Request for Proposals
Water Quality Monitoring Program
Bid Opening Date: July 16, 2021

Project Abstract

The Town of North Stonington Water Pollution Control Authority is seeking proposals from qualified firms to implement a water quality monitoring program modeled on program initiated in 1976 that called for periodic sampling and testing of potential pollution sources to provide early warning signs of impending sewage problems. The WPCA seeks recommendations for additional sampling locations based on the actual development that has occurred since 1994 and that which is anticipated. The tasks detailed below include: reviewing past sampling locations and available test results; visual inspection, water sampling, and testing in original locations, and comparing results; providing recommendations for additional sampling locations based on development that has occurred and/or to establish baseline conditions, and providing an overall evaluation of results.

Project History

In 1994, the North Stonington Water Pollution Control Authority (WPCA) adopted a Water Pollution Control Plan for the stated purposes of (1) providing information and guidelines for ongoing inventory and monitoring of water quality and potential pollution sources so as to provide early warning signs enabling sewer avoidance, or to determine if sewers are required, and (2) provide information as to the workings of the North Stonington WPCA for the benefit of all concerned.

Specifically, the WPCA was given the responsibility of maintaining a continuous monitoring of conditions and activities which might be expected to endanger the purity of the Town's waters. The institution of a continuing program of water sampling was recommended to provide early indications of impending sewage problems, and the recommended bi-annual reports would revise, as appropriate, the population growth and density projections, industrial development projections and commercial development projections thereby providing early indications of sewer needs if required earlier than the year 2020 (the year projected in earlier reports).

Sampling of subsurface water was to be done on an as needed basis. In 1972, an initial survey of the town was conducted in order to determine if water pollution existed. Based upon the natural drainage characteristics of the land, the Town was subdivided into thirteen drainage districts. Sample sites were then chosen on the basis of current land use patterns. Eleven of the thirteen districts were studied. This same approach was followed in 1976, and results pointed to four potential sources of pollution that included Cedar Ridge, Kingswood/Meadowood, North Stonington Village and the 1-95 state rest area.

Some corrective action was taken and by 1976, the major problems in the Village had been resolved, but the status of the state Rest Area, Cedar Ridge and Kingswood/Meadowood areas remained unchanged. Cedar Ridge remained a significant concern as no improvements had occurred in the intervening four years.

As of the 1994 Plan, the WPCA had not updated the status of these potential problem areas and no further testing was done despite their objective to develop a water quality sampling and testing program that began with the resampling and testing of the initial sampling sites listed in the Sewer Authority's 1976 Report No. 2. The 1994 Plan also recommended additional testing in areas of known industrial, agricultural, residential (home occupation) and commercial operations identified as either not adequately evaluated in the past or

new to the town since 1976, areas around all major bodies of water in Town, and areas with existing or anticipated community sewage disposal systems.

The revised list of 44 Sampling Sites was included in the 1994 Plan (Appendix C).

The water quality sampling program was to be flexible enough to include testing of the following types of ground water:

- Public water supply well fields subject to the Connecticut Aquifer Protection Act (APA).
- Other public water supply fields which are not subject to the APA.
- Community water supply systems.
- Aquifers suitable and identified for future public water supplies.
- Areas of town where sewer avoidance is threatened.

Despite their good intentions, none of the objectives or actions identified in the Plan were implemented.

Between 1994 and 2020, the year the need for public sewers was anticipated, significant growth has occurred but not to the degree projected. A sewer district was established in the Exit 92 area on parcels in the Economic Development and Industrial Districts (See Map Appendix D). Despite the designated district, only AZ Electric and the CT DOT Rest Stop are connected to Public Sewer (private connection with Stonington) and no formal agreement with Stonington exists for further connections. The Hilltop Inn and Bellissimo Grand Hotel on Rte. 2 in the general Commercial Zone are each serviced by individual package treatment plants. All other parcels in town are serviced by on-site septic systems.

Recent interest in several large undeveloped parcels in the Economic Development District and Industrial Zone prompted a new Facilities Study in 2019. Development is expected to continue, and pressure from prospective businesses to provide public water and sewer are increasing. As such, the WPCA has concluded that the 1994 Plan must be updated to reflect the actual and anticipated growth and options for extending public utilities to the existing sewer district thoroughly explored. In 2017, the Commission approved the Map amendment to create the Resort Commercial District along the western end of Rte. 2 just prior to Foxwoods Resort Casino. The new zone consists of approximately 350 acres of formerly residential land, and allows larger mixed-use residential/commercial and recreational developments that will certainly require public water and sewer. The WPCA recommend establishing a new Sewer District in this Zone to me serviced by the extension of the existing MPTN system. No water sampling or testing has occurred in this area, and a baseline should be established.

Required Tasks

1. Review 1972 and 1975 Engineering Reports (Appendix A & B)
    a. Verify Drainage Districts (13)
    b. Verify 1972 Sampling Sites (36)
    c. Review the 1994 Plan revised list of sampling locations
2. Provide recommendations for additional sampling locations based on the list included in the 1994 Plan and development activity (actual and anticipated) since 1994.
3. Visual Inspection of Sampling Sites recommended
    a. Perform water sampling and testing
        - Specific Conductivity Sampling
        - E-coli MPN Survey
        - Millipore Survey
    b. Provide comparison with 1972 and 1975 Results
4. Establish and Identify Drainage Areas and New Sampling Sites in Resort Commercial Zone to establish a Baseline
    a. Provide map and Location description of any new drainage areas and sampling sites

b. Perform visual inspection of sampling site
c. Perform water sampling/testing
   - Specific Conductivity Sampling
   - E-coli MPN Survey
   - Millipore Survey
d. Evaluate results

Instruction to Bidders

1. Bid Submission
All bids are to be forwarded to the Selectmen's Office, 40 Main Street, North Stonington, CT 06359 by July 16, 2021 at 1:00 P.M. at which time and place the bids will be publicly opened and read.

2. Sealed Envelope: Bids must be submitted on the attached form and submitted in a seal envelope clearly labeled: **WPCA - Water Quality Monitoring Program.**

3. Minimum Insurance Requirements.

The selected contractor shall agree to maintain in force at all times during which services are to be performed the following coverage placed with a company(ies) licensed to do business in the State of Connecticut:

General Liability*	Each Occurrence	$1,000,000
	General Aggregate	$2,000,000
	Products/Completed Operations Aggregate	$2,000,000
Auto Liability*	Combined Single Limit	
	Each Accident	$1,000,000
Umbrella*	Each Occurrence	$1,000,000
(Excess Liability)	Aggregate	$1,000,000
Professional Liability	Each Occurrence	$1,000,000
	Aggregate	$1,000,000

A certificate of insurance naming the Town of North Stonington as an additional insured shall be required commencing work.

Workers' Compensation	WC Statutory Limits	
and Employers' Liability	EL Each Accident	$500,000
	EL Disease Each Employ	$500,000
	EL Disease Policy Limit	$500,000

4. Bid Award
The Town of North Stonington reserves the right to reject any and all bids that are not in the best interest of the Town. All bids must be valid for at least 60 days.

5. Questions
Address all questions to Selectmen's Office selectmen@northstoningtonct.gov All questions must be submitted by July 7, 2021 and answers will be posted on the website. Respondent is responsible for verifying scope of work.

Phase IIIB
Route 184 East

Phase IIIC
Route 49

Phase I
Route 2

Phase IIIA
Route 184 West

Phase II
Route 627

Phase IIID
Route 49

1,500 LF

1,800 LF

1,800 LF

3,000 LF

1,800 LF

2,500 LF

1,000 LF

2,000 LF

2,000 LF

TOWN OF NORTH STONINGTON

TOWN OF STONINGTON

North Stonington
Connecticut

Sewer District Maps

Legend

Proposed Sewer Line
- Forced Main / Pressure Sewer
- Gravity Sewer
- Existing Pipe

Point
- Existing Man Hole
- Man Hole
- Proposed Pump Station
- Stream Crossing
- Proposed Flow Direction

Sewer District
- Existing
- Proposed Addition

Zones
- Commercial Zone 2 (C2)
- Commercial Development (CD)
- Village Commercial (VC)
- Office/Research (OR)
- Industrial (I)
- High-Density Residential (R40)
- Medium-Density Residential (R60)
- Rural Preservation Zone (R80)

Additional Features
- Parcel Lines
- Accessway - 2011
- Structures - 2011

N
W E
S

0 1,000 2,000 4,000 Feet

Map #: 1561
Map Date: 1/26/2012
Rev from Map#1442-5/3/2011

Notes

THIS MAP IS PREPARED FOR THE INVENTORY OF REAL PROPERTY FOUND WITHIN THESE JURISDICTIONS AND IS COMPILED FROM RECORDED DEEDS, PLATS, AND OTHER PUBLIC RECORDS AND DATA. USERS OF THE MAP ARE HEREBY NOTIFIED THAT THE AFOREMENTIONED PUBLIC PRIMARY INFORMATION SOURCES SHOULD BE CONSULTED FOR VERIFICATION OF THE INFORMATION CONTAINED ON THIS MAP. THE TOWNS AND THE MAPPING COMPANIES ASSUME NO LEGAL RESPONSIBILITIES FOR THE INFORMATION CONTAINED ON THIS MAP. HORIZONTAL DATUM BASED ON THE CONNECTICUT STATE PLANE COORDINATE SYSTEM, NAD83

TOWN OF NORTH STONINGTON

Sewer Authority Engineering Report

Prepared by North Stonington Sewer Authority

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April 29, 1972

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1.0 Introduction

This report presents the work of the North Stonington Sewer Authority in responding to the Water Resources Commission Order No. 84, Modified, Step A. Included herein are 1) background correspondence since issuance by the Water Resources Commission of Order No. 84,2) a sanitary survey which considers the land use, population density, appearance and biological conditions of the waters of the Town, 3) a long range projection of domestic and industrial growth which together with the sanitary survey provides a basis for determining whether a municipal sewerage system will be required within the next 50 years.

2.0 Conclusion

It is the conclusion of the North Stonington Sewer Authority that municipal sewerage service will not be required before the year 2020.

The basis for this conclusion is developed in the succeeding sections of this report and is briefly summarized herein without regard to the order of importance:

1. Sanitary survey and sampling analysis show that existing problems are relatively few in number and correctable on site.
2. The population growth rates are following the "low" predictions of the 1967 Plan of Development (1).*
3. Growth patterns show no tendency to develop growth centers. The town is rural and is expected to remain so.
4. Zoning and sub-division regulations provide the mechanism to ensure and enforce orderly growth and the development of responsible and technically adequate on-site disposal systems and drainage.
5. Industrial growth is predicted to occur to a modest level within a designated area which has adequate soil conditions to allow safe on-site disposal of wastes.

*Numbers in parentheses () refer to references listed at the end of the report.

3.0 Recommendations

The North Stonington Sewer Authority assumes the responsibility of maintaining a continuous monitoring of those conditions and activities which might be expected to endanger the purity of our waters. To this end, the following recommended actions are offered:

1. A continuing program of sampling will be instituted which will provide early indications of impending sewage problems. This Authority will work closely with the EPA to establish a format and procedure for conducting this program which will meet our mutual goals.
2. A bi-annual report to the EPA will be prepared by this Authority, commencing 30 April 1974. This report will revise, as appropriate, the domestic growth projections and concentrations and the industrial and commercial growth projections thereby providing early indications of sewer needs if required earlier than the date predicted in this report.
3. This Authority shall review, for approval, sewerage system plans for all proposed subdivisions, commercial and industrial developments.
4. The EPA should take appropriate action to establish a monitoring and sampling program for the Department of Transportation Rest Area adjacent to I-95 and the Shunock River to establish that the on-site sewage disposal system is functioning properly.
5. With consideration for the findings and conclusion made by this Authority, it is our contention that Order No. 84, as modified on 15 June 1970, should be recinded.

4.0 Background Information

The purpose of this section of the report is to document the key events from the issuance of Order No. 84 to the Town of North Stonington in 1967 to the present time. Pertinent correspondence is included in Appendix A of this report. Materials and information gleaned from published reports and used in this document are referenced to the original source.

4.1 Order 84

Order No. 84 (3) (Appendix A, Exhibit 1), was issued to the Town of North Stonington on the 19th day of June 1967. This document orders the Town of North Stonington to construct necessary sewage collection system to serve present and future needs and to provide capacity for future industrial waste. A rigid timetable of events is specified in the order which goes from step A) which requires that an engineering report be submitted to the Water Resources Commission by April 30, 1970, to step G) which calls for placing constructed facilities in operation by December 31, 1972. Of special significance are the facts that the order calls for "... the discharge of all sewers to the Pawcatuck system in the Town of Stonington" and that the issuance of the order appears to be based on "Having found that the Town of North Stonington is a municipality within which a community pollution problem can reasonably be anticipated in the future ..."

In September of 1969 the Town of North Stonington engaged the engineering firm of Metcalf and Eddy of Boston, Massachusetts (Appendix A, Exhibit 2 & 3) to perform the engineering study required by Step (A) of Order No. 84. For record it is noted that the firm of Metcalf and Eddy was well acquainted with the Town as it had developed a comprehensive plan for the Town of North Stonington in 1967 (1). In addition, this same firm was concurrently engaged in performing a regional sewerage study (2) for the Southeastern Connecticut Regional Planning Authority (SCRPA). Though the time allocated for an engineering study may be regarded as minimal, there was considerable groundwork done during the 1967 to 1969 period which would be of extreme value to any sewerage study.

A letter report by Metcalf and Eddy dated May 22, 1970 was submitted to the State of Connecticut, Water Resources Commission (Appendix A, Exhibit 4). The significant points of the letter report are that (1) no significant pollution problems exist in the Town of North Stonington, (2) the opinion that sewerage facilities, pending no unforseen developments, would be unwarranted for some time (8 to 10 years is

mentioned in the letter), and (3) a request for a two year delay in the submission of a more comprehensive engineering report was requested. A subsequent letter to the Water Resources Commission dated May 28, 1970 (Appendix A, Exhibit 5) requested a two year extension, to April 30, 1972 for completion of Step (A) of Order No. 84.

Order No. 84 Modified (Appendix A, Exhibit 6) was issued to the Town of North Stonington on the 15th day of June 1970. Essentially the modified order is the same as the original order except that all dates are advanced by two years. A change in wording, though it is believed by this Authority to be unwarranted, was also made to the modified order and it now reads "Having found that the Town of North Stonington is a municipality causing pollution of the waters of the State of Connecticut . . ."

4.2 North Stonington Sewerage Study Committee

A North Stonington Sewerage Study Committee was appointed by the Board of Selectmen in June of 1971. It should be noted here that this Committee was not at this time instituted as a Commission or Board duly established by vote at a town meeting with specific, specified powers by law. Therefore, the initial Committee objectives were to formulate a response to Order No. 84 Modified. In its early deliberations the objectives were further delineated to:

1. Determine if a pollution problem did exist in the Town of North Stonington
2. Formulate and recommend initial steps to be taken by the Town for preservation of a pollution free environment within the Town of North Stonington
3. Formulate and recommend the necessary steps required for a long term program for maintaining a pollution free environment in the Town of North Stonington.

It is believed that the above objectives, pursued with diligence and perseverence will meet the spirit and intent of Order No. 84.

4.3 North Stonington Sewer Authority

At a town meeting held on January 31, 1972 a resolution which formally established a Sewer Authority, with the duties and powers specified in State Statutes, was adopted. This resolution became effective (15) fifteen days after it was passed by the Town Meeting. Members of the Authority were appointed on March 21, 1972 (Appendix A, Exhibit 7).

5.0 Sanitary Survey

5.1 Objective

The primary objectives of the sanitary survey were (1) to determine if a pollution problem does exist in the Town of North Stonington, (2) to establish a baseline against which future surveys may be compared and (3) to quantify the magnitude of any problem discovered.

5.2 Basic Approach

For purposes of this survey the Town was subdivided into thirteen (13) natural drainage districts. It was reasoned that areas of pollution, if they existed, could at least be initially identified by testing the water quality in the brooks and streams in their particular drainage district. Sampling sites were chosen within eleven (11) of the most populated districts. In addition to the water samples taken, a visual inspection was made in the vicinity of each sample site. Housing concentrations, existing land use and any special features were also considered in this study. Dye testing was not conducted.

5.3 Existing Land Use

Land use within the Town of North Stonington as of July 1966 is shown in Table 1 and Figure 1. Changes in land use between July 1966 and October 1971 are given in Table 1 and are minimal. From a pollution and sewage generation point of view the most striking figures given in Table 1 are that less than 1% of the Town can be classified as suburban while state preserves, woodland, wetlands, agricultural land, open spaces and water areas account for 93% of the land area. North Stonington is a rural community.

Of particular interest in this study are the residential areas. Again referring to Table 1 and Figure 1, the 1125 rural residential acres are scattered throughout the Town's 54.6 square miles, mostly along the existing highways and roads. The 195 acres of suburban low density are made up partly of the Village area and the Kingswood/Meadowood development. The 60 acres of suburban, high density consists of part of the Village area and the Cedar Ridge development. More detailed information will be given in other parts of this report relative to the suburban low and high density areas.

5.4 Existing Dwelling & Population Densities

The dwelling distribution as of March 1966 is shown in Figure 2. New dwelling starts from March 1966

to October 1971 are shown in Figure 3. In October of 1971 there were 1201 dwelling units, of which 146 were seasonal, and 89 were trailers. The dwelling distribution indicates that the only areas of relatively high population density are the Village, Kingswood/Meadowood and Cedar Ridge.

The population of North Stonington was 3,748 per the 1970 census. The average population density is therefore, 0.10 persons/acre, which ranks 147 of the 169 towns in the State of Connecticut.

5.5 Existing Sewerage Facilities

There are no public sewage collection or disposal facilities in the Town of North Stonington. The majority of housing units rely on septic tank or cesspool units for sewage treatment or disposal.

5.6 Visual Inspection of Sample Sites

A listing of sample sites is given in Table 2. Figures 4, 4A, 4B, 4C and 4D show the location of the sample sites and the natural drainage boundaries of each district. A more detailed description of each drainage district with some of the pertinent statistics and characteristics of the district are given in Appendix B.

A visual inspection of the streams, ponds and brooks was made in the vicinity of each sample site. There was no indication of pollution, such as fecal matter, debris, high turbidity or odor, in the vicinity of any sample site with the exception of (1) the North Stonington Village, (2) Cedar Ridge, (3) Kingswood/Meadowood, and (4) the I-95 State Rest Area. The above noted areas were judged to be possible problem areas from visual observations and a more detailed account of each area is given below.

5.6.1 Village of North Stonington

The Shunock River was visually inspected from Route 2/201 near Gallup Pond, sample site 9, to the Village area, sample site 14. Sample sites 9, 10, 29, 28, 27, 11, 11^1, 11^2, and 14 are located within this traverse of the Shunock River which is approximately one mile in extent. The general appearance of the river was clean, clear, free of debris and free of high turbidity except for the very local and specific areas described in this section.

Above sample site 10, the natural drainage

area is very sparsely populated and there appeared to be no reason to take samples upstream of this point. The pond at sample site 10 is used for swimming and fishing. Gallup Pond just above site 9 is a favorite trout fishing pond. Between sites 9 and 10 is located the shallow well which supplies water to the Kingswood/Meadowood development. From appearance and local usage, pollution above sample site 10 is not a serious consideration. From site 10 to within 400 ft. above sample site 29 there are no homes.

Sample sites 29, 28, 27, 11, 11^1, 11^2, and 14 are located in the Village area. In this area two pipes, believed to be sewer pipes, terminated or discharged into the Shunock River. At one of these locations a fluid discharge was observed entering the Shunock River. Samples for biological analysis were taken in the immediate area of the discharge by a Town Health Officer at the time of discharge. Aside from the above, the condition of the river appeared to be clean, clear and free of any evidence of sewage within 100 feet of the discharge noted above. A heavy concentration of sample sites was, however, chosen in this area due to the viewed discharge and the proximity and density of homes in the immediate area of the River.

5.6.2 Cedar Ridge Area

Cedar Ridge is a development of 123 homes located along Route 184. Lot sizes are 10,000 sq. ft. and each home is served by an on-site sewage disposal system consisting of a septic tank and drainage field. This area of North Stonington is officially classed as suburban, high density, 4 to 8 homes per acre. There is a well in the Cedar Ridge area which furnishes the domestic water needs of Cedar Ridge.

