4.8	0.3	Turn RIGHT onto dirt road.
5.0	0.2	Park on right. Walk to lake.

STOP #1: WILBER LAKE RESERVOIR

(refer to Figure 1 locator map)

Wilber Lake serves as the principal water supply for the city of Oneonta and adjacent suburban areas. The lake itself covers an area of approximately 90 acres when full and receives runoff and infiltration from a drainage basin of only about 1650 acres. Relief within this drainage basin is 393 feet, with the highest elevation being 1928 feet. Nearly 80% of the drainage basin is forested mainly with mature hardwoods and pine. Some selective lumbering has occurred over the years, but clear-cutting of trees has not, and lumbering has apparently had minimal effect on the drainage characteristics within the basin. The remaining area is comprised of fields, pastures and open bushy areas. The city owns or controls most areas adjacent to the reservoir and no development is allowed. Surface deposits around the lake consist of a silty clay glacial till matrix with shale and siltstone slabs in a layer ranging from about seven to twelve feet thick, decreasing in thickness on the surrounding hillsides to a little over five feet (Walker, 1985).

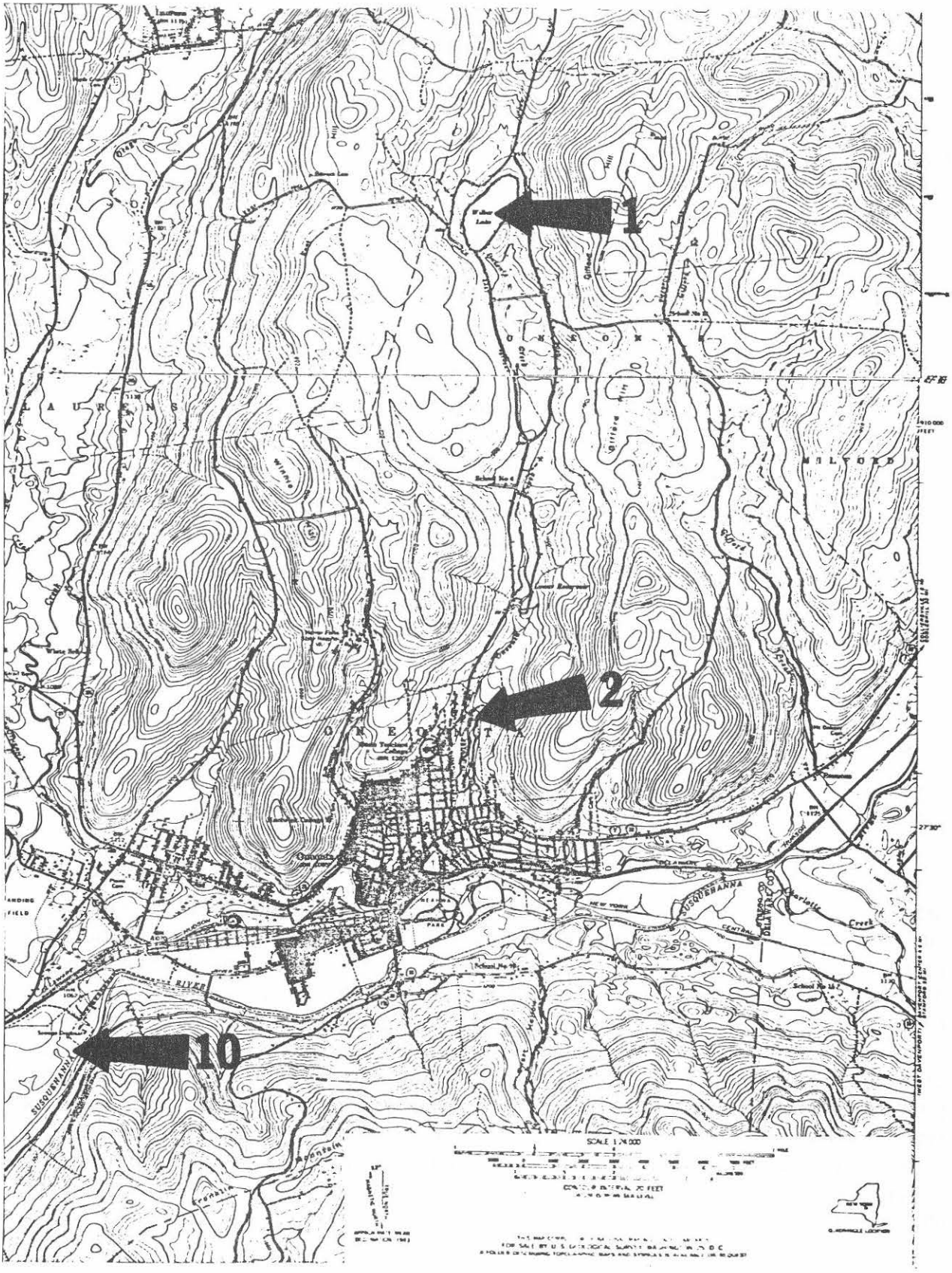

Figure 1: Locator Map

The lake contains approximately 450 million gallons of accessible water, with another 70 million gallons contained below the water supply intake pipes. According to water treatment plant personnel, the present water use is highly variable, but typically averages about 1.5 million gallons per day (roughly 100 gallons/person/day), or approximately 550 million gallons per year. This requires more than one complete recharge of the lake every year, which only occurred for five years between 1958 and 1982 (Walker, 1985). These years were fortunately when water demands were less than present, but increasing demands since that period have necessitated the search for supplementary sources of water. The largest single users of the city's water supply are the colleges (Hartwick College and the State University College) and water usage varies greatly depending on whether or not one or both colleges are in session since the student population is greater than one-third of the total city population.

The lower reservoir holds an estimated 25 million gallons maximum (probably considerably less due to sedimentation). The water treatment plant will not use water from this source deeper than about two or three feet because of the amount of suspended sediment in the water column. Even with this additional supply, it would only equal a few days supply at the present demand. Supplementary sources include a well drilled west of the city in 1941 for industrial uses but was never used. It is now on property owned by the New York State Electric and Gas Company and was leased to the city in 1982. This well has been connected to the city's water main and can provide up to about one million gallons per day (1.5 cubic feet/second) for four months (Arthur