Town of Provincetown, Massachusetts

TECHNICAL APPLICATION DOCKET FOR EMERGENCY WATER SUPPLY DEVELOPMENT AT CAPE COD NATIONAL SEASHORE

May 1978

CAMP DRESSER & McKEE INC.

One Center Plaza, Boston, Massachusetts 02108

environmental engineers, scientists, planners, & management consultants

CDM

WRD Resource Room

CACO
657647

Town of Provincetown, Massachusetts

TECHNICAL APPLICATION DOCKET FOR EMERGENCY WATER SUPPLY DEVELOPMENT AT CAPE COD NATIONAL SEASHORE

May 1978

CAMP DRESSER & McKEE INC.
Environmental Engineers
Boston, Massachusetts

CDM
environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC.
One Center Plaza
Boston, Massachusetts 02108
617 742-5151

May 5, 1978

Mr. Denis P. Galvin
Acting Regional Director
United States Department of the Interior
National Park Service
North Atlantic Region
15 State Street
Boston, Massachusetts 02109

Provincetown, Massachusetts
Emergency Water Supply
Technical Docket

Dear Mr. Galvin:

In response to your letter to Mr. Charles Cobb, Town Manager, Provincetown, Massachusetts, dated March 29, 1978, please find enclosed the technical application docket for: (1) the Town's temporary use of test well Site No. 4 at the Cape Cod National Seashore, and (2) the temporary use of approximately 1,000 feet of right-of-way through the Seashore for installation of a temporary water pipe from another potential water supply source. Appendix A of the enclosed contains answers to the ten technical questions addressed in your March 29, 1978 letter. Appendix B comments on items in Mr. Lawrence C. Hadley's letter to Mr. William S. Fitts, Chairman, Provincetown Water Commission, dated February 14, 1978. Summarized below is the technical docket.

SUMMARY

Existing Emergency Situation

Provincetown's water supply consists of two groundwater sources: (1) Knowles Crossing well field, with an estimated yield of 0.8 million gallons per day (mgd), and (2) South Hollow well field, having an estimated yield of 1.2 mgd. The total yield of both sources is 2.0 mgd. In the summer of 1977, with both sources in operation, the Town experienced a water shortage when the maximum day demand was an estimated 2.8 mgd, resulting in the depletion of system storage. Subsequently, in December 1977, a gasoline spill was discovered in the immediate vicinity of the South Hollow well field. As discussed in detail in the docket and in Appendix A, and based on information available at this time, it is not recommended that the South Hollow well field be operated continuously this summer (1978). Accordingly, an extreme water supply deficit will occur this summer, the result of which would be most severe. Without adequate supply, water system pressures can not be maintained, jeopardizing the public health (via the potential for infusing polluted groundwater), public safety (greatly lessened fire protection away from water courses), the economic welfare of the Town and its residents, and the recreational enjoyment of the numerous visitors to the Cape Cod National Seashore and surrounding Towns. In summary, a condition to justify the status of "emergency" exists.

Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

http://archive.org/details/townofprovinceto00camp

To be considered adequate, a groundwater supply source must have the capability of meeting the system's maximum day consumption demands. The 1978 summer maximum day demand is projected to be equal to that of the summer of 1977 (2.8 mgd). Even if the South Hollow well field was in continuous operation this summer, a supply deficit would exist similar to that of 1977. However, since an emergency condition does exist, if additional sources equal in yield to the yield of the South Hollow well field (1.20 mgd) could be developed prior to the summer tourist season, the Provincetown supply, in conjunction with appropriate water conservation methods, might be close to adequate. Coincident flows for fighting fires would, at best, be still difficult to obtain during high demand periods.

Accordingly, an investigation was made to locate emergency supplies equal in yield to 1.20 mgd. The technical docket estimates that to satisfy the expected 1978 summer maximum day consumption demands in total, emergency supplies having a yield of 1.40 mgd would need to be developed. This required yield takes into account the water conservation measures the Town intends to impose on system consumers. With more strict conservation measures and 1.20 mgd of emergency supply, the total 1978 summer supply yield (Knowles Crossing plus emergency sources) should equal the projected maximum day demand flow rate.

Temporary Water Supply Alternatives Evaluated

Seven potential water sources for temporary supply use were evaluated. The enclosed technical docket discusses each alternative source in detail. It was concluded that of the seven, only two are viable for immediate emergency use:

1. Cape Cod National Seashore - Test Well Site No. 4 (0.75 mgd yield)

2. North Truro Air Force Base Well (0.50 mgd yield)

The five remaining sources evaluated were discounted because of one or more of the following reasons:

a. The quality of the water supply dictated treatment (either temporary, e.g., portable units, or permanent), which, due to the time restraints of construction, was not viable;

b. Use of the source would have an impact on the quality of water at the Knowles Crossing well field;

c. Time restraints of a testing program and subsequent source development, including regulatory agency permits; and

d. Prohibitive costs

Both of the apparently viable sources would be considered temporary, until the South Hollow well field is put back into operation, and/or other long-term supply sources are developed. These two temporary sources would supply the short-term emergency deficiency of Provincetown's water system. All costs relating to the construction and subsequent dismantling of the temporary facilities would be borne by the Town. Also the Town is prepared to enter agreement with the National Park Service and the Air Force on a time limitation for temporary use, and to negotiate a price for water purchases.

Recommended Emergency Supply

Test Well Site No. 4

The previously identified (see "Report on Continuous Pumping Tests, Provincetown, Massachusetts," January 1968, Whitman & Howard, Inc.) Test Well No. 4 at the Cape Cod National Seashore would be temporarily developed at an estimated yield of 0.75 mgd (520 gpm). The well would be driven, and the pump and drive motor and associated equipment housed in a wood structure set on a concrete base. The well pump would be powered by a propane gas powered engine, and a flow recorder and totalizer would be installed on the discharge line. When the source is terminated, the equipment would be removed, the wood housing dismantled, the concrete base slab broken-up and removed, the well capped, and the site restored as nearly as possible to its original condition. The capped well would revert back to the N.P.S. for it's own future use or another emergency condition, if required.

Delivery to the Provincetown system would be via a temporary (over-land) 8-inch diameter pipe supplied by the Massachusetts Civil Defence. Supply would be pumped from Test Well Site No. 4 to the intersection of Route 6A and Highland Road. The route of the piping is shown on Figure 5.

The environmental impacts associated with the development of this source are discussed in detail in the docket. In summary, the impacts are expected to be minimal.

The present day estimated cost to develop (construct) and dismantle Test Well Site No. 4, including all appurtenances and piping, is $150,000.

As proposed, the use of Test Well Site No. 4 will not have any significant impact on the administration, management and protection of the park. The well site will be separate from existing park facilities, and will be maintained and serviced by the Town of Provincetown. Since the temporary piping will be flanged or restrained-coupling galvanized steel, and the well station will have no windows and a locked door, protection service impact upon the N.P.S. and should be minimal, if any. Of course, advise and guidance would be solicited from the N.P.S. both during installation and operation and the Park Service would be afforded inspection opportunities at any time.

Provincetown provides public support, accommodations and services for users of the Cape Cod National Seashore (e.g. - lodging, restaurants, gas stations, laundermats, etc.). Accordingly, the attractiveness of the park to visitors is dependent upon Provincetown's capability to providing adequate support facilities. By Provincetown utilizing Test Well Site No. 4 as a temporary emergency source, both the Town and the park will benefit.

North Truro Air Force Base

The North Truro Air Force Base (NT-AFB) is served by a well having a capacity of about 0.50 mgd. Water is pumped from the well to a storage facility located on the base. A tentative agreement has been reached between the Town and the NT-AFB whereby the Town would utilize the well for approximately 22 hours per day. By connecting to a hydrant outside of the well station, water would be pumped to the vicinity of the South Hollow well field pumping station via 8-inch diameter overland Massachusetts Civil Defense piping (see Figure 6 in the docket for the pipe route). Approximately 1000 ft of the pipe route would entail crossing park service land. A temporary booster pumping unit would pump the water into the existing water system piping at the same hydraulic grade line elevation as the South Hollow well field did.

The environmental impacts of this development are expected to be minimal. A detailed discussion is included in the docket.

The present day estimated cost to construct, dismantle, and appropriately restore the NT-AFB source is $90,000.

Long Range Supply Sources

Potential long range supply sources capable of supplementing the town's existing sources (Knowles Crossing and South Hollow) were investigated. Because of numerous uncertainties (e.g., future consumption demands, additional groundwater testing programs), the final selection of a water supply development program is dependent upon additional hydrologic and environmental studies.

Implementation Schedule

Detailed in the enclosed docket is an implementation schedule that must be adhered to if Provincetown is to receive emergency water supply by the start of the peak tourist season. Following, are critical milestones.

Milestone	North Truro Air Force Base	National Park Service Test Well Site No. 4
1. Submit Technical Docket	5 May 1978	5 May 1978
2. Start Design	8 May 1978	15 May 1978
3. Tentative Agency Approvals	15 May 1978	15 May 1978
4. Complete Design	29 May 1978	19 June 1978
5. Regulatory Agencies Approvals	2 June 1978	23 June 1978
6. Start Construction	15 May 1978*	22 May 1978*
7. Complete Construction and Supply Start-up	30 June 1978	7 July 1978

* Supply Well

As shown above, compliance with the indicated schedule is absolutely imperative in order to have the facilities available this summer. As proposed, the design and construction of the temporary water system will proceed simultaneously in order to meet the required supply start-up dates.

We trust that the enclosed information meets the requirements of the N.P.S. to allow the development of Provincetown's emergency supply sources. Your expeditious review and approval of the enclosed is respectively requested.

Very truly yours,

CAMP DRESSER & McKEE INC.

Thomas F. Cheyer

Thomas F. Cheyer
Senior Vice President

TFC/cam

Encl.

