Appendix A: BIBLIOGRAPHY

The United States Geological Survey is the leading hydroscientific research agency of the Federal Government with responsibility for collecting and disseminating information concerning the source, quantity, quality, distribution, movement and availability of both surface and ground waters. Since its creation in 1879, the research and fact-finding role of the USGS has grown and been modified to meet changing needs. As part of that evolution, the USGS has become the primary source of data on the Nation’s surface and ground water resources.

Today’s programs serve a diversity of needs and users. Programs on Long Island include:

- Collecting, on a systematic basis, data needed for the continuing determination of the quantity, quality, and use of a sole source aquifer system.
- Conducting analytical and interpretive water resource appraisals describing the occurrence, availability, and the physical, chemical, and biological characteristics of surface water and ground water.
- Conducting supportive basic and problem oriented research in hydraulics, hydrology, and related fields of science to improve the scientific basis for investigations and measurement techniques and to understand hydrologic systems sufficiently well to quantitatively predict their response to stress, either natural or manmade.
- Disseminating the water data and the results of these investigations and research through reports, maps, computerized information services, and other forms of public releases.
- Providing scientific and technical assistance in hydrologic fields to other Federal, State and local agencies.

HISTORY

The U.S. Geological Survey was established by an act of Congress on March 3, 1879, to provide a permanent Federal Agency to conduct the systematic and scientific classification of the public lands, and examination of the geologic structure, mineral resources, and products of national domain. The earliest investigations on Long Island were financed solely by the Geological Survey, and include A.C. Veatch’s 1904 Professional Paper #44, Underground Water Resources of Long Island, N.Y., and M.L. Fuller’s 1914 classic The Geology of Long Island. These reports were among the most extensive and intensive of any investigations of ground water supplies ever made in the United States up to that time. Before 1910, water resources investigations in New York were directed from Boston with a subdistrict office in Utica. In 1910, a District Office was established in Albany supervised by the first District Engineer.

On Long Island, critical water problems were developing due to the rapid urbanization and population growth that took place in the 1920’s. The first major investigation of these problems was brought about through a cooperative agreement between the U.S. Geological Survey and the Joint Legislative Committee of the Legislature of the State of New York signed in 1931. At that time excessive industrial and municipal pumping over a period of years in the western part of Long Island had depleted the underground reservoirs and lowered the water table so that there had been an inflow of salt water into the aquifers. A number of large public supply pumping stations had been abandoned and others had been threatened. In order to prevent overdevelopment and to protect the remaining public supply wells from salting, the State Legislature placed the control of Long Island’s ground water resources in the hands of the New York State Water Power and Control Commission. This enabled the Commission to regulate the drilling of new wells in areas of excessive withdrawal and thus eventually to slow down the rate of increase of contamination of the aquifers. The investigations of the Geological Survey were originally designed to provide data to be used by the Water Power and Control Commission in carrying out its conservation policies and to reach conclusions regarding ground water conditions of Long Island, with particular reference to the safe yield of the several aquifers in different parts of the area. It was fully realized that reliable conclusions could not be reached on the basis of a short investigation, and that a long term association would be essential.
In 1932, the cooperative agreement specifically included the new York State Water Power and Control Commission, and the Nassau County Department of Public Works. Cooperation was extended to include the Suffolk County Board of Supervisors in 1933.

An office was opened in Jamaica in early 1944. This was later moved to Mineola in 1949, and then to Syosset in 1977. Development of the New York District continues as local and national demand for water information and research increases. A review of past accomplishments reveals that the work of the U.S. Geological Survey on Long Island has acquired an international reputation for its sophistication and innovative approach to solving the complex water problems of such a vulnerable and densely populated area. Because of its extensive knowledge of the bi-county area developed through decades of conducting basic data studies and ground water investigations, the United States Geological Survey was chosen as one of the principal public agency consultants for the Long Island 208 Study by the Nassau-Suffolk Regional Planning Board.

The following subject areas have been historically examined by the USGS. Relevant technical reports are cited with each designation. For a complete listing of reports please refer to the January 1991 Bibliography of Cooperative Water Resources Reports Prepared by the U.S. Geological Survey, New York District, Long Island Subdistrict.

BASIC DATA OR MONITORING REPORTS


AREAL INVESTIGATIONS ON LONG ISLAND


GEOLOGICAL INVESTIGATIONS: MAPPING THE WATER BEARING UNITS


**WATER QUALITY STUDIES**


HYDROGEOLOGIC MODELLING STUDIES


SPECIAL HYDROGEOLOGIC STUDIES


OVERALL REPORTS ON GEOLOGY AND GROUND WATER RESOURCES OF LONG ISLAND

Bailey, Bruce, Kenneth Webster and Ronald Steward *Long Island Precipitation Patterns and Drought Probability*: Atmospheric Sciences Research Center, State University of New York at Albany, March 1985

Booz-Allen and Hamilton, October 1974 *Water-Management Alternatives on Long Island*


Holzmacher, McLendon and Murrell, P.C., Melville, N.Y.: March 1972. *Hele-Shaw Model Study of Contaminant Motion in the Long Island Aquifer System*


URPB, June 1983. *Investigation of the Feasibility of a Regional Groundwater Management Information System for L.I.*


New York State Conservation Dept. Division of Water Resources Albany, N.Y. Office of Planning Coordination, January 1970

*Long Island Water Resources*


**NASSAU COUNTY**

Water Supply And Groundwater Studies

**GENERAL STUDIES**


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Hughes, Henry. James Pike, Keith Porter, 1984, Assessment of Groundwater Contamination by Nitrogen and Synthetic Organics in Two Water Districts in Nassau County, N.Y., Center of Environmental Research, Cornell University, Ithaca, N.Y.


Nassau County Environmental Management Council, 1974. Environmental Master Plan for Nassau County


Nassau County Department of Health

GROUNDWATER AND WATER SUPPLY REPORTS


—., 1972, Public Health Justification for a Municipal Sewerage System in the Kings Point-Manhasset Area. Nassau County Dept. of Health, Mineola, N.Y. 11501


Dvirka and Bartilucci, 1986, *Investigation of Contaminated Aquifer Segments, Nassau County, New York*


Padar, F.V., 1971, Influence of Sewage Constituents on Quality of Nassau Waters. Nassau County Dept. of Health, Mineola, N.Y. 11501

Padar, F.V., 1975, Need for Sewers in Nassau County. Nassau County Dept. of Health, Mineola, N.Y. 11501


**Nassau County Department of Public Works**


Lawler, Matusky & Skelly Engineers, October 1980, *Streamflow Augmentation Study Within Nassau County Sewage Disposal Districts No.2 and No.3*, County of Nassau Department of Public Works


Perlmutter, N.M., and J.J. Geraghty. Geology and *Ground Water Conditions in Southern Nassau and Southeastern Queens Counties*

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Water supply and groundwater resources of Suffolk County have been extensively investigated. The studies performed have advanced our knowledge of the principle of groundwater hydrology, sources of contamination, remediation measures and provide a basis for future planning efforts. The intent of the following listing of reports and studies is to provide a representative sampling of the efforts of various agencies and individuals to expand our understanding of the major water resources issues.

COMPREHENSIVE PLANNING AND RESOURCE EVALUATION REFERENCES

Beginning with the 1904 W.H. Burr reports which evaluated the potential of using Long Island groundwater resources to supplement New York City drinking water supplies, periodic master planning for preservation and development of Suffolk County fresh water resources have been undertaken including:


Dvirka and Bartilucci, 1987, Suffolk County Comprehensive Water Resources Management Plan (2 vols), (January 1987)


Suffolk County Department of Health Services, 1987, Suffolk County Comprehensive Water Resources Management Plan: Suffolk County Department of Health Services, Hauppauge, N.Y. (January 1987)

TYPE AND SOURCES OF GROUNDWATER CONTAMINATION REFERENCES

Sources of groundwater pollution have been extensively evaluated. Initial concerns during the 1950-60’s included potential for salt water intrusion, effects of synthetic detergents and other sewage constituents, and the impact of industrial wastewater discharges. During the 1970-80’s, nitrates, organic chemicals and pesticides were found to be compounds which significantly degrade the water supply aquifers. Reports which address this subject include:

Andres, Barry D.; Flynn, John M.; and Davids, Herbert W., 1959, Effects of Synthetic Detergents on Ground Water By Launderette Wastes In Suffolk County, N.Y.


New York State Department of Health, 1969, The Long Island Groundwater Pollution Study


Suffolk County Department of Health Services, 1985, Right-of-way Chemical Survey: Drinking Water Section (August 1985)


WATER QUANTITY AND DROUGHT REFERENCES

Information available on groundwater elevation levels, precipitation and assessment of effects drought conditions may have on the aquifers are found in the following:

Bailey, B.H.; Webster, K.; and Stewart, 1985, Long Island Precipitation Patterns and Drought Probability: Atmospheric Science Research Center Publication No. 1000, SUNY Albany

Fitzgella, J.A. and Baier, J.H., 1975, Contaminants in Rainwater and Their Relation to Water Quality: Water and Sewage Works; Melville, N.Y.

Jackson, C.D., 1982, Evapotranspiration and Recharge on Long Island: Cornell Soil and Water Publication SW82-1


**WATER TREATMENT TECHNOLOGY REFERENCES**

Investigation and evaluation of treatment technology used to remove contaminants found in Suffolk County groundwater include:


Suffolk County Department of Health Services, 1984, *Report on Central Water Supply Distribution Center*: SCDHS, Drinking Water Section

**PUBLIC AND PRIVATE WATER SUPPLY REFERENCES**

Information on the quality of public and private water supply sources and efforts to extend public water to communities with contamination are found in the following:

Suffolk County Department of Health Services, 1981, *Marginal Water Suppliers*: Drinking Water Supply Section

Suffolk County Department of Health Services, 1982, *Corrosion Monitoring-Community Public Water Systems*: Drinking Water Section


Suffolk County Department of Health Services, 1985, *Priority Pollutant Testing*: Drinking Water Section (August 1985)


SUPPLEMENT


Appendix B: THE DELINEATION PROCESS

Article 55 of the New York State Environmental Conservation Law predesignated nine SGPA’s and established preliminary boundaries based on Article X of the Nassau County Sanitary Code in the case of North Hills and Northern Oyster Bay and on the delineations in the State Groundwater Management Plan (NYSGMP) in the case of the remaining SGPA’s.

As part of the Special Groundwater Protection Area Project (the Pilot Area Study), the Long Island Regional Planning Board undertook a review of the SGPA boundaries depicted in the State Plan. The process for the confirmation or modification of previously identified SGPA’s included the review and evaluation of the areas on the basis of the following four criteria identified in the NYSGMP:

- Water recharging through the area contributes to a relatively deep aquifer system.
- Recharge water is of high quality.
- The land surface is relatively undeveloped, and there is potential to protect recharge quality by controlling future development.
- The potential exists for the future development of water supply sources from the aquifer system recharge. As a result of the evaluation, the boundaries of the Northern Oyster Bay, the South Setauket Woods, the Central Suffolk Pine Barrens and the South Fork SGPA’s were expanded to encompass contiguous parcels or areas that meet the criteria.

The organization of the Special Groundwater Protection Area Advisory Council, at the commencement of the full scale planning effort, as mandated in Article 55, provided an opportunity for the affected municipalities and other agencies to review and to suggest additional revisions to the boundaries. Town representatives assisted in the provision of land use and environmental data and proposed further inclusions and one deletion. The Council approved a new set of boundaries with the proviso that it have a chance to make final modifications as the results of the study became available.

Additions generally comprised institutional properties, golf courses and other large low density areas. At the request of the Town of Southold, the Council considered the extension of the northern portion of the Central Suffolk SGPA eastward to include the Laurel Lake area in Southold. Inasmuch as the area in question appears to meet the four criteria cited above, the Council readily approved the proposed addition. Downtown Riverhead, a densely developed area with numerous commercial and industrial land uses, constituted the only significant deletion.

The Town of Southold further requested the Advisory Council to consider a 3,000 acre corridor extending from Mattituck to Southold in the vicinity of County Route 8 and the Long Island Railroad for nomination as a new SGPA pursuant to ECL Article 55, Sections 1109 and 1111. Although the area in question does not conform in all respects to the definitional criteria for an SGPA, the Council instructed the LIRPB to develop the requisite information and submit a petition for nomination. In December 1989, the Board, acting on behalf of the Advisory Council, submitted a petition to NYSDEC Commissioner Thomas C. Jorling. The petition called for the designation of a Southold Special Groundwater Protection Area in order to protect a major portion of a locally significant groundwater recharge area lying within the shallow flow Hydrogeologic Zone IV.

On March 9, 1990, Commissioner Jorling approved the petition subject to the modifications set forth in his letter. The modifications required that the plan address two additional issues: how implementation will result in the improvement of existing ambient water quality and how it will assure the maintenance of sufficiently large volumes of high quality ground water.

As noted in Part I, the pre-designated Woodbury Road-West Pulaski Road area has been eliminated as a separate SGPA and the land area therein incorporated into the Oyster Bay and the West Hills SGPA’s, leaving eight SGPA’s for which the LIRPB was contractually obligated to provide boundary delineations and management plans. The LIRPB has also agreed to provide boundary delineation and a management plan for the newly designated Southold SGPA, thus increasing the number of areas for which plans have been formulated to a total of nine.
The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:

Beginning at a point where the southerly side of the Long Island Expressway (Interstate Route 495) intersects the Nassau-Queens County boundary; then
southward along the Nassau-Queens County boundary line to the northerly boundary of the Northern State Parkway; then
eastward along the northerly boundary of the Northern State Parkway to the point of intersection with the Village of North Hills-Herricks boundary; then
eastward along the Village of North Hills-Herricks boundary line to Shelter Rock Road; then
northward along the easterly boundary of Shelter Rock Road to the northerly boundary of the Long Island Expressway (Interstate Route 495); then
northeastward along the northerly boundary of the Long Island Expressway (Interstate Route 495) to the point of intersection with the Village of North Hills boundary; then
generally north and west along the boundary line of the Village of North Hills to the point of contact with Shelter Rock; then
southwestward across Shelter Rock Road to the eastern side of Brinkerhoff Land opposite Third Street; then
southward along the easterly boundary of Brinkerhoff Lane to Fourth Street; then
westward along the southerly boundary of Fourth Street to Clapham Avenue; then
northward along the westerly boundary of Clapham Avenue to Centre Drive; then
westward along the southerly boundary of Centre Drive to East Drive; then
southward along the easterly boundary of East Drive to South Drive; then
westward along the southerly boundary of South Drive to West Drive; then
northward along the westerly boundary of West Drive to Northern Boulevard (State Route 25A); then
westward along the southerly boundary of Northern Boulevard (State Route 25A) to Community Drive; then
southward along the westerly boundary of Community Drive to Pond Mill Road; then
westward along the southerly boundary of Pond Mill Road to Allen Drive; then
southward along the easterly boundary of Allen Drive to Cumberland Avenue; then
westward along the southerly boundary of Cumberland Avenue to Lakeville Road; then
southward along the easterly boundary of Lakeville Road to the Long Island Expressway (Interstate Route 495); then
westward along the southerly boundary of the Long Island Expressway (Interstate Route 495) to the point or place of beginning.