Palmer, pers. comm.), but is only used at about half that capacity. This supply is only used when necessary due to the rust scale in the pipes. Water must be pumped back against the normal flow direction in the mains, which increases the rust scale and discoloration problem. Also, any treatment (such as chlorination) must be done at the well head. Another well drilled in Wilber Park can provide up to about 250 thousand gallons per day. This well is near the water treatment plant and is connected to the water supply pipe to the plant, but is presently not in service. A last resort supplementary supply is possible from the Susquehanna River. Problems with this source are discussed later, as this is one of the stops (#3) on this trip.

		Return back on dirt road to Wilber Lake Road.
5.1	0.1	Turn LEFT at stop sign onto Wilber Lake Road and return to city.
6.7	1.6	Bear RIGHT at yield sign.
8.4	1.7	City limit. Continue straight ahead on East Street.
8.8	0.3	Water treatment plant on left.

STOP #2: WATER TREATMENT PLANT
(refer to map in Figure 2)

The city's water treatment plant, located on East Street near the high school, treats an approximate average of 1.5 million gallons of water per day from Wilber Lake with chlorine at the rate of 12-18 pounds/day, the rate dependent upon water demand. Also, the supplementary water supply from the West End well is treated daily with 4 to 5 gallons of sodium chloride solution at the well head when this well is being utilized.

		Continue on East Street.
9.4	0.6	Turn RIGHT at stop sign onto Center Street.
9.5	0.1	Turn LEFT at light onto Maple Street.
9.7	0.2	Turn RIGHT at set of traffic lights onto Main Street. Take immediate LEFT onto Grand Street.
9.8	0.1	Turn RIGHT onto Market Street.
10.0	0.2	Turn LEFT at bottom of grade onto Gas Avenue. Cross RR tracks and bridge.
10.1	0.1	Turn LEFT across bridge, following sign Catella Park and Mill Race Walk.
10.3	0.2	Park on right just before overpass.

STOP #3: MILL RACE PUMPING STATION
(refer to Figure 3)

The mill race, originally constructed to divert water from the Susquehanna River to provide water power to mills located downstream, now serves as a flood control channel and as a possible supplementary source of water for the city. The small brick building contains a pump which can divert water from the intake immediately above the small dam on the mill race to the reservoir via the pipe visible in the streambed which enters the mill race at the dam. However, this water source is highly undesirable and is viable only in an emergency. There is a high algae content which results in discoloration and an undesirable taste. The water may be polluted with other contaminants as well. Perhaps more significantly, during a drought, when supplementary water supplies would be most needed, the river level would be too low to provide water to this channel. Also, during winter months, it is likely that the water in the above ground pipe from the pumping station to the reservoir would freeze.