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	
	• Purpose of this Report	I-1
	• Study Area	I-2
II.	POPULATION AND WATER CONSUMPTION	
	• Population	II-1
	• Water Consumption	II-2
III.	EXISTING EMERGENCY SITUATION	
	• General	III-1
	• Gasoline Spill Adjacent to the South Hollow Well Field	III-3
	• Chloride Concentration at Knowles Crossing	III-5
	• Town-Enacted Remedial Measures	III-6
	• Capacity of Existing Supply under Current and Anticipated 1978 Summer Conditions	III-9
IV.	TEMPORARY WATER SUPPLY ALTERNATIVES	
	• Provincetown	
	Atkins Mayo Road Site	IV-2
	• North Truro	
	South Hollow Well Field	IV-6
	Rumrunner Restaurant Site	IV-7
	A Site Opposite Test Well No. 4	IV-8
	• Cape Code National Seashore-Test Well Site No. 4	
	. Supply	IV-10
	. Delivery to the System	IV-12
	. Operation of the Water Supply System	IV-16

TABLE OF CONTENTS
(Continued)

Page

. Environmental Considerations

.Impact of Groundwater Level Changes..... IV-17
.Impact of Construction Activities..... IV-18
.Associated Environmental Impacts..... IV-18

. Estimated Cost..... IV-19

- Other

Trucking or Barging..... IV-20

North Truro Air Force Base Well

.Supply..... IV-22
.Required Water Supply Facilities..... IV-23
.Operation of Temporary Water System..... IV-25
.Environmental Impacts..... IV-26
.Impacts of Construction Activities..... IV-26
.Estimated Cost..... IV-27
.Development of Emergency Water Supplies..... IV-27

V. RECOMMENDED EMERGENCY SUPPLY SCHEME

- General..... V-1
- Water Supply Development..... V-2
- Project Scheduling..... V-3

North Truro Air Force Base Supply..... V-3

Test Well No. 4..... V-6

- Terms of Agreement for Development of Supplies.... V-6

VI. POTENTIAL LONG RANGE WATER SUPPLY SOURCES

- Projected Future Water Demands..... VI-1
- Existing Water Supply..... VI-2
- Future Water Supply Requirements..... VI-2

LIST OF FIGURES

Figure		Page
1	General Location Plan.....	I-3
2	Existing Supply Sources.....	III-2
3	Location of Potential Supply Source in Provincetown.....	IV-3
4	Location of Potential Supply Sources in North Truro.....	IV-4
5	National Park Service Test Well Site No. 4 - Proposed Temporary Connection to Provincetown System.....	IV-14
6	North Truro Air Force Base - Proposed Temporary Connection to Provincetown System.....	IV-24
7	National Park Serivce Test Well Site No. 4 - Project Scheduling.....	V-4
8	North Truro Air Force Base - Project Scheduling.....	V-5

LIST OF TABLES

Table		Page
1	Anticipated 1978 Summer Emergency Supply Conditions..	III-10

APPENDIX

A. Response to National Park Service
March 29, 1978 Correspondence

B. Response to National Park Service
February 14, 1978 Correspondence

C. Preliminary Results of Gasoline Leakage Studies

D. Town-Enacted Conservation Measures

E, Correspondence Relative to the Potential Temporary
Use of North Truro Air Force Base Well

F. Correspondence Relative to the Potential
Temporary Use of A Site Located Opposite
the National Park Service Test Well Site
No. 4 on the Department of Public Works'
Right-of-Way

G. Correspondence from the Provincetown Chamber
of Commerce

H. Correspondence from the Massachusetts Department
of Environmental Quality Engineering

I. INTRODUCTION

I. INTRODUCTION

Purpose of the Report

This report provides information relative to the development of an emergency water supply for the Town of Provincetown. A recent gasoline spill in the vicinity of the South Hollow Road area has limited the use of one of the Town's major water supply wells. As the tourist water consumption reaches its maximum level this summer, a shortage in water supply will be experienced unless action is taken immediately to obtain emergency supplies.

Investigations have been made relative to the anticipated water demands, potential for reduction through water conservation, and temporary supplies which may be obtained. Seven alternative water supplies were considered and a recommended water supply scheme is included in this report.

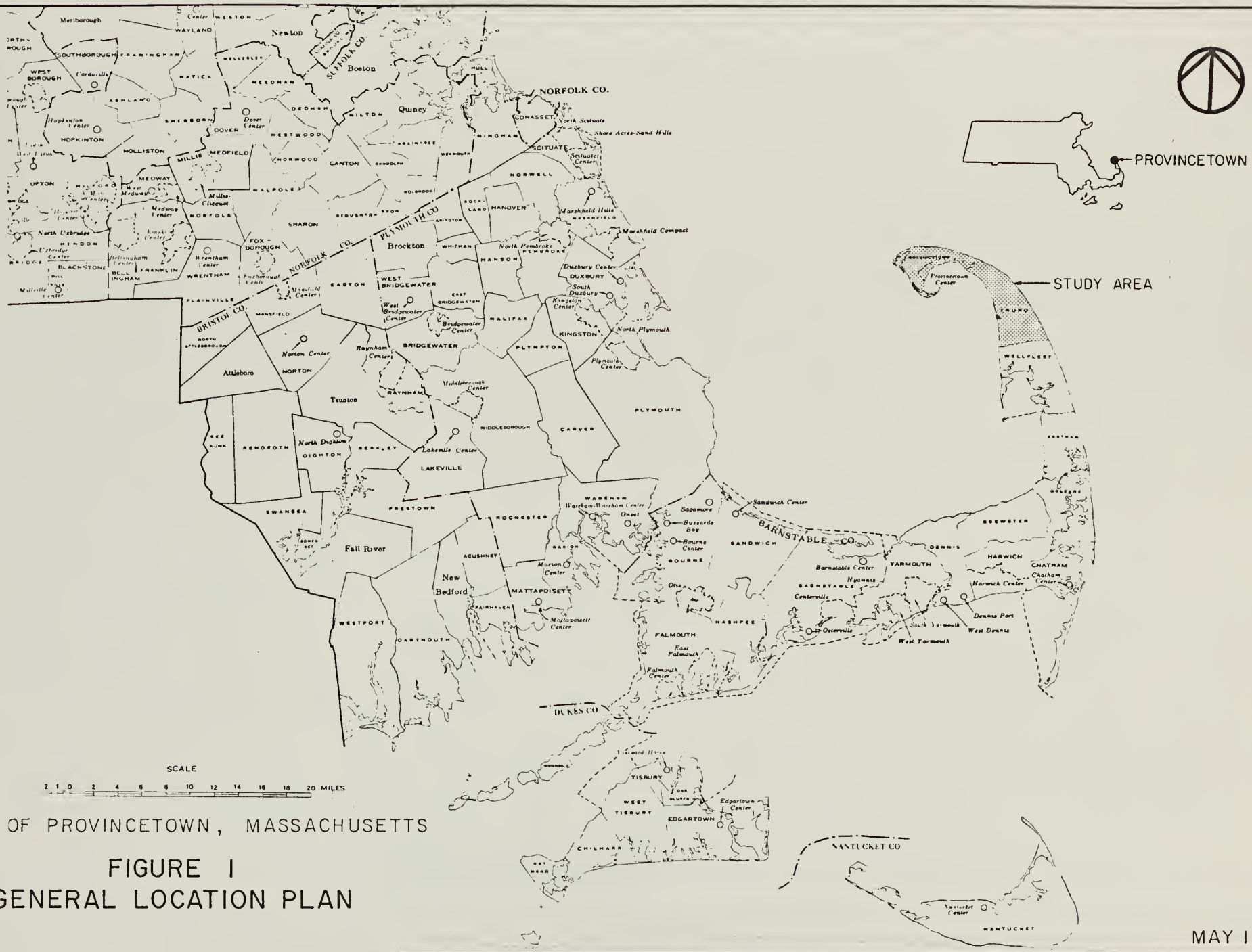
In a separate study, Camp Dresser & McKee Inc. and Geraghty and Miller, Inc., are evaluating the extent of the gasoline spill and the potential for future use of the South Hollow well field. The results of that report may not be available until late in the summer. For this reason, the temporary supply must be established before the fate of the affected well field is determined.

Study Area

The Town of Provincetown is located on the northernmost tip of Cape Cod. It is bordered on three sides by the ocean, and to the east lies the Town of Truro. Figure 1 illustrates the general location of Provincetown, and the Town of Truro, where existing and potential water supplies exist.

Land of the Cape Cod National Seashore occupies approximately 80 percent of Provincetown's area. The National Seashore land offers some of the finest beaches in New England. All are protected from commercial development and have been preserved in their natural state. The seashore is dotted with ponds, lakes, and vast stretches of undeveloped land. It is a prime recreational area which includes campgrounds, picnic areas, jeep and bicycle trails.

The developed land in Provincetown, consisting of the land located outside of the National Seashore, is located to the south along Provincetown Harbor. Provincetown's proximity to the National Seashore and its location on Cape Cod make it ideal for summer recreation. The tourist industry is the major economic base on which the Town exists. Although tourism is highest in the warm summer months, the number of off-season residents and tourists has been increasing over the past few years.



TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE I
GENERAL LOCATION PLAN

MAY 1978

II. POPULATION AND WATER CONSUMPTION

II. POPULATION AND WATER CONSUMPTION

In order to estimate the supply volumes required for the summer season, recent population and water consumption trends have been evaluated. The estimated demands during the emergency period effect the number of supply sources required and the necessary water conservation measures to dampen daily demands. The latter will be discussed in Chapter III.

A correlation between population and water consumption usually exists which enables estimation of per capita water consumption, or the total daily consumption divided by the number of people served. The results are usually expressed in gallons per capita per day (gpcd), and may be compared to typical gpcd figures to determine if per capita consumption is excessive.