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:

Beginning at a point where the westerly side of Northern State Parkway intersects the northerly boundary of Jericho Turnpike; then
eastward along the northerly boundary of Jericho Turnpike to the point of intersection with the boundary line of the Village of Muttontown at Underhill Boulevard; then
generally northward along the boundary line of the Village of Muttontown to a point due west of Belvedere Dr.; then
due east to Belvedere Dr.; then
northeastward along Belvedere Dr. and Sagamore Dr. to a point of intersection with the westerly boundary of Somerset Pl.; then
northward along westerly boundary of Somerset Pl. to a point of intersection with the boundary of the Village of Oyster Bay Cove; then
generally southeastward along the boundary line of the Village of Oyster Bay Cove to Berry Hill Road; then
southward along the easterly boundary of Berry Hill Road to Renee Road; then
eastward along the northerly boundary of Renee Road to Cold Spring Road (Syosset-Cold Spring Road); then
eastward along the northerly boundary of Cold Spring Road (Syosset-Cold Spring Road) to South Woods Road; then
southward along the easterly boundary of South Woods Road to Syosset-Woodbury Road; then
westward along the southerly boundary of Syosset-Woodbury Road to the westerly boundary of the Sisters of Mercy Convent property (Section 15, Block C, Lots 13E, 13F and 667; and Section 15, Block F, Lots 34B and 34D of the Nassau County Land and Tax Map); then
southward along the westerly boundary of the Sisters of Mercy Convent property (Section 15, Block C, Lots 13E, 13F and 667; and Section 15, Block F, Lots 34B and 34D of the Nassau County Land and Tax Map) to the westerly boundary of the Municipal Golf Course of the Town of Oyster Bay (former Bruce Estate); then
southward along the westerly boundary of the Municipal Golf Course of the Town of Oyster Bay (former Bruce Estate) to Jericho Turnpike; then
eastward along the northerly boundary of Jericho Turnpike to its intersection with South Woods Road; then
southward along the easterly boundary of South Woods Road and Piquet's Lane to Woodbury Road (Hicksville-Woodbury Road); then
southwestward along the easterly boundary of Woodbury Road (Hicksville-Woodbury Road) to the Long Island Expressway (Interstate Route 495); then
eastward along the northerly boundary of the Long Island Expressway (Interstate Route 495) to the point of intersection with the Northern State Parkway; then
eastward along the northerly boundary of Northern State Parkway to the point of intersection with Plainview Road (Washington Avenue); then
southeastward along the easterly boundary of Plainview Road (Washington Avenue) to the point of intersection with the Long Island Expressway (Interstate Route 495); then
eastward along the northerly boundary of the Long Island Expressway (Interstate Route 495) to the Nassau/Suffolk County line; then
northward along the Nassau/Suffolk line to North Hempstead Turnpike (State Route 25A); then
westward along the southerly boundary of North Hempstead Turnpike (State Route 25A) to Moore's Hill Rd.; then
northwestward along the southerly boundary of Moore's Hill Road to Cove Road; then
northwest along the westerly boundary of Cove Road to East Main Street; then
westward along the southerly boundary of East Main Street to the point of intersection with the western boundary line of the Village of Oyster Bay Cove; then
southward along the western boundary line of the Village of Oyster Bay Cove to the point of intersection with northeast corner of the Pine Hollow Country Club; then
generally west and then south along the western boundary of the Pine Hollow Country Club to North Hempstead Turnpike (State Route 25A); then
westerly along the northerly boundary of North Hempstead Turnpike (State Route 25A) to Jericho-Oyster Bay Road (State Route 106); then
southward along the easterly boundary of Jericho-Oyster Bay Road (State Route 106) to the point of intersection with the boundary line of the Village of Muttontown; then
southeastward and then generally northwestward along the boundary line of the Village of Muttontown to the point of intersection with the boundary line of the Village of Upper Brookville; then
generally eastward along the boundary line of the Village of Upper Brookville to the point of intersection with the western boundary of Jericho-Oyster Bay Rd. (State Route 106); then
northward along the westerly boundary of Jericho-Oyster Bay Road and Pine Hollow Road (State Route 106) to the boundary of the Village of Upper Brookville opposite High Street; then
generally northwestward along the easterly boundary of the Village of Upper Brookville to Lake Avenue; then
northward along the westerly boundary of Lake Avenue to West Shore Road; then
northward along the westerly boundary of West Shore Road to Cleft Road; then
northwestward along the southerly boundary of Cleft Road to Feeks Lane; then
westward along the southerly boundary of Feeks Lane to Bayville Road; then
northward along the westerly boundary of Bayville Road to Horse Hollow Rd.; then
southwestward along the southerly boundary of Horse Hollow Road to Lattingtown Road; then
generally northwestward on the southerly boundary of Lattingtown Road to Dosoris lane; then
southward along the easterly boundary of Dosoris Lane to Old Tappan Road; then
eastward along the northerly boundary of Old Tappan Road to the western boundary line of the Village of Lattingtown; then
generally southeastward along the boundary line of the Village of Lattingtown to the northerly boundary of the Long Island Railroad right-of-way at its intersection with Oyster Bay Road; then
northward along the westerly boundary of Cold Spring Hills Road to Foresdale Drive; then
westward and northward along the southerly and westerly boundary of Foresdale Drive to Meadow Lane; and
westward along the southerly boundary of Meadow Lane to Oak Ridge Road; then
westward along the southerly boundary of Oak Ridge Road to East Gate Drive; then
northwestward along the southerly boundary of East Gate Drive to the Long Island Railroad; then
eastward along the northerly boundary of the Long Island Railroad to Oakwood Road; then
northward along the westerly boundary of Oakwood Road to Tax Map Parcel #0400-090.00-06.00-016.000; then
westward along the northerly boundaries of Tax Map Parcels #0400-090.00-06.00-016.000, 0400-090.00-06.00-017.000,
0400-090.00-06.00-018.000, 0400-134.00-03.00-002.000, 0400-134.00-03.00-001.000, 0400-134.00-01.00-003.000 and
0400-134.00-01.00-002.000 to Woodbury Road; then
southward along the easterly boundary of Woodbury Road to Woodlale Road; then
northwestward along the westerly boundary of Woodlale Road to Saw Mill Road; then
northeastward along the southerly boundary of Saw Mill Road to Tax Map Parcel #0400-088.00-01.00-012.001; then
northward along the easterly boundary of Tax Map Parcel #400-088.00-01.00-012.001 to Lawrence Hill Road (S.R. 25A); then
westward along the southerly boundary of Lawrence Hill Road (North Hempstead Turnpike) to the point or place of begin-

OAK BRUSH PLAINS SPECIAL GROUNDWATER PROTECTION AREA

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:
Beginning at the point where the Smithtown-Huntington Town Line intersects the southerly side of Hauppauge Road (New
Highway); then
westward along the southerly boundary of Hauppauge Road to Daly Road; then
southeastward along the easterly boundary of Daly Road to Commack Road; then
southward along the westerly boundary of Commack Road (C.R. 4) to the Long Island Railroad; then
eastward along the northerly boundary of the Long Island Railroad to the Sagtikos State Parkway; then
northward 4114 feet along the easterly boundary of the Sagtikos State Parkway to the southern boundary of the Pilgrim
State Hospital (Tax Map Parcel 0500-71.1-13); then
eastward 505 feet along the southerly boundary of Tax Parcel #0500-071.00-01.00-013.000; then
northwestward 935.7 feet along the boundary of Tax Parcel #0500-071.00-01.00-013.000; then
eastward 1946 feet along the boundary of Tax Parcel #0500-071.00-01.00-013.000 to Crooked Hill Road; then
northward along the westerly boundary of Crooked Hill Road to the southern boundary of the Pilgrim State Hospital
(Tax Parcel #0500-071.00-01.00-012.001); then
eastward 859 feet along the southern boundary of Tax Parcel #0500-71.00-01.00-012.001; then
eastward 1039 feet along the southern boundary of the Union Free School District (Tax Parcel #0500-072.00-02.00-
001.000) to Wicks Road; then
northward along the westerly boundary of Wicks Road to the Smithtown-Islip line (Motor Parkway) C.R. 67; then
westward and northward along the southerly and easterly boundary of Motor Parkway C.R. 67 to Commack Road; then
northward along the eastern boundary of Commack Road Smithtown-Huntington Town Line to the point or place of begin-

SOUTH SETAUKET WOODS SPECIAL GROUNDWATER PROTECTION AREA

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:
Beginning at the point where the westerly boundary of Old Town Road intersects the southerly boundary of Lower Sheep
Pasture Road; then
westward along the southerly boundary of lower Sheep Pasture Road to Upper Sheep Pasture Road; then
southward and westward along the southerly boundary of Upper Sheep Pasture Road to Cinderella Lane; then
westward along the southerly boundary of Cinderella Lane to Robin Hood Lane; then
southward along the easterly boundary of Robin Hood Lane to Storyland Lane; then
westward along the southerly boundary of Storyland Lane to Pond Path Drive; then
northward along the westerly boundary of Pond Path Drive to Lower Sheep Pasture Road; then

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westward along the southerly boundary of Lower Sheep Pasture Road to Bennetts Road; then
northward along the westerly boundary of Bennetts Road to the L.I.R.R.; then
westward along the southerly boundary of the L.I.R.R. to Stony Brook Road; then
eastward along the northerly boundary of Stony Brook Road 171 feet to the boundary of the State University of New York at Stony Brook; then
in an eastward, then southward, and then westward direction along the boundary of the State University of New York at Stony Brook to Stony Brook Road; then
southward along the eastwardly boundary of Stony Brook Road to Oxhead Road; then
eastward along the northerly boundary of Oxhead Road 2,284 feet to the southeasterly most point at the State University of New York at Stony Brook; then
northward and eastward along the easterly and southerly boundary of the State University of New York at Stony Brook to Nicolls Road (CR 97); then
northward along the westerly boundary of Nicolls Road to Hills Lane; then
eastward along the northerly boundary of Hills Lane to Pond Path Drive; then
southward along the easterly boundary of Pond Path Drive to 34th Street; then
westward along the southerly boundary of 34th Street to Sycamore Circle; then
southward and westward along the easterly and southerly boundary of Sycamore Circle to Sycamore Drive; then
westward along the southerly boundary of Sycamore Drive to Nicolls Road (County Route 97); then
southward along the easterly boundary of Nicolls Road to Nesconset-Port Jefferson Highway (Route 347); then
southwest along the southerly boundary of Route 347 to Lakeside Avenue; then
southward along the easterly boundary of Lakeside Avenue to Twisting Drive; then
southward along the easterly boundary of Twisting Drive to Tulip Grove Drive; then
southward along the easterly boundary of Tulip Grove Drive to Pond Path Drive; then
northward along the westerly boundary of Pond Path Drive to Wood Avenue; then
southward along the easterly boundary of Wood Avenue to Spruce Street extended to Wood Avenue; then
eastward along the northerly boundary of Spruce Street to Hammond Lane; then
southward along the easterly boundary of Hammond Lane to Florence Street; then
eastward along the northerly boundary of Florence Street extended to Washington Avenue (Stony Brook Road); then
southward along the easterly boundary of Washington Avenue (Stony Brook Road) to Forest Road; then
northward and eastward along the westerly and northerly boundaries of Forest Road to Mark Tree Road; then
northward along the westerly boundary of Mark Tree Road to Bette Anne Drive (Nicolls Road, CR 97 Northern Service Road); then
eastward along the northerly boundary of Bette Anne Drive to Balin Avenue; then
northward along the westerly boundary of Balin Avenue to Chester Street; then
eastward along the southerly boundary of Chester Street to Wireless Road; then
southward along the easterly boundary of Wireless Road to Strathmore Village Drive; then
eastward along the northerly boundary of Strathmore Village Drive to Milbury Lane; then
northeast along the northerly boundary of Milbury Lane to Patricia Lane; then
northeastward along the northerly boundary of Patricia Lane to Doe Lane; then eastward along the northerly boundary of Doe Lane to Fawn Lane West; then
northeastward along the westerly boundary of Fawn Lane West to Arrowhead Lane; then
northward along the westerly boundary of Arrowhead Lane to the southwestern corner of Tax Parcel #0200-253.00-001.00-024.000; then
northward and eastward along the westerly and northerly boundary of Tax Parcel #0200-253.00-01.00-024.000 to the boundary of Tax Parcel #0200-278.00-06.00-001.000; then
northwestward and southwestward along the northern boundary of Tax Parcel #0200-278.00-06.00-001.000 to Fireside Lane; then
northward along the westerly boundary of Fireside Lane to Rack Lane; then
eastward along the northerly boundary of Rack Lane to Longhorn Lane; then
southward along the easterly boundary of Longhorn Lane to Cabin Lane; then
eastward along the northerly boundary of Cabin Lane to Deer Lane; then
northward along the westerly boundary of Deer Lane to Tax Parcel #0200-226.00-01.00-007.001; then northward along the westerly boundary of Tax Parcel #0200-226.00-01.00-007.001 to Old Town Road; then northwestward along the westerly boundary of Old Town Road to the point or place of beginning.

CENTRAL SUFFOLK SPECIAL GROUNDWATER PROTECTION AREA

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:

Beginning at a point where the southerly side of Nesconset-Port Jefferson Highway (Route 347) intersects the easterly side of Jayne Boulevard; then southward along the easterly boundary of Jayne Boulevard to Marlboro Drive; then eastward along the northerly boundary of Marlboro Drive to Joline Road; then southward along the easterly boundary of Joline Road to Erie Street; then southward along the easterly boundary of Erie Street to Greene Avenue; then eastward along the northerly boundary of Greene Avenue to Long Street; then southward along the easterly boundary of Long Street to Clinton Avenue; then westward along the southerly boundary of Clinton Avenue to Champlain Street; then southward along the easterly boundary of Champlain Street to Norton Avenue; then westward along the southerly boundary of Norton Avenue to Old Town Road; then southward along the easterly boundary of Old Town Road to Jayne Boulevard; then southward along the easterly boundary of Jayne Boulevard to Dare Road; then southward along the easterly boundary of Dare Road (North Lane) to Middle Country Road (Route 25); then eastward along the northerly boundary of Route 25 to Patchogue-Mount Sinai Road (County Route 83); then southward along the easterly boundary of County Road 83 to Bicycle Path Drive; then southeastward along the easterly side of Bicycle Path Drive to Mt. McKinley Avenue; then southward along the easterly boundary of Mt. McKinley Avenue to Granny Road; then northeastward along the northerly boundary of Granny Road to Port Jefferson-Patchogue Road (Route 112); then southward along the easterly boundary of Route 112 to Horse Block Road (County Route 16); then eastward along the northerly boundary of County Route 16 to Maine Avenue; then northward along the westerly boundary of Maine Avenue to the extension of the northerly boundary of Fire Avenue; then eastward along the northerly boundary of Fire Avenue to John Roe Smith Avenue; then southward along the easterly boundary of John Roe Smith Avenue to Jeff Street; then eastward along the northerly boundary of Jeff Street to Hagerman Avenue; then southward along the easterly boundary of Hagerman Avenue to the Long Island Expressway (Route 495); then eastward along the northerly boundary of Route 495 to the William Floyd Parkway (County Route 46); then southward along the easterly boundary of County Route 46 to the Long Island Railroad main line; then eastward along the northerly boundary of the Long Island Railroad tracks to Tax Parcel #0200-555.00-01.00-018.100; then southward and eastward along the boundary of Tax Parcel #0200-555.00-01.00-018.100 to the intersection of North Street and Manor-Yaphank Road; then southward along the easterly boundary of Manor-Yaphank Road to Moriches-Middle Island Road; then eastward along the northerly boundary of Moriches-Middle Island Road to Sunrise Highway (Route 27); then eastward along the northerly boundary of Route 27 to Manorville Branch C.R. 91 (old railroad grade-untapped); then southeastward along the northerly boundary of C.R. 91 (old railroad grade-untapped) to Old Country Road (Route 71); then eastward along the northerly boundary of Route 71 to the Long Island Railroad tracks; then eastward along the northerly boundary of the Long Island Railroad tracks to Montauk Highway (Route 80); then eastward along the northern boundary of Route 80 to Riverhead-Hampton Bays Road (S.R. 24); then northward along the westerly boundary of Route 24 to Sunrise Highway (Route 27); then eastward along the northerly boundary of Route 27 to Squiretown Road; then northward along the westerly boundary of Squiretown Road to Upper Red Creek Road; then westward along the southern boundary of Upper Red Creek to Lower Red Creek Road; then
southward along the easterly boundary of Lower Red Creek Road to Riverhead-Hampton Bays Road (Route 24); then
westward along the southerly boundary of Route 24 to Peconic Avenue; then
northward along the westerly boundary of Peconic Avenue to the centerline of the Peconic River (Riverhead-Southampton town line); then
westward along the center line of the Peconic River (Riverhead-Southampton town line) to Forge Road (Dam Road); then
northward and eastward along the westerly and northerly boundaries of Forge Road to West Main Street (State Route 25); then
eastward along the northerly boundary of State Route 25 to Kroemer Avenue; then
northward along the westerly boundary of Kroemer Avenue to Old country Road (County Road 58); then
eastward along the northerly boundary of County Road 58 to Mill Road; then
northward along the westerly boundary of Mill Road to Middle Road; then
eastward along the northerly boundary of Middle Road to Main Road (State Route 25); then
eastward along the northerly boundary of Main Road (past the Riverhead-Southold town line) to the Long Island Railroad; then
eastward along the northerly boundary of the Long Island Railroad to Factory Avenue (Railroad Avenue); then
northward along the westerly boundary of Factory Avenue to Sound Avenue; then
westward along the southerly boundary of Sound Avenue (past the Riverhead-Southold town line) to its intersection with State Road 25A; then
westward along the southerly boundary of State Road 25A to Nesconset-Port Jefferson Highway (S.R. 347); then
westward along the southerly boundary of Nesconset-Port Jefferson Highway to the point or place of beginning.