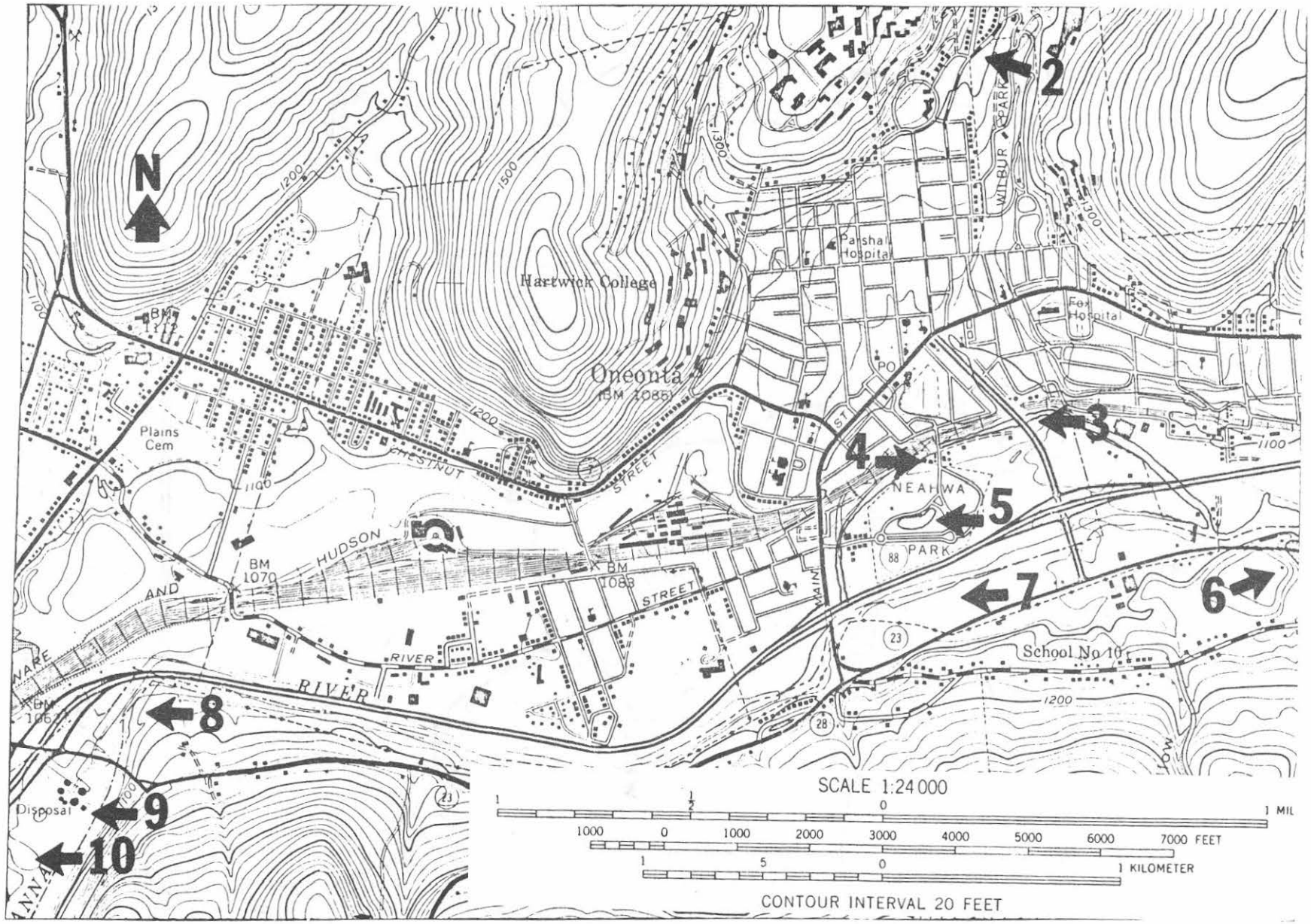

Figure 2: Detail Map of Stops 2-10

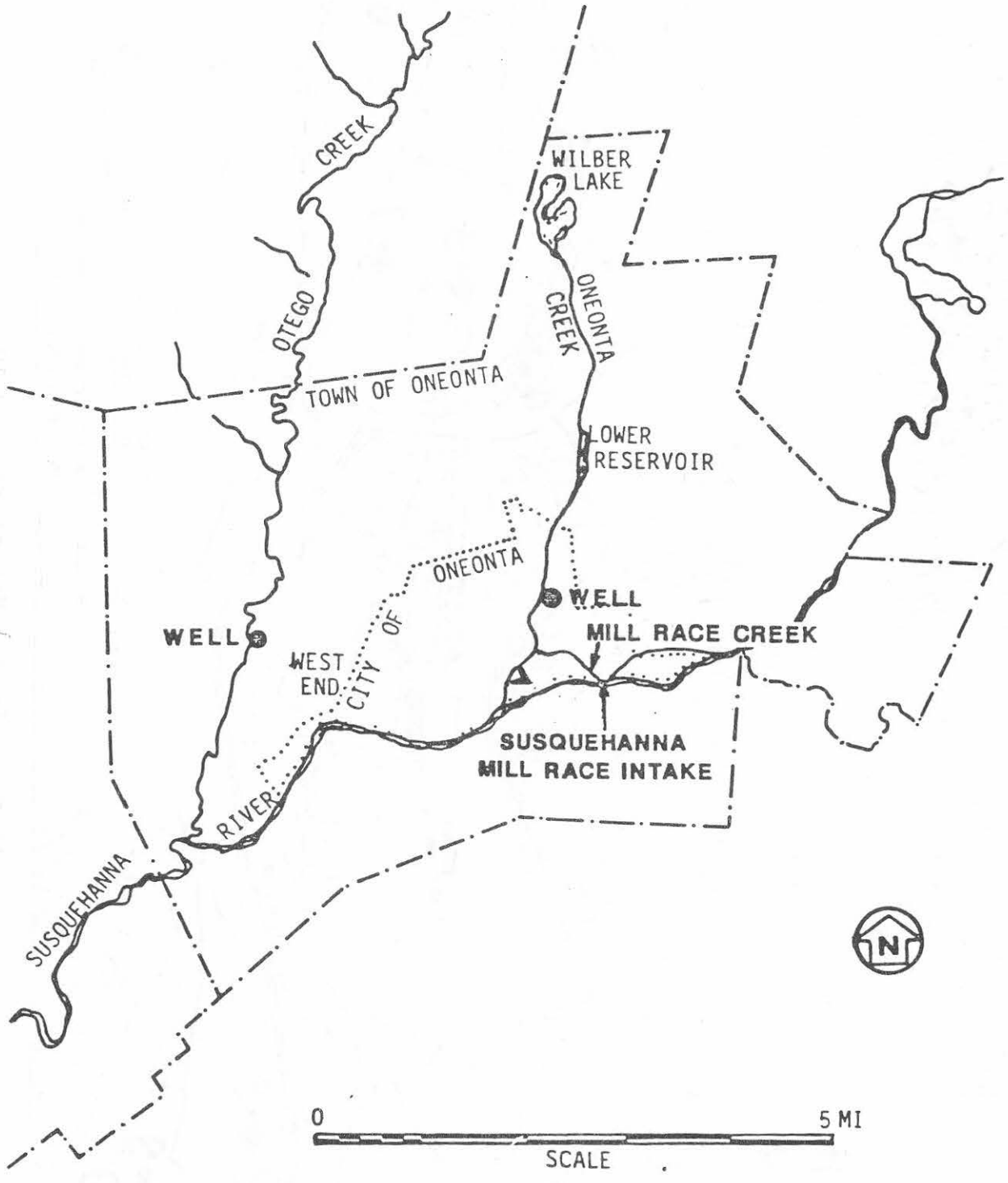

Figure 3: City Water Supply Sites

Return to Gas Avenue.

10.4	0.1	Turn LEFT at stop sign onto Gas Avenue.
10.5	0.1	Park near bleachers at ball park.

STOP #4: NEAHWA PARK-BURIED HAZARDOUS WASTE SITE
(refer to Figure 4)

From 1881 until 1953, a coal gasification plant operated in the general area now occupied by the baseball field and adjacent buildings along Gas Avenue in what is now part of Neahwa Park. The plant was originally constructed in 1881 by the Oneonta Gas Light Company, which merged with the Oneonta Electric Power and Light Company in 1887. In 1918, it became part of the Ithaca Gas and Electric Company, which itself became part of New York State Electric and Gas Company (NYSEG). With the advent of cheaper petroleum, natural gas and electric power, the plant closed in 1953 after 72 years of operation. Most of the buildings were dismantled in 1956 and the remaining buildings and property were sold to the City of Oneonta in 1966. The site has since been used for the city garage and storage of city highway equipment, the dog pound, a road salt storage facility, and presently as a minor league baseball field. While in operation, this plant produced gas for heating and lighting from coal, as well as many by-products which are now known to be hazardous (Figure 5). Some of these by-products were buried in the immediate vicinity and were not discovered until recent excavations to repair the Gas Avenue bridge were begun.