The Cedar Ridge storm drain system serves Cedar Ridge and a short stretch of Route 184 adjoining the development. These drains discharge into a swamp or pond which are the

extreme upper reaches of Anguilla Brook which eventually discharges into the Pawcatuck River. Sample sites 30 and 31 were chosen at the outfalls of the storm drainage system at Hickory Lane. It was reasoned that any pollution generated within the Cedar Ridge area would manifest itself at these sample sites.

From the appearance of sites 30 and 31, even though site 30 was dry during the September 25 and October 16 inspections, it was judged that direct connections between household drains and storm drains existed. Catch basins in the Cedar Ridge area were also inspected and gave further evidence of the above conclusion.

5.6.3 Kingswood/Meadowood

The Kingswood/Meadowood development consists of 177 homes on about 195 acres. Fifty nine homes have been built on lots of from 18,000 to 20,000 sq. ft., while 118 homes have been built on lot sizes of 20,000 sq. ft. or larger. In April of 1965, the minimum lot size was established at 20,000 sq. ft. by agreement of the Planning and Zoning Commission and the Kingswood/Meadowood developer. Existing zoning regulations now call for 1 acre lots in the area. Each home is served by an on-site sewage disposal system consisting of a septic tank and leaching field. The Kingswood/Meadowood area is classed as low density residential, 1 to 4 homes per acre.

Eight storm drain outfalls or culverts serve the Kingswood/Meadowood area. One storm drain serves about one half of Meadowood Drive and Kingswood Drive and discharges through a culvert into the swamp on the north side of Main Street, sample site 23. The swamp feeds the Shunock River. The balance of the developed area is served by a storm drainage system which empties into the Assekonk Swamp through 7 storm drain outfalls. Sample sites 32, 33, 34, 35, and 36 were located at five of the seven outfalls. The Assekonk Swamp discharges into the Assekonk Brook which joins the Shunock River in the center of the Village. An important feature of the storm drain system serving the Kingswood/Meadowood development is that individual footing drains are connected to the storm drain system.

The flow at sample site no. 23 appeared to be clear. However, due to the concentration of housing in the Kingswood/Meadowood area the storm drainage system was inspected. It was found that storm drains did not conform to plans on file and that there was evidence in the manholes of a direct connection between household drains and the storm drain system.

The appearance of the flow at sample sites 32, 33, 34, 35, and 36 varied considerably. At sites 32 and 33 the flow was full of algae and unsightly scum but there was no particular evidence of sewage in the discharge. Sample site no. 34 was dry. Sample sites 35 and 36 appeared to be clear.

5.6.4 State Rest Area

Sample sites 15, 15^1, 15^2, and 15^3 were located on the Shunock River between the service road connecting Routes 2 and 49 and the Route I-95 Bridge over the Shunock River. A State operated rest area and welcome station is located on the south side of the River along I-95. The sewage disposal fields for the rest area are located on the north side of the service road and Shunock River. Due to local protests at the time of construction, the sewage disposal beds are used only for the sewage facilities at the rest area. The planned trailer sewage dumping station is closed and is not in use.

The Shunock River at this point appeared to be clean and clear except for areas adjacent to the River bank. Along the north bank there were numerous areas which showed a water level above that of the river and these areas were generally filled with algae. In this area the service road is built on fill approximately 20 feet high and the edge of this fill forms the River Bank.

5.7 Sampling and Testing

A tabulation of the results of all sampling accomplished to date is given in Table 3. Sampling and testing consisted of specific conductivity readings taken at 35 sites on September 25th and 26th, 1971; E. Coli, MPN and specific conductivity readings taken at 22 sites on October 16, 1971 and Millipore samples taken at 10 sites on December 18, 1971. (See Appendix B)

5.7.1 Specific Conductivity Sampling

The objective of sampling the specific conductivity was to help establish a baseline for the stream conditions in North Stonington and to assist in choosing sites for further sampling. It is significant to compare these specific conductivity data with that presented in the U.S.G.S. Report (Connecticut Water Resources Bulletin No. 15 Dated 1968) for those same sites and on comparable seasonal dates. A comparison of conductivity levels with those previously established would at least give some gross indication of changes in stream chemistry. Current reading versus reading taken on September 24, 1963 and September 22, 1964 compare as follows:

Site 1	lower/lower
Site 7	lower/lower
Site 22	lower/lower
Site 2	lower/lower
Site 21	lower
Site 19	lower
Site 11	lower
Site 20	lower
Site 12	higher
Site 17	same/lower

Current levels of specific conductivity were appreciably lower than those recorded in 1963 and 1964. It can at least be concluded that stream quality at the sites has not deteriorated from 1963 to 1971.

The survey also resulted in a listing of sites which were to be tested for E-Coli.

5.7.2 E-Coli MPN Survey

To give some measure of significance to the tabulated MPN values in Figure 3, the State of Connecticut Health Department uses an MPN value of 1000 as the dividing line between classification of waters safe and unsafe for swimming. Values of MPN over 1100 were considered suspect and worthy of further study. Of the 22 samples taken, 13 showed MPN values in excess of 1100; these were sites 2, 11, 14, 15[3], 20, 21, 23, 28, 29, 31, 33, 35, and 36. The source of the high MPN values at sites 2, 20, and 21 were at least initially attributed to animal rather than human pollution due to the very sparse housing density in the area of the sites and due to the fact that cow

pastures are contiguous with the streams. Sites 28 and 29 are in the immediate vicinity of known septic violations which are now being acted upon by the Town Health Officer. Sites 11, and 14 are only a short distance, within 500 feet, of sites 28 and 29. Sites 23 and 31 represent outfalls from storm drainage systems where there are suspected interconnection between the storm drains and household drains. These sites were listed for further study and sampling. Sites 33, 35 and 36 are outfalls from storm drains in the Kingswood area while site 15^3 is near the I-95 State Rest Area.

5.7.3 Millipore Survey

Millipore samples were taken at sites 2, 10, 11, 15^1, 15^3, 20, 23, 31, 32, and 36. It was the purpose of these tests to discriminate between animal and human sources of waste so that the most probable cause of high E-Coli measurements could be established. A ratio of Fecal Coliform to Fecal Strep of 4 or greater indicates human waste while a ratio of less than 1 indicates animal waste. Intermediate ratio values of from 1 to 4 can be either and are not conclusive.

Site 31, where visual inspection indicated direct connection of sewage lines to storm drains, was the only site which showed that the high E-Coli count was due to human waste. All other sites were inconclusive or indicated sources other than human waste.

5.8 Evaluation of Sanitary Survey

From the sanitary survey conducted to date several conclusions can be reached:

1) In the Cedar Ridge area it has been conclusively shown that a pollution problem exists by virtue of interconnection of house sewage disposal system or systems and the storm drains. This conclusion is substantiated by visual inspection, E-Coli and Millipore testing. This condition is regarded as serious and has been brought to the attention of the Town Health Officer for proper action.
2) The North Stonington Village area along the Shunock River has been shown to be an area of pollution. There are known septic violations where household sewage is discharged into the river. (These specific violations are being acted upon by the Town Health Officer). Biological samples sub-

stantiate visual observations of pollution. However, the general appearance of the Shunock River in the Village area is clean. Elimination of specific violations may very well reduce biological readings to acceptable levels.

3) The result of the sanitary survey in the Kingswood and Meadowood area is considered to be sporadic and inconclusive. For example, site 23 shows a low total Coliform on the Millipore test sample while other indicators including visual observations would lead one to anticipate much higher readings. Perhaps the additional dillution of the heavier flow during December was adequate to reduce reading to acceptable levels. In the Kingswood area, site 32 which was expected to be one of the worst sites from visual observations, tested well within acceptable levels. Sites 35 and 36 appeared to be clear but showed higher E-Coli MPN values. It is significant that sample sites 25, 26, and 12 which are downstream of sample sites 32, 33, 34, 35 and 36 tested well within acceptable limits of E-Coli concentrations. From the above observations it is concluded that the Kingswood/Meadowood area is a low level polluter which could be corrected principally by the elimination of household drain connections to foundation drainage systems.

4) The Shunock River State Rest Area also showed sporadic results. Biological samples taken within very short distances of each other (200 to 500 ft.) showed significant difference in biological test results, sites 15^1, 15^2, 15^3. The river appeared to be very clean except as noted in the section on visual observations. These results indicate that the problem is very local and may be due to leaching from the highway fill or drainage field of the State Rest Area sewage disposal system. Further tests are required to determine the exact cause of pollution.

5) High E-Coli counts at sample sites No. 2 and 20 are not regarded as a problem due to the very low density of dwellings in the area. The most probable cause is animal but if it should be due to nearby dwellings there should be no difficulty in taking corrective action. The same reasoning applies to site 21 with regard to dwellings within North Stonington and contiguous with the Pawcatuck River or its tributaries within North Stonington.

6.0 Long Range Planning

6.1 The Domestic Growth Predictions (See Appendix C)

6.1.1 The Objective of this section is to re-evaluate the population growth pattern as last projected in the Comprehensive Plan of Development for the Town of North Stonington, dated 1967. (1)

6.1.2 Population Growth:

The town's adopted subdivision and zoning regulations are expected to result in a population growth that will lie between the low forecast in the comprehensive plan of development and the forecast of the South-eastern Regional Planning Agency. These figures project to 11,000 and 15,500 re-spectively by the year 2020. (See revised Zoning Regulations (Appendix E); Town Revised Subdivision Regulations (Appendix F); attached report of SCRPA, (Appendix C); and the Comprehensive Plan of Development (1), page 50-52).

6.1.3 Population Distribution:

The population distribution patterns are expected to continue the present trend of scattered development with no new concentration centers appearing. See Figure 2 which shows the dwelling units in 1966, and Figure 3 for the dwelling additions from 1966 to 1971.

6.1.4 Land Use:

Future land use for residential development will occur at a density 0.5, to 1.1 family per acre with the minimum lot size of 40,000 square feet to 80,000 square feet per dwelling unit in the zoning regulations (Section VI, Table of Area Regulations, and attached zoning map, Appendix E).

6.1.5 Dwelling Units:

Single family dwelling units are expected to continue the present scattered growth pattern throughout the town. (See Figure 3 for housing units built 1966 through 1971).

6.1.6 Existing Public Facilities:

Water utilities continue to serve the town's two existing major subdivisions where population density exceeds the 1.1 family per acre density. (See Town Comprehensive plan of development page 119-120).

6.1.7 Public Utilities Plan:

Based on the foregoing items the ultimate utility service area as shown on Figure 26 of the Comprehensive Plan of Development is now considered obsolete under the adopted zoning and subdivision regulations. The initial utility service area shown on Figure 26 of the Comprehensive Plan of Development is changed to be the ultimate for water service utility. Sewerage service utility is not planned in this area before the year 2020. (See attached copy of zoning map; Section VI Table of area regulations in Revised Zoning Regulations; and Comprehensive Plan of Development Figure 26).

6.2 Industrial Development (See Appendix D)

6.2.1 The Objective of this section is to make a conservative prediction of the industrial growth over the next 50 years.

6.2.2 Assumptions & Relevant Data

- Town of North Stonington in 50 years - 2020
  Note: Present population growth patterns are following the low forecast in the Town's Comprehensive plan of development. This projects to a population of 11,000 in 2020. The Southeastern Regional Planning agency forecast projects to 15,500 by 2020 and was used as a high figure.
- Present population 3,784, projected population 11,000 to 15,500
- Number of Acres available for development 400+
- Number of Acres to be developed 200+
- Number of Acres to be set aside 200+ (Buffers, open space, etc.)
- Any industry requiring any significant discharging of waste would be required (Code inforcements) to neutralize sufficiently to discharge as ground water and/or self contain for subsequent self disposal.
- Each plant employee uses (Discharges) 25 gals/day. (Commission decided to use figure

of 50 gals/day for safety margin).

- Over 50% of available acreage in Industrial Zone has slight to moderate limitation for on-site sewerage disposal drainage. (Reference Town soil map report by U.S. Dept. of Agriculture, April, 1968).
- Safe disposal rate in average soil; 1 gallon/day for each 5 square foot of land or 8,000 gallons/day per acre.

6.2.3 Industrial Growth Projection

It was projected that 5 light industry, 10 office/commercial, 1 pure research facility, 10 service support facilities (motels, gas, restaurants, etc.) might reasonably be expected to locate within the established zone in the next 50 years. These 26 facilities would employ perhaps 600. Note that it is not anticipated that heavy industry would be attracted to this area.

6.2.4 Conclusions

On the basis of these projections it was conservatively estimated that by the year 2020 less than 250,000 gallons per day of plant wastes would require disposal; and that this volume could safely be disposed of in less than 40 acres of the more than 200 acres now planned for these industries. It should be noted here that any industry which might require excessive and peculiar waste discharging would be required to neutralize to the point where waste could be discharged normally to a ground absorption system or would have to contain for subsequent self disposal. Also note should be made of the fact that in the region of interest over 50% (200 acres) of the available acreage has slight to moderate limitations for on-site sewerage disposal drainage as reported in the town soil report, U.S.D.A., April 1968.

Table 1 - Land Use

Class	July 1966 No. of Acres	July 1966 Percent of Total Area	October 1971 No. of Acres	October 1971 Percent of Total Area
DEVELOPED LAND				
Residential				
Rural	1,050	2.9	1,125	3.2
Suburban-low density	195	0.5	195	0.5
Suburban-high density	60	0.2	60	0.2
Seasonal	35	0.1	35	0.1
Commercial	35	0.1	40	0.1
Industrial	60	0.2	79**	0.2
Institutional and Governmental	220	0.6	220	0.6
Utilities and Transportation	665	1.9	700	2.0
Subtotal - developed	2,320	6.5	2,454	6.9
PUBLIC OPEN SPACE				
State Preserves*	1,355	3.8	1,355	3.8
Intensive Recreation	90	0.3	90	0.3
UNDEVELOPED LAND				
Woodlands	21,100	59.3	21,100	59.3
Wetlands	2,745	7.7	2,745	7.7
Agricultural Land	4,620	13.0	4,620	13.0
Open Land	2,735	7.7	2,601	7.3
Water Area	615	1.7	615	1.7
Subtotal - undeveloped	31,815	89.4	31,681	89.0
GRAND TOTAL	35,580	100.0	35,580	100.0

*Does not include 2,000 acres of state preserve land which is classified as wetlands.
**Includes 55 acres of gravel banks which revert to Open Land after being worked.
Source: Existing Land Use Map, July 1966, (Ref. 1)
October 1971 Tax Assessor's Abstract

Table 2 - Listing of Sample Sites

1	Green Fall Br. at Putker Rd.
2	Green Fall Br. at Rt. 216
3	Clarks Falls at Grist Mill Dam
4	Green Fall Br. at Old 184 Crossing (Hopkinton)
5	Pendleton Hill Br. at Browning's Corner
6	Wyassup Br. at Rt. 49
7	Wyassup Br. at Dam
8	Pendleton Hill Br. at Old Cemetery Rd.
9	Gallup Pond at Rt. 2 Crossing (Shunock R.)
10	Shunock R. at Hewitt Pond
11	Shunock R. at West Main St. Bridge - N.S. Center
11^1	Shunock R./Assekonk B. - at Parking lot, N.S.
11^2	Shunock R./Assekonk Br. - at East Main St. Bridge N.S. Center
12	Assekonk Br. at Corner Parking lot, N.S. Center
13	Assekonk Swamp at Pine Grove
14	Shunock R. at Store
15	Shunock R. at I-95 Service Road Culvert
15^1	Shunock R. at I-95
15^2	Shunock R. at I-95 - 100 ft. up from I-95 Bridge
15^3	Shunock R. at I-95
15^4	I-95 Service Road - Catchbasin
16	Pawcatuck River at State Line
17	Shunock R. at Rt. 49 (Voluntown Road)
18	Lantern Hill Brook
19	Yawbux Br. at Ryder Road
20	Assekonk Br. at Jeremy Hill

Table 2 - Listing of Sample Sites (Cont.)

21		Boom Bridge - Pawcatuck R.
22		Pendleton Hill Br. (at gaging station)
23		Culvert corner Rt. 2 and West Main St.
24		Assekonk Br. at Dam
25		Assekonk Br. at Rt. 2 crossing
26		Assekonk Br.
27		Shunock R.
28		Shunock R.
29		Shunock R.
30	Culvert	Cedar Ridge - Hickory Lane at Pond Drive
31	Culvert	Cedar Ridge - Hickory Lane at Oak Drive
32	Culvert	Kingswood at extension of Old Colony Road
33	Culvert	Kingswood at Pinecrest - East
34	Culvert	Kingswood at Pinecrest - West
35	Culvert	Kingswood at Laurel Wood Rd.
36	Culvert	Kingswood at Old Colony Rd. - West

Table 3 - Test Results

Station Number	Drainage Basin Number	Conductivity 9/25 & 26 Temp / Cond	Coliform Tests 10 - 16 - 71 MPN	Temp/Cond	Millipore Tests Total Coliform	Fecal Coliform	Fecal Strep	Fecal Coliform / Fecal Strep
1	3	57/30						
2	4	57/50	>1100	60/70	200	20	7	2.86
3	2	63/60						
4	4	56/60						
5	2	56/75						
6	8	54/50						
7	8	61/52						
8	2	55/65						
9	6	58/72						
10	9	60/75	1100	58/92	260	4	4	1
11	9	58/94	>1100	58/109	740	0	4	0
11[1]	9	57/100						
11[2]	9	58/98						
12	9	52/165	1100	60/92				
13	9	58/83						
14	9	57/100	>1100	59/95				
15	10	56/98						
15[1]	10	57/105	1100	64/100	80	0	0	
15[2]	10	56/120	93	56/125				
15[3]	10	56/130	>1100	60/125	750	0	10	0
15[4]	10	60/110						
16	12	63/105	290	60/100				
17	10	56/112	460	60/100				
19	7	57/63						
20	9	54/120	>1100	59/109	270	24	10	2.4
21	11	62/105	>1100	60/102				
22	2	56/60						

Table 3 - Test Results (cont.)