SOUTH FORK SPECIAL GROUNDWATER PROTECTION AREA

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:
Beginning at the point where the easterly side of Noyack Road (C.R. 38) intersects the easterly boundary of Majors Path; then
southward along the easterly boundary of Majors Path to Great Hill Road; then
eastward along the northerly boundary of Great Hill Road to the extension of the easterly boundary of the North Sea Landfill (Town of Southampton property); then
generally southward and westward along the easterly and southerly boundaries of the North Sea Landfill to Majors Path; then
southward along the easterly boundary of Majors Path to the Village of Southampton boundary; then
eastward along the Southampton Village boundary to Sebonac Road (County Road 39); then
eastward along the northerly boundary of County Road 39 to the Long Island Railroad; then
eastward along the northerly boundary of the Long Island Railroad to Hedges Lane; then
southward along the easterly boundary of Hedges Lane to Montauk Highway (S.R. 27); then
eastward along the northerly boundary of Route 27 to Cove Hollow Road; then
northward along the westerly boundary of Cove Hollow Road to the Long Island Railroad; then
eastward along the northerly boundary of the Long Island Railroad to the Village of East Hampton Boundary; then
northward and eastward along the westerly boundary of the Village of East Hampton to Gould Street; then
northward along the easterly boundary of Gould Street to Cedar Street; then
westward along the northerly boundary of Cedar Street to Hands Creek Road; then
northward along the westerly boundary of Hands Creek Road to Oak View Highway; then
eastward along the northerly boundary of Oak View Highway to Three Mile Harbor Road (C.R. 40); then
northward along the westerly boundary of Three Mile Harbor Road to West Drive; then
eastward along the northerly boundary of West Drive to Springs Fireplace Road; then northward along the westerly boundary of Springs Fireplace Road to Ocean Parkway; then
eastward along the northerly boundary of Ocean Parkway to Accabonac Road; then
southwestward along the westerly boundary of Accabonac Road to the Long Island Railroad; then
eastward along the northerly boundary of the Long Island Railroad to Cranberry Hole Road; then
eastward along the northerly boundary of Cranberry Hole Road to Cross Highway; then
northwestward along the westerly boundary of Cross Highway to Alberts Landing Road; then
westward along the southerly boundary of Alberts Landing Road to Amagansett Springs Road; then
northward along the westward boundary of Amagansett Springs Road to Neck Path Road; then

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northwestward along the westerly boundary of Neck Path Road to Accabonac Road; then
southwestward along the westerly boundary of Accabonac Road to Talmadge Avenue; then
northwestward along the southerly boundary of Talmadge Avenue to Springs-Fireplace Road (C.R. 41); then
northward along the westerly boundary of Springs-Fireplace Road (C.R. 41) to Cross Highway; then
westward along the southerly boundary of Cross Highway to Three Mile Harbor Road; then
southward along the easterly boundary of Three Mile Harbor Road to Springy Banks Road; then
northward along the westerly boundary of Springy Banks Road to Ocean Parkway; then
westward along the southerly boundary of Ocean Parkway to Middle Highway; then
northerly along the westerly boundary of Middle Highway to Shorewood Drive; then
westward along the southerly boundary of Shorewood Drive to Hands Creek Road; then
northward along the westerly boundary of Hands Creek Road to Ely Brook Road; then
northward along the westerly boundary of Ely Brook Road to Alewive Brook Road; then
northward along the westerly boundary of Alewive Brook Road to Northwest Road; then
southwestward along the southerly boundary of Northwest Road to Old Northwest Road; then
northward along the westerly boundary of Old Northwest Road to Northwest Landing; then
westward along the southerly boundary of Northwest Landing Road to Swamp Road; then
southwestward along the southerly boundary of Swamp Road to its intersection with the southern boundary of Northwest Harbor County Park; then
generally westward along the southern boundaries at Northwest Harbor County Park and the New York State land known as the Sag Harbor Golf Course to S.R. 114; then
northwestward along the westerly boundary of S.R. 114 to the Sag Harbor Village boundary; then
westward and northwestward along the Sag Harbor Village boundary to, and along, the northern shore of Round Pond and again westward along the Sag Harbor Village boundary to Brick Kiln Road; then
westward along the southerly boundary of Brick Kiln Road to Stony Hill Road; then
northward along the westerly boundary of Stony Hill Road to Noyack Road (C.R. 38; then
westward and southwestward along the southerly and easterly boundaries of Noyack Road (C.R. 38) to the point or place of beginning.

HITHER HILLS SPECIAL GROUNDWATER PROTECTION AREA

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:

Beginning at a point where the westerly boundary of Hither Hills State Park intersects with the northerly boundary of Montauk Point State Boulevard S.R. 27; then
eastward along the northerly boundary of Montauk Point State Boulevard S.R. 27 to Tax Parcel #0300-044.00-01.00-001.000; then
northward and then eastward along the westerly and northerly boundaries of Tax Parcel #0300-044.00-01.00-001.000 to Tax Parcel #0300-048.00-03.00-008.007; then
northward along an extension of the westerly boundary of Tax Parcel #0300-048.00-03.00-008.007 to the northerly boundary of the Long Island Railroad (Tax Parcel #0300-026.00-01.00-002.000); then
westward approximately 1,100’ along the northerly boundary of the Long Island Railroad (Tax Parcel #0300-026.00-01.00-002.000), to the westerly boundary of Tax Parcel #0300-026.00-01.00-004.000; then
northward along the westerly boundary of Tax Parcel #0300-026.00-01.00-004.000 to the Block Island Sound Shoreline; then
generally westward and southward along the shoreline of Block Island Sound, Napeague Bay and Napeague Harbor (as approximated by the seaward boundaries of Tax Parcels #0300-026.00-01.00-001.100, #0300-026.00-01.00-001.200, and #0300-086.00-02.00-001.000) to the point or place of beginning.
SOUTHOLD SPECIAL GROUNDWATER PROTECTION AREA

The Special Groundwater Protection Area shall include the area contained within the defined boundaries as follows:
Beginning at a point where the southerly boundary of Oregon Road intersects the easterly boundary of Mill Lane; then
southward along the easterly boundary of Mill Lane to a point 500 feet south of the southern boundary of the Long Island Railroad property; then
eastward from a point 500 feet south of the southerly boundary of the Long Island Railroad property to Terry Court; then
northward along the westerly boundary of Terry Court to Glover Lane; then
northeastward along the northerly boundary of Glover Lane to Tucker Lane; then
northward along the westerly boundary of Tucker Lane to Middle Road (County Road 48); then
westward along the southerly boundary of Middle Road (County Road 48) to Kenny Road; then
northward along the westerly boundary of Kenney Road to Sound View Avenue; then westward along the southerly boundary of Sound View to Mill Road; then
northwestward along the southwesterly boundary of Mill Road to View Avenue (Sound Avenue West); then
westward along the southerly boundary of View Avenue (Sound Avenue West) to Henry's Lane; then
southward (approximately 50 feet) along the westerly boundary of Henry's Lane to the LILCO R.O.W.; then
westward along the southerly boundary of the LILCO R.O.W. to its intersection with Cox's Lane; then
southward along the westerly boundary of Cox's Lane to Middle Road (County Road 48); then
westward along the northern boundary of Middle Road (County Road 48) to Depot Lane; then
northward along the westerly boundary of Depot Lane to Oregon Road; then
westward along the southerly boundary of Oregon Road to the point or place of beginning.
Appendix C: WATER CONSERVATION

In Nassau and Suffolk Counties 2.6 million people depend upon the water from underground aquifers for their drinking water. There are three principal sand and gravel filled geological formations. The Upper Glacial closest to the land surface, is already partially contaminated, and is likely to become more so. There is a growing understanding of the need to provide additional protection for the upper glacial and deeper aquifers (Magothy and Lloyd) from contamination, to maximize recharge into the aquifers, and to conserve the water that flows through them.

Availability of groundwater is influenced by a number of factors including recharge and evaporation, storage and discharge. Estimates of the amount of available water must consider water lost through evaporation or discharge to the ocean. Evaporation, though a natural and unavoidable part of the water cycle, prevents water from returning to the aquifer, and is thus a consumptive process. Evaporation also includes the water lost from irrigation of agricultural fields and landscaping. Discharge to the ocean includes sewage treatment plants in both counties, other treatment plants discharge to estuarine waters. Water is said to be used consumptively when it is not returned to the aquifer for future use. Due to discharge to the ocean, underground flow to the bays is reduced which could negatively affect surface water quality. Although the supply of this valuable resource is continuously replenished or augmented by precipitation, there is a limit on the quantity of water which can be withdrawn from the groundwater reservoir over an extended period of time without unfavorably affecting the viability of the system, or creating adverse environmental impacts.

Estimates have been made, at various times in the past, of the amount of groundwater which can be withdrawn and used consumptively without creating unacceptable effects, which may include saltwater intrusion, lowering of the groundwater table, or the drying-up of lakes and streams. This is called the safe yield concept. Although the safe yield concept is somewhat subjective, it can be used to establish the approximate amount of water available for use. The current estimates of safe yield are 180 MGD in Nassau County and 466 MGD in Suffolk County.

Current groundwater pumpage by the Jamaica Water Supply Company in Queens is considered to be significantly in excess of any reasonably established safe yield. The Jamaica Water Supply Company serves about 520,000 people in Queens and western Nassau. Pumpage has resulted in a depression of the water table to roughly 10 feet below sea level in eastern Queens, resulting in serious effects on the aquifer in that area and in underground water flow across the border from Nassau.

In Nassau County, various water supply studies over the past 25 years have estimated the safe yield and have projected groundwater consumptive uses through the year 2000. The Permissive Sustained Yield (PSY) was established at 151 MGD by historical studies prior to development of the 1980 Nassau County Master Plan for Water Supply. The 1980 Master Plan estimated a PSY of 180 MGD for Nassau groundwater, or 207 MGD assuming 27 MGD of underflow from Suffolk County. The revised PSY of 180-207 MGD would result in a significant lowering of water levels and the potential elimination of groundwater flow supporting year-round streamflow and freshwater wetlands. In 1978, the total public supply pumpage in Nassau was 182.3 MGD, of which 140 MGD was consumed or lost to the groundwater system. Although the range of 180-207 MGD is clearly well in excess of the current consumptive use of 140 MGD, it is not clear that the effects associated with that level of pumpage would be fully consistent with proper management of the regional groundwater resource.

The aquifers underlying Nassau County and western and central Suffolk County, are a part of a single system and therefore each area should be managed as part of a whole. Nassau County water levels are declining. It has been documented that overpumping and mining of groundwater can adversely affect water levels, wetlands and the volume of stream flow within the system. To date, lowered groundwater elevations, streamflow declines and stream shortenings have not been evident in southwestern Suffolk County as a result of the development of the Southwest Sewer District #3. However, as part of the Suffolk County Flow Augmentation Needs Study (FANS) Milestone III report (Suffolk County Department of Public Works 1990), a set of triggering mechanisms was developed to indicate if and when augmentation will be necessary.

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In July 1987 a Comprehensive Water Conservation Plan Ordinance went into effect in Nassau County. This county-wide Comprehensive Management/Conservation Program is designed to regulate or limit the use of water throughout the County, including the towns, cities, villages and special districts, and provide enforcement to conserve, protect and manage the waters within its jurisdiction. This ordinance was enacted in response to pumping restrictions imposed on the public water purveyors in Nassau County by the NYSDEC in 1986. This was initiated in order to curb water withdrawals to ensure a long-term water supply for Nassau County. Nassau is dependent upon a sole source aquifer system which serves the domestic, industrial, commercial and recreational needs of its residents. Due to the environmental sensitivity and consumption of this aquifer’s water supply it was determined that certain limitations were necessary at this time. Included in the ordinance were lawn sprinkling use restrictions, air conditioning water recirculation requirements, car wash recirculation requirements and fire hydrant use restrictions.

In addition, a Speaker’s Bureau has been formed by Nassau County’s Department of Public Works to educate the public on water and conservation by giving public presentations. The program targets both children and adult citizens and the audience has increased due to the continuing outreach efforts of both the Department and the Cornell Cooperative Extension.

Because public education is a long-term effort that requires several years before results are observed, the County has implemented other measures that should yield results in the short-term. The short-term efforts include proposed capital projects to retrofit County facilities, implementation of the provisions of the County’s Water Conservation Ordinance, distribution of water saving kits for the home to the public, and the explanation of practical water conserving ideas and techniques to the public.

The County has distributed to residents an updated water conservation brochure, and one on the proper use and application of fertilizers. The publications are a cooperative effort between the Department, Nassau County Health Department, and Cooperative Extension.

In addition, Cornell Cooperative Extension’s staff and educational literature of up-to-date, unbiased, research-backed information on water quality and quantity issues was made available to Nassau County residents through the efforts of the Cooperative Extension of Nassau County.

According to Nassau County Department of Public Works, the year-round effects of the program should become evident in a few more years as more data is collected from which reliable comparisons can be made. It should be noted, however, that there does appear to exist a very real County-wide pumpage reduction of approximately 4% during the base pumpage months of January through March and October through December of 1989 when compared to pumpage of the prior five (5) years for the corresponding months.

Suffolk County

The demand for water in Suffolk County will continue to increase due to population increases and growth in public, commercial and industrial facilities. Suffolk’s sole source aquifer has an adequate supply of water to meet projected needs; however, there are areas of the county where the water supply is stressed, either because of limited freshwater resources, such as those on islands and peninsulas, or because of significant groundwater contamination, such as on the North Fork. In these stressed areas, the conservation of water is a necessary element in water supply management. In the remainder of Suffolk County, water conservation is a well advised management practice and a wise use of resources. Water conservation can help ensure the long-term adequacy of the groundwater reservoir as a source of water supply, and to prevent unfavorable impacts on the environment that would occur due to reduced water levels.

Water conservation can also result in significant monetary savings due to a reduction in capital expenditures by water suppliers for additional wells, pumps, storage tanks, conventional treatment facilities, and transmission mains, and in operation and maintenance costs for power, equipment, labor, chemicals, etc. In some instances conservation may eliminate the need to use water which requires extensive and costly treatment to remove chlorides, pesticides, nitrates, and synthetic organic chemicals. In addition to cost reductions to water suppliers, which result in pass-through savings to consumers, water conservation can also result in direct savings to the homeowner, primarily through the reduction of energy costs to heat hot water and to pump water from private wells.
There are a number of other potential benefits derived from water conservation. One such benefit is a significant reduction in capital, operation, and maintenance costs for sewerage facilities in areas that are served by wastewater collection and treatment facilities. Homeowners can save money by purchasing less water and using less energy to produce hot water. In addition, water conservation may help to protect groundwater quality, since the use of turf, groundcover, and landscaping that requires less irrigation will generally require less fertilizer. An important consideration in the assessment of the potential effectiveness of a water conservation program is the quantity of water presently used. Water pumpage in Suffolk County during the year 1980 is indicated below.

Although residential use constitutes 65 percent of all present water use, a successful water conservation program requires the participation and cooperation of all categories of water users. On a per capita basis, the total pumpage was 162 gallons per capita per day (gpcd), and residential use was 105 gpcd. Actual records of interior and exterior residential use are not documented in Suffolk County, but studies conducted throughout the country, primarily for the drought-plagued Western states, indicate that the actual interior residential use of water varies from 44.5 to 76.0 gpcd. The principal exterior residential use is irrigation, primarily for lawns.

<table>
<thead>
<tr>
<th>Category</th>
<th>1980 Pumpage (mgd)</th>
<th>% of Total Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>134.95</td>
<td>65.0</td>
</tr>
<tr>
<td>Commercial/Industrial</td>
<td>44.32</td>
<td>21.4</td>
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<tr>
<td>Agricultural</td>
<td>15.24</td>
<td>7.3</td>
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<tr>
<td>Institutional</td>
<td>9.78</td>
<td>4.7</td>
</tr>
<tr>
<td>Cemetery/Golf Course</td>
<td>3.20</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>207.49</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The main objective of a water conservation program is a reduction in the use of water without adversely affecting the health and well-being of residents and visitors. Based on the present supply of water, conservation efforts should not reduce the current standard of living, but rather curtail wasteful water use practices in all user categories.

Based on an analysis of present water use in Suffolk County, and an evaluation of the potential for water conservation, it is estimated that a reduction in total water use of twenty-five percent could be achieved with no significant adverse effect on the standard of living. However, a reduction of this magnitude would require the universal use of water-efficient plumbing units and appliances; a reduction in the percentage of land planted with turf; the use of the minimum essential amount of water for the irrigation of lawns and agricultural crops; and, the complete cooperation of all segments of the community.

It is not anticipated that reductions of this magnitude will be achieved unless a water shortage caused by drought or groundwater contamination necessitates the imposition of mandatory restrictions. Without such restrictions, the reduction of water use through voluntary conservation will probably be more modest (on the order of 5% in presently developed areas), and will result primarily from the increased cost of water and energy. Replacement of existing plumbing fixtures with more efficient units would make it possible to achieve a larger water use reduction.

In newly developed areas, where the use of water-efficient plumbing units is mandatory and zoning regulations restricting the percentage of land planted with turf may be adopted, it is believed that a ten percent reduction in per capita water use below present levels can be reasonably anticipated.
Available water conservation techniques may be classified into five categories: structural, operational, economic, legal and educational. Although a successful conservation program will probably include elements from all five of the categories listed above, the individual components of the program must be tailored to suit the needs of each community.

Conservation methods available in each of the five categories listed above are described in this section.

**STRUCTURAL**

Structural methods of reducing interior water use include the following:

- low water use plumbing fixtures (sink and lavatory faucets, urinals, and toilets);
- low water use appliances (clothes and dishwashers);
- flow regulators on faucets (orifices, aerators, and spray taps);
- flow regulators on showers (fixed and variable orifices) and low flow shower heads;
- pressure regulators on water mains and service lines;
- elimination of household plumbing leaks (e.g., in faucets and toilets);
- insulation of hot water pipes (to reduce wastage prior to the receipt of hot water at sinks, tubs, etc.);
- use of water for several purposes with or without treatment (e.g., household water used for soap-related purposes could be reused for toilet flushing or irrigation).

On a system-wide basis, wastewater could be treated and used for potable or non-potable purposes, although reuse for potable purposes has not received wide acceptance.

Structural methods of reducing exterior water use including the following:

- use of grasses and plants that require less water than the commonly used blue grass lawn;
- landscaping to efficiently utilize precipitation and irrigation (e.g., gentle slopes, contoured grading);
- use of land cover other than grasses (e.g., stones, rocks, wood chips, wooded areas);
- use of efficient irrigation practices that employ moisture sensors, flow meters, irrigation schedules (related to precipitation and evapotranspiration rates), and application rate controls.