Tourist consumption comprises a portion of the Town's total daily consumption throughout the year. This occurrence raises the year-round resident per capita consumption in Provincetown by an unknown amount. Therefore, typical per capita consumption estimates cannot be effectively applied in Provincetown.

Population

The population in Provincetown in any given day may be divided into two groups: permanent population, or year-round residents; and tourist

population, which consists of all visitors, who are not year-round residents. During the summer months, the tourist population greatly exceeds the permanent population. This situation produces the highest demands on the water system.

The 1975 State Census estimated Provincetown's population to be 3,947 people. This estimate includes permanent residents only. The 1975 peak summer population, defined as the maximum number of people in the Town on any given day, has been estimated by the Cape Cod Planning and Economic Development Administration to be 18,900 people. This is approximately 4.8 times that of the permanent population. This high influx of tourists significantly affects summer water demands.

It is estimated that the present population of Provincetown is roughly equal to that of 1975. As no updated records are available, it is assumed that the tourist population is also approximately equal to the 1975 estimate.

Water Consumption

The average daily water consumption for a given year is defined as the total water consumed during the year divided by 365. The average daily consumption in 1975 was 0.95 mgd, increasing to 1.0 mgd in 1977.

As Provincetown's summertime water demands are greatly influenced by the tourist population, it is convenient to break down the consumption further into the average summer daily consumption (ASDC) and average winter daily consumption (AWDC). The average summer daily consumption is the average daily consumption over the months of June, July, and August, when tourist consumption is at its highest. The AWDC is the total consumption of the remaining nine months of the year divided by 270

(9 months x 30 days per month). The ASDC will most accurately indicate average daily requirements during the emergency water supply situation.

The ASDC of Provincetown for 1977 was estimated to be 1.54 mgd. It is estimated that the 1978 summer demands will be approximately equal to those of 1977.

Maximum daily consumption is defined as the maximum amount of water consumed in a 24-hour period during the year. Typically, several consecutive days of high consumption may occur. Community water supply systems are normally designed to provide maximum daily consumption from their supplies, with distribution storage to provide for maximum hourly demands.

According to the 1976 "Report Relative to Investigation of Provincetown Water System, Provincetown, Massachusetts" by Whitman and Howard, Inc., of Wellesley, Massachusetts, the maximum daily consumption over the period from 1965 to 1975 has averaged 1.8 times the ASDC of Provincetown. Assuming this factor is applied to the estimated 1978 ASDC, the estimated 1978 maximum daily consumption for the Town is approximately 2.8 mgd.

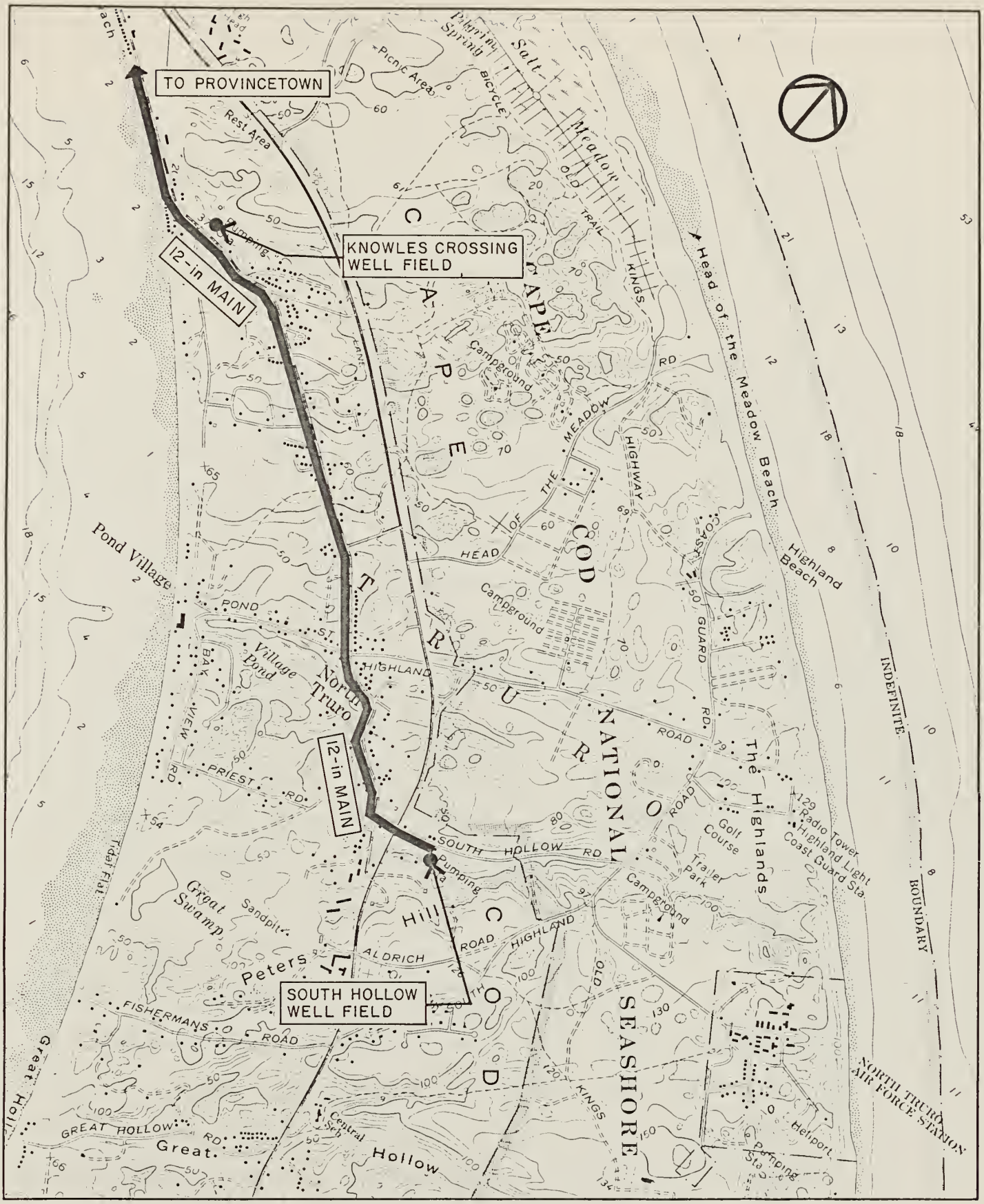
III. EXISTING EMERGENCY SITUATION

III. EXISTING EMERGENCY SITUATION

General

Provincetown has two water supply sources, the Knowles Crossing well field and the South Hollow well field. The locations of the two supply sources are shown on Figure 2. The Knowles Crossing well field is equipped with a diesel-powered pump capable of producing approximately 0.8 million gallons per day (mgd). The South Hollow supply is also diesel-powered, capable of producing approximately 1.2 mgd. There is no standby equipment at either station to allow for emergencies such as breakdowns, equipment failure, etc.

To be considered adequate, a supply source must have the capability of meeting the maximum day consumption demands. Demand rates greater than maximum day are supplied by system storage facilities. Supply deficieincy is based on the difference between maximum day demand and the accepted yield of the sources. Peak hourly consumption is defined as the largest amount of water used in one hour within a particular year. Distribution storage tanks are designed to provide water during peak hourly demand, thus relieving the required pumping rate at the supply sources. Storage tanks also provide large volumes of water to fight fires, in addition to providing emergency storage in the case of power failures, equipment



TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 2
EXISTING SUPPLY SOURCES

SCALE: 1" = 2000'

MAY 1978

breakdowns, etc. Provincetown presently has two storage tanks, one with an estimated capacity of 2.5 million gallons and the other with a capacity of approximately 1.0 million gallons. A third water storage tank, with a capacity of 5 million gallons, is under construction and may be in operation by mid-June.

Provincetown's two water supply well fields are capable of producing approximately 2.0 mgd under normal operation. Since the maximum daily demand in 1977 was an estimated 2.8 mgd, the supply deficit of 0.8 mgd resulted in the storage tanks nearly emptying several times over the course of the summer. At this time, no emergency storage was available in case of equipment failure, nor was there adequate supply volumes to provide fire protection.

Recent operational procedures of the Town's water system have changed since discovery of the gasoline spill in December. The spill has allowed for only limited operation of the South Hollow well field, placing a greater demand on the Knowles Crossing facilities. As the average daily demands during the winter months are approximately half those which occur during the tourist season in the summer months, Provincetown has been able to cope with the existing supply limitations to this point.

Gasoline Spill Adjacent to the South Hollow Well Field

In December 1977 an estimated 2,000 to 3,000 gallons gasoline spill from a service station was detected. The gasoline reportedly originated from an underground storage tank, which had leaked since sometime in July of the same year. The gasoline service station is located approximately 600 feet from the South Hollow well field. To date, no contamination of the water supply has been detected.

The location of the gasoline spill is within a groundwater table area which, most likely, contributes to the flow from the South Hollow well field. Local groundwater table gradients have been observed to slope toward the well field during pumping. Therefore, continuous, extended pumping from the South Hollow well field could result in withdrawal of gasoline-contaminated water from the wells.

For this reason, use of the South Hollow well field has been limited since discovery of the gasoline spill. Periods of pumping have been followed by extended periods of non-pumping to allow water level recovery and, thereby, reduce the potential for gasoline contamination. Future use of the well field is dependent upon the actual location of the gasoline contaminated groundwater, its movement during pumping and periods of shutdown, and the possibility for its removal or controlled movement through various remedial methods.

Studies are presently underway to determine the magnitude and extent of the gasoline spill, and its impact on the use of the South Hollow well field. Preliminary monitoring wells and water quality sampling have been reported to the Town by its consulting engineers, Whitman and Howard, Inc., which indicate movement of contaminated groundwater toward the well field, despite extended periods of non-pumping since the spill. In addition, gasoline contamination has been reportedly detected in nearby private well systems. Additional monitoring well installations and water samping are being completed under the gasoline spill investigation to accurately assess these reports.