Station Number	Drainage Basin Number	Conductivity 9/25 & 26 Temp / Cond	Coliform Tests 10 - 16 - 71 MPN	Temp/Cond	Millipore Tests Total Coliform	Fecal Coliform	Fecal Strep	Fecal / Strep Coliform
23	9	57/245	>1100	58/245	70	0	0	
24	9	59/78						
25	9	54/150	210	60/85				
26	9	53/160	2.2	60/86				
27	9	59/90						
28	9	58/550	>1100	58/110				
29	9	63/120	>1100	70/1100				
30	13		dry					
31	13		>1100	60/440	57,000	130	7	18.6
32	9		240	60/152	20	0	0	
33	9		>1100	60/131				
34	9		no flow					
35	9		>1100	62/198				
36	9		>1100	54/190	150	4	0	

Flow at site 22 on 9/26/71 was 0.23 ft^3/sec at 12:45 EDT - Flow Duration 98%
Flow at site 22 on 10/16/71 was 1.15 ft^3/sec at 9 A.M.EDT - Flow Duration 81%
Flow at site 22 on 12/18/71 was 7.0 ft^3/sec at 8:30AM EST - Flow Duration 42%

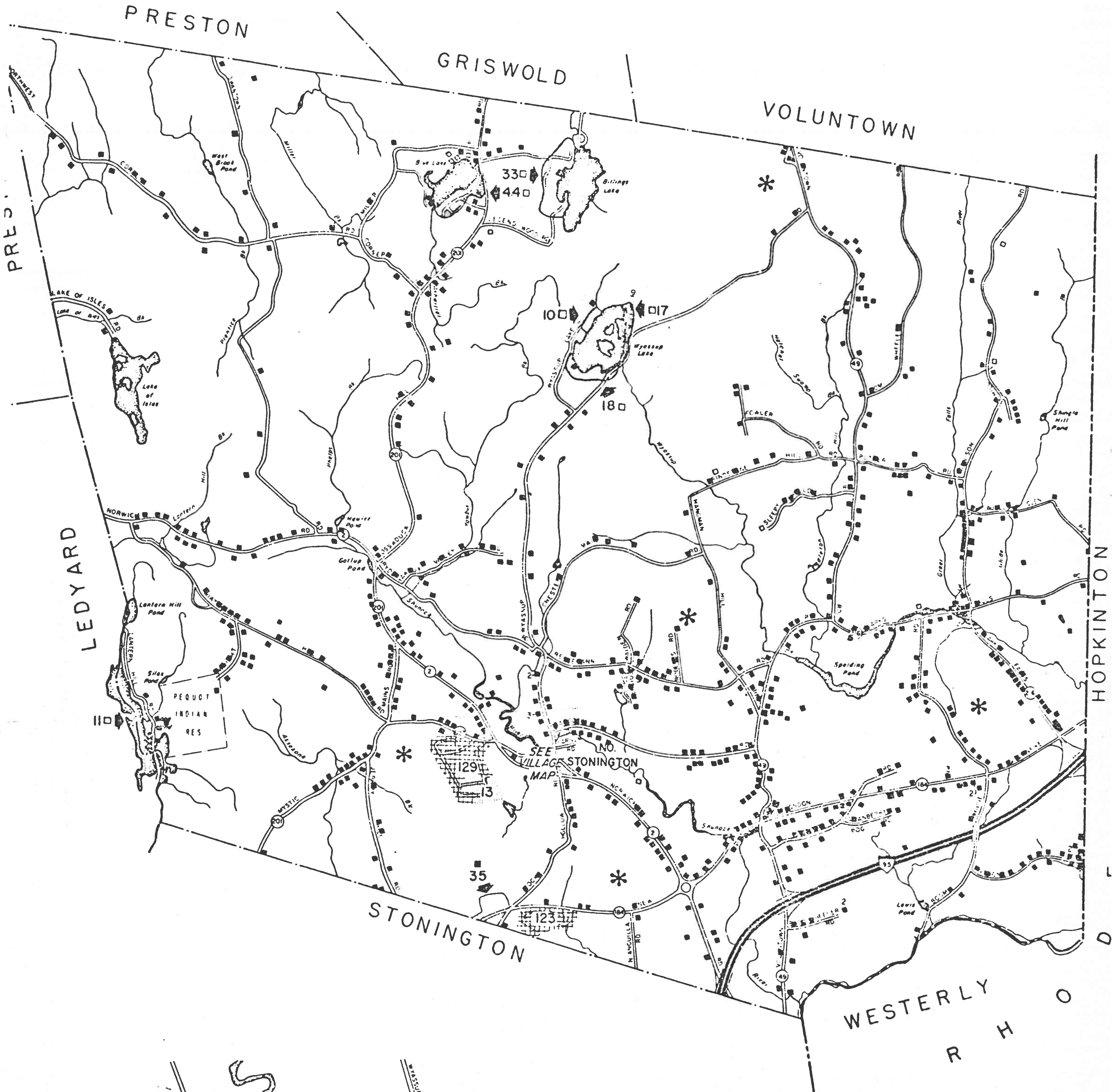
Temperature - °F.
Cond. - Conductivity Micro Mhos
MPN - Most Probable Number

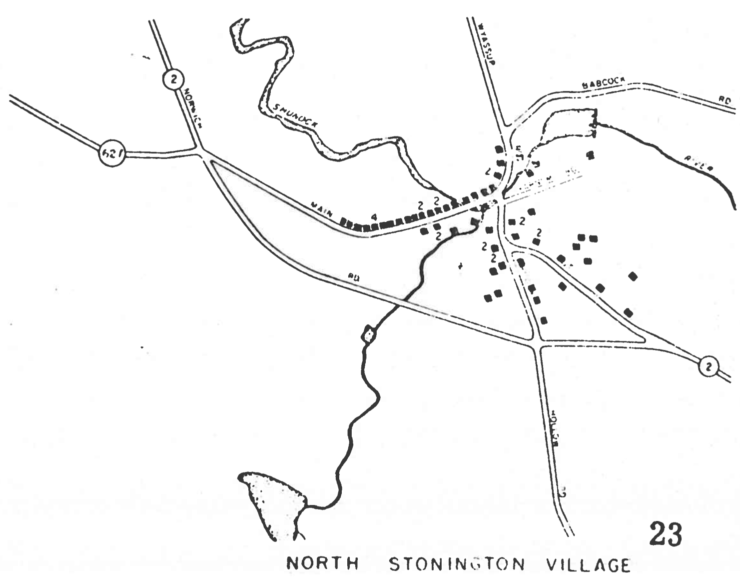
COMPREHENSIVE PLAN • TOWN OF NORTH STONINGTON, CONNECTICUT

EXISTING LAND USE

N

METCALF & EDDY • ENGINEERS & PLANNERS • BOSTON, MASS. NEW YORK, N.Y. PALO ALTO





LEGEND

- ■ Year-round Dwelling Structure
- ■° Multi-family Structure (Numeral refers to dwelling units)
- □ Seasonal Dwelling Structure
- 00 Concentration of Dwelling Structures (Numeral refers to number of units)
- 00 Recent Subdivision Activity (Numeral refers to completed dwellings)
- 00 Approved Subdivision (Numeral refers to approved but unbuilt dwellings)
- * Possible Future Growth Areas

Source: Field Survey by Metcalf & Eddy, March, 1966

COMPREHENSIVE PLAN • TOWN OF NORTH STONINGTON CONNECTICUT

DWELLING UNITS

AUG. 1966

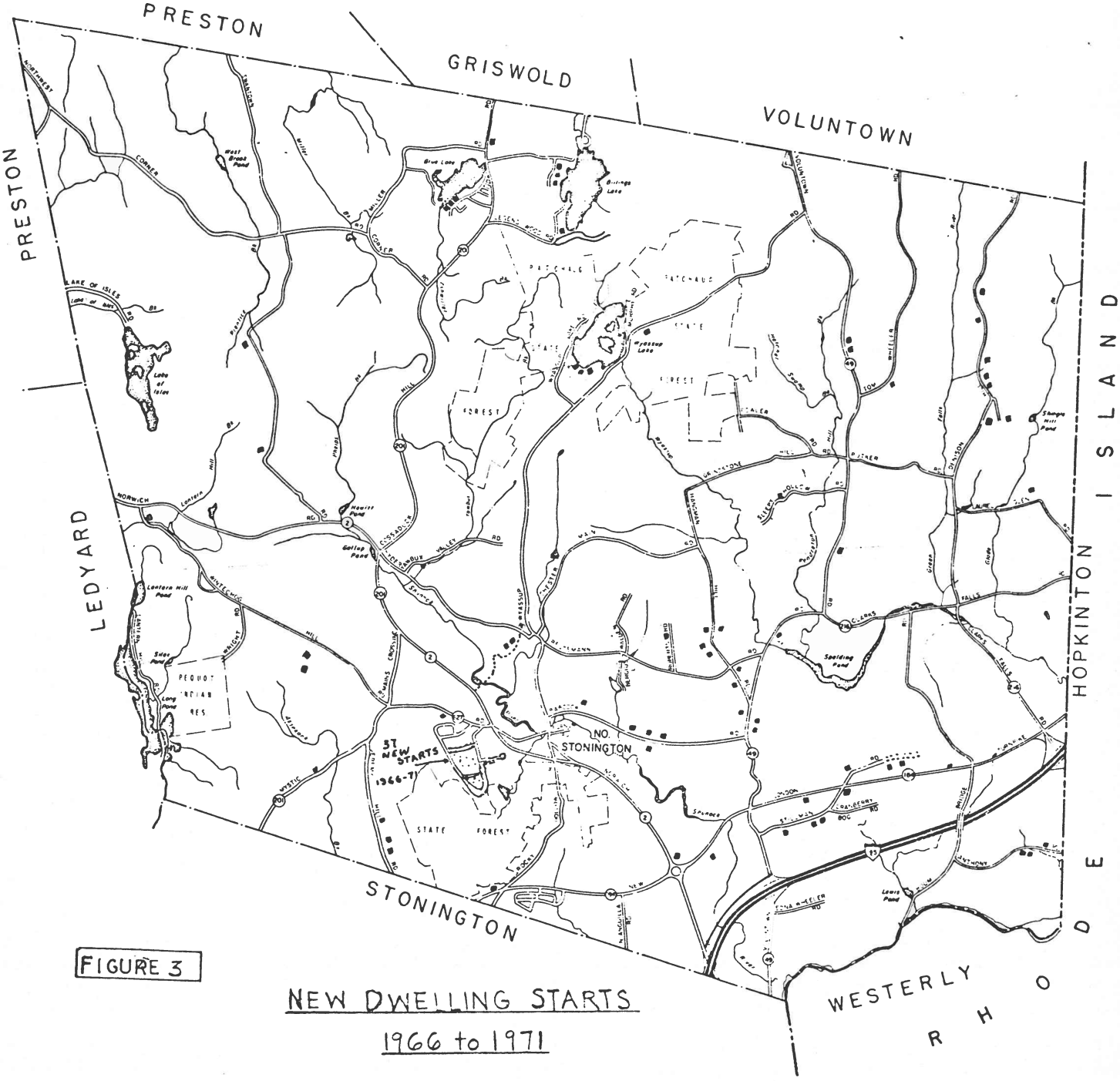
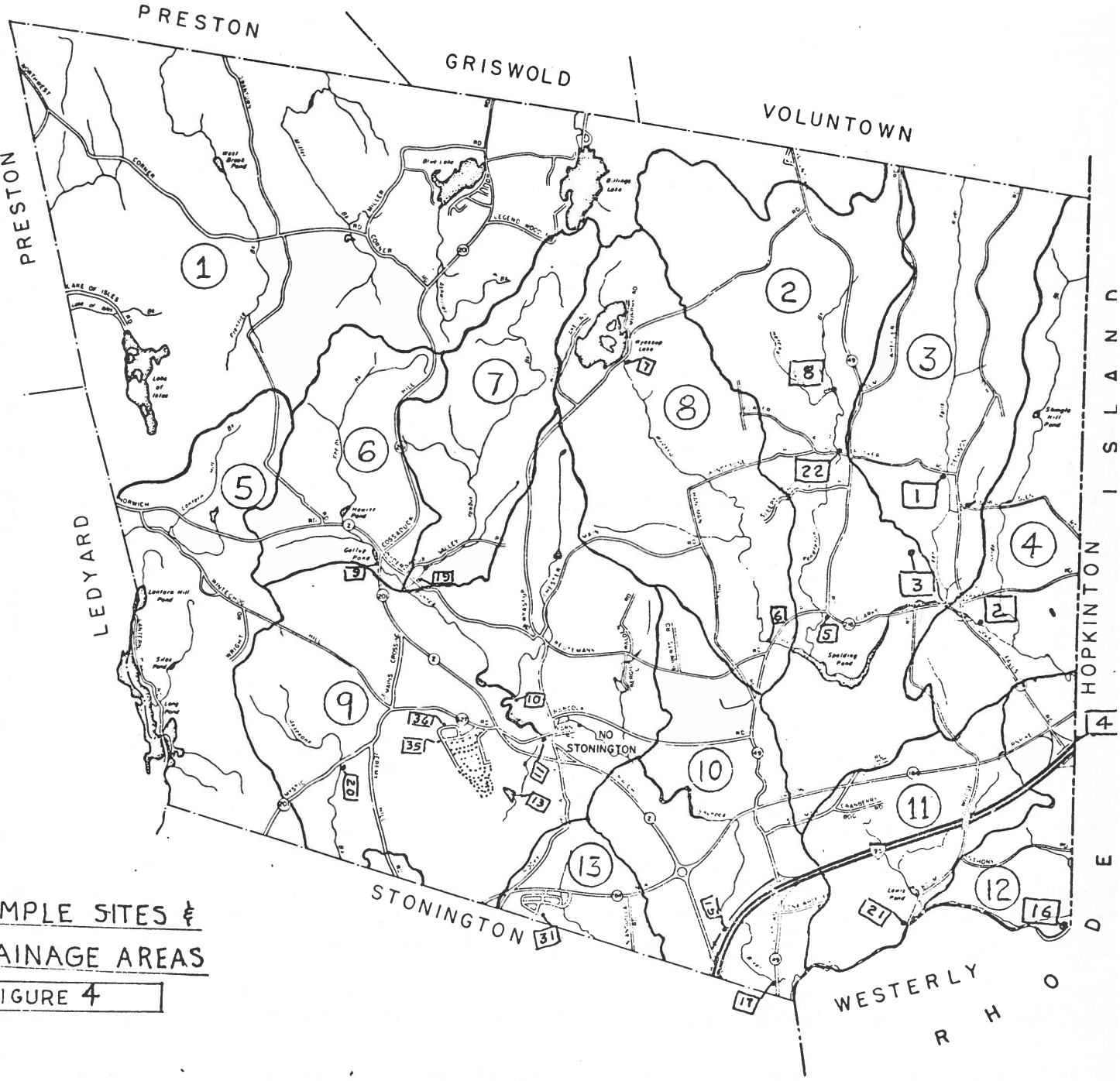