**OPERATIONAL**

Operational methods of water conservation that can be initiated by a water purveyor include the following:

- leakage detection and elimination in the water distribution systems;
- installation and maintenance of meters at all installations, including public buildings and fire service lines;
- installation of separate meters for outdoor water use;
- installation of building service lines of sufficient diameter to provide adequate, but not excessive, quantities of water;
- water meter maintenance and replacement programs.

**ECONOMIC**

Economic techniques that may be used to promote water conservation include the following:

- pricing policies that employ uniform rates regardless of the volume used, or rates that increase with increased water usage;
- demand pricing, which employs rates that vary with the time of use (e.g., rates may increase during the summer or during the time of day when the demand peaks);
- incentives, such as rebates or tax credits, for customers who conserve water;
- monetary penalties for customers who use excessive quantities of water;
programs that publicize energy savings through reduction of metered cost, fuel for hot water, and electricity for private
well operation.

**LEGAL**

Building codes, plumbing codes, zoning ordinances, and other local, state, and federal statutes may include provisions designed to encourage water conservation. Some activities that have been controlled by law, or may be considered for future legal action, include:

- Mandatory use of low water-use plumbing fixtures. (The use of efficient fixtures has been required for all new installations and all replacement units by a 1980 amendment to the New York State Environmental Conservation Law. This amendment and a subsequent revision, effective January, 1988, limit the flow in sink and lavatory faucets and showerheads to 3 gallons per minute; the water usage of urinals to one gallon per flush; and the usage of toilets to three and one-half gallons per flush.);

- Mandatory use of water conserving models of appliances such as clothes washers and dishwashers;

- Metering of all water service lines and well pump discharge lines, including agricultural wells;

- Restrictions on the use of water for cooling, which could be included in well permits and invoked when required by local conditions;

- Restrictions on the use of water for lawn irrigation, car washing, swimming pool filling, fountains, etc.

- Restrictions on the use of water for industrial purposes. (For example, industries that use large quantities of water could be excluded by laws or ordinances from stressed areas. During droughts or other emergencies, the use of water for industrial purposes could be temporarily curtailed by government regulations);

- Restrictions on the percentage of a parcel of land that may be planted with irrigated high maintenance turf;

- Restrictions on the use of water for farm irrigation.

**PUBLIC EDUCATION**

A well informed public is an essential element of a successful water conservation program. All water users must be informed regarding their source of water, limitations on the volume available, and the practices that jeopardize the quality or quantity of the water supply. The public must be aware of water conservation, and must be advised on how to participate.

Public information programs may include the following elements:

- Direct mailings (e.g., water bill inserts, newsletters, pamphlets);

- News media (e.g., newspapers, radio, television);

- Personal contact (e.g., telephone calls, public meetings, talks at schools, civic associations, and service clubs);

- Special events/exhibits (e.g., displays in shopping centers, county fairs, schools);

- Formal courses or contests in the elementary schools, high schools and colleges.

**Water Conservation in the Home Environment**

The following sections describe various water conservation programs that may be suitable for water uses inside and outside the home. The total estimated pumpage for interior and exterior uses in each of the five land use categories in Suffolk County is shown in the following paragraphs.
<table>
<thead>
<tr>
<th>User Category</th>
<th>Interior Use (mgd)</th>
<th>Exterior Use (mgd)</th>
<th>Total Pumpage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>111.7</td>
<td>23.2</td>
<td>134.9</td>
</tr>
<tr>
<td>Commercial/Industrial</td>
<td>43.0</td>
<td>1.2</td>
<td>44.2</td>
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<tr>
<td>Agricultural</td>
<td>0.0</td>
<td>15.3</td>
<td>15.3</td>
</tr>
<tr>
<td>Institutional</td>
<td>8.3</td>
<td>1.6</td>
<td>9.9</td>
</tr>
<tr>
<td>Cemetery/Golf Course</td>
<td>0.0</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td><strong>163.0</strong></td>
<td><strong>44.6</strong></td>
<td><strong>207.6</strong></td>
</tr>
</tbody>
</table>

The exterior use (outdoor use) of 44.6 mgd, which is primarily for the irrigation of lawns, shrubbery, and farmland, constitutes 21.5 percent of the total pumpage. This water is transmitted to the atmosphere by evaporation and transpiration; none of it is assumed to return to the aquifer (i.e., 100 percent consumptive use is assumed).

The agricultural use of 15.3 mgd is significant since it represents 7.4 percent of the total pumpage in Suffolk County, and occurs in many areas where fresh groundwater resources are limited. There is presently no requirement to meter the flow from privately owned agricultural wells, and there is little incentive to reduce the quantity of water used (other than the cost-savings resulting from decreased pumpage).

Conservation practices that can be employed in agriculture include better timing of irrigation; crop rotation using crops that require less water (e.g., grain); and, drip irrigation, which is now becoming more feasible for application in Suffolk with the increasing popularity of orchards and nursery crops.

The remaining 29.3 mgd of exterior use is primarily lawn irrigation. Although this activity is aesthetically rewarding, and improves the standard of living, it is non-essential. Education of the public to eliminate wasteful practices such as excessive lawn irrigation can achieve significant savings, with no reduction in the standard of living.

The quantity of water used for irrigation in new residential and commercial developments can be significantly reduced below present rates by limiting the percentage of turfed area; utilizing appropriate blends of turf grasses, land-covers, and landscaping shrubbery; and, installing separate meters to facilitate the charging of higher rates for water used outside of buildings.

The potential exists in both existing and new areas to reduce peak and maximum day demands. By imposing restrictions on the use of water for exterior purposes (e.g., restrictions on the days and time of day that irrigation is permissible), such as those required in Nassau County, reductions of maximum day and peak demands can be achieved. This can ultimately reduce costs and the need for new facilities, such as wells and storage tanks.

Another potential for water conservation is the reduction of unmetered water in water supply systems. The difference between pumpage and sales, sometimes called unaccounted for water, which can often be more than 10 percent of total pumpage, includes leakage; water used by water purveyors for well blowoff, filter backwash, and tank overflow; and, water discharged from hydrants.

It is not feasible to eliminate all unmetered water, but a reduction in leakage is frequently cost-effective. A one percent reduction in pumpage could also eliminate the need for one or two wells and appurtenances. More significant savings would be realized by larger reductions in leakage.
TABLE C-9
Residential Interior Water Use

<table>
<thead>
<tr>
<th>Water Use</th>
<th>Present Use (gpcd)</th>
<th>(%)</th>
<th>Estimated Use With Conservation (gpcd)</th>
<th>% Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet</td>
<td>25</td>
<td>40</td>
<td>17.0</td>
<td>32</td>
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<tr>
<td>Bath</td>
<td>20</td>
<td>30</td>
<td>16.5</td>
<td>18</td>
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<tr>
<td>Lavatory Sink</td>
<td>3</td>
<td>5</td>
<td>2.5</td>
<td>17</td>
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<tr>
<td>Laundry</td>
<td>10</td>
<td>15</td>
<td>6.0</td>
<td>40</td>
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<td>Dishwashing</td>
<td>3</td>
<td>5</td>
<td>2.5</td>
<td>17</td>
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<tr>
<td>Drinking/Cooking</td>
<td>3</td>
<td>5</td>
<td>2.5</td>
<td>17</td>
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<td><strong>64</strong></td>
<td><strong>100</strong></td>
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<td><strong>47.0</strong></td>
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</table>

Potential for Conservation in Interior Water Use

The typical residential interior use of water is shown below.

The average interior use of water is approximately 64 gallons per capita per day, primarily for toilet flushing, bathing, and laundry. It is estimated that a water conservation program consisting of public education, pressure regulation, and use of water saving appliances and plumbing fixtures could reduce the use to 47 gpcd — a 27 percent reduction — with no impact on the standard of living. A similar reduction could also be achieved in institutions such as hospitals and dormitories, and in commercial establishments.

Water Conservation Considerations

Some of the more viable water conservation methods to consider are:

- creating a county-wide public information program aimed at creating a knowledgeable and cooperative citizenry;
- creating specific sub-regional water conservation programs in areas where the water supply is stressed;
- requiring water suppliers to prepare studies aimed at reducing leakage and other wasteful components of unaccounted for water in their systems; metering all water pumped from wells, including public, commercial, and industrial wells; metering all water services, including public buildings and fire lines;
- metering all agricultural irrigation wells;
- eliminating decreasing block rates for water, and adopting uniform block rates or, when justified by expenditures, increasing block rates;
- encouraging elimination of household plumbing leaks and the voluntary conversion to water-efficient plumbing fixtures when their use is not mandated by law. (A tax incentive similar to those for energy conservation should be considered to encourage the installation of water-efficient units.);
- incorporating the 1980 water conservation amendment to the New York State Environmental Conservation Law into state, county, and local building codes, and also encouraging enforcement of these regulations. (Also, publicizing the law as part of an educational program, and enforcing the provisions of the statute regulating the sale of water-efficient fixtures through plumbing wholesalers and retailers.);
- encouraging the use of water-saving appliances by stressing the potential savings in water and energy costs and the overall advantages of water conservation;
- encouraging the reuse of water in industrial applications;
- adopting restrictions on exterior water use aimed at reducing peak demands, maximum day demands, and overall outdoor use, when necessary;
- limiting the percentage of land in newly developed areas that may be planted with turf;
- installing separate meters in newly developed areas to measure the quantity of water used outdoors, and establishing a higher rate for outdoor use;
• limiting the use of water by new industry, especially in quantity stressed areas.

• encouraging the use of grasses, land-cover, and landscaping that will require less irrigation, and the voluntary reduction of turfed areas around existing residences and commercial buildings;

• encouraging the use of moisture sensors, rather than timers or manually operated controls to activate lawn sprinklers;

• encouraging or requiring appropriate water conservation measures by all classes of users, i.e., residential, commercial/industrial, agricultural, institutional, and cemeteries/golf courses;

• carefully scrutinizing all applications for cooling water wells in order to avoid adverse effects, such as deterioration of water quality or a reduction in quantities available for essential purposes;

A majority of these conservation methods can be considered for implementation as part of a public information program. Specific state and local legislation, however, may be required in some instances. Most of the methods are applicable on a county-wide basis, although some may be more important for specific areas.
Appendix D: EXISTING PROGRAMS

Introduction
Overview of Major Agency Roles and Responsibilities

The entire subject of groundwater management, particularly on Long Island, is extremely complex. The threats to the resource are many and diverse. Correspondingly, there exists a variety of agencies and programs at all levels of government to control, manage, or regulate various threats; or to carry out other activities related to management of the resource; or to protect public health and the environment. Concern for groundwater on Long Island is not new. The long standing importance of groundwater within the overall water resource picture as a critical source of drinking water supply, has always influenced the application of public health, water supply, and environmental programs. There is a very strong history of program activity on Long Island, with groundwater as a principal focus. Rarely, however, have agencies had the luxury of viewing the entire array of programs and activities as an integrated package with respect to overall management and protection of the groundwater resource. Existing programs have derived much of their statutory authority and funding from the federal and state levels and have focused on specific types of threats (e.g., municipal and industrial wastewater discharges, landfills, etc.) to both ground and surface waters. Consequently, the mix of existing programs has developed piecemeal with respect to the groundwater resource. Historically, the major integrators of programs on Long Island have been the local (county and city) health agencies, which have undertaken various local program initiatives as well as administering major portions of state environmental and public health programs through delegation. Long Island has been fortunate in having strong local agencies which have been able to effectively tailor the administration of many state and federal program initiatives to best meet groundwater resource management needs.

The program development efforts described in this document have not sought to create a new and separate program to replace the existing structure. Rather, program development is seen as a refining of existing institutions and program elements along with selected new program elements where justified, within an integrated framework. Most of the program elements required for Long Island groundwater management already exist. This Chapter will briefly describe the major existing programs and participants which currently manage Long Island's groundwaters.

Table D-1 illustrates the existing program elements relating to groundwater management on Long Island, and the pattern of existing agency roles and responsibilities.

The Table categorizes program elements within eight major areas of program activity:

- Resource Management: Program elements which apply to overall management of the resource rather than the control of specific threats.
- Source Control: Programs designed primarily to prevent water quality impacts from specific categories of pollution sources.
- Zoning and Land Development Control: A critical category of prevention activities which are exclusively within the authority of local government.
- Water Supply: Programs to prevent water quantity impacts and protect consumers through public water supply regulation.
- Response and Remediation: Programs to investigate groundwater contamination, locate and cut off its sources, and help users to find alternative sources of supply.
- Public Education and Participation.
- Research.
- Regulatory Enforcement.

Public education and participation, research and regulatory enforcement are essential activities supporting all of the other program elements. The element-by-element description of existing programs, which begins on page D-4, is organized according to the general categories shown in Table D-1.

## TABLE D.1
Summary of Existing Programs Related to Major Groundwater Management Agencies

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<th>LIRPB</th>
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<th>SCPC</th>
<th>SCDHS</th>
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Legend: ☐ Primary Program Role ☐ Participating Program Role ☐ Little or No Role
Arrayed against the program elements in a matrix format are agencies and organizations. The sheer size of the matrix (23 elements by 21 agencies or categories of organizations) is ample illustration of the complexity and diversity of the existing institutional framework for Long Island groundwater management. As shown, a variety of federal, state and local agencies are directly responsible, or are otherwise involved in the various management, regulatory, or other activities which collectively comprise the groundwater management framework.

In many cases, a particular agency or agencies carry out important activities within a program element. These are shown as having primary program roles.

In other cases, the program activity is one in which all or most agencies are involved in the normal course of doing business; or an agency has a significant but not central or statutorily mandated role. These are shown as having participating program roles.

Several conclusions can be drawn from this Table with respect to the structure of agency roles and responsibilities:

- There are five principal regulatory management agencies which have major statutory authority and carry out the bulk of the actual regulatory program activities in the areas of standards setting, contaminant source controls, water quantity regulation, public water supply regulation, and regulatory enforcement. These are the New York State Departments of Environmental Conservation and Health; the Nassau and Suffolk County Health Departments; and the New York City Department of Health. They can reasonably be viewed as the core regulatory participants in the overall program.

- Other federal, state and regional level agencies have important roles in the current program, but the roles are generally limited in scope. These include the USEPA, the USGS, the LIRPB, and the Nassau County Department of Public Works. Many of these agencies have critical roles in one or more program elements.

- Cities, towns and villages have the major statutory authority for zoning and land use control, a critical element where the major state, county and federal agencies have no authority. These local jurisdictions also play a major role in the construction and operation of facilities, and in incident response.

Prior to an element-by-element description of the existing program, it is important to review the major participants at the federal, state, county and local levels and their areas of responsibility.

FEDERAL LEVEL

There are two federal agencies with important roles and responsibilities in groundwater management: The U.S. Environmental Protection Agency (USEPA) and the U.S. Geological Survey (USGS), a unit of the Department of Interior.

The Environmental Protection Agency

The USEPA is the major federal environmental agency and is responsible for the administration of several federal programs which provide regulatory safeguards against groundwater contamination. These include programs under the Resource Conservation and Recovery Act (RCRA); Superfund (CERCLA); the Clean Water Act (CWA); the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); the Toxic Substances Control Act (TSCA); and the Safe Drinking Water Act (SDWA).

EPA policy is generally to delegate specific programs to the States, upon request and upon attainment of legislative requirements; to provide flexibility for States to effectively implement the policies and plans embodied within their groundwater programs, to the extent permitted by statute; to oversee state performance in carrying out delegated national programs which use federal grants; and to support the States through provision of technical expertise and research.

New York State has sought and received delegation of several federal programs. Of particular importance for the state's groundwater program are the delegated programs under the Clean Water Act delegated to NYSDOH. The authorities provided under these Acts are mirrored by comparable state legislation, and the delegated programs provide essential funding support to assist state programs in water pollution control and solid and hazardous waste management.

EPA has been developing an agency policy on groundwater which recognizes that state and local governments have the principal responsibility for the management and protection of groundwater. This is consistent with New York State’s program, and the Long Island program with the exception that USEPA should move aggressively to develop national drinking water quality standards and national technology standards for industrial wastewater treatment. National standards in these areas are essential to establish a reasonable level of equity among States and regions.
The U.S. Geological Survey

The second major federal agency with a critical role in Long Island groundwater management is the USGS. Historically, USGS programs to define and evaluate the groundwater resource have provided much of the available information on Long Island’s groundwater resource. The USGS is a highly professional organization which will continue to have an important role in conducting groundwater resource evaluations to support the program. The USGS maintains a sub-District (i.e., sub-State) office on Long Island and conducts resource evaluations through cooperative agreements with several local (county) agencies in the area as well as with state agencies.

STATE LEVEL

The two state agencies with the most extensive responsibilities and programs are the Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH).

DEC is the environmental agency of the state, responsible for assuring the quality and quantity management of groundwater that is loose in the environment. The DOH is the public health agency of the state, responsible for assuring delivery of a safe water supply to the public.

Department of Environmental Conservation

The Department of Environmental Conservation has the responsibility for administering an array of environmental quality and natural resource programs, several of which directly relate to groundwater. Principal among these are the water quality and water resource programs, currently administered by the Division of Water. However, they also include programs in areas such as Solid and Hazardous Waste Management, Pesticide Regulation, Mineral Resources, Oil and Gas Regulation, and others. DEC is specifically charged with the coordinated management of water resources (ECL Article 15) and the control of water pollution and maintenance of reasonable standards of purity of the State’s waters, both ground and surface (ECL Article 17).