Reliance on the South Hollow well field supply to fulfill the expected 1978 summer consumer demands is not recommended. At this time, there are

many unknown factors regarding the probability of gasoline contamination, and well field use may need to be terminated if extended pumping is conducted.

Chloride Concentration at Knowles Crossing

Use of the Knowles Crossing well field is complicated by periodic salt water contamination. Operation of the well field at its capacity (0.8 mgd) for prolonged periods causes inland movement of the relatively thin interface between salt water and fresh water and chloride concentrations increase. This inland movement of the salt water is also related to the average groundwater flow or the amount of precipitation which occurs at the time.

The highest average annual extraction from the Knowles Crossing well field occurred in 1976, during average precipitation conditions. During that year, average withdrawal of 0.55 mgd resulted in chloride concentrations in excess of 200 parts per million (ppm). Average withdrawal during the period of December through April was approximately 0.3 mgd. (The EPA recommended limit on chloride concentration is 250 ppm.) It is anticipated that higher withdrawal rates during a relatively low precipitation period could possibly result in chloride concentrations which exceed accepted water quality standards.

Withdrawals from the Knowles Crossing well field since the gasoline spill have averaged approximately 0.60 mgd. This pumping rate is about 2 times the average rate during the 1976 record withdrawals for the same period (December 1977 to April 1978). The relatively high pumping rates during these recent months have resulted in higher than normal (130 ppm) chloride concentration (up to 190 ppm). The result of this relatively

high usage of the Knowles Crossing well field indicates that the well field, in all probability, would develop undesirable chloride concentrations if it is continued to be operated at maximum rates. Therefore, it appears that the Knowles Crossing well field should be restricted to an average withdrawal of approximately 0.5 mgd for the summer to limit salt water contamination. However, the well field, based on a preliminary examination of local conditions, could possibly sustain withdrawal rates of 0.8 mgd for short periods (one to two weeks) without causing significant contamination. Accordingly, a supply of 0.8 mgd could be realized from the Knowles Crossing source to satisfy projected summer maximum demand conditions.

Town-Enacted Remedial Measures

The Town is fully cognizant of its summertime water supply shortage. Newspaper stories in the local paper have kept the citizens aware of the consequences of the South Hollow well field being unusable this summer. Conservation of the water supply is a necessary measure which needs to be implemented. A strict water conservation program may reduce maximum daily demands in Provincetown by as much as 20 percent.

The Provincetown bylaws were recently amended to include the following water conservation measures:

"Section 29. No person shall use lawn sprinklers or Town water for outdoor purposes in violation of Water Department Regulations.

1. The use of lawn sprinklers and sprinkler hose for the watering of lawns and gardens is hereby prohibited during the period of May 1st through

September 30th inclusive, unless specific authorization is granted by the Board of Water Commissioners after a public hearing.

2. The use of non-attended water hoses is prohibited unless specific exemption is granted by the Board of Water Commissioners.
3. No water shall be used from a fire hydrant except by the Fire Department without first obtaining a written permit from the Board of Water Commissioners.
4. The use of Town water supply for the purpose of driving piling is prohibited unless a permit is obtained therefor from the Board of Water Commissioners.
5. It shall be unlawful to use the Town water supply to fill or cure any swimming pool unless a written permit is obtained therefor from the Board of Water Commissioners.
6. It shall be unlawful to use the Town water supply for use as a coolant in a Central Station Air Conditioning and/or refrigerating and/or open circuit type system, utilizing, evaporating, and/or water-cooled condensers or cooling-tower utilizing chilled water, and/or Unit Air Conditioners and/or refrigerators which are water cooled of the open circuit type without the express written consent

of the Board of Water Commissioners.

The Board of Water Commissioners is empowered to make other rules and regulations pertaining to the use of the municipal water supply after public hearing. Such regulations shall take effect when promulgated by publication in a newspaper of general circulation in the Town of Provincetown and by posting the same on the bulletin board of the Town Hall.

A violation of the aforementioned articles shall be punished by a fine not to exceed Fifty ($50.00) dollars per day; each day constituting a separate offense."

On April 24, 1978, Provincetown's Board of Water Commissioners passed further emergency regulations, as illustrated in Appendix D. The measures prohibit the use of Town water to wash road vehicles and boats. The use of water hoses to clean the exterior of buildings was also banned. The regulations allow water to be served at restaurants only upon request. Permits now required for the filling of swimming pools will allow filling to be staggered to damper maximum demands.

The Board of Water Commissioners also strongly encouraged the use of stickers or signs in restaurant and hotel restrooms to encourage tourists to conserve water. The adjustment of valves below sinks to cut maximum flow rates by one-half was recommended. A citizens' steering committee has made water-saving devices available at cost and has displayed such devices at Town Hall since May 1, 1978. The devices will be displayed throughout the emergency period to educate consumers on their potential use.

Other conservation measures such as bricks in water closets (for toilets), the repair of dripping faucets, the replacement of toilet balls, and the use of showers at lower rates are further potential water-saving techniques. Reduction of water system pressures may also be considered to further reduce both water consumption at the taps and leakage in the water mains. CDM will be making recommendations to the Board of Water Commisioners, such as the above, in order to maximize conservation results.

Public awareness of the shortage is widespread. A recent letter from the Chamber of Commerce to the Town Manager indicated that if a 10 percent reduction in the number of tourists occurs this summer, many of the Town's businesses will be in serious trouble. The Chamber of Commerce went on to say that they would assist "to formulate a water-saving plan and educate both members and non-members (of the Chamber of Commerce) in ways to save precious water."

Capacity of Existing Supply Under Anticipated 1978 Summer Conditions

The anticipated 1978 summer emergency supply conditions are illustrated on Table 1. The table includes an estimated 20 percent reduction in water consumption due to the water conservation program discussed in the previous section. The total estimated supply required is 2.2 mgd, of which an estimated 0.8 mgd can be provided by use of the Knowles Crossing Well Field. The resulting deficit in summertime water supply is approximately 1.4 mgd.

Unless additional supplies are obtained, these rates of water will be the entire supply available during the summer. Temporary emergency summer water supplies for the Town this summer may avoid the dilemma the Town now faces.

TABLE 1. ANTICIPATED 1978 SUMMER EMERGENCY SUPPLY CONDITIONS

	Average Day	Maximum Day
Consumption, mgd	1.5	2.8
Reduction by Water Conservation Method, mgd	0.3	0.6
Adjusted Consumption, mgd	1.2	2.2
Capacity of Existing Supply, mgd*	0.5	0.8
Deficit, mgd	0.7	1.4

*Knowles' Crossing Well Field only.

The following chapter will examine water supply alternatives based on their feasibility. The criteria will include timeliness, cost, and environmental impacts.

IV. TEMPORARY WATER SUPPLY ALTERNATIVES

IV. TEMPORARY WATER SUPPLY ALTERNATIVES

This chapter describes the alternatives studied in the course of the present investigation. Recommendations are based on the results of these evaluations. In general, five major items were of concern:

1. The time required to develop the alternative supply source(s) including obtaining necessary permits.
2. The estimated capacity of the source(s) and development of the least number of supplies as is reasonable.
3. The water quality of the source(s), specifically, the degree of treatment to render the supply potable.
4. Environmental impacts.
5. Reliability and operational procedures.

A total of seven temporary water supply alternatives were considered. From the previous chapter, it was concluded that the total additional supply required during the emergency period is estimated to be 1.4 mgd, even taking cognizance of implemented conservation measures.

The seven alternatives evaluated include:

1. Atkins Mayo Road Site (Provincetown)
2. South Hollow Well Field (North Truro)
3. Rumrunner Restaurant Site (North Truro)
4. A site opposite Test Well No. 4 (North Truro)

5. Test Well Site No. 4 (Cape Cod National Seashore)

6. Trucking or Barging

7. North Truro Air Force Base Well

The location of the alternatives, with the exception of the trucking alternative or the barging alternative, are shown on Figures 3 and 4. Because a supply deficit of 1.4 mgd exists to fulfill maximum day demands, use of any one of the alternatives may not provide enough water. Well supply alternatives were considered based on a preliminary estimate of the flow rates which could be safely drawn during the emergency period without causing salt water enroachment. These estimates are based on conservative analyses of the groundwater system and may be revised when further tests are made.