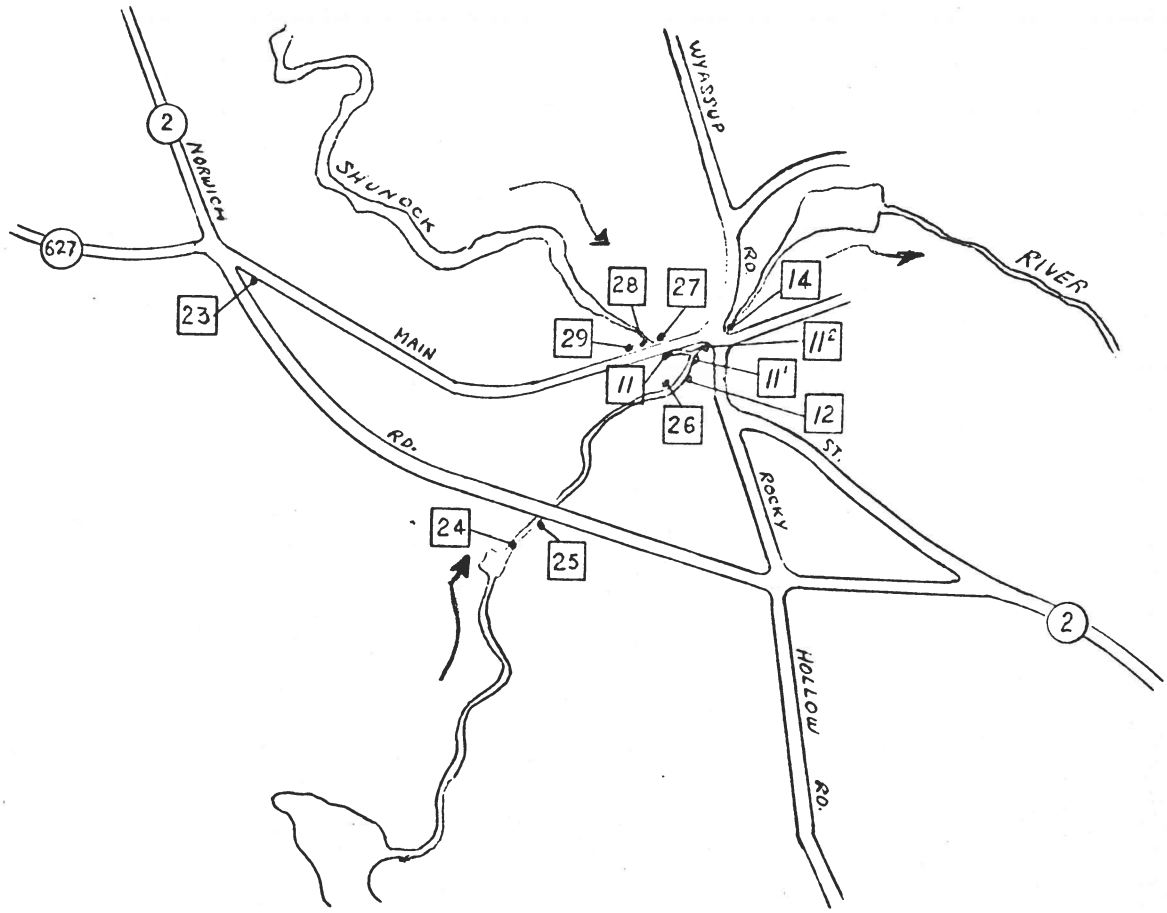
FIGURE 3

NEW DWELLING STARTS
1966 to 1971



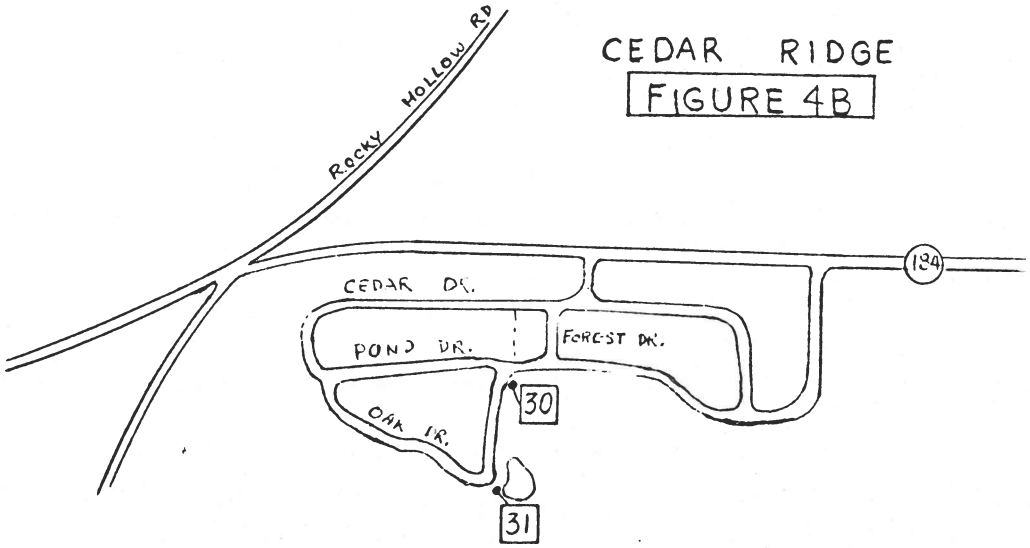
SAMPLE SITES & DRAINAGE AREAS

FIGURE 4



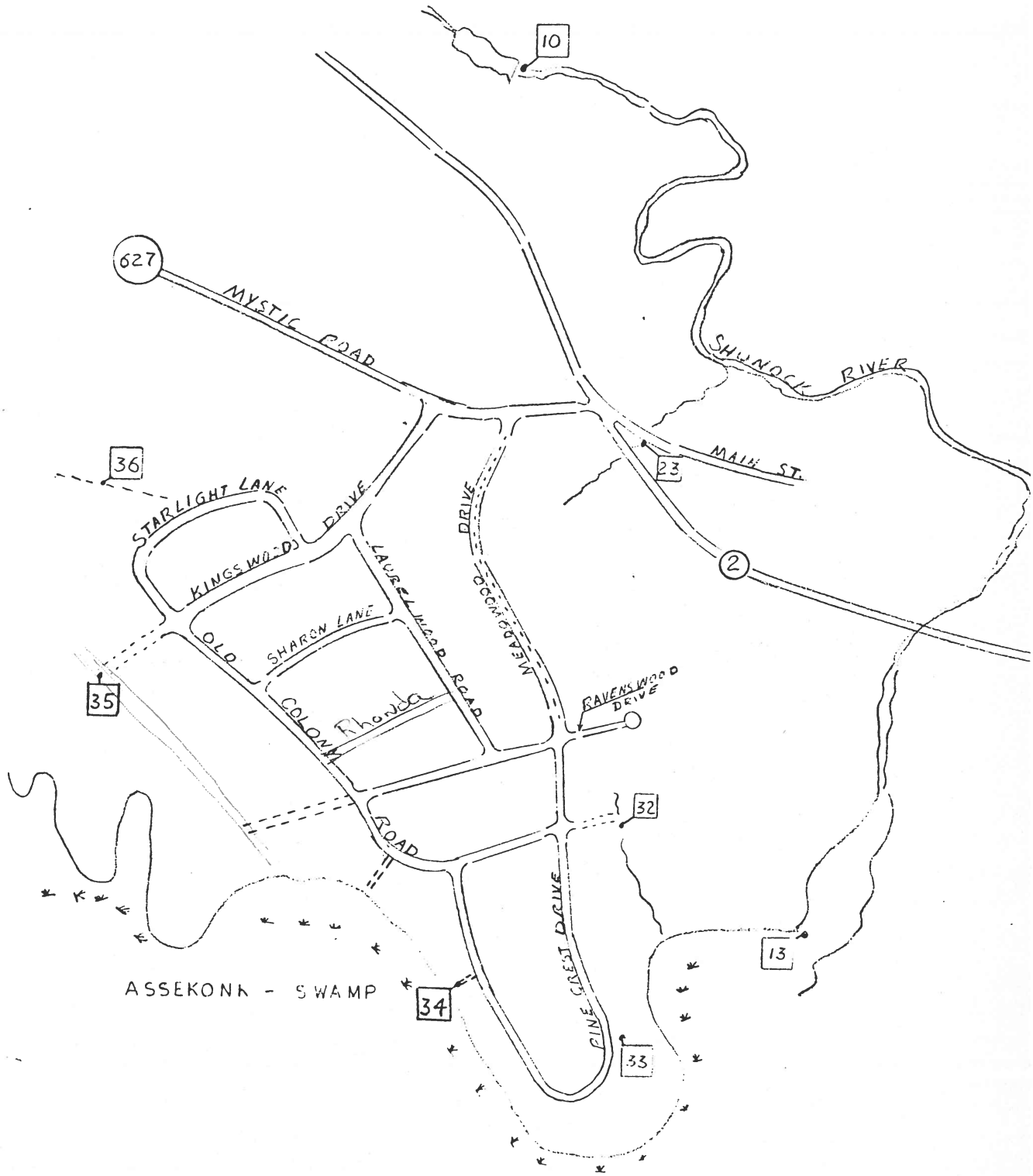
NORTH STONINGTON VILLAGE

FIGURE 4A



CEDAR RIDGE

FIGURE 4B

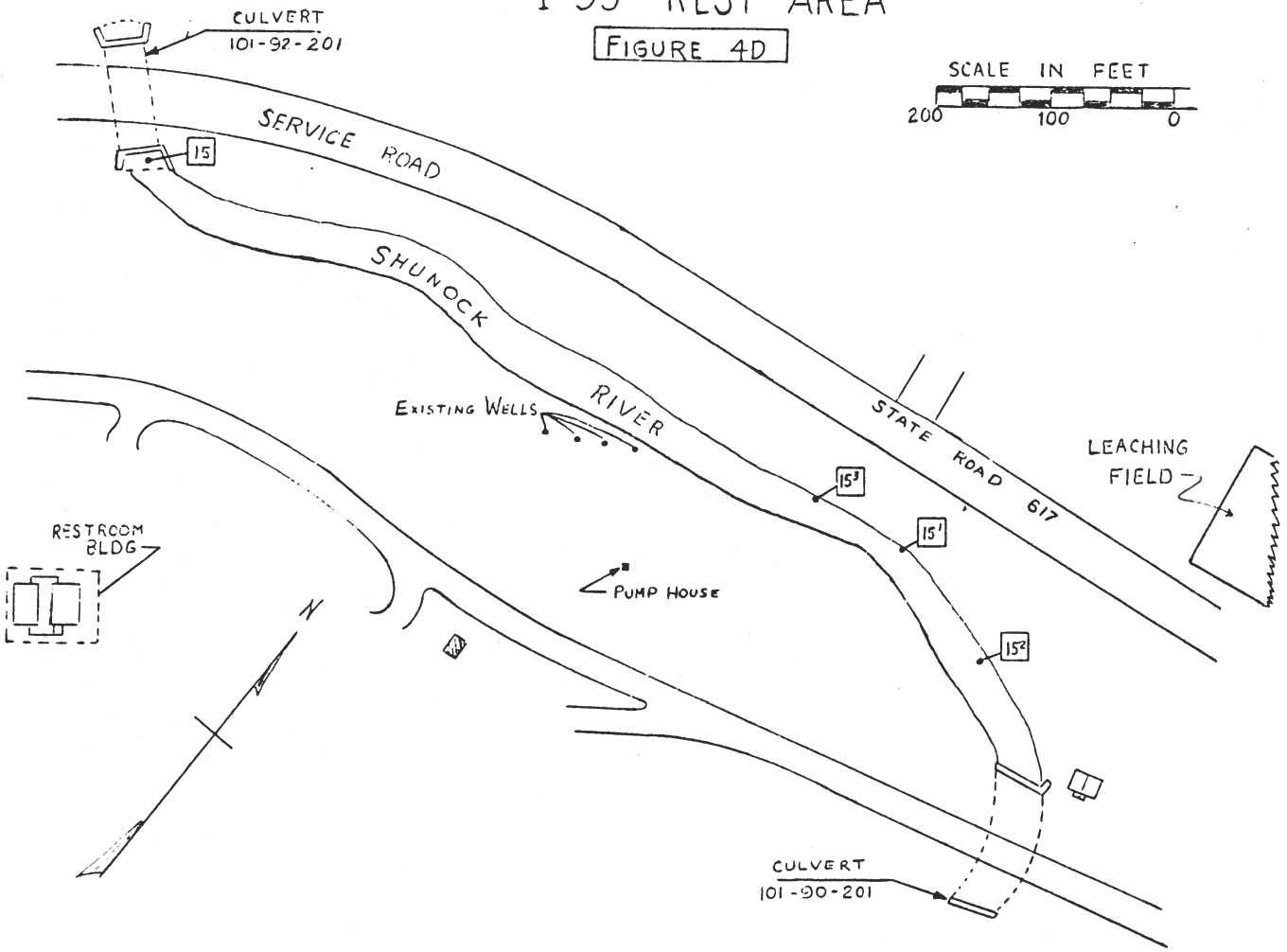


KINGSWOOD - MEADOWOOD

FIGURE - 4C

I-95 REST AREA

FIGURE 4D



References

1. Comprehensive Plan of Development
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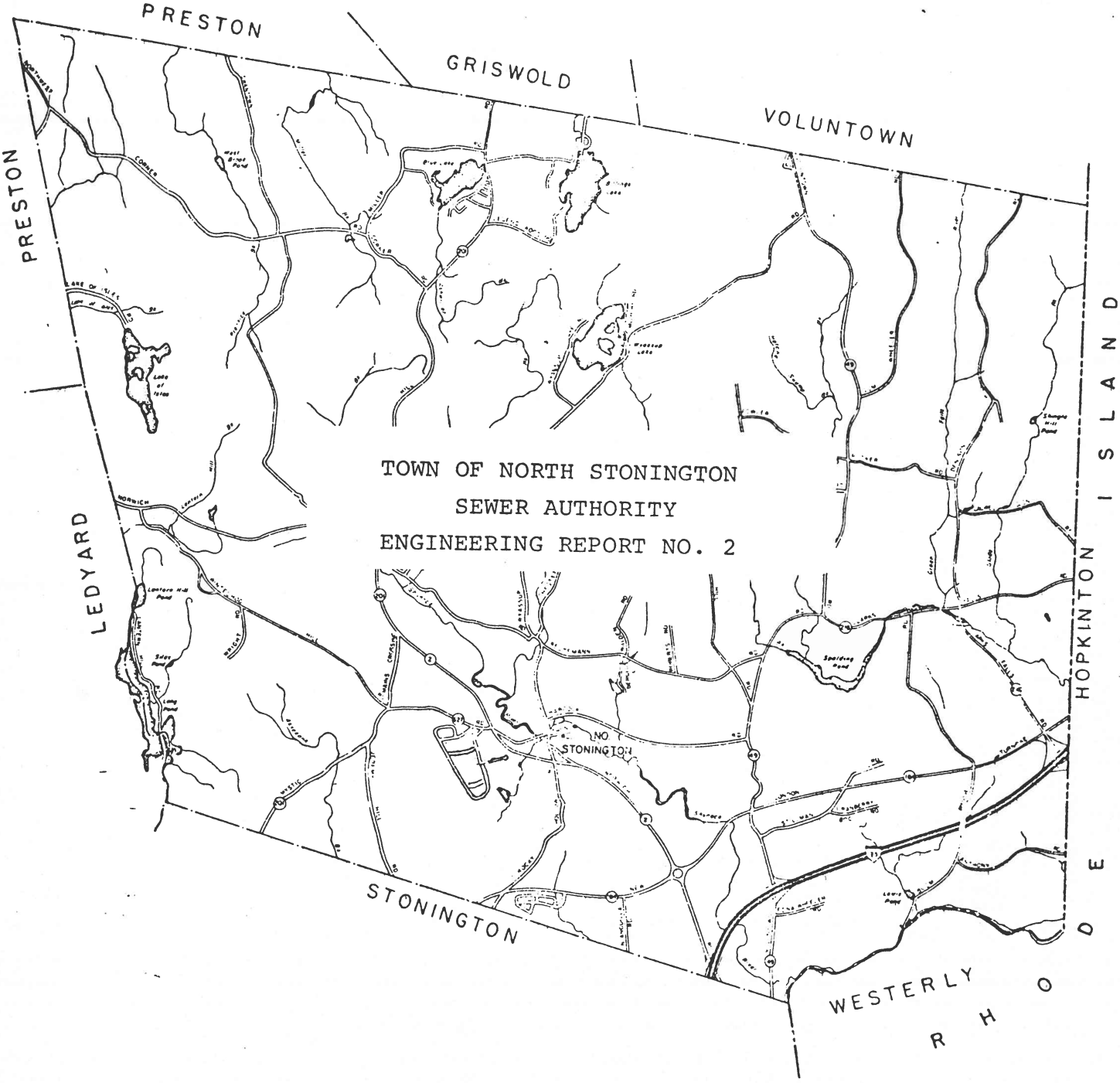
2. Recommended Regional Sewerage Plan, 1969
Prepared for Southeastern Connecticut Regional Planning Agency
Prepared by Metcalf & Eddy
Engineers and Planners
February, 1969

3. Tax Assessor's Abstract of October 1971, Town of North Stonington

4. Connecticut Water Resources Bulletin No. 15, dated 1968



April 20, 1976

TOWN OF NORTH STONINGTON

SEWER AUTHORITY ENGINEERING REPORT NO. 2

April 20, 1976

TOWN OF NORTH STONINGTON

Sewer Authority Engineering Report No. 2

Prepared by North Stonington Sewer Authority

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Richard W. Marble
Chairman

April 20, 1976

TABLE OF CONTENTS

1.0 Introduction

The initial North Stonington Sewer Authority Engineering Report was submitted to the Department of Environmental Protection (DEP) on April 29, 1972. In that report it was recommended that a biannual report be made to DEP to provide early warning of conditions which might indicate the need for sewers earlier than predicted in the original report. Since the submission of the 1972 report no formal reply or comments has been received from DEP and the biannual report scheduled for 1974 was not prepared. However, several meetings have been held between DEP and the Sewer Authority over the past two years, and it was mutually agreed that a 1976 report would be issued. (1)(2)* This report is submitted in fulfillment of that obligation and follows the outline of the original report and includes the material requested by DEP. All data presented in the original report remains valid and this report updates only those data required. In addition, the activities of the Authority during the past four years are documented. The conclusions of the original report are still valid and are repeated in this report.

*Number in brackets ( ) refer to documents included in the Appendix.

2.0 Conclusion

It is the conclusion of the North Stonington Sewer Authority that municipal sewerage service will not be required before the year 2020.

The basis for this conclusion was developed in the original report and is reinforced by the succeeding sections of this report. Conclusions are briefly summarized herein without regard to the order of importance:

1. Sanitary survey and sampling analysis show that existing problems are relative few in number and correctable on site.

2. The population growth rates are following the "low" predictions of the 1967 Plan of Development.

3. Growth patterns show no tendency to develop growth centers. The town is rural and is expected to remain so.

4. Zoning and subdivision regulations provide the mechanism to ensure and enforce orderly growth and the development of responsible and technically adequate on-site disposal systems and drainage.

5. Industrial growth is predicted to occur to a modest level within a designated area which has adequate soil conditions to allow safe on-site disposal of wastes.

5.6 Visual Inspection of Sample Sites

A visual inspection of sample sites listed in table 1 was made on April 21 and September 20, 1975, and February 16, 1976, at the time biological test samples were obtained. No appreciable changes occurred from the visual inspection documented in the original report with the exception of N. Stonington Village and Kingswood/Meadowood areas which are discussed below. For record it is noted that Cedar Ridge area has had no additional development since the 1972 report and the appearance of sample sites 30 and 31 are the same as reported in 1972.

5.6.1 Village of North Stonington

Four homes in the Village were identified as discharging sewage into the Shunock River and these homes have been condemned. At a town meeting on May 1, 1976, an appropriation of $60,000 was authorized for the purchase and demolition of the four homes. As of the date of this report, three of the homes have been purchased, demolished and a bicentennial green constructed in the area. The fourth home is being acquired by the Town but legal complications have delayed its acquisition and it is not known when the sale will be consumated. Only one elderly person lives in the house in question. The appearance of the Shunock River has been greatly improved by the above noted changes.

5.6.3 Kingswood/Meadowood

Ravenswood Drive from Laurel Wood Road to Kingswood Drive and Ronda Lane from Laurel Wood Road to Old Colony Road has been developed. See Figure 4C. It is estimated that 25 homes have been added in the Kingswood/Meadowood primarily in the area noted above. (Unfortunately a precise number cannot be given. This information was requested from Town Officials but never received.) The additional development did not change the appearance of sample sites 32, 33, 34, and 35 which are located in Kingswood/Meadowood.

5.7 Sampling and Testing

Standard membrane filter tests were performed at approximately 30 sample sites on April 21 and September 20, 1975, and February 16, 1976. Unfortunately, tests performed on the September 20 samples were judged to be invalid and are not reported. Many of the test results for the February 16 samples contained non-ideal colony counts and therefore only those results which had actual colony counts between 10 and 100 are given in the body of the report. Laboratory reports of April 21, 1975, and February 16, 1976, are included in the appendix (3)(4).

Dye testing of the North Stonington Village was requested by the Sewer Authority in February of 1973 and accomplished by D. Capellaro, principal sanitarian of the Connecticut State Department of Health. Results are discussed in Section 5.7.5.

5.7.4 Standard Membrane Filter Tests

Tables 1 and 2 and Figure 4 give sample sites and test results. Since there is no direct or simple quantitative correlation between total coliform counts determined by the standard membrane filter test and the MPN (most probable number) used in the original report, a quantitative assessment of improvement or degradation is not possible. However, areas which showed high MPN values in 1972 show high total coliform counts in 1975 and 1976.

5.7.5 Dye Testing in North Stonington Village

In February of 1973 this Authority requested that 33 homes in the village center that border the Shunock and Assekonk Rivers be dye tested (5). A sanitary survey of the Village was made by D. Capellaro in February and March of 1973, and 21 dye tests were performed. In addition to the 4 known violators (4 homes being acquired by the Town), 3 additional dwellings were found to seep sewage into the Shunock and one obvious septic failure was found. Various other marginal and undesirable situations were identified and are definite problems as their is little or no room for repairs. The four systems referred to above were corrected by installating new and/or repairing existing systems but no known action was taken on the marginal systems identified.

As a backup effort, a preliminary feasibility study was conducted on a small joint septic system which would serve 7 homes in the Village. The system would collect the effluent from septic tanks and provide a lift station to pump effluent to a leaching field on Town property at the Town garage. This concept has been judged to be feasible and was sized by Professor R. Laak of the Univerisity of Connecticut for 7 homes, but expansion to a maximum of about 20 homes is regarded as practical. If, at some future date, such a plan appears to be appropriate, a definitive proposal could be developed using this concept.

5.8 Evaluation of Sanitary Survey

In North Stonington Village, considerable improvement has been made in eliminating sources of pollution and in repairing defective septic systems. Unfortunately, this progress seems to have stopped and therefore, the Village is still regarded as an existing problem area.

Additional areas of known pollution remain the same as stated in the 1972 report. The most critical problem is Cedar Ridge where no improvements have been made over the past four years.

6.0 Long Range Planning

The Planning and Zoning Commission and the Development and Industrial Commission have reviewed and find no reason to change their reports which were included in the 1972 report. (6)(7)

7.0 Sewer Authority Activities

Important Sewer Authority activities between 1972 and 1976 not reported elsewhere in this report are included in this section.

7.1 Review of Subdivision and Commercial and Industrial Development Plans

The Sewer Authority was successful in attaining approval/disapproval authority on all subdivision plans and proposals as well as commercial and industrial development plans presented to the Planning and Zoning Commission. This power affords the Authority the opportunity to assess and advise on all planned systems. Since 1972, nine sets of plans were received of which five were found to be acceptable and four were rejected.

7.2 Sewer Authority Annual Reports

The annual reports of the Sewer Authority which correspond to the Town Fiscal Year of July 1 of a given year to June 30 of the following year are included in the appendix for record. (8)(9)(10)

7.3 Resignation of North Stonington Sewer Authority

To carry out the Sewer Authority recommendations requires the cooperation of other Town Officials and commissions. Unfortunately, this spirit of cooperation does not exist and therefore, the Sewer Authority will resign as a body after submission of this report. The appendix (11)(12)(13) contains correspondence relating to this condition.

Table 1
Test Results, Standard Membrane Filter Test

Station Number	Total Coliform (100 ml) 4/21/75	2/16/75
1	150,170	
1-2		200
2	1210,980	
3	300,240	150
4	100,60	
5	210,350	
6	460,500	
9	350,310	
10	60,50	
11	390,300	
12	510,680	220
14	550,600	
15	290,200	
15-1	150,260	150
15-2	380,280	170
15-3	250,300	
16	1000,880	1200,600
17	190,110	
20	400,530	
21	800,750	
22	310,270	130
23	80,50	
25	230,190	
28	0,0	100
29	550,440	210
30	TNC*	2100,2500
31	750,900	3100
32	230,180	
33	40,90	
35	50,60	190
36	120,140	600

*TNC = too numerous to count and have values at least 3000/100 ml.