Major elements of the Department’s water program integral to Long Island groundwater management include water resources planning, water quality standards and classifications, water quality monitoring and surveillance, municipal and industrial wastewater discharge permits (SPDES) and programs for the development, operation and maintenance of municipal wastewater facilities. Also, the DEC’s Long Island Well Permit program constitutes the only currently existing statutory authority and program for quantity management on Long Island.

Department of Health

The Department of Health under the New York State Public Health Law is responsible generally for the protection of public health and, more particularly, for assuring a safe potable supply of water for the State’s citizens. Under the Public Health Law and Part 5 of the State Sanitary Code, DOH administers a major program to assure that all public water supply systems in the state are properly operated and maintained and that all consumers are assured delivery of a safe and adequate supply of water. This program includes activities relating to regulation of public water supply facility design and construction; periodic monitoring of the quality of waters delivered to the tap; periodic inspection and evaluation of all public water systems; emergency response to water supply systems experiencing critical water quality or quantity problems; laboratory services; and establishment and enforcement of state drinking water standards.

Because water supply is the dominant and most important use of groundwater, the DOH necessarily has a very strong role in groundwater management.

New York State Legislative Commission on Water Resource Needs of Long Island

The State Legislative Commission was established in 1979 through the action of the State Legislature as an indication of its concern about water resource problems on Long Island. The Commission’s mandate authorizes it to

- investigate and evaluate studies and reports;
recommend ways to regulate and supervise activities that deplete, defile, damage or adversely affect the waters and lands of Nassau and Suffolk;

identify uncontaminated sources of water;

recommend legislative or administrative actions to preserve and protect the water resources. In addition to its legislative role, the Commission works closely with the towns and counties, citizen groups, and the various agencies, as an advocate to improve and facilitate efforts directed at water management and protection.

COUNTY AND LOCAL LEVELS

State and federal agencies, by themselves, will never have the full range of authority, resources, and capability to adequately manage and protect Long Island's groundwater resources. Historically, much of the basic regulatory program for which authority resides at the state level has actually been carried out at the County level through delegation. Patterns of land use and urban development are important determinants of impacts on Long Island's aquifer system. Authority to control land use lies strictly at the local (town, city and village) level.

County and City Health Agencies

The Suffolk County Department of Health Services (SCDHS), the Nassau County Department of Health (NCDH) and the New York City Department of Health (NYCDOH) are the major local regulatory agencies addressing groundwater on Long Island. These agencies administer, through delegation, major elements of state (DEC and DOH) programs for water pollution control, solid waste management and water supply regulation which are critical to the groundwater program. In addition, these agencies administer groundwater programs utilizing their own legal authority and funding. For example, a local program of major importance is the Suffolk County Article 12 program to regulate the storage and handling of hazardous materials.

These major County regulatory agencies - acting either under their own authority or as agents of the state - currently perform the bulk of the day-to-day activities required to administer regulatory programs for groundwater management and protection on Long Island. The very central role of these agencies will undoubtedly continue in the future.

Long Island Regional Planning Board

The Long Island Regional Planning Board (LIRPB) has also played an important role in groundwater protection by developing the 1978 Long Island Comprehensive Waste Treatment Management Plan (Nassau/Suffolk 208 Plan) and related planning projects. This plan focused public awareness on the sensitivity of Long Island's groundwater resource and advanced a series of recommendations, including the Hydrogeologic Zones, for protecting the resource. Through its planning oversight role, the LIRPB has encouraged and assisted local governments to render zoning and land use decisions strengthening groundwater protection.

Towns, Cities, and Villages

Towns, cities and villages in New York State are vested, under state law, with responsibility for regulation of land use. Land use controls will necessarily be an important element of groundwater protection programs on Long Island in the future, particularly in critical geographic areas subject to development pressure. The groundwater management program in New York State, will look to local governments to carry out zoning and other land use control responsibilities in a manner which will assist in providing for better protection of the resource. Further, local governments play a major role in groundwater management through their direct operation of well fields, water and sewage treatment plants, and landfills. In these operational functions they are the direct consumers of the groundwater and are responsible for direct threats to the groundwater.
Appendix E: WATERSHED RULES AND REGULATIONS

Introduction

Over the years a great many groundwater monitoring and pollution investigations have taken place on Long Island. The result of these efforts have supported the obvious conclusion that man's activity on the land surface can and often does lead to groundwater contamination. This contamination may be areawide, as in the case of urbanization or farming, or localized as in the case of a point source such as a landfill or industrial discharge.

The extent of contamination is documented in many studies and plans, among the most recent of them, the Suffolk County Water Resource Management Plan (SCWRMP); the Long Island Groundwater Pollution Study (LIGWPS); the New York State Water Resource Management Study - L.I. Region; and the studies and reports issued by the United States Geological Survey (USGS).

In addition to studies, the various government entities have enacted regulations to protect groundwater. The Environmental Protection Agency (EPA) has issued regulations addressing water pollution, hazardous wastes, and drinking water. New York State Department of Environmental Conservation (DEC) has enacted many regulations dealing with solid waste, hazardous wastes, etc., through the Environmental Conservation Law and subsequent rules and regulations. The New York State Department of Health has similar laws and regulations administered through the Public Health Law and the State Sanitary Code. Local government - in this instance, Nassau County and Suffolk County - has each enacted its own groundwater protection rules and regulations. Most of these measures are contained in the various sections or Articles of their respective Sanitary Codes. The content of seven such articles, three from Nassau and four from Suffolk, are summarized below.

Article VI of the Nassau County Sanitary Code titled Public Drinking Water Supply regulates the public drinking water supply in order to assure the protection of sources and the quality of drinking water and to provide for the effective design, operation and safety of public water supply facilities. Article VI, Section 5, provides requirements for the protection of sources of drinking water which include Department preparation of County-wide Wellhead Protection Regulations which must be approved by the Board of Health and which will take precedence over Watershed Rules and Regulations of individual public water suppliers except where the latter are more restrictive.

In order to preserve groundwater quality beneath the SGPAs, Article X of the Nassau County Public Health Ordinance requires that within an SGP each new residence utilizing an on-site sewage disposal system be located on a parcel having an area of at least 40,000 square feet per dwelling unit or the equivalent, based upon sewage flow, for non-residential uses. The ordinance also applies to any building or structure within an SGP which would result from a proposed alteration, addition or change of usage. The discharge of industrial wastewater, even if treated, is prohibited within these areas.

All facilities within SGPAs in Nassau County, including those operated by municipalities, hospitals, laboratories, nursing homes, commercial and industrial establishments, educational institutions and country clubs, are also subject to Article XI of the Nassau County Public Health Ordinance. This ordinance regulates the storage, handling and control of toxic and hazardous materials including chemicals, heating oil, road deicing salt and medical waste.

In Suffolk, Article 4 of the County Sanitary Code deals with water supply and recognizes that Long Island's groundwater is the sole source of drinking water. The regulation covers new sources of water, bottled water, water treatment, prevention of cross-connections, etc., as required to protect the purity of the water supplied to the consumer.

Article 6 establishes the requirements for water supply and sewage disposal for realty subdivision, commercial and industrial developments. It recognizes the various groundwater management zones; imposes specific requirements for each zone, and emphasizes the need to limit potential wastewater generation associated with future land uses, especially in Hydrogeologic Zones III, V and VI.

Article 7 deals with the control of specific sources of pollution. It recognizes the water supply importance of deep recharge and water supply sensitive areas and attempts to protect them through prevention and control of contaminants. The regulations are quite specific in prohibiting the types of hazardous materials that can be stored at locations within the deep flow recharge area.
Article 12 deals with the storage and handling of toxic and hazardous materials. Because it was enacted in 1980, it became the benchmark for subsequent state and federal regulations. The regulations apply to the design, construction, and testing of underground and above ground storage tanks as well as indoor and outdoor storage areas.

All of these studies and regulations focus on the overall goal of protecting and preventing further contamination of Nassau and Suffolk County’s groundwater and, thereby, hopefully providing safe and plentiful drinking water for the future. They all recognize that the aquifer system has been impacted by past and present land use. As a result, environmental programs have a two-fold direction: dealing with the present contamination and preventing further contamination. These two concerns become important in the development of Watershed Rules and Regulations.

Detailed wellhead protection measures can be and frequently are a key component of watershed rules and regulations. The views of the Advisory Council respecting the applicability and significance of a wellhead by wellhead or well field by well field approach to the maintenance of high quality ground water is reflected in the relevant sections of chapters two and five.

Two sets of WRRs, one designed to protect the small watershed of an upstate village and one recommended by an environmental lobby on Long Island have been included for information only. Neither has been endorsed by the Advisory Council, which believes that the existing body of federal, state and local laws and regulations constitute an uncodified but generally effective set of watershed rules and regulations.

Pursuant to the authority vested in the State Commissioner of Health by Section 1100 of the Public Health Law, new section 112.5 of Part 112 Title 10 (Health) of the Official Compilation of Codes, Rules Regulations of the State of New York, to be effective upon publication Notice of Adoption is hereby added to read as follows:

SECTION 112.5 Village of Millbrook, Dutchess County.

(a) APPLICATION:

The rules and regulations set forth in this Section duly made and enacted in accordance with the provisions of Section 1100-1107 of the Public Health Law shall apply to the source of public water supply of the Village of Millbrook. Said water supply is located approximately one mile east of the Village along NYS Route 44 on land identified as Dutchess County Office of Real Property Tax number 6865-265185. The location of boundaries designated for the protection zones, which comprise the Millbrook public water supply watershed, are described on the watershed protection zone described on the watershed protection zone map, dated April 1992 and filed with the New York State Commissioner of Health, Albany, New York, and with the Village Clerk of the Village of Millbrook, Dutchess County, New York, and included as Appendix A of these Rules.

(b) DEFINITIONS:

(1) Agricultural associated animal waste shall mean manure obtained from agricultural industries.
(2) Aquifer shall mean a consolidated or unconsolidated formation or groups or parts thereof, capable of storing and releasing water.
(3) Chloride salt - Any bulk quantities of chloride compounds and other deicing compounds intended for application to roads, including mixtures of sand and chloride compounds in any proportion where the chloride compounds constitute over eight percent of the mixture. A bulk quantity of chloride compounds means a quantity of one thousand or more, but does not include any chloride compounds in a solid form, including granules, which are packaged in waterproof bags or containers which do not exceed one hundred pounds each.
(4) Commissioner of Health unless otherwise noted, shall be the Commissioner of Health of the State of New York.
(5) **Disposal** shall mean the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste, radioactive material, hazardous waste, or wastewater into or on any land or water so that such solid waste, radioactive material, hazardous waste, or wastewater will remain on the land or water and will not be removed.

(6) **Environmental assessment form** shall be a form used by an agency to assist it in determining the environmental significance or nonsignificance of actions as defined in 6 NYCRR, Part 617.

(7) **Fertilizers** shall be any commercially produced mixture generally containing phosphorous, nitrogen, and potassium which is applied to the ground to increase nutrients to plants.

(8) **Flood plain** shall be the 100-year high water level of streams, ponds, estuaries, and lakes.

(9) **Groundwater** shall be any water beneath the land surface in the saturated zone.

(10) **Hazardous material** shall mean any substance listed in either 6 NYCRR Part 371, or 6 NYCRR Part 597, alone or in combination, including but not limited to petroleum products, organic chemical solvents, heavy metal sludges, acids with a pH less than or equal to 2, alkalies with a pH greater than or equal to 12.5, pathogenic or infectious waste or any material exhibiting the characteristics of ignitability, corrosivity, reactivity or EP toxicity.

(11) **Herbicides** shall mean any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any weed, and being those substances defined as herbicides pursuant to Environmental Conservation Law Section 33-0101.

(12) **Human excreta** shall mean human feces and urine.

(13) **Manure** shall mean animal feces and urine.

(14) **Non-agricultural associated animal waste** shall mean manure obtained from non-agricultural industries.

(15) **Non-point discharge** shall mean discharges of pollutants not subject to SPDES State Pollutant Discharge Elimination System permit requirements.

(16) **Open storage** shall mean the holding of a material in a way that the material is exposed to the elements of nature.

(17) **Pest** shall mean (1) any insect, rodent, fungus, weed, or (2) any form of terrestrial or aquatic plant or animal life or virus, bacteria or other micro-organism (except viruses, bacteria or micro-organisms on or in living man or other living animals) which the Commissioner of Environmental Conservation declares to be a pest as provided by Environmental Conservation Law Section 33-0101.

(18) **Pesticide** shall mean any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant, and being those substances as pesticides pursuant to Environmental Conservation Law Section 33-0101 et seq.

(19) **Point Source discharge** shall mean pollutants discharged from a point source as defined in Environmental Conservation Law Section 17-0105.

(20) **Protection zone** shall mean any of the watershed management zones, as delineated on the watershed protection zone map, dated April 1992, and included as Appendix A of these Rules and described herein. These zones shall be designated Zone I, Zone II and Zone III.

(21) **Radioactive material** shall mean any material in any form that emits radiation spontaneously, excluding those radioactive materials or devices containing radioactive materials whose receipt, possession, use and transfer are exempt from licensing and regulatory control pursuant to regulations of the New York State Department of Labor or United States Nuclear Regulatory Commission.

(22) **Radiation** shall mean ionizing radiation; that is, any alpha particle, beta particle, gamma ray, x-ray, neutron, high-speed proton, and any other atomic particle producing ionization, but shall not mean any sound or radio wave, or visible, infrared, or ultraviolet light.

(23) **Recyclables handling and recovery facility** shall mean a solid waste management facility, other than pickup and transfer vehicles, at which recyclables are separated from the solid waste stream, or at which previously separated recyclables are collected, for collection, storage, and off-site shipment.

(24) **Septage** shall be the contents of a septic tank, cesspool, or other individual wastewater treatment work which receives domestic sewage wastes.

(25) **Sludge** shall be the solid, semi-solid or liquid waste generated from a waste processing facility, but does not include the liquid stream of effluent.

(26) **Solid waste** shall mean all putrescible and nonputrescible materials or substances discarded or rejected as being spent, useless, worthless or in excess to the owners at the time of such discard or rejection, including but not limited to garbage, refuse, industrial and commercial waste, sludges from air or water control facilities, rubbish, ashes, contained gaseous material, incinerator residue, demolition and construction debris, discarded automobiles and offal but not including sewage and other highly diluted water carried materials or substances and those in gaseous form, and being those wastes defined as solid waste pursuant to Environmental Conservation Law Section 27-0701.
(27) **Solid waste management facility** means any facility employed beyond the initial waste collection process including, but not limited to, transfer stations, bailing facilities, rail haul or barge haul facilities, processing systems, including resource recovery facilities or other facilities for reducing solid waste volume, sanitary landfills, facilities for the disposal of construction and demolition debris, plants and facilities for compacting, composting or pyrolysis of solid wastes, incinerators and other solid waste disposal, reduction or conversion facilities, as defined in Environmental Conservation Law Section 27-0701 et seq.

(28) **Spill** shall mean the leaking, pumping, emitting, emptying or dumping of wastes or materials into or on any land or water.

(29) **State Pollutant Discharge Elimination System (SPDES)** shall mean the system established pursuant to Article 17, Title 8 of Environmental Conservation Law for issuance of permits authorizing discharges to the waters of the State of New York.

(30) **Stormwater runoff recharge basins** shall mean a man-made device capable of retaining surface water runoff to induce groundwater infiltration.

(31) **Supplier of Water** shall mean the Village of Millbrook, Dutchess County, New York, incorporated under the laws of New York State. The Village of Millbrook is the owner and operator of the public water supply facilities located within the watershed protection zones as described on the watershed protection zone maps, dated April 1992, filed with the New York State Commissioner of Health, Albany, New York, and with the Village Clerk of the Village of Millbrook, Dutchess County, New York, and included as Appendix A of these Rules.

(32) **Wastewater treatment works** shall mean any treatment plant, sewer, disposal field, lagoon, pumping station, septic system, collection and distribution pipes, on-site disposal systems and seepage units, constructed drainage ditch or surface water intercepting ditch, or other works not specifically mentioned in this paragraph, installed for the purpose of treatment, neutralization, stabilization, storage, or disposal of wastewater.

(33) **Wastewater** shall mean aqueous carried waste including, but not limited to, dredge spoil, solid waste, hazardous waste, incinerator ash and residue, septage, garbage, refuse, sludge, chemical waste, infectious waste, biological material, radioactive materials, heat, and industrial, municipal and agricultural waste.

(34) **Water Supply Protection Zone** shall mean the land area, known as Zone I, delineated on the map, dated April 1992 and filed with the New York State Commissioner of Health and with the Village Clerk of the Village of Millbrook, and included as Appendix A of these rules. The Water Supply Protection Zone includes a portion of the Millbrook stream bed, a portion of the intermittent surface stream network, the southeastern gravel deposit areas of the watershed and other areas of the watershed having gravelly and sandy soils.

(35) **Watershed Protection Zone** shall mean the land area, known as Zone III, which is tributary to Zone II and is the tributary surface area from which the aquifer is replenished by runoff. The Watershed Protection Zone is delineated on the map, dated April 1992 and filed with the New York State Commissioner of Health and with the Village Clerk of the Village of Millbrook, and included as Appendix A of these Rules.