NYSEG hired professional consultants to analyze the soils and groundwater in the area, including those from several drilled test wells and excavated pits, in order to determine any present or potential hazard. The initial site survey was initiated in April 1986 and the final technical report was published in February 1990. Analyses of soil from the test pits indicated the presence of the following material (TRC Environmental Consultants, 1988):

A. Aromatic hydrocarbons

benzene
chlorobenzene
1-2-dichlorobenzene
1-4-dichlorobenzene
ethylbenzene
toluene

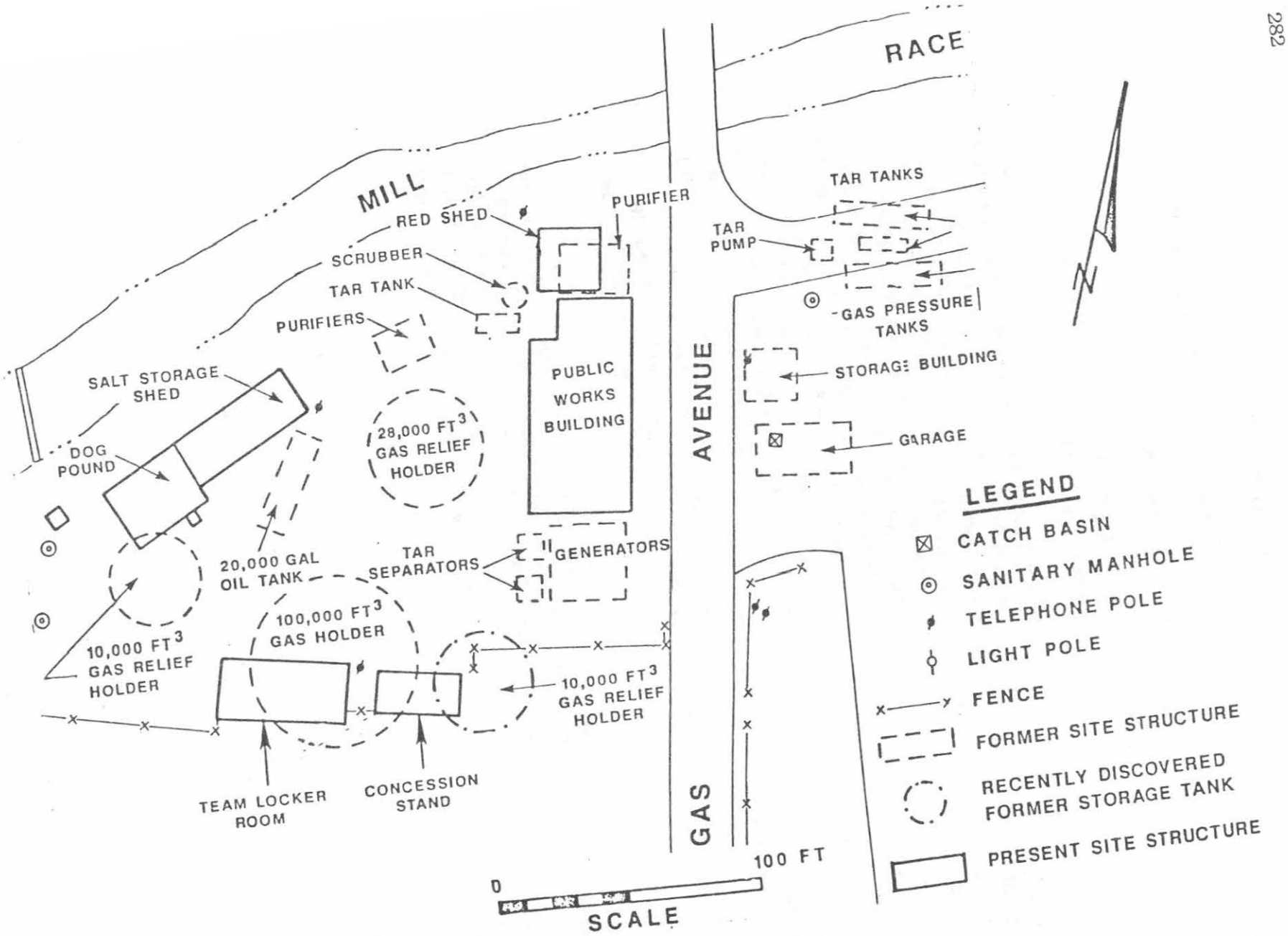

Figure 4: Neahwa Park

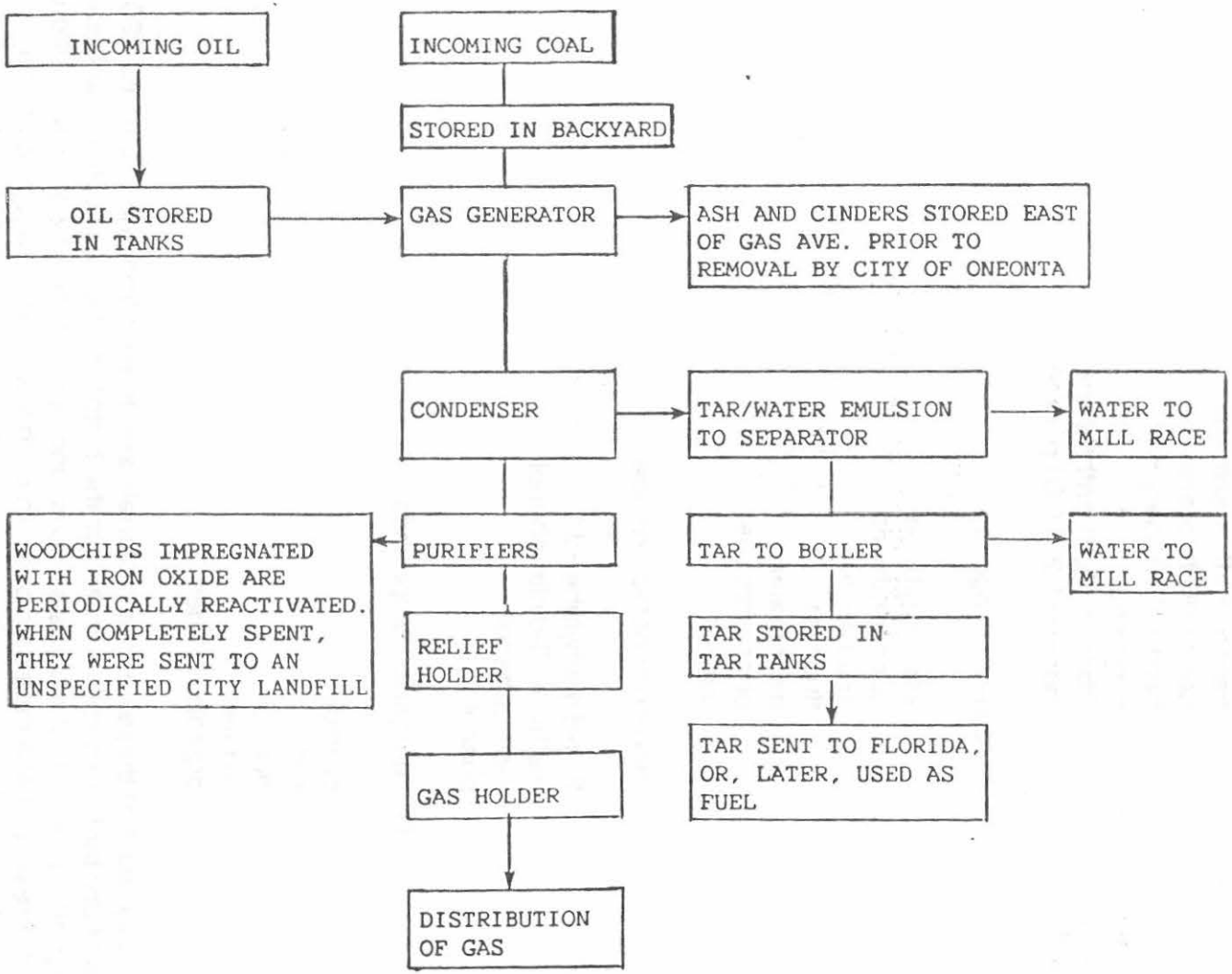

Figure 5: Flow Chart for Gasification Process

B. Polynuclear aromatic hydrocarbons (PAHs)

1. Carcinogens

benzo (A) anthracene
benzo (A) pyrene
benzo (B) fluoranthene
benzo (K) fluoranthene
benzo (GHI) perylene
chrysene
dibenzo (A,H) anthracene
indeno (1-2-3 CD) pyrene