Flow at site 22 on 4/21/75 was 7.6 C.F.S. (Flow Duration 37%)
Flow at site 22 on 2/16/76 was 9.6 C.F.S. (Flow Duration 28%)

Table 2. Listing of Sample Sites

1	Green Fall Br. at Putker Rd.
1-1	Green Falls Br. Rt 216 N.S. & 216 E.W.
1-2	Green Fall Br. above Wyassup Br.
2	Green Fall Br. at Rt. 216
3	Clarks Falls at Grist Mill Dam
4	Green Fall Br. at Old 184 Crossing (Hopkinton)
5	Pendleton Hill Br. at Browning's Corner
6	Wyassup Br. at Rt. 49
7	Wyassup Br. at Dam
8	Pendleton Hill Br. at Old Cemetery Rd.
9	Gallup Pond at Rt. 2 Crossing (Shunock R.)
10	Shunock R. at Hewitt Pond
11	Shunock R. at West Main St. Bridge - N.S. Center
11^1	Shunock R./Assekonk B. - at Parking lot, N.S.
11^2	Shunock R./Assekonk Br. - at East Main St. Bridge N.S. Center
12	Assekonk Br. at Corner Parking lot, N.S. Center
13	Assekonk Swamp at Pine Grove
14	Shunock R. at Store
15	Shunock R. at I-95 Service Road Culvert
15^1	Shunock R. at I-95
15^2	Shunock R. at I-95 - 100 ft up from I-95 Bridge
15^3	Shunock R. at I-95
15^4	I-95 Service Road - Catchbasin
16	Pawcatuck River at State Line
17	Shunock R. at Rt. 49 (Voluntown Road)
18	Lantern Hill Brook

Table 2 (Continued)

19	Yawbux Br. at Ryder Road
20	Assekonk Br. at Jeremy Hill
21	Boom Bridge - Pawcatuck R.
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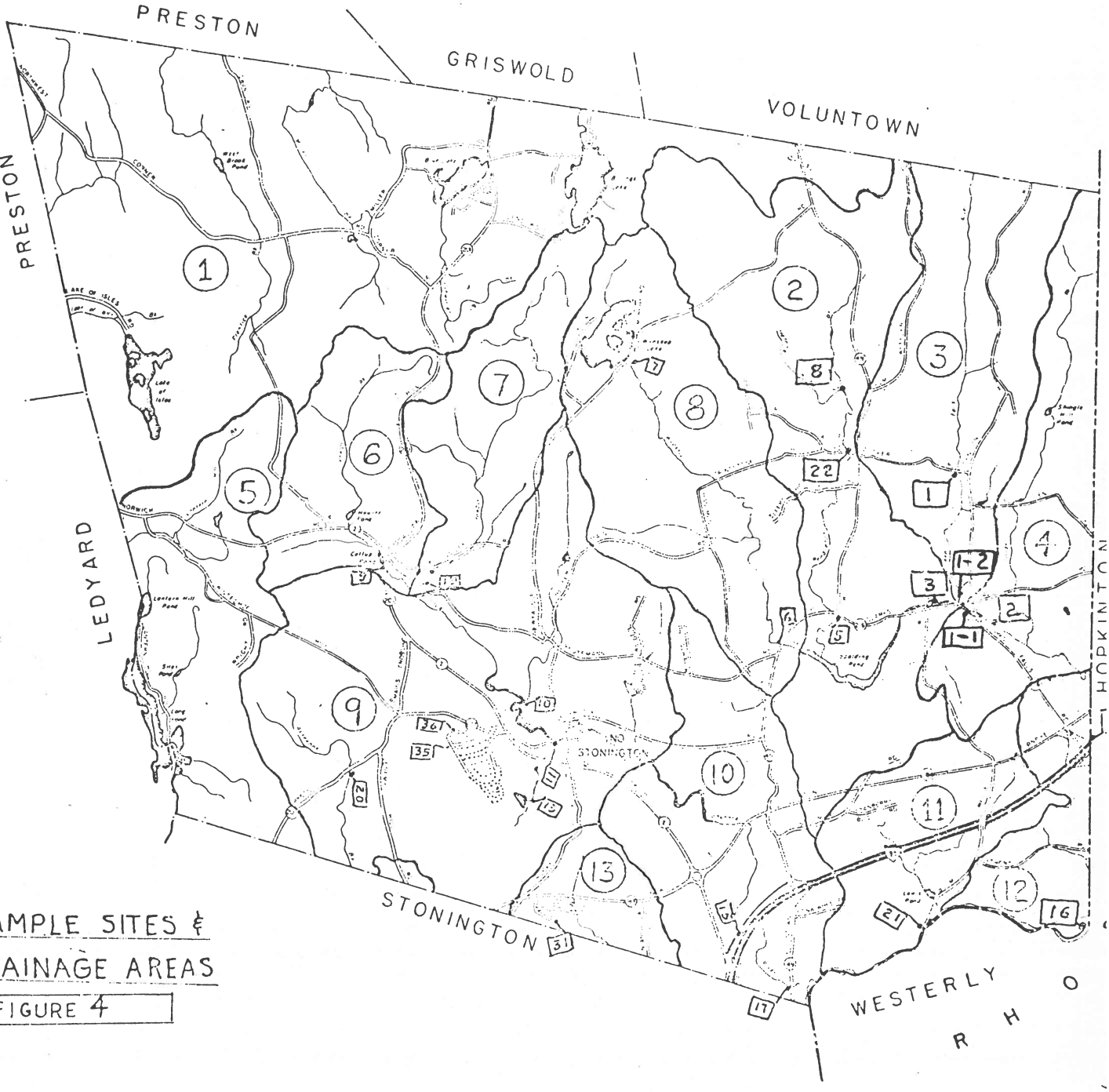
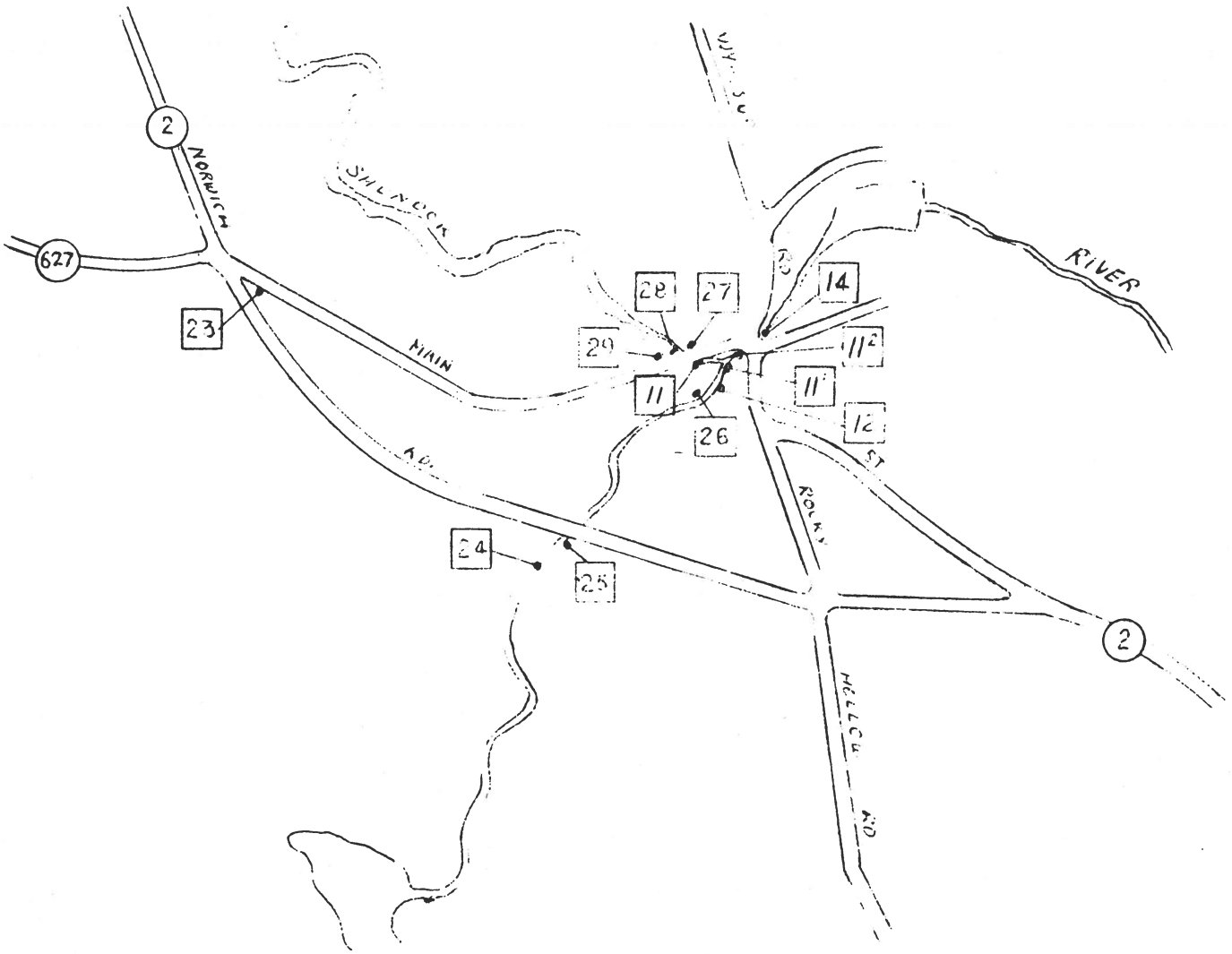
25	Assekonk Br. at Rt. 2 crossing
26	Assekonk Br.
27	Shunock R.
28	Shunock R.
29	Shunock R.
30	Culvert, Cedar Ridge - Hickory Lane at Pond Drive
31	Culvert, Cedar Ridge - Hickory Lane at Oak Drive
32	Culvert, Kingswood at extension of Old Colony Road
33	Culvert, Kingswood at Pinecrest - East
34	Culvert, Kingswood at Pinecrest - West
35	Culvert, Kingswood at Ravenswood Dr.
36	Culvert, Kingswood at Old Colony Rd. - West



SAMPLE SITES & DRAINAGE AREAS

FIGURE 4

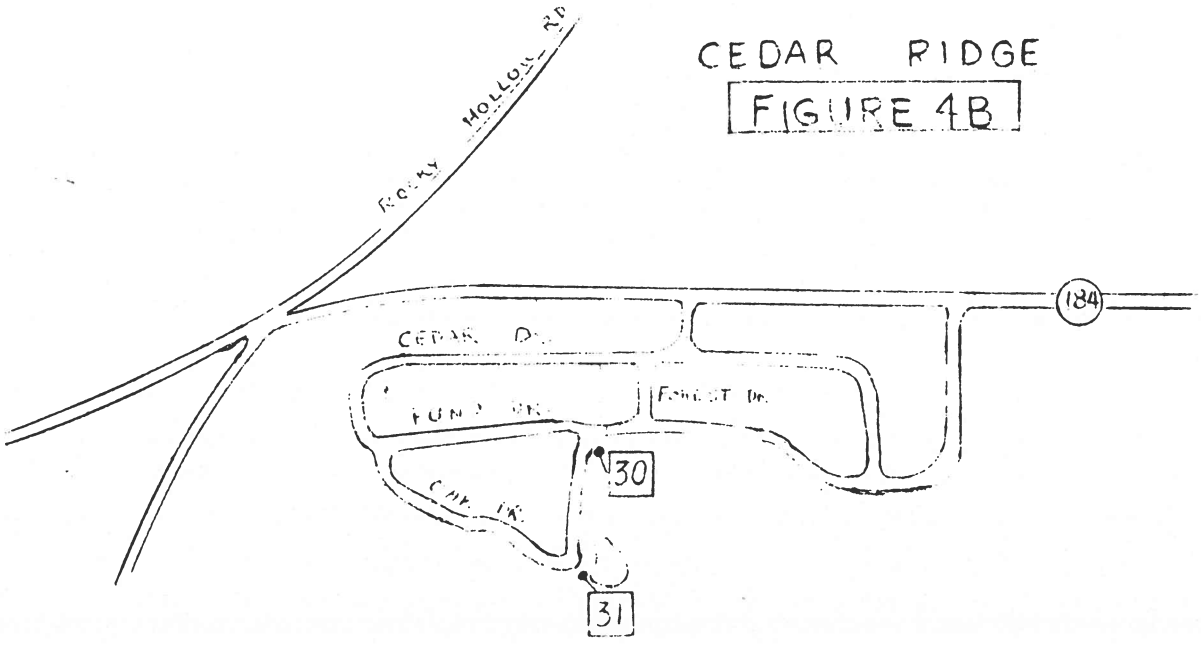


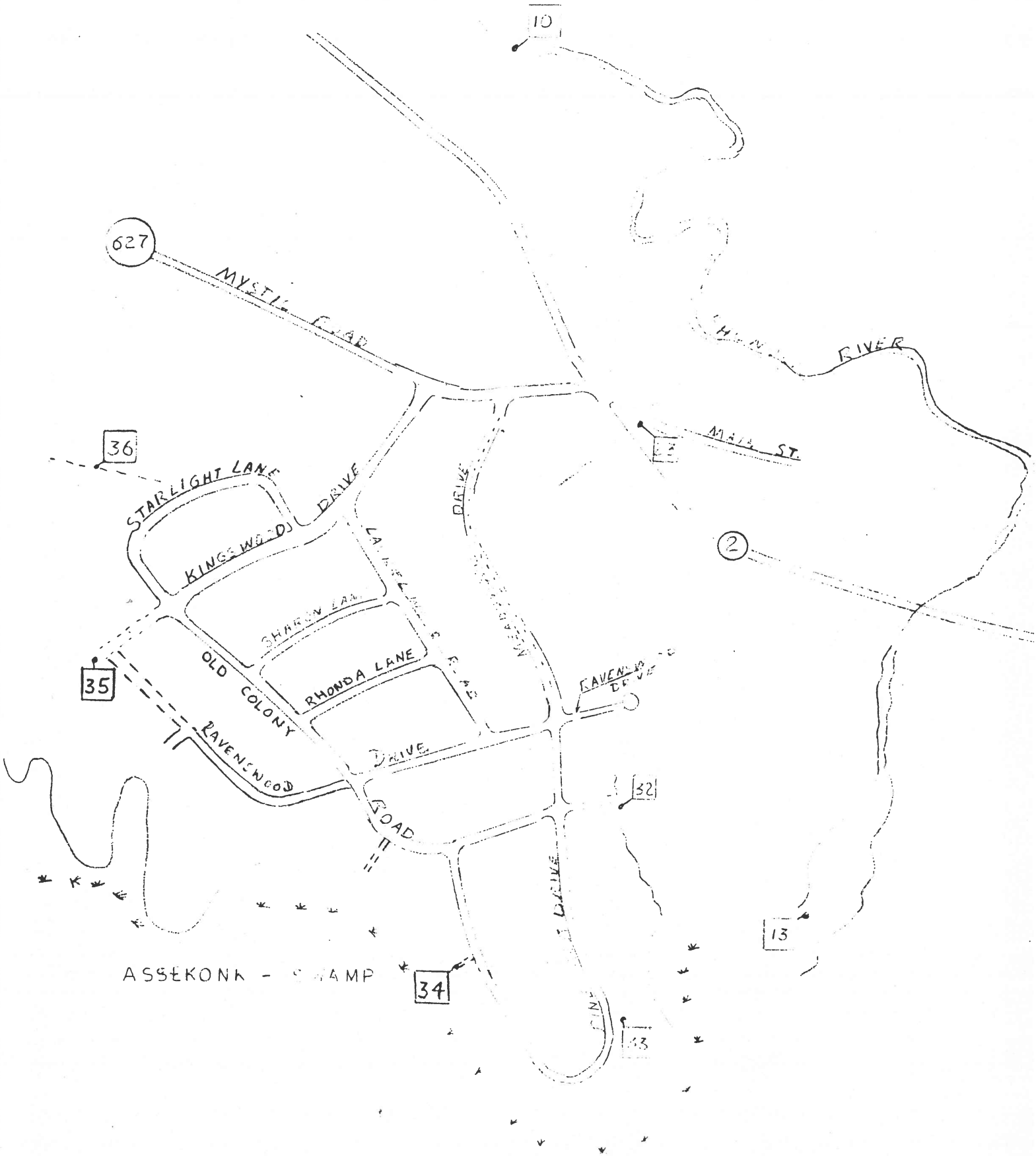
NORTH STONINGTON VILLAGE

FIGURE 4A

CEDAR RIDGE

FIGURE 4B





KINGSWOOD - MEADOWOOD

FIGURE-4C

APPENDIX
BACKGROUND DOCUMENTS

1. State of Connecticut Department of Environmental Protection Letter to Sewer Authority, dated 3 December 1974

2. Letter from R. W. Marble to Mr. Wesley L. Winterbottom, Department of Environmental Protection, dated 14 February 1975

3. Letter, Richard J. Benoit, EcoScience Laboratory, to Mr. Ed Budzik, No. Stonington Sewer Commission, dated 21 April 1975

4. Results of Analyses of Streamwater samples from No. Stonington Collected Monday, February 16, 1976.

5. Letter from No. Stonington Sewer Authority to Mr. Donald Capellaro, dated 1 February 1973

6. Letter, Charles P. Robinson, The Town of North Stonington Connecticut, Planning & Zoning Commission to Mr. Richard W. Marble, Sewer Authority, dated 21 August 1975

7. Letter, Development and Industrial Commission to North Stonington Sewer Authority dated 22 August 1975

8. Sewer Authority Annual Report 1972-1973

9. Sewer Authority Annual Report 1973-1974

10. Sewer Authority Annual Report 1974-1975

11. R. W. Marble letter to Mr. R. S. Lee, First Selectman, North Stonington dated 7 January 1976

12. James L. Schmidt, MD. letter to Roy S. Lee dated 29 January 1976

13. R. W. Marble letter to Roy S. Lee dated 4 February 1976

Water Pollution Control Authority

Plan For The Town of North Stonington

January 18, 1994

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PREFACE

This Water Pollution Control Plan for the Town of North Stonington, Connecticut is for the purpose of: (1) providing information and guidelines for ongoing inventory and monitoring of water quality and potential pollution sources so as to provide early warning signs enabling sewer avoidance, or to determine if sewers are required and (2) provide information as to the workings of the North Stonington Water Pollution Control Authority (WPCA) for the benefit of all concerned.

1.0 INTRODUCTION

Sections 22a-416 through 22a-484 of the Connecticut General Statutes provide for water pollution control to protect the waters of the State of Connecticut. The Commissioner of Environmental Protection is given broad powers to provide this protection. Some of these powers have been delegated to municipal water pollution control authorities. The Commissioner, however, retains the authority to preempt a decision of a municipal water pollution control authority if required to uphold the state law, or the Federal Clean Water Act (33USC 1251 et seq.). All decisions and actions of the WPCA are subject to the review and approval of the Commissioner.

Section 7-246 of the Connecticut General Statutes authorize a town to create a WPCA. If sewers are utilized within the borders of a municipality, either to correct water pollution problems or to prevent pollution from occurring, the municipality is required by state statute to have a Water Pollution Control Authority to ensure the effective management of the sewer system.

In 1992 the Town of North Stonington was presented with plans for large hotels to be located in the aquifer protection zone near the Route 2 - Route 184 rotary and east of Route 2 south of I-95. The Planning and Zoning Commission approved the requested regulation change and special permit for a hotel north of the rotary on Route 2, with the condition that sewerage must be approved by the Connecticut Department of Environmental Protection. The volume of effluent from the planned hotel indicated that sewers might be necessary to prevent water pollution. Other businesses in the area expressed an interest in hooking up to sewers if available. Many residents of town expressed an interest in promoting economic development in the area to provide tax relief. The success and expansion plans of the Mashantucket Foxwoods Casino and Resort was expected to bring commercial development pressures and opportunities in the commercial, office/research, highway-commercial, and industrial zoned areas.

A primary concern in pursuing these general development goals was the protection of the aquifer underlying a large portion of the area zoned for commercial and industrial development. A large, primary aquifer has been identified by the Connecticut DEP and the Planning and Zoning Commission. Zoning regulations have been

adopted to protect this aquifer area. The aquifer has also been identified and explored by the Town of Westerly, Rhode Island as a significant source of future drinking water for Westerly's municipal water system.

In view of these considerations the Board of Selectmen appointed the current North Stonington Water Pollution Control Authority effective February 20, 1993, consisting of eight members in accordance with the Town of North Stonington ordinance "AN ORDINANCE CONCERNING SEWER AUTHORITY". Section 7-246(b) of the Connecticut General Statutes provides that the WPCA may prepare and periodically update a water pollution control plan for the Town: "Such plan shall designate and delineate the boundary of: (1) areas served by any municipal sewerage system; (2) areas where municipal sewerage facilities are planned and the schedule of design and construction anticipated or proposed; (3) areas where sewers are to be avoided; (4) areas served by any community sewerage system not owned by a municipality and (5) areas to be served by any proposed community sewerage system not owned by a municipality. Such plan shall also describe the means by which municipal programs are being carried out to avoid community pollution problems. The authority shall file a copy of the plan and any periodic updates of such plan with the commissioner of environmental protection and shall manage or ensure the effective management of any community sewerage system not owned by a municipality."

The powers of the WPCA are advisory unless pollution occurs or is likely to occur to the waters of the State of Connecticut or of the United States. Waters of the State are those waters that enter or leave a piece of property under common ownership within the state. Waters of the United States are those that reach the ocean. Pollution is anything that lessens the purity of the waters of the State or United States. Pollution or the threat of pollution can often be contained within the confines of a property by proper on-site pollution control facilities and management. This is directly administered on the local level by the Town Sanitarian, Health Officer, Inland Wetlands Agency, and the Zoning Enforcement Officer acting under various state and local laws and regulations.

The Planning and Zoning Commission provides the land use planning, regulations, and enforcement designed to prevent water pollution in areas of the town where sewers are neither needed or wanted. This is the sewer avoidance area of the town and may consist of part or all of the town. If the intensity of development in any area of town should exceed the capacity of the land to handle on-site disposal, sewers will be required to prevent water pollution regardless of whether they are planned or desired.