Provincetown

Atkins Mayo Road Site

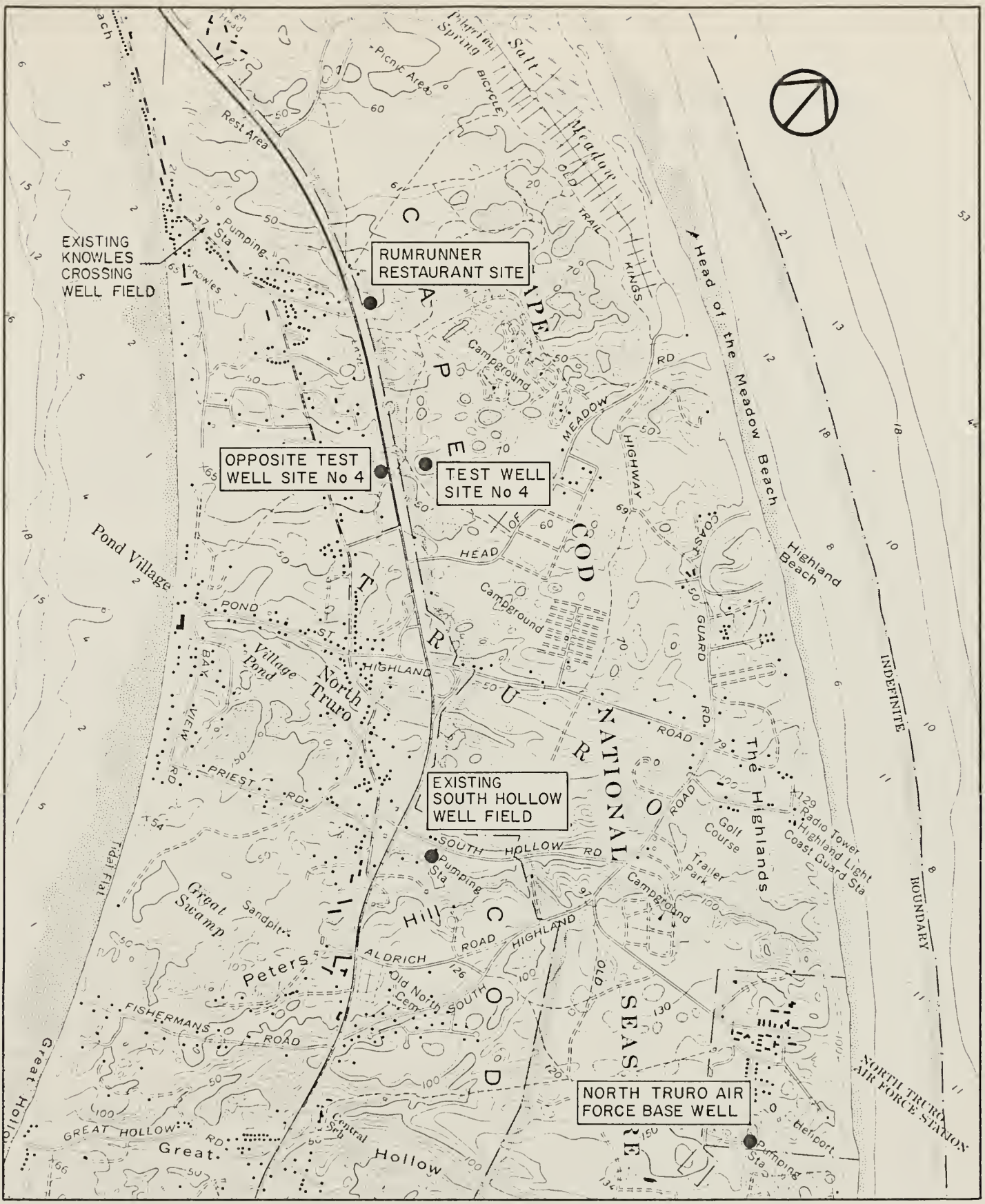
In the July 1976 report by Whitman and Howard, Inc., a proposed Provincetown site, located off Atkins Mayo Road, had been determined capable of yielding up to 500 gpm (0.72 mgd). However, it has been reported that water from this site contains excessive amounts of iron, manganese, color, and turbidity and has exhibited high hydrogen sulfide odors. Thus, extensive treatment would be required before it can be offered to the consumer. Construction of a well, pumping station, connecting water main and a water treatment facility at this site would be required to develop the supply.

TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 3
LOCATION OF POTENTIAL SUPPLY SOURCE
IN PROVINCETOWN

SCALE: 1" = 2000'

MAY 1978



TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 4

LOCATION OF POTENTIAL SUPPLY SOURCES IN NORTH TRURO

SCALE: 1" = 2000'

MAY 1978

A typical water treatment process utilized to remove the noted contaminants in this raw water include: chemical pretreatment, coagulation, flocculation, sedimentation and filtration. Previous preliminary studies of this supply development have stated that a combined sand-carbon filter media would be required. The integration of the treatment elements to provide proper treatment requires extensive pilot plant testing. Before this pilot testing can be conducted, temporary well facilities must be constructed at the site to provide the water necessary for treatability studies. The time period necessary to construct the well facilities and conduct treatability studies is approximately two months.

The possibility of utilizing portable water treatment systems was investigated. The only systems that are known to be immediately available consist of pretreatment and portable diatomaceous earth filtration units. These units have been utilized by the National Guard for field water supply. Pilot plant testing would be required to determine if these systems would be effective in reducing contaminants to levels acceptable for public water supply. More importantly, however, the portable filter systems have a limited capacity (50 gpm or less) and therefore, are not suitable for use to treat the 0.75 mgd (520 gpm capacity of the site). Therefore, use of these temporary portable filter units would not be a feasible treatment alternative.

Development of a suitable municipal-sized water filtration plant would require complex engineering design, pilot plant testing, construction, and start-up operations. Typically, these efforts take one to two years to complete.

In summary, treatment of the groundwater produced from the Atkins Mayo Road well site is not a feasible short-term supplemental water supply alternative for Provincetown this summer, primarily due to the time required to determine an appropriate treatment method and to construct required facilities. The potential for use of this source as a future permanent supplemental supply for the Town is further discussed in Chapter VI.

North Truro

South Hollow Well Field

As discussed in Chapter III, the degree of use of the South Hollow well field for the summer of 1978, if usable at all, is not known at this time. Additional information regarding the status of the gasoline leak investigations is presented in Appendix B, attached. However, the possibility of treating gasoline contaminated water as it is pumped from the South Hollow well field was considered.

Several large capacity activated carbon filter units would be required for removal of the gasoline contamination from the well supply (a 1.2 mgd capacity) prior to public consumption. Because of the low threshold limits for detection of the gasoline by consumers (See Appendix C), the filtering system would probably be needed to remove more than 99 percent of the gasoline. This relatively high removal efficiency would require pilot plant evaluations to design a suitable filtration system.

Construction of a temporary activated carbon filtration system is not possible. As previously mentioned for the treatment of the Atkins Mayo Road Site, diatomaceous earth filtration units are the only portable

treatment systems available for use in Provincetown, and these systems have very low capacity. No portable activated carbon filtration systems are available.

The time required to set up manufactured activated charcoal filters to treat the 1.2 mgd capacity is estimated to be approximately 14 to 16 months. The time period includes pilot plant work, which would determine the type of equipment and operation for effective gasoline removal. Since this amount of time is not available for operation this summer, the alternative was not pursued as a temporary supply source. Furture use of the South Hollow well field as a long-range water supply is discussed in Chapter VI.

Rumrunner Restaurant Site

The Rumrunner Restaurant site was offered as a potential site by the landowner. It is located less than 2,000 feet from the center of the Knowles Crossing well field.

The actual capacity of a well in this area is unknown. To date, no exploratory test wells have been installed or pumping tests conducted for this area. However, due to the relatively uniform characteristics of the soils in this area and the proximity to previous test well sites, a well in the area could possibly yield 0.5 to 0.75 mgd. In addition, water quality of the well site is unknown; however, it is expected to be acceptable for public consumption without treatment. Test well installations and pumping tests are required to determine actual well yields and water quality characteristics.

The effects of continuous extended water withdrawals from a well at the Rumrunner site was made during these investigations. Groundwater level drawdowns were computed based on data from previous pumping tests conducted by other engineering consultants and reports by the USGS. It was presumed that the average rate of water withdrawals would be approximately 0.5 - 0.75 mgd for approximately a 6 month duration. It was further assumed that no significant recharge from precipitation would occur during 120 days of this period.

Analysis based on the above assumptions indicates that continuous withdarwals of 0.5 mgd would cause significant drawdowns at the Knowles Crossing well field. The drawdowns would cause landward movement of the salt water/fresh water interface and therefore, possibly cause a significant increase in salt levels of groundwater withdrawn by the Knowles Crossing wells. Due to the adverse impact of potential chloride contamination to the existing municipal supply, this alternative does not seem viable for municipal water supply development. Further testing and a more detailed analysis would be required to accurately determine the magnitude of these impacts; the time constraint on development of an immediate supply precludes such an evaluation.

A Site Opposite Test Well No. 4

The possibility of installing a temporary well in the vicinity of Test Well No. 4, on land not controlled by the National Park Service was investigated. Provincetown, by Massachusetts statutes, has the legal right to establish municipal water supplies in this area of North Truro, Massachusetts. Because of the limited time available to obtain rights to

utilize private properties, these studies were limited to possible use of Massachusetts Department of Public Works (DPW) property along the Route 6 right-of-way in North Truro, Massachusetts. Figure 4 shows the general location of this area.

The actual capacity of a well in this area is unknown. To date, no exploratory test wells have been installed or pumping tests conducted for this area. However, due to the relatively uniform characteristics of the soils in this area and the proximity of Test Well Site No. 4 (discussed hereinafter), a well in the area could possibly yield 0.5 to 0.75 mgd. In addition, water quality of the well site is unknown; however, it is expected to be acceptable for public consumption without treatment. Test well installations and pumping tests are required to determine actual well yields and water quality characteristics.

Formal requests to permit well testing and installation of a temporary well supply in the Route 6 Right-of-Way were recently sent to the DPW. The DPW regional office in Middleborough, Massachusetts has formally responded to the requests. In a letter, dated May 1, 1978, Mr. V. M. Cassesa, the Acting District Highway Engineer for the DPW regional office stated that he could not recommend permission to conduct well testing or to develop a temporary well supply along the Route 6 Right-of-Way in North Truro, Massachusetts. His reason related to the possibility for contamination by runoff of winter salt from the State highway. Copies of all correspondence are included in Appendix G.

In addition, the necessity for permits from the DPW, and for well testing prior to determining the feasibility of establishing a temporary well supply in this area, requires a period of time which would not likely allow the supply to be developed before this summer.

The proximity of this well to the National Park Test Site No. 4 indicates that it's use would impact the groundwater system and the general environment in a similar manner to Test Site No. 4. A detailed evaluation of these environmental factors is presented in the following discussion of Test Site No. 4.

Cape Cod National Seashore-Test Well Site No. 4

Supply. A maximum yield of 1 mgd was estimated for a well at this site based on evaluation of well exploration and pumping tests performed in 1969 for the Town of Provincetown, Massachusetts. A report entitled, "Report on Continuous Pumping Tests, Provincetown, Massachusetts", dated January, 1969, as prepared by Whitman & Howard, Inc., Engineers and Architects, recommended development of this site for municipal water supply for the Town. The report also indicated water quality was acceptable for public consumption without treatment.