2. Non-carcinogens

acenaphthene
acenaphthylene
anthracene
fluorene
naphthalene
phenanthrene
pyrene

C. Non-chlorinated phenols

2, 4-dimethylphenol
methyl-4, 6-dinitrophenol
4-nitrophenol
phenol

D. Inorganic compounds

cyanide
iron
zinc
sulfate
organic nitrogen

It is assumed that these various materials are derived from the estimated 220,000 gallons of dry tar buried in this area over the history of the gasification plant operation. Although the above list of materials may sound devastating, it was determined that although present, these materials occur in such low concentrations as to be considered safe in their present location deep beneath the surface (TRC Environmental Consultants, 1990). In fact, it was determined that excavation and attempted removal of these materials may present a greater risk while simultaneously presenting the problem of what to do with the material once it is removed. It is doubtful

that all of the materials could be retrieved in any case. Groundwater movements are being monitored and excavations in the area are prohibited to prevent this material being exposed. The site has been taken off the hazardous site list by the New York State Department of Environmental Conservation and any remediation will come under the control of DEC's Water Division (rather than the Hazardous Waste Division). However, controversy between City officials and the DEC officials continues. One problem includes the fact that State standards are less strict than Federal standards and if Federal standards were followed, the site would still be on the hazardous site list and may therefore qualify for Superfund cleanup. However, DEC officials state that Superfunds were used only when a site had been abandoned or the responsible party was bankrupt or uncooperative. This is not the case and NYSEG and DEC officials plan to work together to develop a remediation plan if it is determined to be necessary.

Walk to:

STOP #5: HODGES POND

One of the main attractions within the city's Neahwa Park is Hodges Pond. Although swimming is not allowed, it is stocked with small fish (bluegills, etc.) and becomes an ice-skating rink in the winter months. However, recent years have shown dense weed growth in the pond and it was becoming less aesthetically enjoyable as a result. Annual weed removal was expensive and was a temporary solution at best. It was decided in 1990 to drain the pond and dredge much of the bottom mud. Also, to control weed growth without resorting to herbicides, one plan is to lower the water levels in the fall and allow freezing winter temperatures to kill the roots of the shallow water weeds.

Another potential problem is that groundwater movement in this area is generally from the area of the coal tar contamination (STOP #4) toward Hodges Pond. The potential effects of this on the pond are presently unknown.

		Return in vehicle to Market Street.
10.7	0.2	Turn RIGHT at stop sign onto Market Street.
10.9	0.2	Turn LEFT at stop sign onto Grand Street.
11.0	0.1	Turn RIGHT at stop sign onto Main Street. Stay in far right lane and enter Lettis Highway at intersection.
11.6	0.6	Continue straight through next two sets of overhead traffic lights at overpass.
11.8	0.2	Turn LEFT at traffic light by McDonalds onto Route 23.

12.0	0.2	Turn RIGHT into shopping mall and turn left to the far side of the mall parking lot near the hill.

STOP #6: SOUTHSIDE MALL - Planned Mining

The hill of glacial gravels at the east side of the shopping mall is owned by a local developer who plans to remove the hill and use the material to fill in wetlands along the Susquehanna River about one-half mile to the west (STOP #7). The advantages include allowing more room for expansion of the mall and/or other forms of commercial development as well as providing more potential development space in the area to be filled. However, local environmental groups (City Environmental Board, Audubon Society, and others) and private citizens who realize their responsibility for the stewardship of the environment are concerned about the effect of such massive changes to the local area. Questions have been raised not so much in regards to the removal of the gravel hill but more in terms of the effect of filling in the present floodplain/wetland area along the river. These concerns will be explained at our next stop, which is at the planned fill site. Other potential problems concerning the removal of the hillside gravel include the traffic congestion and the impact on the road surface itself from the hundreds of truckloads of gravel that will have to be hauled continuously over several months. As of this writing, the planned operations are "on hold" until all required permits are obtained by the developer from appropriate State offices (Department of Environmental Conservation, Department of Highways, etc.).

		Exit shopping mall and turn LEFT.
12.8	0.8	Continue straight through traffic light near McDonalds.
13.0	0.2	Park any place on right across from Christopher's Restaurant.

STOP #7: SOUTHSIDE WETLANDS - Planned Filling

Most of the area between the highway and the river would be filled with the gravel from the hill adjacent to the shopping mall (STOP #6). As can be seen, most of the trees have already been cut and the developer is apparently only waiting for final approval from State agencies.