The town, through the planning process and its Planning and Zoning Commission, may create a district or districts intended for future sewer service. This may be for the purpose of encouraging economic development or a recognition that service will be needed in the future by residential or other uses. The WPCA has broad powers to correct pollution by installing sewer systems, and has jurisdiction over the installation and management of any sewer system constructed within the town.

Installation of sewers in an area where sewers were not anticipated may change the rural character of North Stonington which has been diligently preserved by its people and elected officials. Sewers are likely to bring increased density of development. If the increased density of development is located above and near a drinking water aquifer or in an aquifer protection zone, non-point sources of pollution such as runoff from parking areas, streets, accidental spills, and the like, may cause pollution that cannot be easily corrected by added sewer service. This is a danger that must be recognized and specifically dealt with in formulating the Town's plan of development.

A goal of the WPCA is to help prevent water pollution by providing advisory assistance to those individuals, boards, and commissions who have the authority to plan, regulate, and enforce the measures necessary to prevent water pollution. As an ongoing service, the WPCA will aid this effort by providing educational material to the public concerning the proper use and maintenance of residential septic systems.

2.0 WPCA ACTIVITIES

The North Stonington Water Pollution Control Authority was originally created by Town Ordinance in 1972. The WPCA remained active until 1976 when its members resigned and effectively disbanded the WPCA. No new members were appointed until January of 1993. The WPCA engaged in a full range of activities during 1993 and remains fully active at the present time.

2.1 PRIOR ACTIONS AND REPORTS

On June 19, 1967 the State of Connecticut DEP issued the Town of North Stonington Order No. 84, ordering the Town to construct necessary sewage collection systems to serve present and future needs and to provide capacity for future industrial waste. This order was based on the DEP having found that the Town of North Stonington was a municipality within which a community pollution problem could reasonably be anticipated in the future. Facilities were to be constructed and in operation by December 31, 1972. The order called for the discharge of all sewers to the Pawcatuck system in the Town of Stonington.

The Town engaged the engineering firm of Metcalf and Eddy in September of 1969 to study and report on the need for sewers. Metcalf and Eddy concluded in May of 1970 that no significant pollution problems existed, that sewers would not be needed for 8 - 10 years, and requested a two year extension of Order No. 84 to allow for a comprehensive engineering report to be submitted to the DEP. The DEP granted the requested extension and changed the wording of its Order to read "Having found that the Town of North Stonington is a municipality causing pollution of the waters of the State of Connecticut . . . "

A North Stonington Sewerage Study Committee was appointed by the Board of selectmen in June 1971, and was formally established

at a Town Meeting held on January 31, 1972, as a Sewer Authority with the duties and powers specified in State Statutes. The Authority conducted extensive surveys of sanitary systems within the town and conducted extensive sampling of waters of the town. Long range planning (50 years out), and its impact on the need for sewers was evaluated in cooperation with the Planning and Zoning Commission and the Industrial and Development Commission.

The Authority issued its Sewer Authority Engineering Report dated April 29, 1972, with the following conclusions and recommendations:

"It is the conclusions of the North Stonington Sewer Authority that municipal sewerage service will not be required before the year 2020. The basis for this conclusion is developed in the succeeding sections of this report and is briefly summarized herein without regard to the order of importance:

1. Sanitary survey and sampling analysis show that existing problems are relatively few in number and correctable on site.

2. The town growth rates are following the "low" predictions of the 1967 Plan of Development.

3. Growth patterns show no tendency to develop growth centers. The town is truly rural and is expected to remain so.

4. Zoning and subdivision regulations provide the mechanism to ensure and enforce orderly growth and the development of responsible and technically adequate on-site disposal systems and drainage.

5. Industrial growth is predicted to occur to a modest level within a designated area which has adequate soil conditions to allow safe on-site disposal of wastes."

In its recommendations the Authority assumed the responsibility of maintaining a continuous monitoring of those conditions and activities which might be expected to endanger the purity of our waters. The institution of a continuing program of water sampling was recommended to provide early indications of impending sewage problems. Biennial reports would revise, as appropriate, the population growth and density projections, industrial development projections and commercial development projections thereby providing early indications of sewer needs if required earlier than the year 2020. The Authority requested the rescinding of Order No. 84.

Sewer Authority Engineering Report No. 2 was issued April 20, 1976. The Authority stated that "the conclusions of the original report are still valid and are repeated in this report". The 1976 report documents the activities of the Authority, updates data where required, and includes information requested by the DEP. Considerable activity and corrective actions were taken by the Authority and other town agencies. Four homes in the Village were

condemned and $60,000 was appropriated for the purchase and demolition of the four homes.

The Authority resigned on April 30, 1976, feeling that it no longer could be effective. The DEP subsequently rescinded Order No. 84, and the extra capacity in the Pawcatuck sewerage treatment plant provided to receive sewerage from North Stonington was not used. Slow growth and sewer avoidance practices in accordance with the recommendations of the Sewer Authority Engineering Reports, have maintained sewer avoidance to this date.

The current Water Pollution Control Plan for the Town of North Stonington was approved by the Connecticut Department of Environmental Protection in 1976 and provided for the avoidance of sewers in the Town of North Stonington through the year 2020. This Plan was based on low population growth projections and the commitment of the Planning and Zoning Commission to use its statutory authority to control the location, density, and type of economic and residential development in North Stonington so that sewers would not be needed. The Plan also reflected the view of the Industrial and Development Commission of North Stonington that the desired economic development could be handled by on-site disposal systems.

2.2 1993 ACTIONS

The report that follows is an update of the 1976 Plan and continues sewer avoidance as the primary objective in most areas of the town. The WPCA has identified and considered the feasibility of sewers in one commercial/industrial area of the town where high density economic development appears most likely to occur.

Since 1976 increased protection of the aquifers in North Stonington has been an objective of the Planning and Zoning Commission and aquifer protection regulations have been adopted for this purpose. Economic development has continued to be recognized as a means of lowering the tax burden on the residents of the Town and the lands selected in the Plan of Development for economic development are for the most part located within the aquifer protection zones. Therefore, at some point, sewers may be required to protect the waters of the aquifers in the zones selected for economic development. This reality is addressed in the updated report and represents the only major change in the original report.

If sewers are required or planned to promote economic development the updated plan calls for the preparation and adoption by the Water Pollution Control Authority of rules and regulations for the construction, connection, maintenance, and operation of sewers, assessment of benefits and the collection of fees. The WPCA would also be responsible for the negotiation and adoption of an intermunicipal agreement between the Towns of North Stonington and Stonington for use of the Pawcatuck Sewerage Treatment Plant in Stonington and the future monitoring and servicing of North Stonington's system.

After the completion of these agreements the WPCA would

establish a sewer district with the same boundary as the contiguous Industrial, Highway Commercial, and Office/Research zones in the Route 2/ I-95 area as shown on the zoning map current at the time, subject to engineering and financial constraints of constructing a cost effective sewer system. In no event would the sewer district go beyond these contiguous commercial and industrial districts established by the Planning and Zoning Commission. Thereafter, the WPCA would manage or ensure the effective management of any sewer system within the sewer district as provided by State Statute.

Upon taking office the newly constituted WPCA organized and established a schedule of tasks with task leaders, priorities, and weekly meetings that would enable it to perform its statutory duties in the shortest time possible. The WPCA (1) gathered information, (2) evaluated various sewer system options, (3) formulated its conclusions, and (4) issued this updated WPCA Plan, which will be implemented and updated as required.

Workshop sessions with representatives from various state agencies, town agencies, and other interested groups and persons were scheduled at the close of regular meetings. This provided valuable discussion and learning for the WPCA.

When the WPCA was appointed, the developer of the hotel planned north of the rotary indicated to the authority an urgent need for sewer approval and a willingness to bear the cost of achieving this end. The WPCA responded to this need within the statutory limit of its authority. To this end preparations were made to designate a sewer district, hire legal and engineering consultants, commence writing and adopting rules and regulations for the installation, operation, and financing of sewers, and for negotiating an intermunicipal agreement between North Stonington and Stonington for use of the Pawcatuck sewer treatment plant.

The WPCA decided that all costs would have to be borne by the developer and others using the sewers. Anticipating that the initial funding would be forthcoming from the developer, the WPCA retained an attorney specializing in water pollution control and sewers. The WPCA intended to work with the attorney in drafting sewer district regulations, the essential first step in creating a sewer district. The funding, however, was not forthcoming from the developer, and therefore the WPCA was not able to pursue the actual drafting and adoption of a sewer district, regulations or an intermunicipal agreement with the Town of Stonington. The WPCA does not anticipate pursuing these activities until the required funding is in place from either private or public sources.

3.0 EXISTING WATER QUALITY STANDARDS

The basic standards for the quality of Connecticut's water are the Water Quality Standards and Criteria (WQS) as set forth in Connecticut's clean water program. The WQS set an overall policy for management of water quality in accordance with the directive of Section 22a-426 of the Connecticut General Statutes. In simple terms, the policies can be summarized by saying that acceptable water quality can be achieved by applying Department of

Environmental Protection professional standards that shall:

- Protect surface and ground waters of high quality from degradation.
- Segregate waters used for drinking from those that play a role in waste assimilation.
- Restore surface waters that have been used for waste assimilation to conditions suitable for fishing and swimming.
- Restore degraded ground water to protect existing and designated uses.
- Provide a framework for establishing priorities for pollution abatement and State funding for clean up.
- Adopt standards that promote the State's economy in harmony with the environment.

The WQS does not stand alone; rather, they are one critical element in a program to protect and improve water quality. The WQS were written in response to and in concert with, the principles of Connecticut's Water Pollution Control Act, Connecticut General Statutes section 22a-416 et. seq. The Statues set the broad outline and legal framework for an entire program. They establish the authorities and procedures for the WQS, for permitting discharges to the waters of the State and for the abatement of pollution. Within the framework of the Statues, the WQS establish broad policy and objectives to meet the statutory goals. These objectives are then carried out by means of specific procedures and requirements of statutory sections and even more detailed regulations. These include Statues and Regulations for the permitting of discharges to the waters of the State, hazardous materials management, solid waste management, water diversions, structures, dredging, wetlands and others.

4.0 EXISTING SEWERAGE HISTORY

In the 1972 report, four potential sources of pollution were identified. These included Cedar Ridge, Kingswood/Meadowood, North Stonington Village and the I-95 State Rest Area. Visible septic violations were identified in the Village and corrective action was recommended. A potentially serious problem due to the interconnection of house sewage disposal systems and storm drains was identified in Cedar Ridge. This problem was brought to the attention of the Town Health Officer for corrective action. The State Rest Area and Kingswood/Meadowood were found to be adequately managed by present on- site procedures. For the State Rest Area, it was recommended that the State set up a monitoring program to establish that the current on-site sewage disposal system continued

to function adequately.

By 1976, the major problems in the Village had been resolved, although some potential problems remained a source of concern. The status of the State Rest Area, Cedar Ridge and Kingswood/Meadowood areas was unchanged since 1972, with only Cedar Ridge being of significant concern since no improvements had occurred in the intervening four years.

The present WPCA has not updated the status of these potential problem areas. The Town Health Officer and Town Sanitarian have the primary responsibility for ensuring the proper disposal of septic wastes. The Town Sanitarian attended a WPCA workshop session and summarized his presentation by stating that there were no problems in town that could not be handled on-site on a case by case basis.

5.0 LONG RANGE PLAN

For the present time, the WPCA is guided by the Town's Plan of Development (Town Plan) as setting forth the general long range development and land use plan for the town. The WPCA is in agreement with the Town Plan, and feels that it is important for the WPCA to develop its future agenda in accordance with the overall Town Plan, which reflects the consensus of the town's people. The Town Plan includes the following conclusions and recommendations regarding sewers and public water services:

> The land use recommendations of the Plan assume a strictly limited and clearly defined extension of public water and sewer service into the town from Stonington. High-intensity economic activities should not be dependent on subsurface sewage disposal systems and on-site water supplies. This can only lead to underground and surface water pollution which, in time, will result in state-mandated abatement procedures.
>
> The availability of these utilities makes it possible to expect that the present rural character found throughout most of North Stonington will be maintained. By concentrating the higher density uses in the area of the town within which necessary public utilities will be provided, balanced town growth can be achieved, in terms of both densities and types of land uses.
>
> The Plan recommends that both public water and sewers be allowed to extend only into the area of the town proposed for economic development. Specifically, this includes the Office Research area on Route 2, the Manufacturing area on Route 49, and the Commercial area at the intersection of Routes 2 and 184. It is the intent of the Plan that public sewers not be extended beyond this defined area and that residential development occurring on the perimeter of this area be at a density that is supported by on-site sewage disposal facilities.

Appendix B to this Plan includes two maps outlining the area of town being considered for a potential sewer district and the remaining sewer avoidance area of town.

The WPCA recognizes that casino-related development by the Mashantucket Pequot Tribe has caused the Town to consider modifications to the Town's Plan of Development, especially in the area of town near the present casino site. It is not anticipated at this time that projected changes in land use will require an unscheduled update of the Town Plan.

6.0 POLLUTION AVOIDANCE PROGRAM

The WPCA has identified three activities as central to a pollution avoidance program for the Town of North Stonington:

1. Provide guidance to Town boards and the general public.
2. Develop and maintain a sewerage disposal inventory.
3. Develop an ongoing water quality sampling and testing program.

6.1 GUIDANCE TO TOWN BOARDS AND THE GENERAL PUBLIC

The WPCA views the prevention of water pollution as a critical long term goal of the Town. The dissemination of information to both the Town's land use boards and the general public is an important role for the WPCA as the pressures for development grow in the years ahead. The WPCA's activities will include:

. Providing advisory comment to Town boards and commissions when appropriate to avoid land use regulations or other actions that might lead to excessive development density or otherwise threaten the town's waters.

. Providing advisory comment to town boards and commissions with respect to regulations or other actions involving those industries which the Connecticut Statutes and DEP regulations identify as pollution threats.

. Disseminating information regarding pollution avoidance to town agencies, boards, and commissions, and the general public.

The WPCA does not view its role as being the promoter of economic development. The WPCA's role is to facilitate and cooperate with the initiatives of other town agencies. The WPCA will work with other agencies to review proposed development activities as requested, and will communicate with the agencies to ensure that they remain informed of the WPCA`s activities and concerns.

6.2 SEWAGE DISPOSAL INVENTORY

In order to facilitate maintenance of the conditions necessary for sewer avoidance as specified in this plan, a sewage disposal

inventory will be created and then updated on an annual basis. Included in this inventory will be (1) the four areas of pollution or potential pollution sources identified in the 1972 and 1976 reports (the Village, Cedar Ridge, Kingswood/Meadowood and the State Rest Area), (2) new developments (industrial commercial, agricultural residential) since the 1976 report that represent pollution potential and (3) identifiable future potential sources of pollution.

With the cooperation of the Planning and Zoning Enforcement Officer, the Health Officer, the Sanitarian and other relevant town officials, boards and commissions, an initial and then annual review of prior and current zoning permits issued will be conducted. The present status of these permits with respect to possible sources of pollution will be identified and recorded. A map will be created showing the location and type of potential pollution.

Using the above-described inventory, recommendations will be made on an annual basis to appropriate town officials, boards and commissions as to any actions deemed necessary to assure continued sewer avoidance in areas so designated.

6.3 WATER QUALITY MONITORING

In order to assure early detection of pollution and its source(s) so that corrective action can be taken to avoid the need for sewers, it is the objective of the WPCA to initiate a program of periodic sampling of surface waters for testing. Sampling of subsurface water would be done on an as needed basis.

In order to determine if water pollution existed in 1972, an initial survey of the town was conducted. Based upon the natural drainage characteristics of the land, the Town was subdivided into thirteen drainage districts. Sample sites were then chosen on the basis of current land use patterns. Eleven of the thirteen districts were studied. This same approach was followed in 1976.

It is anticipated that a similar approach to evaluating water quality in town can be followed at the present time. Because of the addition of new or anticipated development, it will be necessary to sample all 13 districts in the current evaluation. This approach will be supplemented with the targeting of known industrial, agricultural, residential (home occupation) and commercial operations identified as either not adequately evaluated in the past or new to the town since 1976. Attention will also be devoted to the identification of any community sewage disposal systems currently in operation or anticipated.

Efforts will also be directed at the identification of existing private water quality organizations and coordination of testing programs where appropriate and to the mutual benefit of the organization and the Town.

The WPCA feels that an ongoing water quality sampling program should be established, and that initially all of the sites listed in the Sewer Authority's 1976 Report No. 2 should be sampled and tested. The sites are listed below and shown on five maps (Figures

4 thru 4D) in Appendix B.

1. Green Fall Br. at Putker Rd.
2. Green Falls Br. Rt 216 N.S. & 216 E.W.
3. Green Fall Br. above Wyassup Br.
4. Green Fall Br. at Rt 216
5. Clarks Falls at Grist Mill Dam
6. Green Fall Br. at Old 184 Crossing (Hopkinton)
7. Pendleton Hill Br. at Browning's Corner
8. Wyassup Br. at Rt. 49
9. Wyassup Br. at Dam
10. Pendleton Hill Br. at Old Cemetery Rd.
11. Gallup Pond at Rt 2 Crossing (Shunock R.)
12. Shunock R. at Hewitt Pond
13. Shunock R. at West Main St.Bridge- N.S. Center
14. Shunock R./Assekonk B.- at parking lot, N.S.
15. Shunock R./Assekonk Br.- at East Main St. Bridge N.S. Center
16. Yawbux Br. at Ryder Road
17. Assekonk Br. at Jeremy Hill
18. Boom Bridge - Pawcatuck R.
19. Pendleton Hill Br. (at gaging station)
20. Culvert Corner Rt 2 and West Main St.
21. Assekonk Br. at Dam
22. Assekonk Br. at Rt 2 crossing
23. Assekonk Br.
24. Shunock R.
25. Shunock R.
26. Shunock R.
27. Culvert, Cedar Ridge-Hickory Lane at Pond Drive
28. Culvert, Cedar Ridge-Hickory Lane at Oak Drive
29. Culvert, Kingswood at extension of Old Colony Road
30. Culvert, Kingswood at Pinecrest-East
31. Culvert, Kingswood at Pinecrest-West
32. Culvert, Kingswood at Ravenswood Dr.
33. Culvert, Kingswood at Old Colony Rd.-West
34. Assekonk Br. at corner parking lot, N.S. Center
35. Assekonk Swamp at Pine Grove
36. Shunock R. at store
37. Shunock R. at I-95 Service Road Culvert
38. Shunock R. at I-95
39. Shunock R. at I-95 - 100 ft up from I-95 Bridge
40. Shunock R. at I-95
41. I-95 Service Road-Catch basin
42. Pawcatuck River at State Line
43. Shunock R. at Rt 49 (Voluntown Road)
44. Lantern Hill Brook

In addition, the major bodies of water in town should be tested. These are: Billings Lake, Blue Lake, Lake of Isles, Lantern Hill Pond, Long Pond, Wyassup Lake, and Spaulding Pond.

The water quality sampling program should be flexible enough to include testing of the following types of ground water:

- Public water supply well fields subject to the Connecticut Aquifer Protection Act (APA).
- Other public water supply fields which are not subject to the APA.
- Community water supply systems.
- Aquifers suitable and identified for future public water supplies.
- Areas of town where sewer avoidance is threatened.

7.0 PERIODIC UPDATE OF WATER POLLUTION CONTROL PLAN

The WPCA recognizes that increased economic development is likely to occur for the next several years. This development will require continued reassessment of the need for sewers and other pollution control measures. The WPCA is also cognizant of the inevitable changes in DEP regulations and policies that will occur as a result of the economic development associated with the Mashantucket Foxwoods Casino and Resort. The WPCA stands ready to respond to these future development and water pollution pressures by:

- Reviewing the WPCA Plan annually.
- If changes in the Plan are warranted, publishing an updated Plan on the third Tuesday of January.
- Meeting as the Chairman of the WPCA deems necessary to deal with water pollution control problems as they may occur from time to time.
- Establish a regular meeting schedule as the WPCA deems necessary to fulfill its statutory duties.
- Meet at least annually with DEP personnel to keep abreast of DEP activities and regulatory changes that may affect North Stonington.

FORMAL ADOPTION

This WPCA Plan was unanimously approved at a meeting of the WPCA held on January 18, 1994.