(36) **Water supply** shall mean the public water supply of the Village of Millbrook.

(37) **Watercourse** shall mean every spring, stream, wetland, marsh, and channel or conduit of water which flow or may flow into the Village of Millbrook public water supply.

(38) **Watershed** shall mean that land area which contributes water to a specific stream, aquifer or aquifer recharge area or portion(s) thereof and shall include the three designated protection zones known as Zone I, Zone II, and Zone III.

(39) **Well** shall mean any present or future artificial excavation used as a source of public water supply which derives water from the interstices of the rocks or soils which it penetrates including bored wells, drilled wells, driven wells, infiltration galleries, and trenches with perforated piping, but excluding ditches or tunnels, used to convey groundwater to the surface.

(40) **Well Head Protection Zone** shall mean the ±119.0 acre parcel owned by the supplier of water (identified as tax parcel #6865-265185) located at the confluence of the Shaw Brook and the Mill Brook which contains the public water supply facilities and the well cone of depression. This zone shall also be known as Zone I as delineated on the map, dated April 1992 and filed with the New York State Commissioner of Health and with the Village Clerk of the Village as Appendix A of these Rules.

(c) **GENERAL PROVISIONS.**

(1) The manufacture, use, storage, disposal or discharge of any products, materials or by-products, such as wastewater, solid waste, hazardous waste or any pollutant within the identified protection zones must conform to the requirements of these Rules.

(2) Any person or entity preparing an environmental assessment form or an environmental impact statement for a project in Zones I, II, or III as defined in this section shall file a copy with the Commissioner of Health and the supplier of water.

(3) An inventory and census shall be initiated and updated every five years by the supplier of water of all systems, facilities and activities in the protection zones that may contribute to water supply source contamination including, as a minimum, those activities included in the original inventory and census, a summary of which is included as Appendix B of these Rules.
(4) Spills. Within any of the herein defined Protection Zones, any person who is the owner of, or in actual or constructive possession or control of a hazardous material, petroleum, or radioactive material, or any agent or employee thereof, or any person in a contractual relationship therewith, who is responsible for, or has knowledge of any spill, as defined in subdivision (b) above, of any hazardous material, petroleum or radioactive material to the ground surface or any water body, shall notify the supplier of water, the New York State Department of Environmental Conservation and the Dutchess County Department of Health. All spills shall be reported to the supplier of water, the New York State Department of Environmental Conservation and the Dutchess County Department of Health within two (2) hours of the spill, or when knowledge of such spill is obtained, and shall be abated in accordance with the provisions of Article 12 of the Navigation Law, Sections 170 through 197, and Article 17 of the New York State Environmental Conservation Law.

(d) SPECIFIC REGULATIONS: ZONE I

(i) All land shall be protected and controlled through direct ownership of the land or through the acquisition of protective easements or other appropriate measures by the supplier of water in order to prevent contamination.

(ii) All systems, facilities, and activities are prohibited except for physical pumping and treatment facilities and controls. The area shall not be used for any purpose other than public water supply except when a permit has been issued by the Village Board for non-intrusive recreation uses such as hunting, fishing, picnicking, nature study, or hiking.

(iii) The development of the water sources shall be designed, constructed and maintained subject to the approval and enforcement authority of the Dutchess County Health Department and New York State Health Department so as to eliminate the opportunity for pollution to enter the water sources.

(iv) The physical pumping facilities and controls shall be protected against damage from tampering by fencing or other enclosures or by their manner of construction and installation.

(v) The area shall be posted prohibiting trespass for any purpose except as permitted in subdivision (d)(2) above.

(e) SPECIFIC REGULATIONS: ZONE II

(1) Wastewater Treatment Works:

(i) all wastewater treatment works receiving wastewater without the admixture of industrial or other wastes, as these terms are defined in Environmental Conservation Law Section 17-0701, in quantities of less than 11000 gallons per day shall be designed, installed and maintained in accordance with the standards established in 10 NYCRR Part 75 (Appendix 75A) and any wastewater disposal standards promulgated by the Dutchess County Health Department where such standards are more stringent. Where required, permits for the installation or continued use of wastewater treatment works shall be obtained and may be denied when rapid percolation is found; and

(ii) all other wastewater treatment works, including design, installation and maintenance, are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation.

(2) Point Source Discharge. Point source discharges, other than stormwater runoff conduits and discharges pursuant to Subdivision e(i)(i) of this section, are prohibited except pursuant to an authorization issued by the New York State Department of Environmental Conservation.

(3) Septage and Sludge:

(i) storage of septage, sludge or human excreta, other than storage associated with the operation of an individual wastewater treatment work, is prohibited; and

(ii) the land application of septage, sludge or human excreta is prohibited.

(4) Solid Waste Management Facilities. The establishment or continued operation of solid waste management facilities are prohibited, except for a disposal area located within the property boundaries of a single family residence or farm for solid waste generated from that residence or farm or a recyclables handling and recovery facility with an on-site capacity not exceeding 450 tons per year, operated pursuant to a valid permit, regulatory exemption or other authorization by the New York State Department of Environmental Conservation.

(5) Animal Waste Storage. Areas utilized for the storage stockpiling of manure and agricultural associated animal waste shall be constructed and maintained such that seepage, leachate or runoff from storage or stockpiling of animal waste cannot adversely impact the quality of the groundwater or surface water.

(6) Hazardous Material:

(i) storage and use of hazardous material are subject to the approval and enforcement authority of the State Department of Environmental Conservation or other agency having jurisdiction; and

(ii) disposal of hazardous material is prohibited.

(7) Radioactive Material. Storage, use and disposal of radioactive material are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation, the State Department of Health, and any other state or federal agency having jurisdiction.
(8) Fertilizer and Manure Use:
   (i) open storage of fertilizers for non-farm and non-residential use is prohibited;
   (ii) agricultural use of fertilizers and land application of manure shall be in conformance with best management practices as developed by the New York State Department of Environmental Conservation and contained in "Controlling Agricultural Nonpoint Source Water Pollution in New York State - A Guide to the Selection of Best Management Practices to Improve and Protect Water Quality", dated 1991, and included as Appendix C of these rules; and
   (iii) fertilizer use for non-farm and non-residential usage shall not be applied in a manner or at rates which would contaminate the Village water supply.

(9) Pesticide and Herbicide Use:
   (i) pesticide and herbicide storage and use are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation;
   (ii) disposal of pesticides, including herbicides other than for those uses set forth in subdivision (e)(9)(i) of this section, is prohibited;
   (iii) disposal of water used for make-up water or for washing of equipment is prohibited except pursuant to an authorization issued by the New York State Department of Environmental Conservation; and
   (iv) use of streams as a source of water or for make-up water or washing of equipment used in conjunction with pesticides and herbicides is prohibited.

(10) Petroleum Storage:
   (i) aboveground or underground petroleum storage tanks, including design, installation and maintenance, are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation as per Environmental Conservation Law Sections 17-0303 and 17-1001 et seq; and
   (ii) abandoned petroleum tanks are subject to the closure requirements of 6 NYCRR, Section 613.9.

(11) Stockpiles:
   (i) storage of chloride salts is prohibited except in structures designed to minimize contact with precipitation and constructed on low permeability pads designed to control seepage and runoff; and
   (ii) storage of coal is prohibited except in structures designed to minimize contact with precipitation and constructed on low permeability pads designed to control seepage and runoff.

(12) Chloride Salt Application. Deicing chloride salt use is restricted to the minimum amount needed for public safety.

(13) Construction and Closure of Wells:
   (i) oil and gas well construction, maintenance and abandonment are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation; and
   (ii) water supply well construction, maintenance and abandonment are subject to the approval and enforcement authority of the Dutchess County Health Department and the New York State Department of Environmental Conservation under 6 NYCRR, Part 601.

(14) Cemeteries. All cemeteries shall be operated to prevent contamination of the public water supply.

(15) Sediment Generation:
   (i) farm tillage practices shall be in conformance with best management practices as developed by the New York State Department of Environmental Conservation, included in "Controlling Agricultural Nonpoint Source Water Pollution in New York State - A Guide to the Selection of Best Management Practices to Improve and Protect Water Quality", dated 1991, and included as Appendix C of these rules; and
   (ii) land disturbing activities which may result in deterioration of the quality or quantity of the public water supply source, including general construction, highway construction, access road construction and maintenance are prohibited except where remedial measures have been put in place to prevent erosion and sediment production.

(f) SPECIFIC REGULATIONS: ZONE III

(1) Wastewater Treatment Works:
   (i) all wastewater treatment works receiving wastewater without the admixture of industrial or other wastes, as those terms are defined in Environmental Conservation Law, Section 17-0701, in quantities of less than 1,000 gallons per day shall be designed, installed and maintained in accordance with the standards established in 10 NYCRR Part 75 (Appendix 75A) and any wastewater disposal standards promulgated by the Dutchess County Health Department where such standards are more stringent. Where required, permits for the installation or continued use of wastewater treatment works shall be obtained; and
   (ii) all other wastewater treatment works, including design, installation and maintenance, are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation, or its agent.
(2) Point Source Discharge. Point source discharges, other than stormwater runoff conduits and discharges pursuant to subdivision (f)(i)(i) of this section, are prohibited except pursuant to an authorization issued by the New York State Department of Environmental Conservation.

(3)Septage and Sludge:
(i) land application of septage, sludge or human excreta within 200 linear feet of any stream, watercourse or Zone I or Zone II boundary is prohibited; and
(ii) land application of septage, sludge or human excreta which is permitted under this subdivision shall be pursuant to a permit issued by the New York State Department of Environmental Conservation or New York State Department of Health as appropriate.

(4) Solid Waste Management Facilities. Solid Waste Management facilities may be established or operated pursuant to a valid permit, regulatory exemption, or other authorization issued by the New York State Department of Environmental Conservation.

(5) Animal Waste Storage. Areas utilized for the storage or stockpiling of manure and agricultural associated animal waste shall be constructed and maintained such that seepage, leachate or runoff from storage or stockpiling of animal waste cannot adversely impact the quality of the groundwater or surface water.

(6) Hazardous Material. Storage, use and disposal of hazardous material are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation, New York State Department of Health or other agency having jurisdiction.

(7) Radioactive Material. Storage, use, or disposal of radioactive material are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation, New York State Department of Health and other state or federal agencies having jurisdiction.

(8) Fertilizer and Manure Use:
(i) open storage of fertilizers for non-farm and non-residential use is prohibited;
(ii) agricultural use of fertilizers and land application of manure shall be in conformance with best management practices as developed by the New York State Department of Environmental Conservation as included in "Controlling Agricultural Nonpoint Source Water Pollution in New York State - A Guide to the Selection of Best Management Practices to Improve and Protect Water Quality," dated 1991, and included as Appendix C of these rules; and
(iii) fertilizers for nonfarm and non-residential usage shall not be applied in a manner or at rates which would contaminate the Village water supply.

(9) Pesticide, including Herbicide, Use:
(i) all pesticide, including herbicide, storage, application and use shall be subject to approval and enforcement authority of the New York State Department of Environmental Conservation;
(ii) disposal of pesticides, including herbicides, other than those uses set forth in subdivision (f)(9)(i) of this section, is prohibited unless approved by the New York State Department of Environmental Conservation;
(iii) disposal of water used for make-up water or for washing of equipment is prohibited except pursuant to an authorization issued by the New York State Department of Environmental Conservation; and
(iv) use of streams for make-up water or washing of equipment used in conjunction with pesticides and herbicides is prohibited.

(10) Petroleum Storage:
(i) aboveground or underground petroleum storage tanks shall be installed, operated and maintained as required by Environmental Conservation Law Sections 17-0303 and 17-1001 et seq; and
(ii) abandoned petroleum tanks are subject to the closure requirements of 6 NYCRR, Section 613.9.

(11) Stockpiles:
(i) storage of chloride salts is prohibited except in structures designed to minimize contact with precipitation and constructed on low permeability pads designed to control seepage and runoff; and
(ii) storage of coal is prohibited except in structures designed to minimize contact with precipitation and constructed on low permeability pads designed to control seepage and runoff.

(12) Chloride Salt Application. Deicing chloride salt use is restricted to a minimum amount needed for public safety.

(13) Construction and Closure of Wells:
(i) oil and gas well construction, maintenance and abandonment are subject to the approval and enforcement authority of the New York State Department of Environmental Conservation; and
(ii) water supply well construction, maintenance and abandonment are subject to the approval and enforcement authority of the Dutchess County Department of Health and the New York State Health Department as set forth in the standards and procedures contained in Part 5-1.22 of the State Sanitary Code and the New York State Department of Environmental Conservation under 6 NYCRR, Part 601.
(14) Cemeteries. All cemeteries shall be operated to prevent contamination of the public water supply.

(15) Sediment Generation:

(i) farm tillage practices shall be in conformance with best management practices as developed by the New York State Department of Environmental Conservation included in "Controlling Agricultural Nonpoint Source Water Pollution in New York State - A Guide to the Selection of Best Management Practices to Improve and Protect Water Quality", dated 1991, and included as Appendix C of these Rules; and

(ii) land disturbing activities which may result in the deterioration of the quality or quantity of the public water supply source including general construction, highway construction, access road construction and maintenance are prohibited except where remedial measures have been put in place to minimize erosion and sediment production.

(g) INSPECTIONS:

The officials of the Village of Millbrook, or any persons charged with the maintenance or supervision of the public water supply system by its officers or their duly appointed representative, shall make regular and thorough inspections of the identified protection zones to ascertain compliance with the rules and regulations set forth in this section. It shall be the duty of the aforesaid officials to cause copies of any rules and regulations violated to be served upon the persons violating the same, together with notices of such violations. If such persons served do not immediately comply with the rules and regulations, it shall be the further duty of the aforesaid officials to promptly notify the Commissioner of Health or his designee of such violations.

The aforesaid shall report to the State Commissioner of Health in writing annually, prior to the 30th day of January, the results of the regular inspections made during the preceding year. The report shall state the number of inspections which were made, the number of violations abated and the general conditions of the protection zones time of the last inspection.

(h) VARIANCES:

(1) The Commissioner of Health, or his authorized representative, may, upon written application from the owner, operator, or person in charge of a site, grant a variance from the requirements of these regulations, provided that a variance may only be granted if the regulated activity, alone or cumulatively with any other proposed activity, will not cause the contamination or degradation of the water supply. The issuance of a variance shall not authorize any use or extension of use in Zones I, II, III for which a permit is required by any local, state or federal authority, but shall authorize the filing of a permit application.

(2) An application for a variance must:

(i) include the applicant’s name, address, and his interest in the subject property; and the owner’s name and address if different from the applicant;

(ii) include the owner’s signed consent to the application if made by any person or entity other than the owner of the site;

(iii) include the street address and legal description of the subject site;

(iv) include a sketch plan illustrating all proposed site alterations, all structures existing on site, the existing uses and zoning of adjacent parcels, site contours and drainage patterns;

(v) demonstrate that the regulated activity will not cause an increased risk of contamination or degradation of the water supply;

(vi) identify the specific provision of these Rules and Regulations from which the variance is sought;

(vii) demonstrate that due to conditions unique and peculiar to the applicant’s situation, compliance with these Rules and Regulations would be unduly burdensome or result in substantial hardship that cannot be otherwise mitigated;

(viii) demonstrate that any undue burden or substantial hardship was not created by the applicant, and cannot be avoided except by a variance;

(ix) demonstrate that alternatives to the regulated activity have been considered and that there is no available alternative which would not require a variance;

(x) demonstrate the regulated activity as proposed includes adequate mitigation measures to justify such variance; and

(xi) be submitted to the supplier of water and the Commissioner.
(3) Review by the Supplier of Water. Within ninety (90) days of the receipt of an application for variance, the supplier of water shall make a written recommendation to the Commissioner as to whether the applicant has met the standards for a variance. In order to make its recommendation, the supplier of water may request additional information from the applicant. The supplier of water may also hold a public hearing on the application, upon thirty (30) days notice. The supplier of water’s written recommendation shall be forwarded by the supplier of water to the Commissioner and served on the applicant.

(4) Decision of the Commissioner:

(i) The Commissioner or his authorized representatives may solicit the views of the supplier of water on a variance application. After reviewing the application and any recommendations provided by the supplier of water, the Commissioner will render a decision to grant, grant with conditions or deny a variance application; The requirements of subdivision (h)(2) of this section shall be used as the basis for each decision. The Commissioner may hold a public hearing on the application, if deemed necessary, to seek further information prior to rendering a final decision;

(ii) The Commissioner shall impose such conditions as he or she may deem necessary or prudent to preserve the quality of the water supply. All conditions shall be expressly set forth and the reasons for such conditions specified. Violations of the conditions of a variance shall be a violation of these Rules and Regulations;

(iii) The issuance of a variance from a requirement imposed by this section shall not act as a variance from any regulation or requirement of any other federal, state or local agency, or any other regulation or requirement of the Department of Health; and

(iv) In granting a variance or a conditioned variance, the Commissioner may require financial security, impose time limitations or limit transfer of the approval.

(v) Remedies for Violation: Remedies for violation of these rules and regulations shall be those specified by Sections 1102 and 1103 of the Public Health Law.