Additional study of well development at Test Site No. 4 was performed during the current investigation. Based on the reports of previous pumping tests (as mentioned above), and reports on the hydrogeology of the area by the United States Geological Survey (USGS), the effects of short term, continuous withdrawals (approximately 6 month duration) on

the groundwater system were evaluated. The elevations were based on the following hydrologic assumptions:

1. No recharge to the aquifer from precipitation for a period of 120 days (during the summer months);
2. Aquifer hydraulic conductivity is approximately 100 ft/day;
3. Aquifer specific yield is 0.1;
4. The depth of fresh water/salt water (FW/SW) interface is defined by the Guyben-Herzburg equation; and,
5. Groundwater levels are based on data published by the U.S.G.S. for the Cape Cod area.

From other available data, the above aquifer characteristics are estimated to conservatively present greater than actual impacts of withdrawal on the groundwater system. Because of the accuracy of the data available, these analyses should be considered as preliminary.

Continuous groundwater withdrawals from Test Well Site No. 4 would result in water table lowering over a large area. The actual area of influence is estimated to extend approximately 4600 feet from well site No. 4 after 120 days pumping with recharge. Natural recharges beyond that period would probably prevent additional drawdowns during a temporary operation. Water levels are estimated to be lowered at the Town's existing Knowles Crossing Well Field by the pumping; approximately 0.45 feet at 0.75 mgd average withdrawals. This estimated water table fluctuation would probably be less than those previously experienced during extreme drought occurrences.

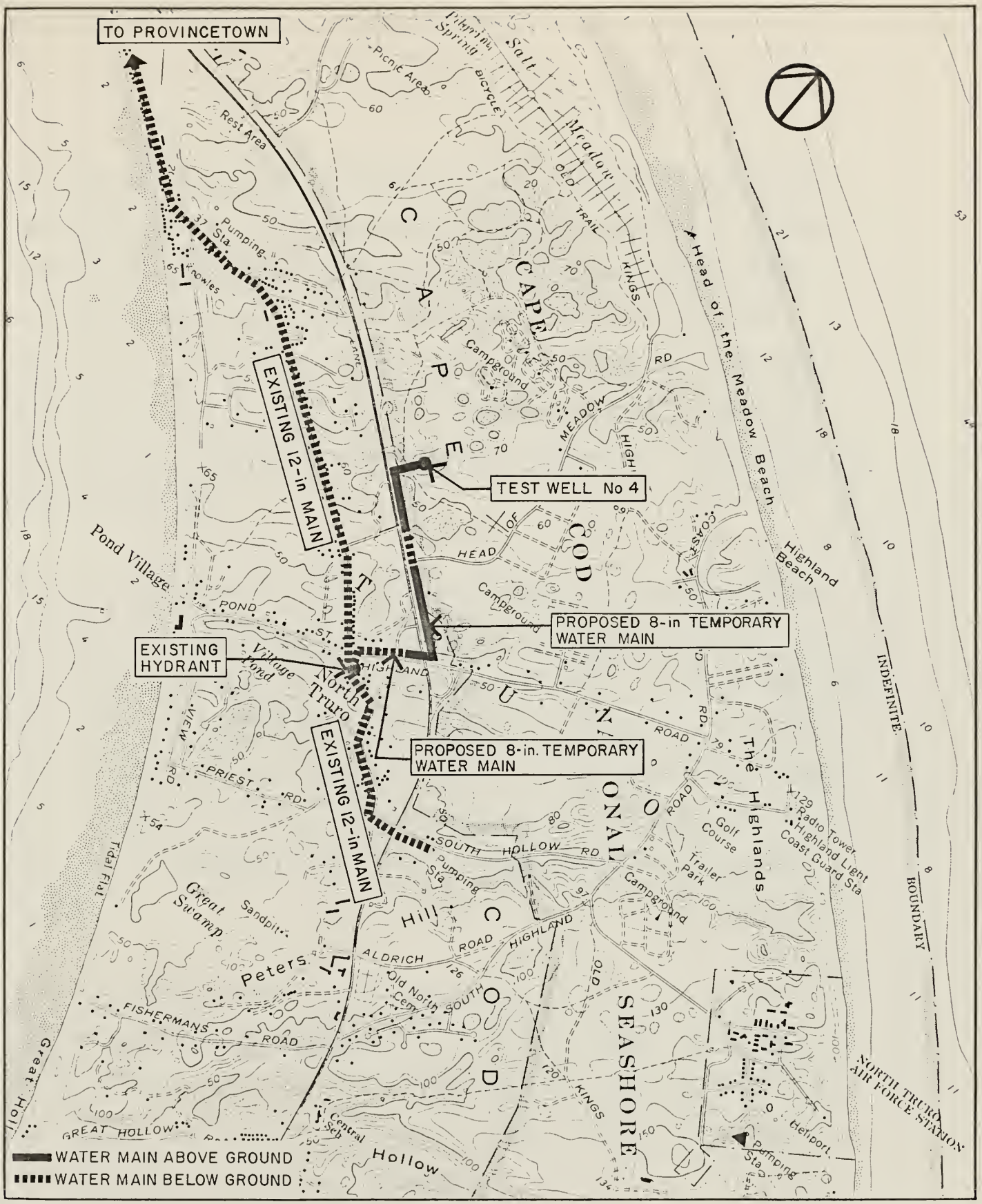
The estimated water level changes resulting from pumping a well at Test Site No. 4 could cause higher than average chloride levels in the Knowles Crossing well field if it is operated at its maximum capacity. However, it is not expected that water quality changes would effect continued usage of the Knowles Crossing supply.

The impact of the groundwater table lowering at the seacoast is estimated to be insignificant. Although landward migration of the FW/SW interface would occur, the interface movement is not expected to cause chloride contamination of private wells because of their typically shallow construction.

Continuous water withdrawal at Test Well Site No. 4 is expected to cause upward movement of the FW/SW interface into an area formerly occupied by the freshwater. This phenomenon is referred to as upconing. Excessive upconing can result in salt water contamination of the water supply well. An evaluation of upconing at this site was based on previous studies presented in water supply paper No. 1608-J published by the U.S.G.S. and the hydrogeologic characteristics previously discussed. From these studies, it appears that average withdrawals of up to 0.75 mgd can be sustained without excessive upconing. The greatest upconing would occur at the well site. It must be noted that these estimates are preliminary because of the limited specific data available.

DELIVERY TO THE SYSTEM

The required water supply facilities include a water supply well, temporary well pumping station and a connecting water main. A location plan of the facilities is shown on Figure 5.



TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 5

NATIONAL PARK SERVICE TEST WELL SITE No. 4

PROPOSED TEMPORARY CONNECTION TO PROVINCETOWN SYSTEM

SCALE: 1" = 2000'

MAY 1978

The proposed water supply well would consist of a simple 24-inch diameter well which would be of gravel-packed construction if necessary. The well would be approximately 60 feet deep, penetrating approximately 10 feet of the more than 200 foot fresh water aquifer. A 25 to 30 foot well screen would be utilized to reduce water level drawdowns in the immediate vicinity of the well (within 60 ft). The well would include a concrete sanitary seal as required by the Massachusetts Department of Environmental Quality Engineering.

The proposed well pumping station would be placed directly over the well. The pumping station building would house the pump and drive system, valves, and appurtenances, and all other equipment at the site. The well pump would be driven by a propane-pulled internal combustion engine or, if necessary, a diesel fueled internal combustion engine. Fuel storage would be located in a suitable metal tank placed above ground outside the main pump station building. The pump motor would be equipped with appropriate silencing equipment.

The well pumping station would be approximately 10 foot by 15 foot in floor dimension and approximately 10 - 12 foot in height. The building foundation would consist of a 6-in. thick concrete slab placed on top of the ground. The building superstructure would be constructed of a pre-fabricated-metal or wood frame structure.

The well pumping station mechanical equipment would include a main-line control valve, a checl valve to prevent reverse flow, a water meter, and totalizer, a chlorination system for water disinfection and motor control equipment. The water meter would be equipped with control equipment to shutoff the pump if excessive flow occurs (possibly due to a pipeline break or other occurrence).

The well site would be approximately 50 foot by 50 foot in area. Trees and large plant undergrowth may have to be removed throughout this area. The entire well site would be surrounded by a security fence to reduce potential for vandalism.

The water main connection to the Town's distribution system is shown on Figure 5. The water main would be an 8-inch diameter steel pipe connected by mechanical couplings which may be borrowed from the Massachusetts Civil Defense Department.

The routing of the proposed main is shown on Figure 5. The lengths which may be run above ground are indicated by a solid line, while the underground sections are indicated by a dashed line.

The length of pipe located in the National Seashore Park would be routed along existing wood roads (jeep trails) where possible. A 100 - 200 foot section adjacent to the well pumping station would be cross-country, not on existing wood roads. All piping in the National Park would be constructed above ground, if required. However, these pipes can be buried

at shallow depths or covered with earth above ground. Beyond the National Seashore Park, the water main would be located within the right-of-way of Massachusetts State Highway Route 6.

The water main would connect to the Provincetown water system at the intersection of Route 6A and Highland Road in North Truro. The total length of pipe is approximately 4800 feet of which approximately 500 feet is located within the National Park Seashore.

All these facilities would be temporary. The pumping station including its concrete foundation can be removed upon termination of use. The piping would be removed and returned to the Civil Defense Department. The well and concrete seal would be removed, if required. However, the well could be capped and turned over to the National Park Service if it is desired.

Operation of the Water Supply System. The operation of the well pumping system and maintenance of the water main and other facilities would be conducted by Provincetown personnel. The pumping system would operate 24 hours per day throughout the period of use. The Town personnel would be responsible for periodic checks of the system each day to monitor water level fluctuations, equipment condition and ensure safety of the water supply. Periodic (once per week) deliveries of fuel and chlorination chemicals would also be required.