Richard E. Blodgett, Jr.Chairman

Robert P. Slocum, Vice Chairman

Donald R. Judge, Secretary

Kenneth T. Payne

Harold C. Karsten

John Macina

Everett L. Fontanella

William H. Hescock

DISTRIBUTION LIST

This plan has been distributed to the following:

Planning & Zoning Commission members and alternates
Zoning Board of Appeals members and alternates
Board of Selectman members
Board of Finance
Zoning Enforcement Officer
Town Sanitarian
Town Health Officer
Town Building Official
Inland Wetlands Commission
Economic Development Commission
Town Clerk
Stonington WPCA
Stonington First Selectman
Southeastern Connecticut Regional Planning Agency
Southeastern Connecticut Water Authority
City Manager, Town of Westerly, Rhode Island
Connecticut Commissioner of DEP
Dennis Greci, DEP
Robert Hust, DEP
Attorney Mike Zizka at Pepe & Hazard

Appendix A- Resource Materials & Maps

This list of resource materials represents a compendium of our files, folder by folder and map by map, established in the Selectmen's Vault in the Old Town Hall on subjects pertaining to the deliberations required to prepare a revised plan for the Water Pollution Control Authority. The Selectmen's Secretary has been specifically authorized to reproduce under current guidelines, any such document in these files originated by the Town's Water Pollution Control Authority. Any request for other documentation reproduction must be directed to its originator.

(a). Aquifer Protection Guidelines:
This brochure was prepared by the State of Connecticut to provide a practical and logical extension of basic geological principals to be used to determine necessity and extent of aquifer protection.

(b). Connecticut State Statutes:

Chapter 103: Municipal Sewerage Systems.
Chapter 105: Fire, Sewer and Other Districts.
Chapter 1-5a: Administration.
Chapter 440: Wetlands and Watercourses.
Chapter 446i: Water Resources.
Chapter 446k: Powers and Duties of the Commissioner (Sec. 22a)

(c). Correspondence (Incoming) March 1993- January 1994.
Contains originals or copies of correspondence received by the Authority for the period covered.

(d). Correspondence (Outgoing) March 1993- January 1994.

Contains copies of correspondence directed to another entity by the Authority for the period covered.

(e). Department of Environmental Protection, State of Connecticut:
Copies of letters specially addressing a request from the Water Pollution Control Authority or a particular phase of the requirements within the Town of North Stonington.

Copies of draft regulations being proposed for adoption.

Copies of protection proposals under study for incorporation within the broader concept of aquifer protection.
"Water Quality Standards", 15 May 1992, 68 pp.

(f). Groton:
Construction standards issued to contractors and inspection procedures to be expected through a contract cycle.

System Standards involving an overview of area system to be

added to the present infrastructure.

Usage Regulations pertaining to residential, commercial and industrial limitations on bulk, density, toxicity and other factors need to control the input of sewerage.

(g). Ground Water (Published Guidelines):
Septic Systems and Ground-Water Protection.
Guidelines for Planning and Inspecting Commercial/Industrial Systems.
Criteria for Regulation of On-Site Sewage Treatment.

(h). Hebron WPCA Regulations:

Copy of the regulations and amendments adopted by the Hebron, Connecticut WPCA for the operation of Hebron's sewage system.

(i). Montville:

Copy of the Montville Aquifer Protection Program.

Copy of the Montville Aquifer Toxicity Report.

(j). North Stonington:
Copy of the WPCA 1972 Report.
Copy of the WPCA 1976 Report.
Copy of the WPCA 1976 Supplemental Report.
Related background materials.

(K). Policies Plan for Connecticut:

Draft of the plan for Conservation and Development within Connecticut for the years 1992 through 1997.

(l). Putnam:

Copy of the inter-municipal agreement entered into by the City of Putnam and the Town of Woodstock to accept the flow of sewage from Woodstock.

Copy of the Water and Sewage Ordinance for the City of Putnam.

(m). Regional Sewerage Plan, SCRPA, 1969

(n). State and Federal Brochures:
Agricultural Waste Management.
Flood Plain Management.
Aquifer Protection Area Program.
Nutrient Management.
Erosion and Sediment Control.

(o). Stonington:

Copy of the Stonington WPCA Regulations.

Copy of the cost estimates prepared by the Stonington WPCA for a buy-in by North Stonington for their sewer system and treatment plant located in the Pawcatuck area.

Copy of a proposed "Inter-Municipal Agreement" between Stonington and North Stonington.

(p). Westerly Water Works:

Plan drawing of test well casings off 184.

Cross section drawing of test well casings.

(q). Wood-Pawcatuck Watershed Association:

Antidegradation Policy.

Pawcatuck Watershed Project.
National Resources Facts.
Connecticut Ground-Water Quality.
Connecticut Water Quality Classifications.
Drinking Water, A Community Action Guide.

(r). North Stonington WPCA:

Copies of the approved minutes of the meetings conducted by the WPCA from March 1993 through January 1994, arranged in inverse order.

Cost estimates for four phase sewage construction.

(s). Maps:

The following is a list of maps utilized and placed on file during the 1993 deliberations of the North Stonington Water Pollution Control Authority.

1. Analysis and Technology Route 2 Sanitary Sewer Extension, May 1991.

2. Town of Stonington WPCA, Pawcatuck District, Sanitary Sewer System, December 1984, Revised March 1991.

3. North Stonington Zoning Map, with WPCA working drafts for proposed Sewer District in the Routes 95, 49, 2 and 184 areas.

4. Bedrock Geology Map of the Ashaway Quadrangle.

5. U. S. Geological Survey of Water Resources in South Eastern Connecticut, Aquifer drilling and testing, Mapping of detailed Stratified Drift information, 1971.

6. Property Owners, draft WPCA worksheet of proposed Sewer District under consideration.

7. Locational Guide Maps, Connecticut Conservation and Development Policies Plan (1992-1997, May 1992.

8. U. S. Geological Survey, Ashaway Quadrangle, Topographic Map

(SE N.S.), Revised 1984. Old Mystic Quadrangle (SW N.S.), Revised 1983.

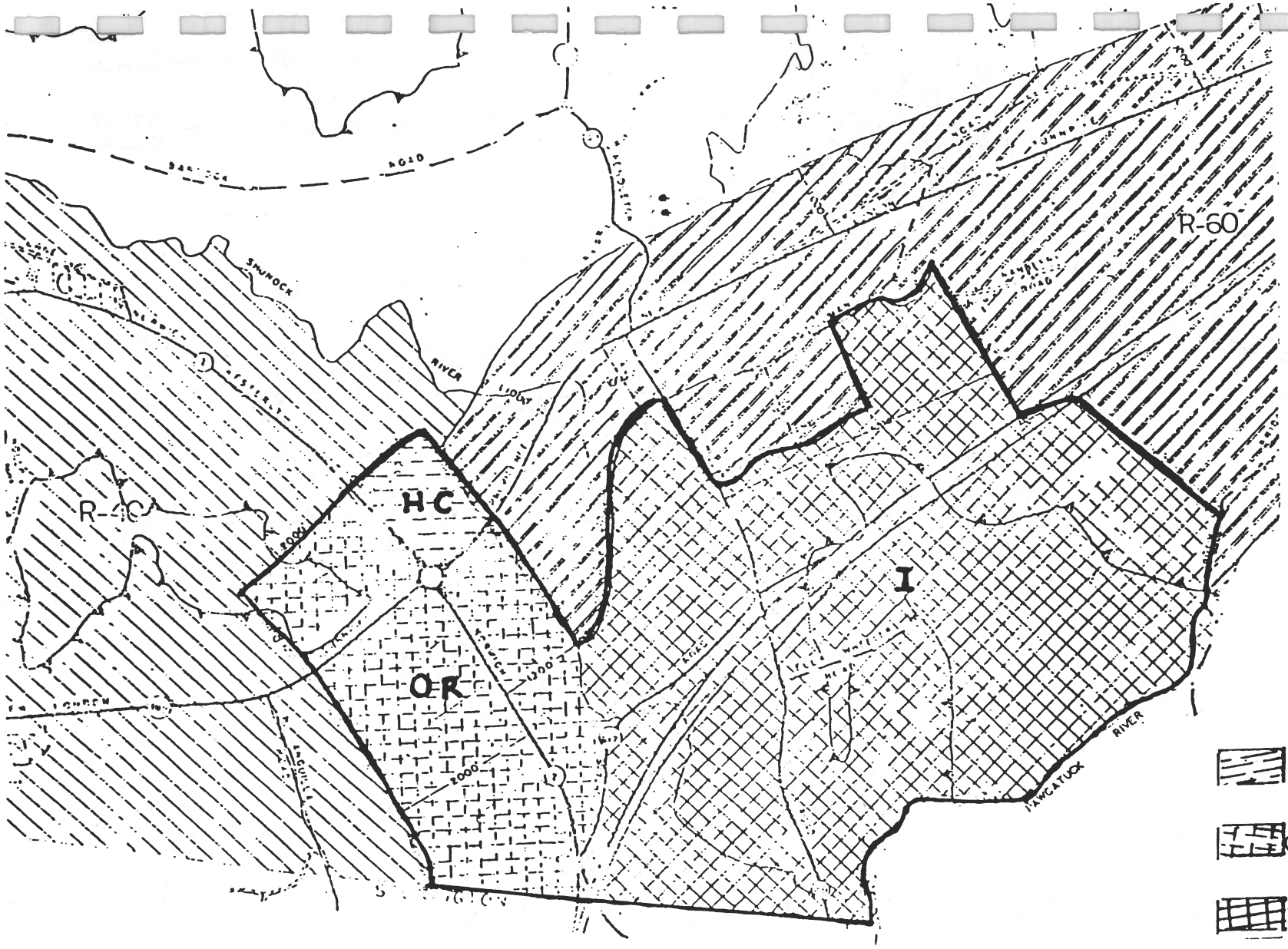
9. Plan showing North Stonington Inn proposed by North Stonington Associates, approved by Planning and Zoning, Revised 11 December 1992.

10. Surficial Geology, U.S. Geological Survey, Ashaway Quadrangle, 1968.

11. Water Quality Classification, Connecticut Department of Environmental Protection, 1987.

12. Ground Water Yields for selected Stratified Drift areas of Connecticut, U. S. Geological Survey, 1986.

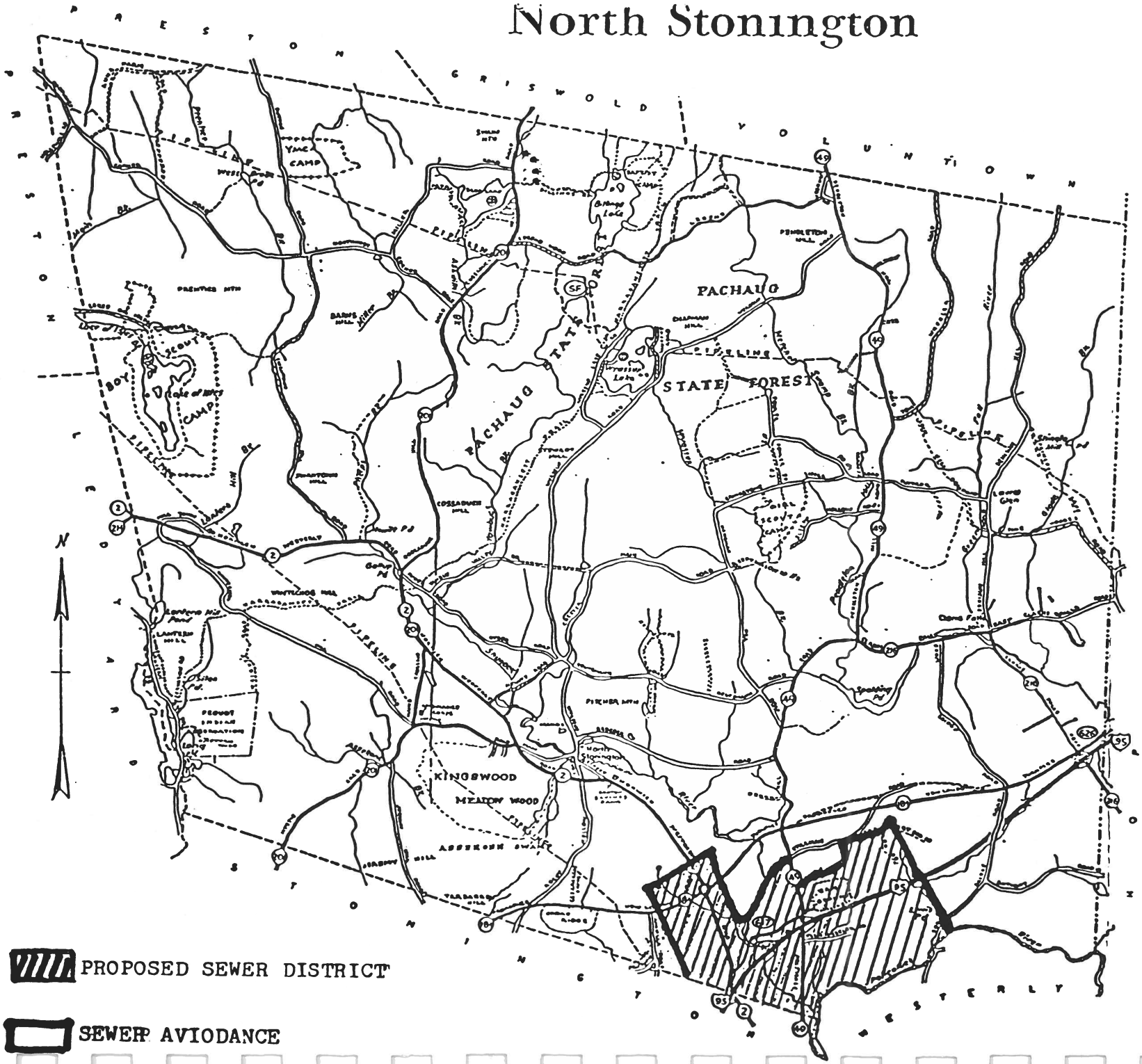
13. Ground Water Availability in Connecticut, State Geological Survey and Natural History Survey, 1978.



APPENDIX B

PROPOSED SEWER DISTRICT - NORTH STONINGTON, CONNECTICUT

North Stonington



APPENDIX B

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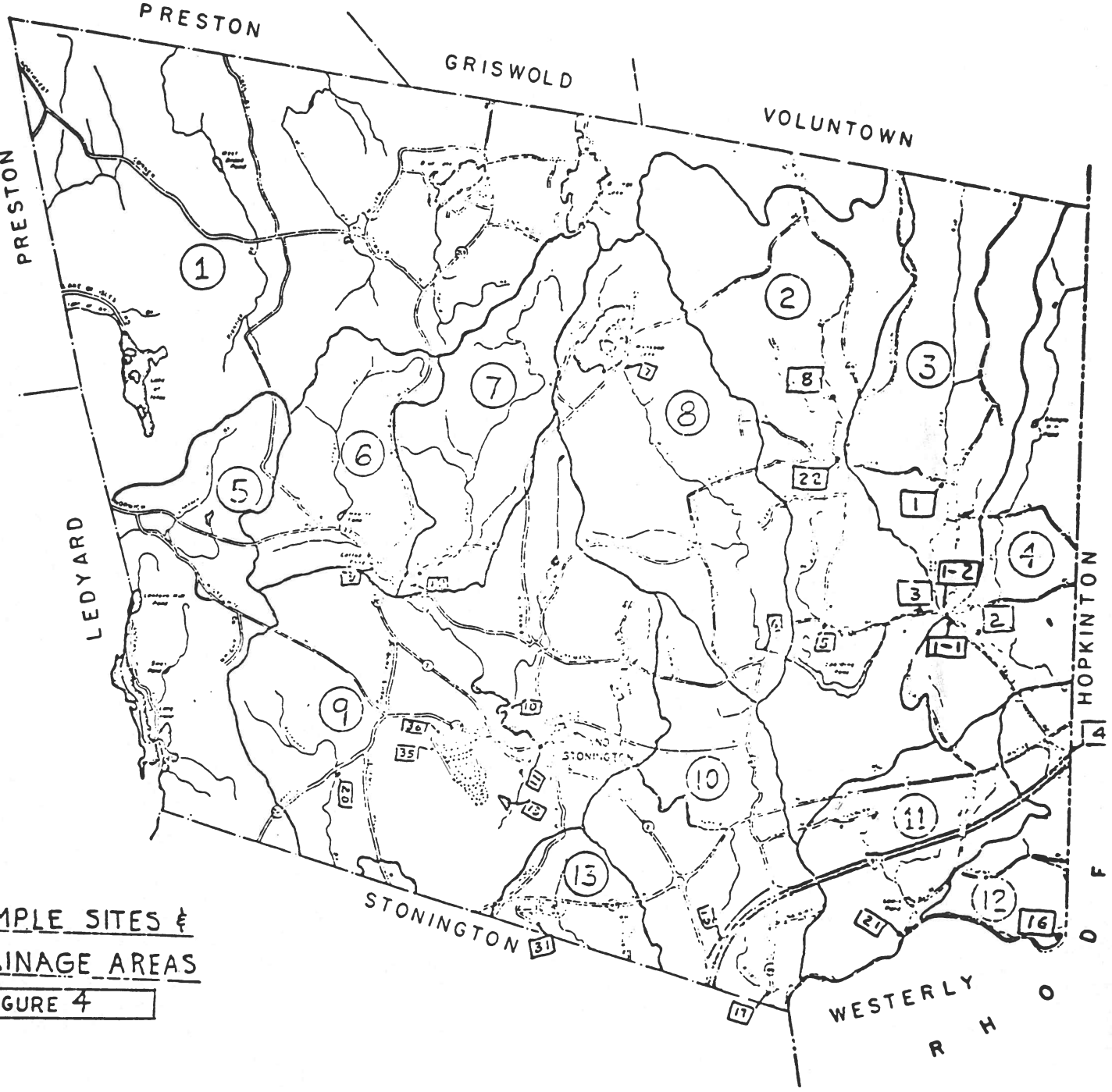
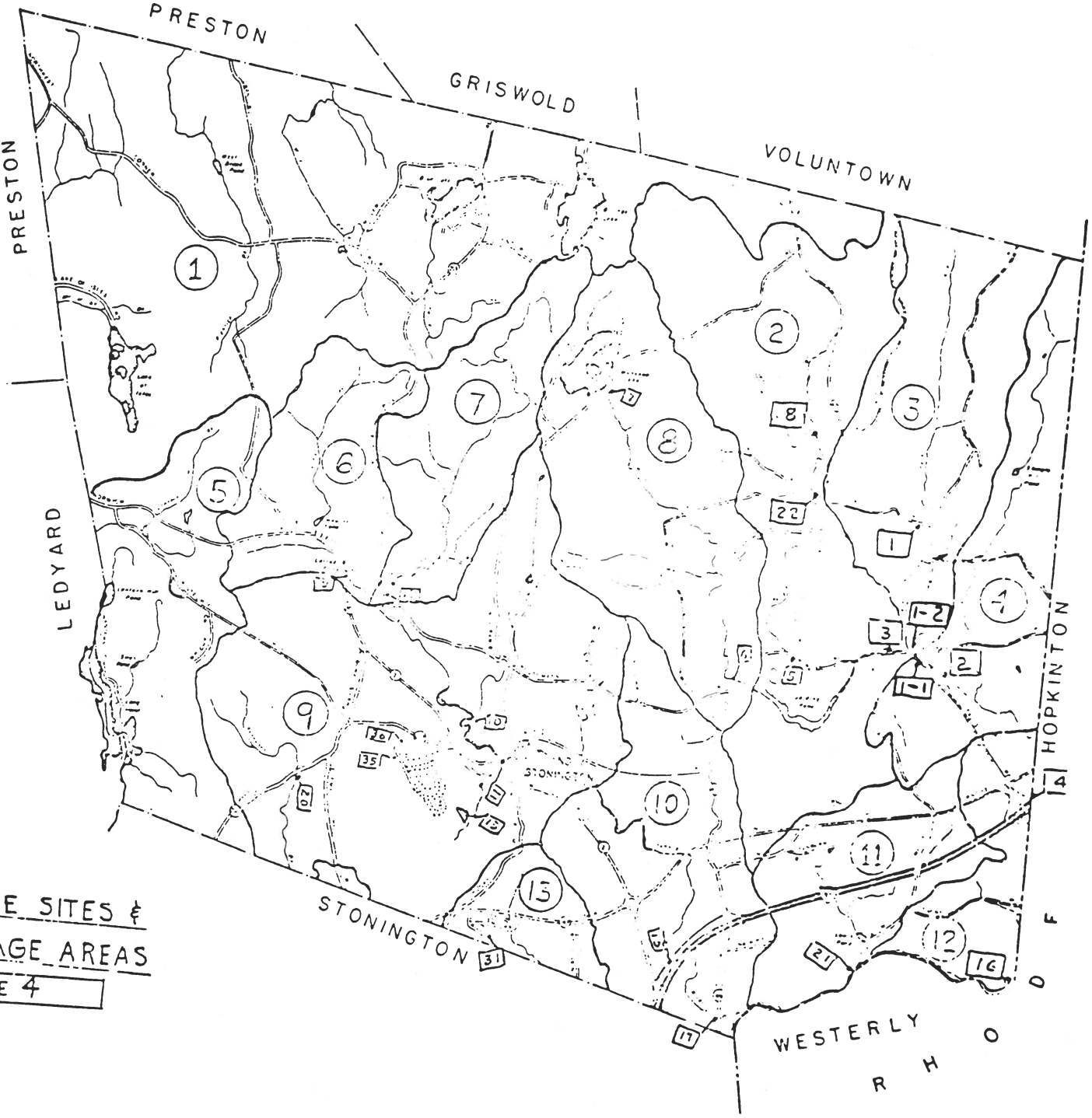