Appendix A: Village Of Millbrook - Watershed Protection Zone Map, April 1992

Appendix B: Millbrook Watershed Inventory And Census Summary, Revised 1992


Text of proposed rule appendices, the regulatory impact statement, and the regulatory flexibility analysis, if any, may be obtained from: Donald MacDonald, Department of Health, Bureau of Management Services, Corning Tower, Room 2230, Empire State Plaza, Albany, NY 12237, (518) 474-8734.

Data reviews or arguments may be submitted to: Same as above.

Revised Regulatory Impact Statement:

The proposed Watershed Rules and Regulations for the Village of Millbrook, originally published on July 29, 1991, have been revised based on public comments. Numerous changes were made to clarify the proposed regulations, provide consistency between zone requirements, provide consistency with existing Environmental Conservation Law (ECL) terminology, allow for more implementable and enforceable regulations and to more clearly identify the zone relationships.

The following are the subdivisions which were revised and the reasons for making the changes:

- (a) Application - The term “wells” was replaced by “source” and the map accompanying the regulations will now be referred to as the Watershed Protection Zone Map, dated April 1992.
- (b)(2) Aquifer - definition modified to more accurately reflect hydrological conditions.
- (b)(3) Zone II is now referred to as Water Supply Protection Area and will not have a “-G” suffix. The new definition will be found in (b)(34).
- (b)(3) Chloride salt - the phrase “excluding liquid chlorides” and the second sentence was deleted to clarify intent.
- (b)(5) Toxic substance was dropped from the definition of disposal.
- (b)(7) Artificial was dropped from the definition of fertilizers.
• (b)(8) The word “average” was deleted from the definition of flood plain.
• (b) (10) Hazardous waste was changed to hazardous material for consistency.
• (b)(14) The definition for linear distance was deleted.
• (b)(16) A new definition was added for open storage to provide clarification.
• (b)(20) The original definition for petroleum was deleted.
• (b)(20) The definition of protection zones was revised to emphasize watershed zones rather than groundwater management zones. The zones will now be I, II, and III as opposed to I-G, II-G, and III-G.
• (b)(21) Radioactive material - definition modified to provide consistency with ECL terminology.
• (b)(27) The definition for sewage system cleaner was deleted.
• (b)(28) The word “accidental” was dropped from the definition of spill.
• (b)(30) The definition of stormwater recharge basin was revised to provide clarity.
• (b)(34)-(35) The original definitions for stream and storage were deleted as being unnecessary.
• (b)(31) The definition of Supplier of Water was modified to reference the the term watershed protection zones.
• (b)(37) The original definition for toxic substance was deleted to provide consistency with ECL terminology.
• (b)(34) Water Supply Protection Zone is the new definition/term used for Zone II and replaces the original (b)(3) definition.
• (b)(35) Watershed Protection Zone is a new definition/term used for Zone III and replaces the original (b)(40) definition.
• (b)(37) The definition of watercourse was modified to provide clarity by dropping the term of any kind.
• (b)(38) The definition of watershed was modified to reference the three protective zones. The suffix -G is dropped from the numerical zone designations to clarify the groundwater/surface water interrelationship.
• (b)(40) The definition for the term well head was dropped and included in the definition for Well Head Protection Zone. This Zone is now referred to as Zone I.
• (b)(47)-(49) The original subdivisions naming the protection zones were deleted and incorporated into the specific zone definitions in (b)(34), (b)(35) and (b)(40).
• (c)(1) The last clause of this provision was deleted as being unnecessary.
• (c)(2) The Zones are now referred to as Zone I, II, and III.
• (c)(3) The inventory and census is now required every five years and the listing of what elements should be included in this update has been dropped as being unnecessary.
• (c)(4) A new subsection was added for reporting accidental spills. The comparable sections in (e) and (f) were deleted.
• (d) The new reference to Zone I is noted, with the suffix -G deleted.
• (d)(3) The first two sentences dealing with Part 5-1.22 compliance and protection of the area have been dropped as being unnecessary.
• (e) This Zone is now referred to as Zone II.
• (e)(iii) - (iv) These original subsections were deleted as being unnecessary or confusing.
• (e)(v) Deleted and incorporated into (e)(i).
• (e)(2) Modified to more properly reference NYSDEC authority and to except stormwater runoff from prohibition within this section.
• (e)(3) Disposal was changed to land application.
• (e)(4) The phrase “operated pursuant to a valid permit, regulatory exemption” or other authorization by the State Department of Environmental Conservation” has been added.
• (e)(5) This section is now referred to as animal waste storage. The last sentence has been deleted as being unnecessary.
• (e)(6)(i)(ii)(iii) Toxic substance was deleted to conform to ECL terminology- In addition, (e)(iii) was deleted as being unenforceable.
• (e)(7)(ii) and (iii) These sections were deleted as being unenforceable.
(e)(6)(ii) The phrase "... the water source or present a threat to the consumer" has been dropped. The terms non-farm and non-residential are used throughout to provide consistency.

(e)(9)(ii) Revised to appropriately reference those activities in (e)(9)(i).

(e)(9)(iii) Exceptions to the prohibition are provided pursuant to NYSDEC authorization.

(e)(10)(i)(ii) and (iii) The term chemical and chemical storage tanks were deleted to conform to ECL terminology.

(e)(12) This section is now referred to as chloride salt application. In addition, (e)(12)(ii) is deleted.

(e)(13)(ii) Reference is now made to 6 NYCRR, Part 601.

(e)(15)(ii) The term minimize was changed to prevent to clarify intent.

(f) This Zone is now referred to as Zone III.

(f)(1)(iii) and (iv) have been deleted.

(f)(3)(i) and (ii) Storage or disposal was changed to land application.

(f)(4) will now read "... are permitted under this subdivision pursuant to a valid permit, a regulatory exemption, or other authorization by the New York State Department of Environmental Conservation".

(f)(5) This section was modified and now conforms to the same requirements of Zone II.

(f)(6) Hazardous waste and toxic substance has been changed to hazardous material.

(f)(8) The subsection now pertains to both fertilizer and manure use. The same NYSDEC document referenced in (e)(15) is also referenced in this subsection for best management practices.

(f)(10) Chemical storage was dropped.

(f)(11) The original accidental spill section was moved to section (c).

(f)(12), (13), (15) Revisions were made to correspond with those made in section (e).

(h) Variances - a new section was added providing extensive procedures for reviewing and granting variances.

Statutory Authority

Public Health Law, Section 1100 authorizes the Department of Health to make rules and regulations to protect public water supplies from contamination.

Legislative Objectives

These regulations are for the protection of water supply source(s) for the Village of Millbrook. Limiting distances for different activities which could contaminate the sources are set forth in the regulations.

Needs and Benefits

The regulations protect the source of the public water supply serving the Village of Millbrook. Different activities on the watershed, which may result in the contamination of the source(s), are restricted or prohibited by these regulations. Limiting distances for different activities which could contaminate the source of the public water supply serving the Village of Millbrook are set forth in the regulations.
COSTS

Costs to State Government

The Department estimates an expenditure of approximately 1 to 5 mandays may be incurred in the regulatory review process if otherwise permitted facilities are restricted or prohibited by these regulations. However, no permit applications for such facilities have been made as of this date. One manday may also be expended annually to review and evaluate variance applications. The Region 3 Office of the NYSDEC may experience an increased workload within its ongoing environmental protection program as a result of enhanced surveillance and inspections of the watershed by the Supplier of Water.

Costs to Local Government

The Village of Millbrook may incur costs associated with the required watershed inspections of approximately 5 to 10 person-days per year. In addition, 1-5 mandays may be expended by the Supplier of Water review and evaluate variance applications. It will also cost about $250 to publish the rules in the local newspaper. Significant costs have been incurred for professional services to draft and implement these regulations.

The Department estimates that the Town of Washington may incur additional costs in road repair and maintenance and also in the already required closure of its existing landfill. The annual cost increment to the local highway department would be less than $1,000 per year.

Cost to Private Regulated Party

The supplier has investigated the potential costs to private regulated parties and has determined that there is no immediate upgrade requirements for existing facilities. In the future it is possible that some additional costs may be incurred by some regulated parties due to compliance with regulated activities or to seek a variance. Although the exact cost cannot be determined with precision due to the speculative nature of the possible compliance actions, the Department estimates that the cost would potentially range between $100 to $1,000 for compliance.

Cost to the Department for Implementation and Continued Administration of the Rule

No new cost would result. Implementation of these regulations would be part of ongoing program responsibility.

Paperwork

The water supply officials are required to keep yearly records of the number of watershed inspections made, number of violations found, number of notices served and number of violations abated. A brief report must be submitted to the Department report must be submitted to the Department summarizing these efforts. One manday will be expended compiling this data. No additional paperwork would be required by regulated parties as a result of these proposed regulations. These records are to be submitted to the State Commissioner of Health in the month of January of every year.

Local Government Mandates

The implementation of this regulation will require the Village of Millbrook to conduct annual inspections in the various protective zones, prepare inspection reports, describe and cite violations and prepare an annual summary report to the Commissioner of Health.

Duplication

This rule does not duplicate requirements of other existing State or Federal regulations. The intent of this regulation is to supplement existing State and Federal regulations with the particular Millbrook. When possible, the ECL was utilized and referenced in the text of this regulation.
The “No Action” alternative exists for protecting the Village of Millbrook’s public water source. This alternative relies primarily on the existing State regulations for protecting water resources statewide. The No Action alternative does not recognize the distinct and unique characteristics of the Village of Millbrook’s watershed and does not protect against the possible threats to the Village’s water supply source. It is therefore considered an inferior option for this particular setting.

The use of zones of protection in watershed rules and regulations enables a community to focus on the primary threats to its water supply in each zone, based on technically sound principles. Since a watershed or aquifer may not be fenced to municipal boundaries, it is for Supplier of Water to adopt specific regulations for its specific source.

There are no alternatives to the imposition of limitive distances for water contaminants or to the limitations on activities which could contaminate the water supply. The distances selected, where used, were deemed the shortest allowable consistent with the public health.

Example Two

Proposed Rules and Regulations from Citizens Campaign for the Environment V

SECTION 100: GOALS AND OBJECTIVES OF WATERSHED RULES AND REGULATIONS

100.1 GOALS

The goal of Watershed Rules and Regulations is to provide the highest possible protection for the source and quality of public water supplies in Special Groundwater Protection Areas.

100.3 OBJECTIVES

The objectives are designed to achieve the goal of Watershed Rules and Regulations. WR&Rs should be consistent with and complimentary of the policies of the SGPA Plan. WR&Rs are written as a document to be implemented by the individual water utility. The objectives reflect the responsibilities and interests of the implementing entity. The following objectives are recommended for SGPA:

100.3.1 To define zones of management and protection around wells within or proximate to SGPA in order to insure the highest possible protection of the groundwater quality produced by the wells. Four zones are proposed.

100.3.2 To define the types of compatible or incompatible activities for areas of protection within SGPA in general and around well heads specifically.

100.3.3 To integrate, support, and augment the enforcement of existing statutes, codes and regulations designed to regulate contaminating activities and protect groundwater quality.

100.3.4 To prepare and implement programs designed to work with those facilities that may pose a risk to water quality due to the use, handling and/or storage of toxic and hazardous materials thereby reducing the likelihood of their introduction into the aquifer. Such programs shall be designed to:

(a.) alert landowners, citizens, commercial and industrial enterprises of the legal regulations and/or restrictions on specific landuse, chemical use and disposal activities as well as the threat they pose to SGPA and to specific well sites; and

(b.) provide informational and professional assistance to those enterprises which, in the course of operations, must handle products that, if introduced into the aquifer, could degrade the groundwater.

100.3.5 To establish strict performance standards for the use of, handling, storage, and/or disposal of toxic and/or hazardous materials and to identify the location of facilities which use such materials so as to preclude and/or minimize their introduction into the aquifer.

100.3.6 To establish specific groundwater quality goals that ensure the non-degradation of the groundwater quality within the SGPA and wellhead protection zones.
100.3.7 To emphasize the importance of non-point pollution controls in the SGPAs and within specific wellhead protection zones.

SECTION 200: DEFINITIONS

200.1 A Definitions Section is usually included in WR&Rs. An example of a Definitions Section is appended.

SECTION 300: GENERAL REQUIREMENTS TO BE APPLIED WITHIN SGPAs

Most WR&Rs have a Section which presents General Requirements or Prohibitions that are applied uniformly across the watershed.

The following provisions are recommended:

300.1 GENERAL PROHIBITIONS

No person, corporation, or public entity, including Federal or State agencies or any political subdivision thereof, shall perform any act or grant any permit or approval which may result in the contravention of standards for water quality. The following regulations and their authorizing legislation are incorporated into this Article:

1. 10 NYCRR PART 170 (Source of Water Supply)

2. 10 NYCRR PART 700-705 (Water Quality Regulations)

3. 10 NYCRR PART 5 (Drinking Water Standards or any subsequent revisions to or replacement thereof)


5. 10 NYCRR PART 75 (Individual Water Supply and Individual Sewage Disposal Systems)

6. 6 NYCRR PART 326 (Restricted Pesticides)

7. 6 NYCRR PART 360 (Solid Waste Management Facilities)

8. 6 NYCRR PART 371-374 (Hazardous Waste)

9. 6 NYCRR 700 - 705 (Water Quality Regulations for Surface Waters and Groundwaters)

10. 6 NYCRR PART 750-757 (SPDES)

11. Suffolk County Sanitary Code, Article 4 (Water Supply)

12. Suffolk County Sanitary Code, Article 7 (Water Pollution Control)

13. Suffolk County Sanitary Code, Article 12 (Toxic and Hazardous Materials Storage and Handling Controls)

14. Nassau County Sanitary Code, Article 6 (Drinking Water Supply)

15. Nassau County Sanitary Code, Article 10 (Special Groundwater Protection Areas)

16. Nassau County Sanitary Code, Article 11 (Toxic and Hazardous Materials Storage, Handling and Control)
300.1.3 Where there may be a conflict or difference in requirements among the regulations cited, either here or in any other sections of this article, the most stringent requirements shall control.

300.1.5 The Suffolk County Sanitary Code, Article 6 (Realty Subdivisions) is not to be applied in SGPAs with respect to the averaging of contaminant loadings. Averaging of discharge loading's over the entire development site, as permitted by Article 6, is expressly prohibited in SGPAs. For SGPAs, the loading impact of a discharge is to be analyzed and calculated at the point of discharge only.

300.3 SPILLS

300.3.1 Spills of gasoline, petroleum products, hazardous, toxic, or flammable substances in excess of 10 gallons shall, in addition to being reported to the local department of health and the NYS-DEC, also be reported to the water utility in a timely manner.

(a.) All well fields within SGPAs shall have signs which provide information regarding prohibitions and regulations, including the procedure for notifying the water utility in case of spills or other emergencies.

300.5 SEWAGE TREATMENT PLANTS

300.5.1 No new Sewage Treatment Plants (STPs) shall be permitted within the SGPAs unless the STP discharges its effluent outside the SGPA.

300.5.2 No private STP shall be permitted, repermitted or expanded which is not incorporated under the Transportation Corporation Act (Article 10).

300.5.3 All existing STPs within SGPAs shall be notified that they are located within a SGPA and sent a copy of the WR&Rs. No STP within a SGPA may continue to operate in violation of the WR&Rs.

300.7 UNDERGROUND BULK TRANSPORTATION PIPELINES

300.7.1 New underground pipelines for the bulk transportation of hazardous/toxic/flammable substances shall be prohibited within SGPAs.

300.7.2 Existing underground bulk transportation pipelines within SGPAs shall have a monitoring and maintenance program which shall be submitted to and approved by the water utility. The monitoring program shall utilize state-of-the-art vapor or groundwater monitoring equipment and technology. The entire length of the pipeline route which occurs within a SGPA shall be inspected for escaping product at least once annually using the methodology specified in the monitoring and maintenance program.

300.9 BULK STORAGE FACILITIES

300.9.1 New Bulk Storage Facilities for hazardous/toxic/flammable chemicals are prohibited with SGPAs.

300.11 SANDMINING AND CONSTRUCTION AND DEMOLITION DEBRIS DISPOSAL

300.11.1 New sandmining sites shall be prohibited within SGPAs.

300.11.2 New Construction and Demolition (C&D) disposal sites shall be prohibited within SGPAs.

300.11.3 Expansions of existing sandmining or C&D sites shall be prohibited within SGPAs.
300.13 WASTEWATER DISPOSAL

300.13.1 Any sanitary/industrial waste discharge of more than 1,000 gallons per day (GPD) shall be considered a major significant discharge as per US-EPA and NYS-DEC policy, requiring a SPDES permit, monitoring and enforcement as a major discharge. Under no circumstances can a point source discharge of 1,000 GPD or more be granted a waiver or permitted to discharge without a valid SPDES permit.

300.15 ENFORCEMENT

300.15.1 Any person, corporation or governmental entity may bring suit in the Supreme Court of New York to enforce the provisions of this Article.

300.17 SEVERABILITY

300.17.1 If any part of this Article is found to be illegal or unconstitutional, the remaining provisions of the Article shall remain in full force and effect.

SECTION 400: WELLHEAD PROTECTION ZONES FOR WELLS WITHIN SGPAs

400.1 SHALLOW WELLS

For Shallow Wells within SGPAs (shallow wells meaning the well is screened in an unconfined aquifer), three zones of protection shall be defined and mapped in addition to the general SGPA boundaries.