One of the principal environmental concerns regarding this operation would be the possible increased potential for flooding. The Federal Emergency Management Agency (FEMA) includes this area within the 100-year floodplain of the river, defined as being at the 1090 foot elevation. Without this area available to help contain floodwaters, it only means that other areas will suffer increased flooding, including city residential and commercial areas. Also, increased stream flow may result in increased erosion downstream. Of particular concern would be the possible erosion of the stream bed adjacent to bridge foundations. Besides the obvious destruction of the

wetland habitat, groundwater properties, water tables and drainage characteristics may be adversely affected. A main point of contention is the fact that the developer has not mentioned what his ultimate plans are for this area once it is filled and ready for development. Without knowing what kind of commercial development is planned for this area makes it difficult for even non-environmentally concerned citizens to decide what is best for this area. Most people appreciate the financial benefits of commercial development in their area, as long as they have input on controlling what type of development is planned.

		Continue straight ahead on Route 23.
13.5	0.5	Continue straight through light.
14.2	0.7	Turn RIGHT onto paved road.
15.5	1.3	Turn RIGHT onto paved road.
15.7	0.2	Turn RIGHT into Oneonta fishing access site.
15.9	0.2	Park and walk to river's edge.

STOP #8: RIVER ACCESS - Erosion Control

This river access site is at the downstream end of a section of the Susquehanna River which was straightened in order to allow the construction of the adjacent section of Interstate-88 to proceed without the added costs of building bridges over the original river meanders. This resulted in the river flowing in a nearly straight line for over a mile. Since rivers naturally develop meanders, especially when flowing over land with minimal gradient, man has had to prevent meander development by lining the river banks with large boulders ("rip-rap"). This also tends to increase downcutting in the restricted channel since flow velocity will increase during increased discharge if it is not allowed to widen its channel. A quick glance downstream should point out the potential hazards of increased erosion caused by natural flooding or from removal of upstream wetland areas which can store floodwaters for gradual release. One of the bridge foundation supports is located in mid-stream and may be weakened by erosion.

Notice also how the flow velocity differs across the river at a meander. This should help explain why there are no boulders to prevent erosion on the inside bend of a meander. Rather, sediment is deposited in these areas of lower flow velocity.

16.1	0.2	Exit and drive straight across highway to Oneonta Municipal Complex.

STOP #9: WASTEWATER TREATMENT PLANT

The Oneonta wastewater treatment plant is classified as a secondary treatment process which involves biological treatment to break down the organic materials followed by chlorination to eliminate potentially harmful bacteria. The average daily volume of water treated in 1990 was 3 million gallons but the plant has a maximum capacity of about 3.6 million gallons daily. According to the manager of the plant, one reason for the higher volume of waste water treated than the volume of reservoir water entering the city supply mains is infiltration of groundwater into some of the older permeable sewer pipes. Also, there are some homes in the town that may be connected to the sewer lines but may have their own private wells rather than being connected to the city water supply.

Continue along paved road to:

16.4 0.3

STOP #10: TRANSFER/RECYCLING STATION

The transfer/recycling center was opened in 1988 when recycling became mandatory in the City of Oneonta, one of the first cities in this area to do so. Recyclables are separated by the generator (individuals, businesses, etc.) and either picked up by commercial haulers during the regular garbage pick-up schedule or brought to the station by individuals. Present materials that are removed from the waste stream and recycled include newspapers, certain types of plastic, glass (clear, green and brown are separated), corrugated cardboard, cans, tires, car batteries, used motor oil, and green waste (grass clippings, leaves, branches, Christmas trees, etc.). Newspapers, cardboard, cans and plastic containers are compacted into bales for shipment to available markets for reuse. Glass bottles are crushed before shipment in order to reduce the volume. The remaining garbage is compacted and transferred by truck to a landfill in Montgomery County.

The facility was taken over by the Montgomery - Otsego - Schoharie Authority (MOSA), which controls garbage collection and recycling in the three county area. A program to begin recycling glossy paper, magazines, junk mail, and similar material is planned to begin this fall. Future plans include the mixing of green waste with sewage sludge to produce a composted material which could be used by farmers or other citizens to enrich their fields and gardens. In many larger metropolitan areas, the use of sewage sludge in this way is not feasible due to the high levels of industrial heavy metals or chemicals it contains. It is also hoped that large-scale recycling of other plastics (such as styrofoam and brittle plastics) will be feasible with further advances in recycling technology and the subsequent development of markets for this material.

END OF TRIP.

REFERENCES

TRC Environmental Consultants, Inc., 1988, Task 2 Report for the Site Investigation at the former Oneonta Coal Gasification Plant for New York State Electric & Gas Corporation: Volume I - Technical Report, 138 pages.

TRC Environmental Consultants, Inc., 1990, Task 4 Report - New York State Electric & Gas Corporation Risk Assessment for the former Coal Gasification Site, Oneonta, New York, 189 pages.

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