SAMPLE SITES & DRAINAGE AREAS

FIGURE 4

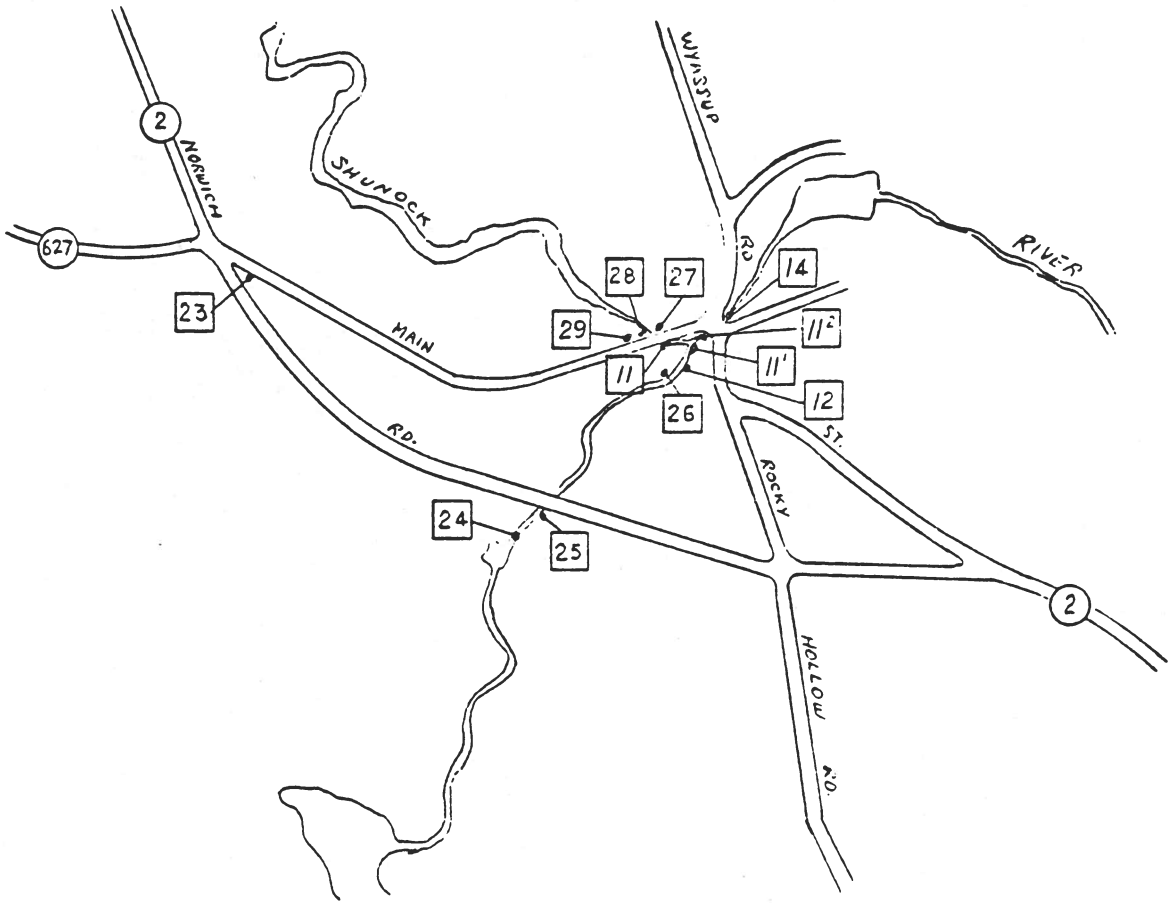
APPENDIX B



SAMPLE SITES & DRAINAGE AREAS

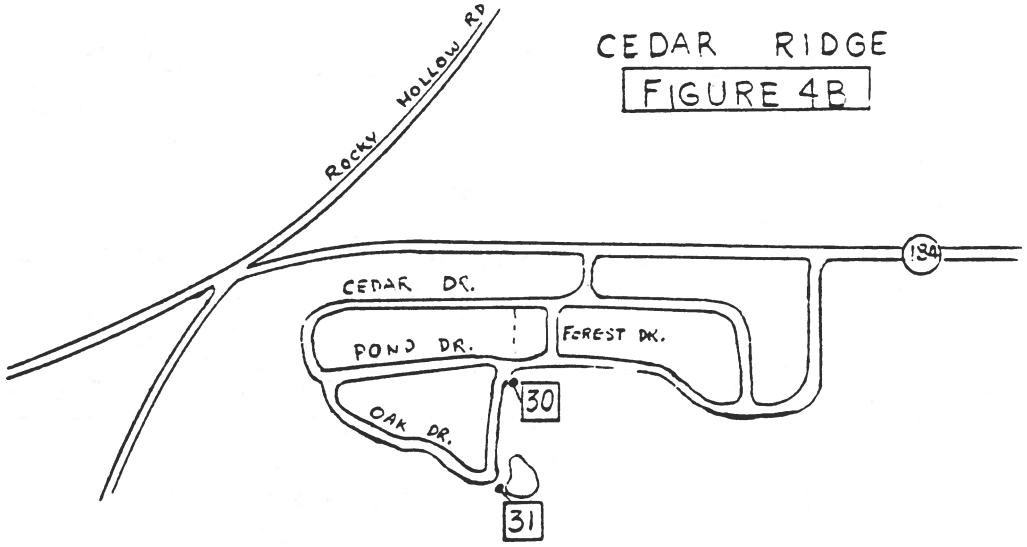
FIGURE 4

APPENDIX B



NORTH STONINGTON VILLAGE

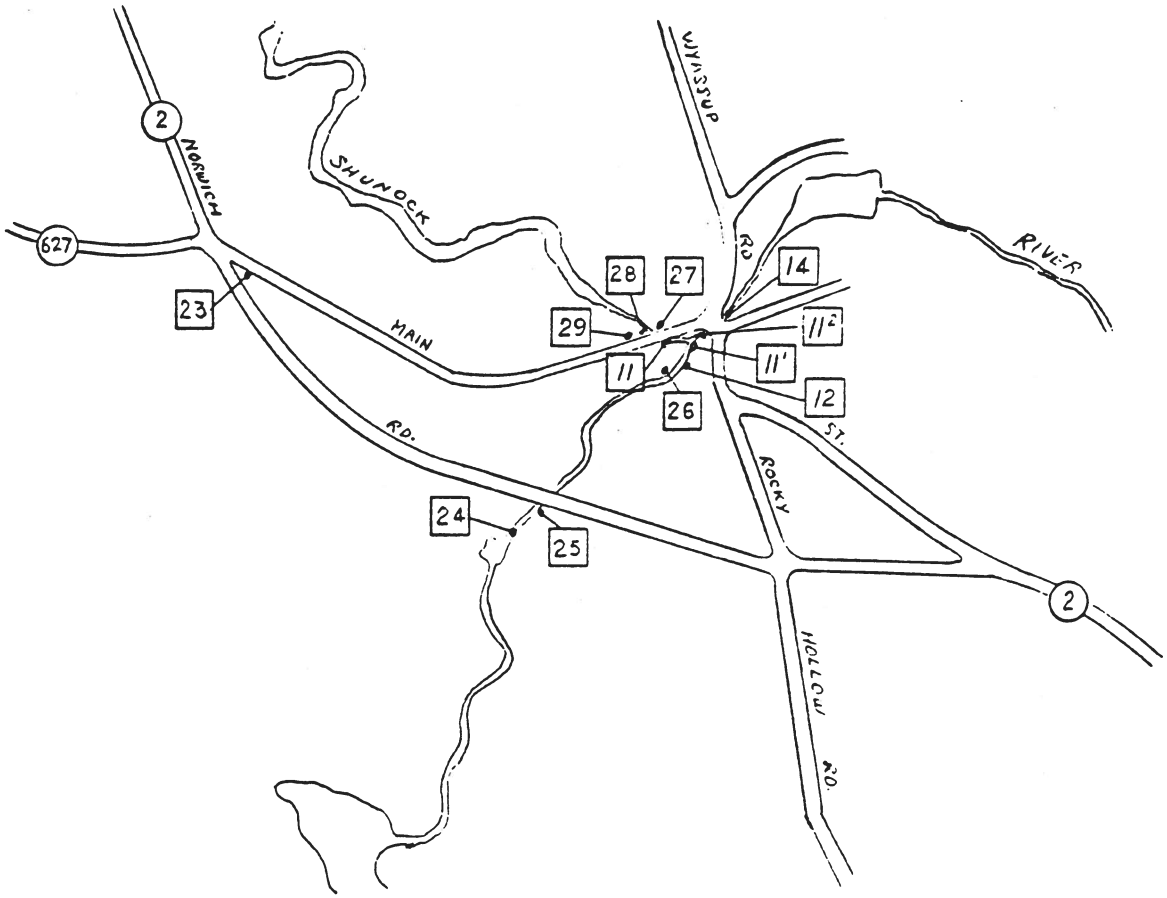
FIGURE 4A



CEDAR RIDGE

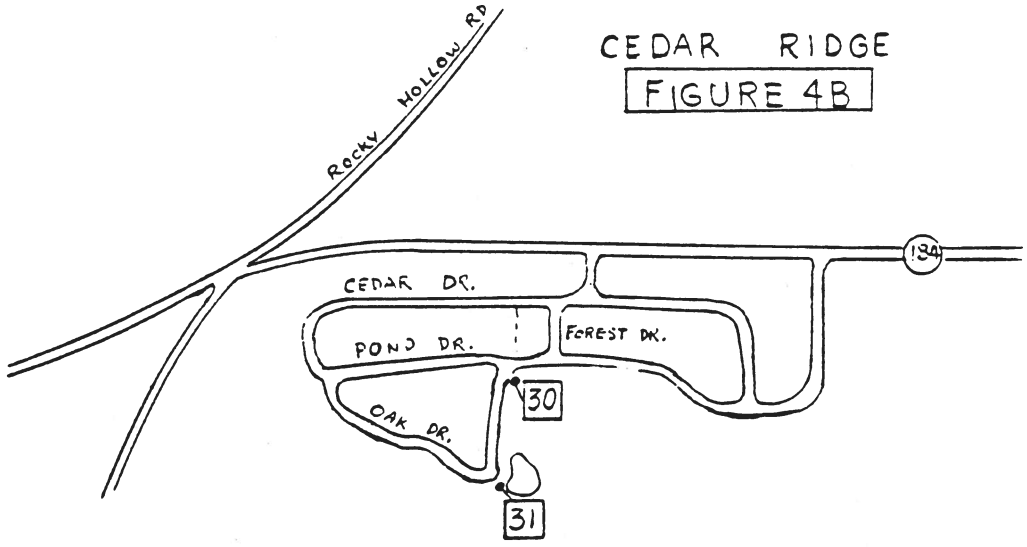
FIGURE 4B

APPENDIX B



NORTH STONINGTON VILLAGE

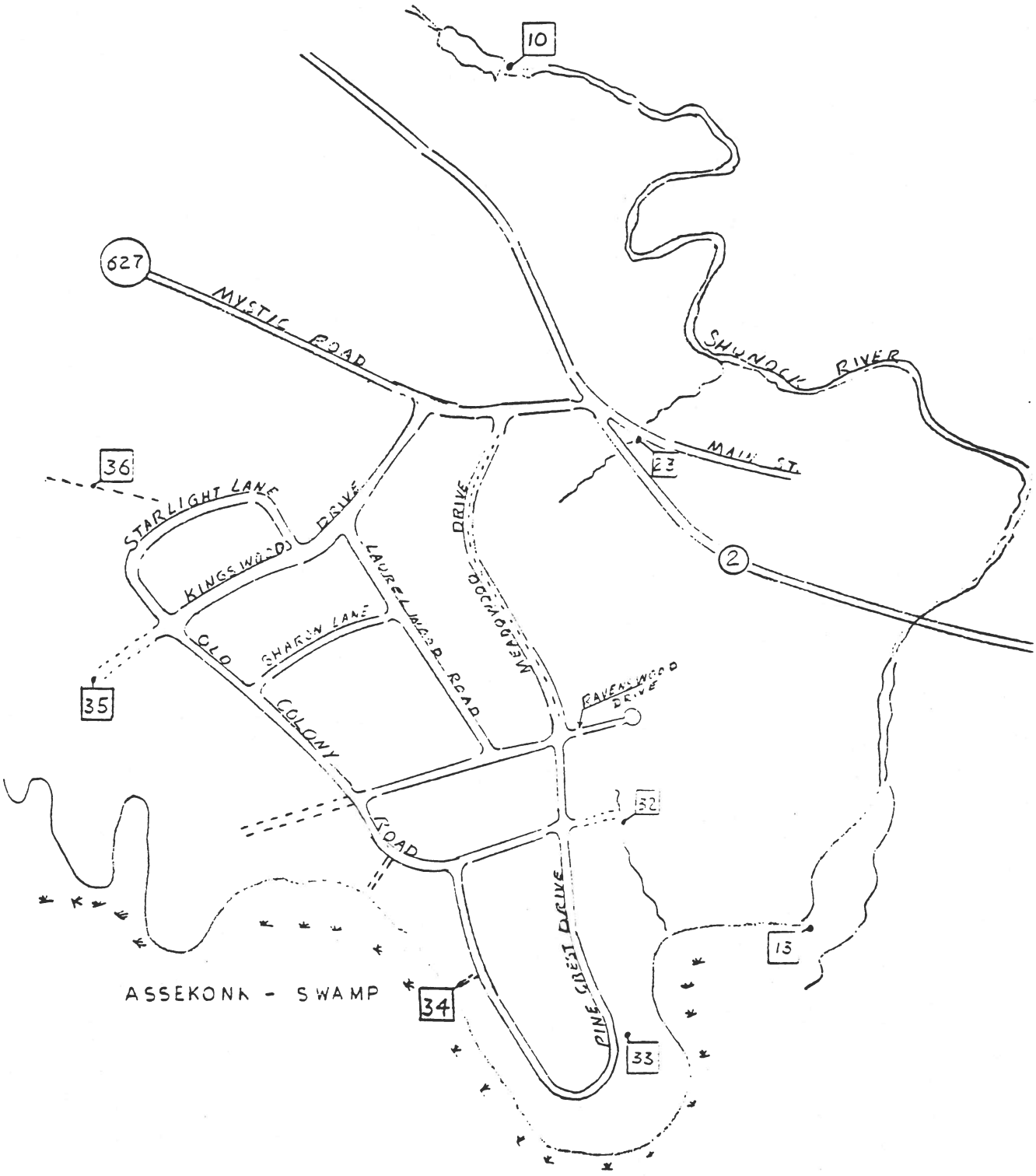
FIGURE 4A



CEDAR RIDGE

FIGURE 4B

APPENDIX B

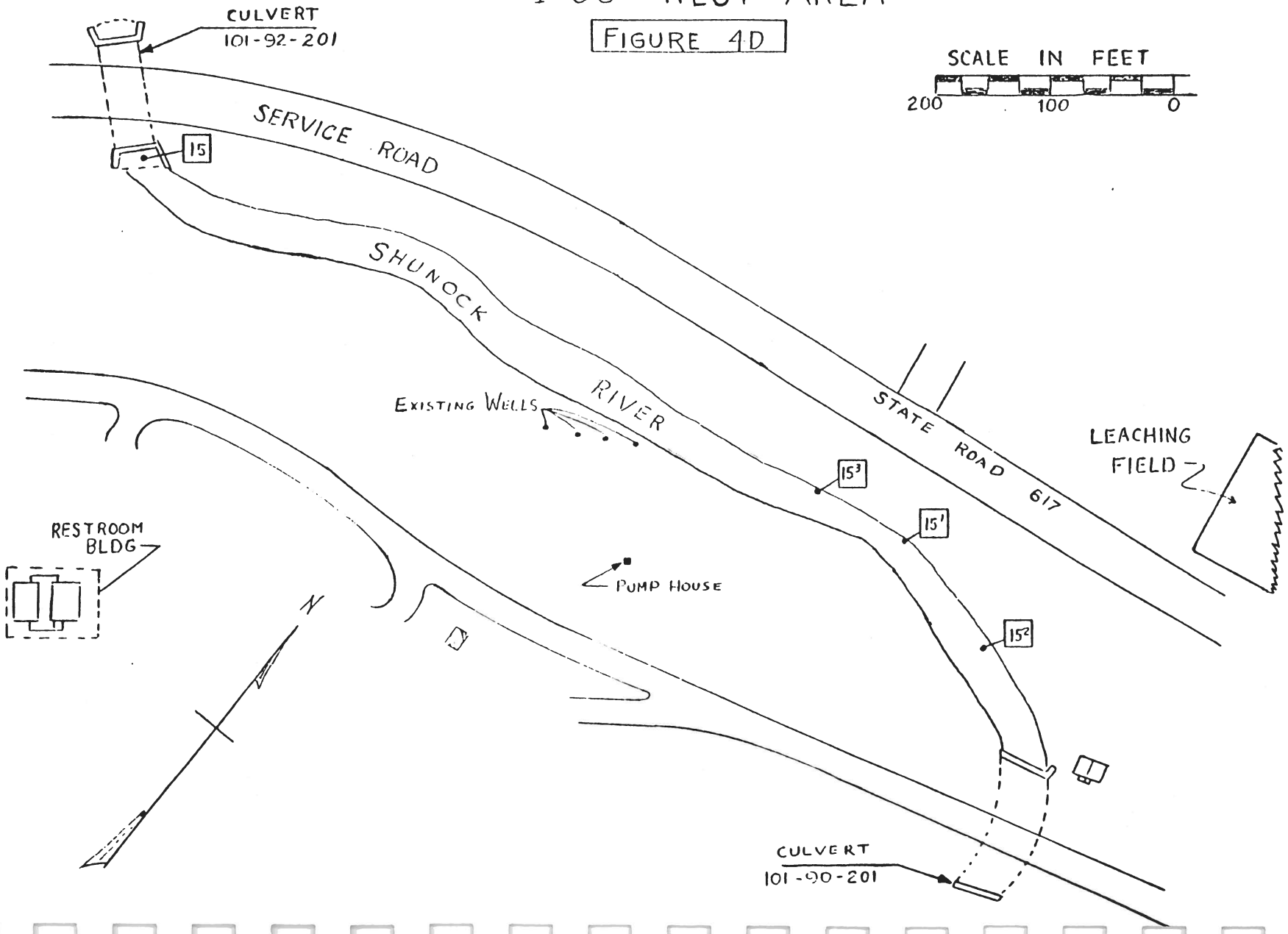


KINGSWOOD - MEADOWOOD

FIGURE-4C

I-95 REST AREA

FIGURE 4D



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