Impact of Groundwater Level Changes. Groundwater level drawdowns, resulting from short-term (6 month) 0.75 mgd average pumpage from Test Well Site No. 4 are not expected to have any measurable impact on the majority of vegetation located within the National Seashore Park. The depth of the groundwater table is typically greater than 50 feet and plant root systems do not extend to this zone. However, approximately 12 acres of marshy deposits and approximately a one acre pond located 1500-2000 feet from the well site could be impacted. At present, little is known about the wetland ecosystem at this site; no soil or ecological studies have been made. Therefore, it has been presumed, for the purposes of this report, that the hydrologic conditions and the nature flora and fauna are similar to typical freshwater wetlands of this region.

Maximum drawdowns in the wetland area are estimated to be from 1 to 1.5 feet at an average withdrawal rate of 0.75 mgd. These drawdowns are within the range of water level fluctuation that would be experienced during extended dry weather conditions (1 - 2 feet below average levels). As water table levels are estimated (from water level records) to presently be slightly above average for this time of year in the annual water cycle, it is expected that the effect of the proposed short-term water withdrawals might possibly be limited to normal hydrological conditions experienced during slightly lower precipitation periods. The marsh flora and fauna therefore should be able to adapt to these changes in water level without any adverse effects. If little or no precipitation occurs during the pumping period, the water level changes in the marshy area could resemble an extreme drought occurrence. Some plants would possibly be effected by this extreme low water condition.

However, any effects of water level drawdown due to the proposed well to the flora and fauna in the area would be reversible and short-term. Once continuous water withdrawals are stopped, water levels would rise to normal elevations. It is estimated that the ecosystem would completely recovery from any effect within 1-2 years time.

Impact of Construction Activities. No major adverse environmental impacts are anticipated from construction activities required for this alternative. Laying of the overland temporary pipeline may be done by hand along existing jeep trails. Therefore, other than the well drilling equipment and material deliveries, heavy construction equipment is not required in the National Seashore. The minimal space required for the proposed pipeline (less than two feet) should avoid large-scale removal of National Seashore plant life during placement of the pipe. However, limited under-growth removal may be necessary. The construction of a temporary well and pumping station and access road would require plant life removal. The affected area would be less than one-eighth acre surrounding the well site. Upon termination of the supply operation, the well site and access road would be cleaned and replanted, as required to minimize lasting visual impacts.

Associated Environmental Impacts. Other impacts would be related to possible noise and air pollution considerations. The pumping station would be equipped to reduce noise to minimum levels. It is expected that the resultant noise levels would not be audible in campground areas located more than 1000 feet from the well site. Air pollution would be minimal as natural dispersion of exhaust gases by wind action would probably reduce concentrations to innocuous levels. No permanent impact from these items are expected.

Estimated Cost. The construction cost is based upon the construction of a well and temporary pumping station at Test Well Site No. 4. The connecting water main would be comprised of Civil Defense piping, obtained on a loan basis, constructed overland as a temporary installation wherever possible.

The estimated construction cost is expected to be between $135,000 and $150,000, and includes an allowance for contingencies. However, the cost does not include allowances for survey or easement plan preparation, if required, rights-of-way acquisition, or legal fees.

OTHER

Trucking or Barging

Trucking or barging water into Provincetown were also investigated as possible methods of supplying the additional water required during the summer months. Both methods would involve exceptionally high costs and several operational concerns which dismiss them as viable supplemental water supply alternatives.

Trucking in water would require numerous truckloads of water per day. If tractor-trailer rigs were used, which is the largest type of truck used for liquid transport, approximately 67 truckloads of water would be required per day (about 15,000 gallons per truckload) in order to supply one million gallons. This would result, in an operation involving several tractor-trailers containing over sixty tons of water each, constantly entering and leaving the Town during its busiest and most heavily populated time of the year. Surely, the permanent residents of the Town, as well as tourists, would object to this constant disruption to normal, daily activities. The estimated cost of an operation of this magnitude would be in the order of $10,000 to $13,000 per day. In addition to the high costs of the trucking operation alone, additional costs would include the costs to purchase water from the trucks and pump it into the Town's storage facility. Additional items necessary to implement this method include the availability of possible sources of this supplemental water supply and its location, the availability of several tractor-trailer rigs, and whether they would be allowed on the relatively narrow Town roads when considering their size and weight.

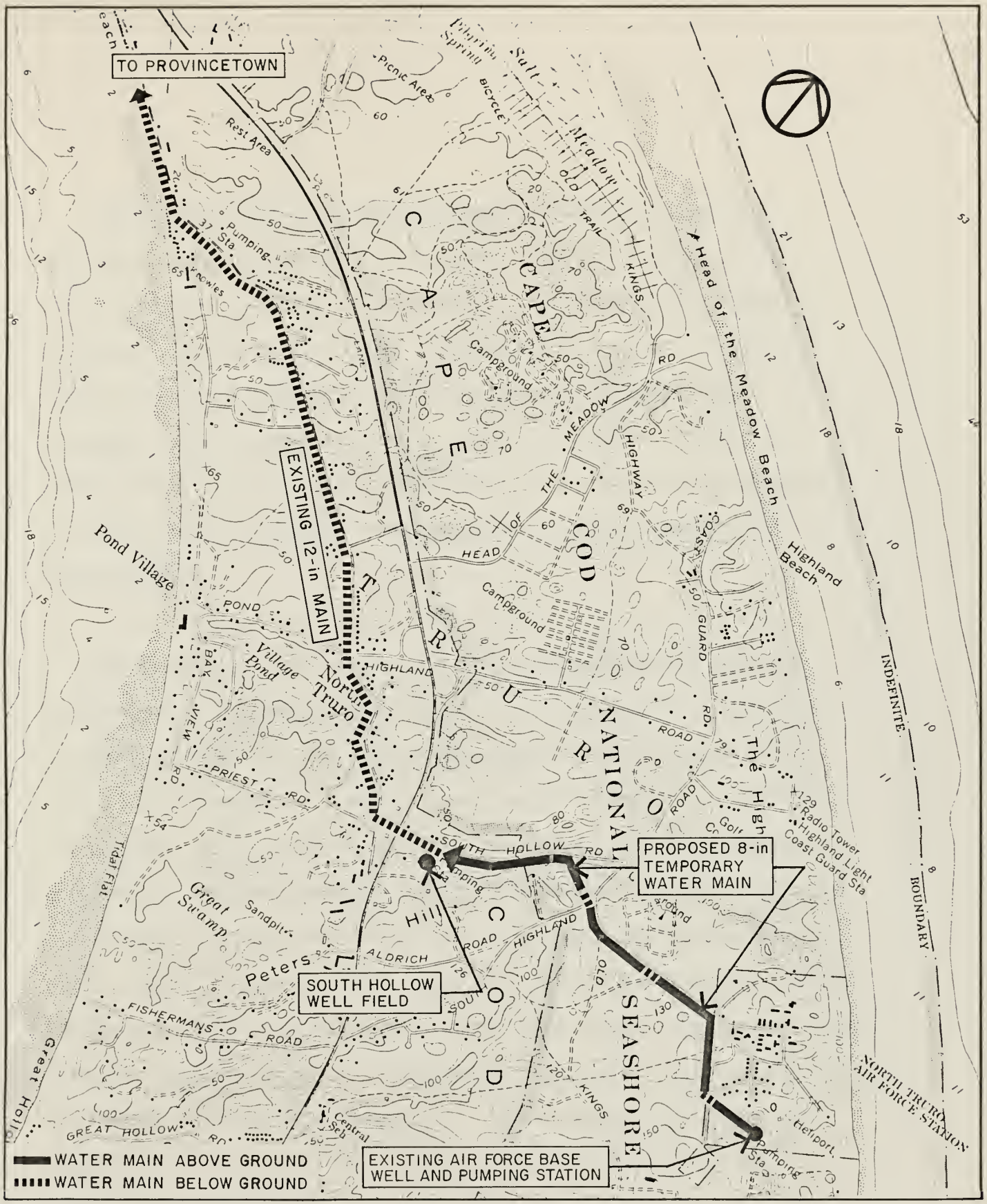
Barging of water into the Town every day would be an equally expensive alternative. Based on discussions with local barging companies, it was learned that barging of water for municipal supply has never been done in this area, but it is possible at a very high cost. The largest barge available has a maximum weight capacity of 1,100 tons which results in a volume of about 264,000 gallons of water per barge. Thus, four barge-loads of water would be required per day. This would require two tandem combinations of two barges each, with each tandem towed by a tugboat. Assuming the water was purchased from a relatively large supply source such as the Metropolitan District Commission (MDC) and pumped into barges in the Boston vicinity, the trip across Cape Cod Bay would take ten to twelve hours. Problems associated with an operation of this magnitude include: (1) lack of facilities in Provincetown to receive barges of this size; (2) weather or rough seas greatly affects travel time, especially when tandem rigs are involved; and (3) there are no barges of the size required available for service this summer, thus an outside source must be found.

North Truro Air Force Base

Supply. The North Truro Air Force Base, home of the 762nd Radar Squadron, is equipped with its own water supply wells. The main well is capable of producing an estimated 0.5 to 0.6 mgd. Water is pumped from the well to a storage facility located on the Base. According to officials at the Air Base, the main well is used only about two hours a day. This would enable the Town of Provincetown to utilize the well for 22 hours per day, providing an estimated 0.45 to 0.55 mgd. For the purpose of this report, a potential supply of 0.5 mgd from the Air Force Base has been assumed. Temporary use of the supply by Provincetown has been approved by the United States Department of the Air Force which has been most cooperative with the Town.