(1.) ZONE I shall be designated as the Zone of Maximum Control (ZOMC). The ZOMC shall extend out around the well for a minimum radius of 200 feet, which is consistent with recommendations of the NYS Wellhead Protection Program (approximately 3 acres). Ideally, a larger site should be acquired as is recommended by the Suffolk County Comprehensive Water Resources Management Plan, e.g., ten acres.

The water utility shall have fee-simple title or covenanted easement when the land is publicly held, to this area.

(2.) ZONE II shall be designated as the Zone of Influence (ZOI). The ZOI shall be that area around each wellhead out to the one-foot draw down point on the water table surface at equilibrium when the well is in use.

(3.) ZONE III shall be designated as the Zone of Contribution (ZOC). The ZOC shall be defined by one of two methodologies depending on the water table gradient:

(a.) For flat/nearly flat* water table gradients, the ZOC will be defined as an area where recharge equals the authorized rated capacity of the well given a specified rate of recharge; or

(b.) For areas of steeper* gradient, the ZOC shall be determined by the Uniform Flow Equation. This will define a parabolic-shaped area extending out from the well in the direction of groundwater flow. It will point toward the groundwater divide. For management purposes, this area can be limited by a specific time of travel. A ten-year time of travel is recommended.

*note: the final version of WR&Rs shall give the technical delineation and details of these terms.

(4.) ZONE IV shall be the area known as the Special Groundwater Protection Area (SGPA)

The relevant regulations and recommendations from the SGPA Plan shall be applied to this zone and incorporated into this Article. It is assumed that special provisions for Zones I, II, and III shall be either more restrictive or additive to those of Zone IV.
Deep Wells

For Deep wells within SGPAs (i.e. all those remaining wells not defined as shallow), two wellhead Zones shall be designated: ZOMC and SGPA.

The ZOMC shall be a 200-foot radial area around the wellhead over which the water utility has maximum control through fee-simple absolute or covenanted easement.

The relevant requirements and recommendations contained within the SGPA Plan for that area outside the ZOMC shall be designed and intended to provide adequate protection for the deep wells.

Mapping the Zones

The water utility shall identify and map the zone boundaries for each shallow well inside a SGPA as well as each shallow well which has some part of Zone I, II, or III within a SGPA. It shall also map the location and ZOMC for each deep well within the SGPA.

Risk Analysis Within the Zones

The water utility shall identify and map all activities within Zones I, II, and III which have the potential to place the water supply well at risk. The types of activities which should be inventoried are listed in Section 500.

All identified potentially contaminating facilities (PCFs) shall be notified that they have been so identified as being within Zones I, II, or III and the specific well/s that they have been identified for.

The water utility shall provide a map locating each well, its wellhead protection zones and all PCFs and their locations as well as the WR&Rs to each municipality within the utility’s service area which contains part or all of a SGPA.

The water utility shall review proposals for projects within any part of a SGPA which has the potential to degrade groundwater quality or exceed water quality goals. Comments shall include a review for consistency with the WR&Rs and the SGPA Plan. Comments shall be submitted to the jurisdiction which is administering the proposal or considering the granting of a permit associated with the project.

New Wells

New wells sited in SGPAs shall be shallow wells unless the site specific conditions of the aquifer hydrology preclude it.

Special Cases

Special cases where Zones I, II, or III extend beyond the SGPA boundaries shall be considered and addressed on a case-by-case basis.

Where the delineation of the ZOI and ZOC for the down-gradient area of the well are identified so that the ZOC falls inside the ZOI, the ZOC boundary shall serve as the down-gradient boundary for both the ZOI and ZOC.
SECTION 500: SPECIFIC REGULATIONS APPLIED TO EACH WELLHEAD ZONE

500.1 ZONE I: ZONE OF MAXIMUM CONTROL (ZOMC)

500.1.1 For each wellhead, the water utility shall possess fee-simple absolute title or covenanted easement to the land within a minimum of 200 radial feet around the wellhead.
   (a.) For multiple wellheads within the same well field, the 200-foot radial areas should not overlap.
   (b.) For existing well sites within SGPA.s which do not meet this minimum requirement, the water utility shall attempt to gain full control over the ZOMC where and when opportunities are available.
   (c.) New well sites shall not be established on existing sites that do not provide a non-overlapping 200-foot radius of protection.

500.1.2 The use of fertilizers, herbicides, pesticides, sodium chloride or similar deicing chemicals, or any other potentially contaminating chemical applications to the land, air, fauna or flora are prohibited.

500.1.3 Within the ZOMC, any new or expanded activity, system, or facility (except for the physical pumping, treatment, controls and access facilities associated with water supply production) is prohibited without the express approval of the water utility.

500.1.4 The approval, construction or placement of a new on-site sanitary waste disposal unit or its associated leaching fields or a receptacle of any kind for either the temporary storage or permanent disposal of human sanitary waste is prohibited.

500.1.5 For existing activities, facilities or systems (i.e. those in existence at the time of adoption of this Article) that would be prohibited if new, the following regulations shall apply:
   (a.) The facility owner/operator shall be notified that they are within the ZOMC of a specific well site which should be identified by location, name and number.
   (b.) A copy of the Watershed Rules & Regulations shall be provided to them.
   (c.) Any facility storing or selling gasoline or petroleum products and which is subject to regulation by the County Weights and Measures Department for such sale shall receive a copy of the WR&R's annually at the time of inspection by the Department of Weights and Measures.
   (d.) Any facility which is a customer of the water utility shall have their identity as being in a ZOMC noted on the utility's customer data base. Additional relevant information regarding the PCF shall also be kept.

500.1.6 The water utility shall create a program to actively cooperate with and educate the facility owner/operator about the appropriate laws, rules and best management practices that will minimize the threat to the water supply represented by these facilities.
   (a.) If the facility owner/operator refuses to cooperate or participate in this program, the water utility shall require the facility owner/operator to install a monitoring well between the adjacent public water supply well and the facility, at the owner's expense.
   (b.) The details of monitoring well installation and regulation shall be the same as those required in Section 500.2.
   (c.) The test results shall be compared with the ambient water quality goals for the ZOMC to determine whether a violation of the WR&R's has occurred. A further examination of the suspect site shall be conducted to determine if the PCF is the cause of the violation.

500.1.7 The ambient water quality goals for the ZOMC shall be the highest attainable drinking water quality. This shall mean levels of indicator contaminants like nitrates shall be less than 1 ppm. Volatile organics and similarly regulated chemicals shall be non-detectable. A detailed list of constituents and quality goals shall be listed in the appendix.

500.1.8 In general, no person, corporation, partnership, governmental entity or agency shall place, discard, dispose or store any substance or undertake any action or activity which is likely to result in a violation of water quality standards, water quality goals, regulations or laws contained in section 300 or cause a water supply well to exceed federal or state drinking water standards or pose a public health threat.
500.3 ZONE II: ZONE OF INFLUENCE (ZOI)

500.3.1 The water utility shall identify and map the ZOI for all shallow wells regulated by this article.

500-3.2 The following types of Potentially Contaminating Facilities or Activities (PCFs) should not be sited within the ZOI as new facilities:

1. Gasoline or service stations
2. Automotive repair facilities
3. Dry cleaning establishments
4. Chemical or petroleum bulk storage facilities
5. Solid waste management facilities
6. Sand mining or C&D disposal operations
7. Hazardous waste collection or transfer operations
8. On-site waste water disposal units for residential buildings built on less than a 5-acre lot
9. On-site waste water disposal units for discharging more than 1,000 gallons per day
10. Private Sewage Treatment Plants (STPs)
11. Municipal STPs which discharge inside the SGPA
12. Sod Farms
13. Salt Piles
14. Radioactive materials handling operation
15. Establishments which are served by an on-site waste water disposal unit and which use toxic and/or hazardous chemicals. Such establishments shall include but not be limited to:
   - photo processing facilities
   - electronics/electroplating shops
   - furniture refinishers
   - paint distributors
   - paint shops
   - printers
16. Home heating tanks storing less than 1100 gallons which do not meet the standards for tanks storing more than 1100 gallons.

500.3.3 The water utility shall identify all potentially contaminating facilities (PCFs) listed in 500.3.2 above which exist within the ZOI at the time of adoption of this article as well as those which occur within the ZOI in the future. The list of PCFs shall be kept as current as possible.

(a) All PCFs shall be notified that they have been so identified and advise them of the wells and ZOIs they are within. They shall also receive a copy of the WR&Rs

500.3.4 PCFs identified in 500.3.3 above shall be regulated by the following requirements:

(a) They shall be considered a non-conforming use within the context of this article.
(b) They must be in conformance with local zoning regulations or have a valid waiver as a non-conforming use.
(c) They must be in compliance with all applicable statutes, regulations and codes.
(d) They cannot expand by more than 20 percent or change from one category of PCF to another as listed in 500.3.2 without first notifying the water utility of their plans. If a local permit or approval is required, the PCF must give the water utility 30-days notice prior to applying for such permit or approval.

500.3.5 All PCFs shall permit the water utility access to inspect the facility for compliance with the WR&Rs.

500.3.6 All PCFs shall participate with the water utility's Chemical Source Reduction and Education Program. If the PCF refuses or fails to participate in the Chemical Source Reduction and Education Program, the PCF shall be required to install a monitoring well between their facility and the water utility well related to the ZOI the PCF is within.

500.3.7 For those PCFs which are required to install monitoring wells, the following requirements shall apply:

(a) Monitoring wells shall be at the owner's expense.
(b.) Where a leak, spill, accident or other potentially contaminating incident is being investigated or remediated, information shall be provided to the water utility in a timely manner, if the effects have migrated beyond the owner’s property.

(c.) Where no leak, spill, etc. is known, semi-annual testing shall be required for the presence of all toxic/hazardous chemicals used, stored or sold by the facility.

(d.) The water utility and the local department of health shall identify the chemicals to be tested for.

(e.) Results of testing shall be provided to the water utility and the local department of health in a timely manner and shall be available to the public from these entities upon request.

(f.) The water utility reserves the right of access to monitoring wells for independent inspection and testing.

(g.) The exact location and depth of the monitoring well/s shall be approved by the water utility and the information shall be kept by the water utility as part of its WR&Rs data base.

(h.) The monitoring well/s shall be designed, constructed and operated in such a manner so as to provide the most likely indication of a leak, spill, accident, etc. which could affect the ZOI well.

(i.) Test results from the monitoring well/s shall be compared with the ambient water quality goals for the ZOI to determine whether a violation of the WR&R has occurred. A further examination of the suspect site shall be conducted to determine if the PCF is the cause of the violation.

500.3.8 Any PCF which is a customer of the water utility shall have their identity as being in the ZOI noted on the utility’s customer data base. Additional relevant information regarding the PCF shall also be kept.

500 3.9 All Sewage Treatment Plants (STPs) within the ZOI shall be required to install monitoring wells as outlined in 500.3.7 above, regardless of their participation in a Chemical Source Reduction and Education Program.

(a.) Each STP shall meet all specifications of its SPDES permit. Notification of any violations shall be provided to the water utility in a timely manner.

(b.) The water utility reserves the right to discontinue water supply to the STP after four SPDES violations. Additionally, the water utility reserves the right to increase the schedule of monitoring to a STP which is violating the SPDES permit.

(c.) The water utility may levy a surcharge on water used by the STP if the STP is a water utility customer. The surcharge shall be fixed at a specific percentage rate of the metered gallons per day of waste water flowing through the STP. The surcharge may remain in effect as long as the STP is not in compliance with the SPDES parameters. All the funds collected by this means shall be placed in a special account of the water utility for Wellhead Remediation and Source Reduction Programs.

(d.) The water utility must be notified of any intent to expand an existing STP.

500.3.10 The use, application or disposal of toxic, hazardous, flammable, contagious, or infectious substances to the land or subsurface which would result in the exceedence of water quality goals for the ZOI or represent a public health threat is prohibited.

500.3.11 The Water Quality Goals for the ZOI shall be:

(a.) Nitrates not to exceed 1 ppm.

(b.) VOCs and similarly regulated chemicals, 1 ppb.

(c.) A detailed list of constituents and quality goals shall be listed in the appendix.

500.3.12 The water utility shall work with and encourage municipalities to use performance standards and other tools to assure that the water quality goals are maintained in the ZOI.

500.5 ZONE III ZONE OF CONTRIBUTION (ZOC)

500.5.1 The water utility shall identify and map the ZOC for all shallow wells regulated by this article.

500.5.2 The water utility shall identify all potentially contaminating facilities (PCFs) listed in 500.3.2 which exist within the ZOC at the time of adoption of this article as well as those which occur within the ZOC in the future. The list of PCFs shall be kept as current as possible.

(a.) All PCFs shall be notified that they have been so identified and advised of the ZOC they are within as well as the well-site name and location associated with the ZOC. They shall also receive a copy of the WR&Rs.
500.5.3 The water utility shall review all projects proposed for a ZOC. Where an opportunity for siting a non-conforming use outside the ZOC exists, the water utility shall recommend siting the project outside the ZOC. Non-conforming uses should be sited as far from the wellhead as possible.

(a.) The water utility shall make additional recommendations for a non-conforming use which are designed to ensure that the project achieves the water quality goals for the ZOC.

500.5.4 All non-conforming uses shall comply with provisions 500.3.4 through 500.3.9.

500.5.5 The use, application, or disposal of toxic, hazardous, or flammable substances to the land or subsurface which would result in the exceedence of water quality goals for the ZOC is prohibited.

500.5.6 The water quality goals for the ZOC shall be:

(a.) Nitrates, not to exceed 1 ppm.
(b.) VOCs and similarly regulated chemicals, not to exceed more than 50 percent of the MCL as set forth in Public Health Law, Part 5.
(c.) A detailed list of constituents and quality goals shall be listed in the appendix.

500.5.7 The water utility shall work with and encourage municipalities to use performance standards and other tools to assure that the water quality goals are maintained in the ZOC.

500.7 ZONE IV SPECIAL GROUNDWATER PROTECTION AREAS (SGPAs)

500.7.1 The LIRPB shall provide a detailed map of the SGPA boundaries to the water utility.

500.7.2 Land use, zoning and regulatory programs recommended within the SGPA Plan shall be strictly applied and enforced within this area.

500.7.3 Subwatersheds within SGPAs shall receive the highest possible protection for the siting of future water supply wells.

(a.) Clustering of any development within a subwatershed shall be prohibited unless the wastewater from such a development is collected communally and discharged outside of the SGPA.
(b.) Applications of all chemicals shall be prohibited within subwatersheds.
(c.) The water quality goals for a subwatershed shall be the same as those which apply to the ZOMC.

500.7.4 The water quality goal for the SGPA, other than a subwatershed, shall be:

(a.) Nitrates, not to exceed 1 ppm.
(b.) VOCs and similarly regulated chemicals, not more than 50 percent of the MCL as set forth in the Public Health Law, Part 5.
(c.) A detailed list of constituents and quality goals shall be listed in the appendix.

SECTION 600: ENFORCEMENT

600.1 INSPECTION AND ENTRY

The water utility may inspect any facility within the SGPA to ascertain compliance with the WR&Rs. The water utility may without fee or hinderance, enter, examine and survey all grounds, structures, monitoring wells, buildings and places within the SGPA to ascertain compliance.

600.3 NOTICE OF VIOLATION

In any case where the water utility has reason to believe that any provision of the WR&Rs has been or is being violated by any person, the water utility shall serve a notice of violation upon such person. The notice of violation shall state the nature and location of the violation, the particular provisions which the water utility alleges have been violated and the applicable penalties. Copies of such notice of violation shall be sent to the applicable state and local regulatory and enforcement authorities. The water utility may request the Department of Health to bring an enforcement action or may bring such action on its own.
600.5 PENALTIES

Penalties for violations of these regulations shall be recoverable in accordance with section 1103 of the Public Health Law. Penalties may be imposed for each day of which such violation continues. Such penalties shall be recoverable in a proceeding before any court having jurisdiction thereof.

600.7 CEASE AND DESIST ORDERS

In the case of a violation concerning an activity which involves a temporary or permanent source or act of contamination to the water supply, the water utility may, in addition to serving a notice of violation, order in writing any person(s) responsible for such violation to immediately cease and desist from such activity. Any further activity is prohibited until the requirements of the WR&Rs have been complied with.

600.9 SUMMARY ABATEMENT

If any person receiving a notice of violation and/or cease and desist order does not comply within 5 working days of such order with the provisions of the WR&Rs, the water utility may summarily abate or remove the cause of the violation, employing such force as may be necessary and proper, and seek reimbursement from the responsible person for costs incurred. Failure by the water utility to exercise the right of summary abatement shall not be deemed to be a waiver thereof, nor shall the remedy by abatement be construed to be exclusive.

600.11 COURT ACTION

The water utility may, in the case of a person failing to comply within 5 working days with a notice of violation and/or a cease and desist order, maintain an action in any court having jurisdiction thereof for the recovery of penalties and for an injunction restraining such person from continuing to violate these regulations. Where the water utility believes that a violation is creating an imminent threat to the water supply, it may immediately maintain such court action.

600.13 PRIVATE ACTIONS

Where the water utility or the Department of Health fails to enforce the WR&Rs, any person may bring an action in any court of competent jurisdiction to enforce the provisions of this article.