Required Water Supply Facilities. Use of the supply would require construction of a watermain connection to Provincetown's distribution system at the South Hollow wellfield. The proposed temporary system is illustrated on Figure 6. The watermain connection would basically constructed of 8-in diameter steel pipe joined by mechanical couplings. The watermain would be constructed above ground along the shoulder of existing roadways (inside and outside the air base) except for the short crosscountry section as shown within the National Seashore Park. As an alternate route to the crosscountry section, the temporary 8-in main may be placed along Highland Street northward to South Hollow Road, then westerly on South Hollow Road. This alternate route, although approximately 900 ft longer than the proposed routing, would avoid construction in the National Park land. The watermain would be buried for the roadway crossing at Highland Road. The watermain connection to the air base system would be made via a connection to the hydrant located at the well pumping station site.

A gate valve would be permanently installed in the air base transmission main to isolate the pumping station to each system as required. This piping connection arrangement would minimize alterations to the existing air base system. Connection to the Town's system would be made through the hydrant located at the South Hollow wellfield. A portable booster pumping system located at the South Hollow wellfield would be utilized to provide adequate pressure to the Town's water system. A plan of the proposed facilities is shown on Figure 6.



TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 6
NORTH TRURO AIR FORCE BASE
PROPOSED TEMPORARY CONNECTION TO PROVINCETOWN SYSTEM

SCALE: 1" = 2000'

MAY 1978

Operation of Temporary Water System. A scheme of operation for these water systems has been proposed. The air base distribution system would operate as is now done: the distribution storage tank would fulfill water demands during most of the day. The tank would be refilled daily from the well pump, and thereafter the well pump would be discharged to the temporary system. The gate valves installed during the program would be used to direct discharge to each system. An operator from the Town would be responsible for this operation.

To insure that the existing air base well and pumping system is not damaged by the proposed operations, a monitoring well system and an automatic pump shut-off system is proposed to be installed at the well pumping station. A monitoring well would be installed to indicate any possible salt water "coning" which may result from the increased withdrawals. These observation wells would be constructed to depths of approximately 200 feet or 55 feet below the bottom of the existing well screen. Water samples would be taken periodically to detect any changes in chloride levels, even though no significant change is expected to occur from the proposed pumping. If chlorides did begin to rise significantly, the pumping rate would be reduced to a level which would prevent any further increases. The water sampling and analysis would be the Town's responsibility.

A pump protective device would be installed to prevent pump operation beyond its capacity. A pressure sensor or flow sensor would be installed at the pumping station such that overpumping or low pressures would shut off the pumping unit. Manual restart of the system would be required to insure that the problem was located and rectified prior to resuming pump operation.

Environmental Impacts. A 0.5 mgd water withdrawal from the well would cause limited water level drawdowns to areas up to 4,600 feet from the well. This drawdown would, most likely, be less than 1-ft at any existing wells within the adjacent areas. There would be no measurable effects caused by the resultant drawdowns on any flora and fauna within the National Seashore Park.

Impacts of Construction Activities. Approximately 1,000 feet of pipeline would be routed through the National Seashore Park land. The pipeline construction would result in limited damage to plant undergrowth in the parth of construction. No large construction equipment would be required; small light-weight vehicles would be used to transport materials through the area. All equipment would be removed once the facilities are not needed (after 6 months). No permanent environmental impacts would be created. The Town would be responsible for clean-up to restore the pipeline route across the park property to a reasonable undisturbed condition.

Estimated Cost. The estimated construction cost is based on the use of borrowed Civil Defense piping. An allowance was made for rehabilitation of the existing pump at the main well. Rental of a booster pump for use at the connection to the Provincetown water system is also included.

The estimated construction cost is $80,000, including contingencies. Additional costs for water purchased from the Air Force would be required. Also, costs for survey or easement plan preparation is not included, nor are rights-of-way acquisition or legal fees, if required.

Development of Emergency Water Supplies

A total of seven emergency water supply alternatives have been evaluated during these investigations. Of these, it appears that only two can be developed in the time available prior to maximum summer demands: (1) a temporary well supply at Test Well No. 4 in the Cape Cod National Seashore Park of 0.75 mgd, and (2) use of the North Truro Air Force Base well at 0.50 mgd. The total combined supplemental capacity from these sources is approximately 1.25 mgd.

V. RECOMMENDED EMERGENCY SUPPLY SCHEME

V. RECOMMENDED EMERGENCY SUPPLY SCHEME

General

The estimated 1.4 mgd water supply deficit expected during this coming summer can be fulfilled by development of water supply alternatives discussed in the previous chapter of this report. As no single water supply alternative can be developed by this summer to supply the entire 1.4 mgd deficit, at least two alternative emergency supplies must be developed. The recommended emergency supplies are: (1) the North Truro Air Force Base (NT-AFB) well, and (2) Test Well Site No. 4 at the National Seashore Park. Both of these supplies could possibly be developed within two months' time and both supplies may provide supply throughout the duration of the emergency (expected to be approximately six months).

Development of these temporary emergency supplies, however, would only provide an additional 1.25 mgd capacity (0.50 mgd from the NT-AFB well plus 0.75 mgd from Test Well Site No. 4). Therefore, the total combined pumping capacity of the Town supplies, including the Knowles Crossing Well Field, would be approximately 2.05 mgd. Demands would exceed supply by approximately 0.15 mgd.

Although it is an undesirable practice, the 0.15 mgd demand deficit may possibly be derived from the water distribution storage

tanks. Even if several consecutive days of high demand occur, the distribution storage would have capacity to fulfill the demand and not be drawn below 65 percent of their total volume. This tank level would provide moderate distribution service pressures and minimum fire protection capability. Average use of the temporary well supplies is estimated to be approximately 0.35 to 0.5 mgd over the approximate six-month emergency period. The lower figures assume that conservation efforts are successful in reducing average water demands. It is presumed that the Knowles Crossing Well Field will provide an average yield of 0.5 mgd (See Chapter III).

Water Supply Development

Development of each recommended temporary water supply must proceed immediately. Due to the emergency status declared by the Town, competitive bidding procedures can be waived. In addition, the Department of Enviornmental Quality Engineering has indicated a willingness to waive many of their specific requirements due to the temporary nature of the proposed facilities. To accelerate the process, only limited engineering design is recommended; plans, specifications and contract documents are to be detailed only to the extent necessary to negotiate with preselected contractors and to obtain required State and other regulatory agency approvals.

Plans required for water main construction would only be detailed in areas where State Highways or private property would be crossed; the sections of the water main route on the National Park Service property would be outlined on large-scale plans.

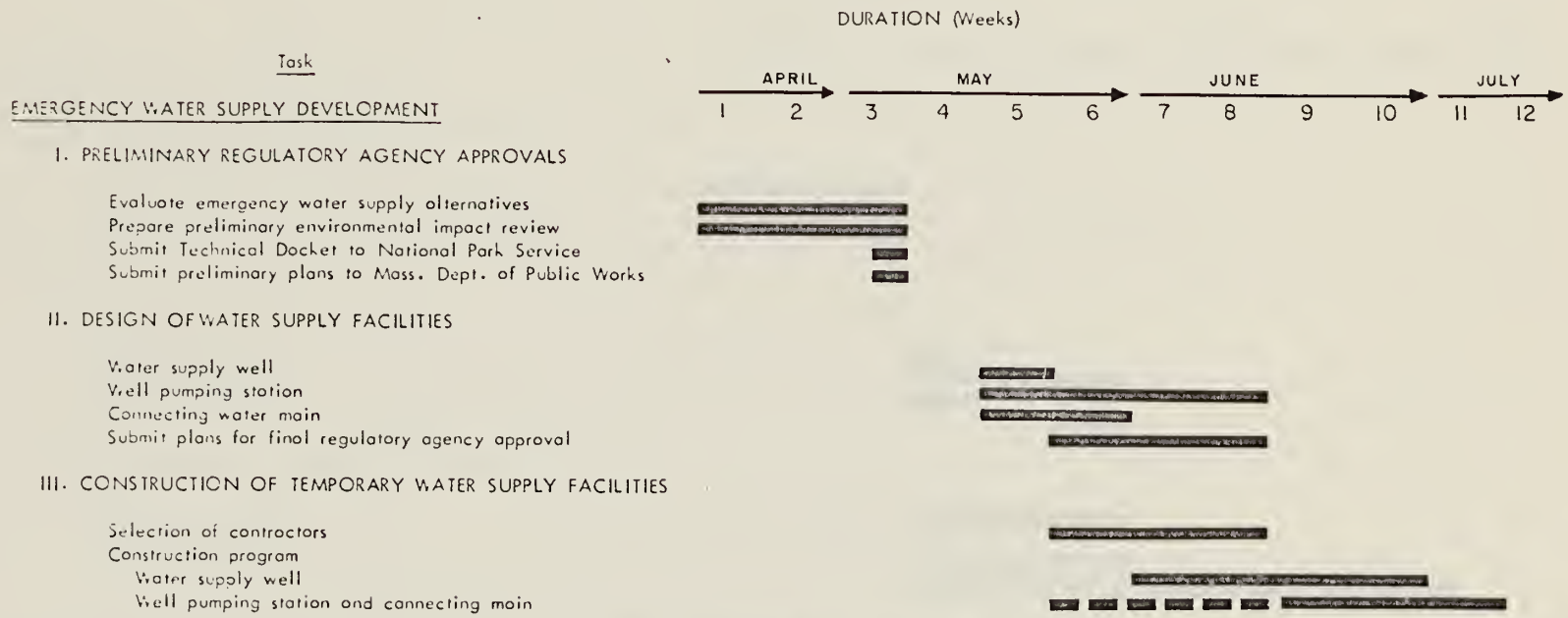
In order to have the requisite water supply facilities operating as soon as possible, the construction program must be fast-tracked. All coordination and communication between the Town, the Contractor and

the Engineer must be orderly and without delay. However, construction quality must be maintained to ensure that the supply, once constructed, can be relied upon to deliver water on a continuous basis, and such that DEQE will approve the completed works. The contractor's operations must be coordinated by a field engineer on-site during construction.

Project Scheduling

Schedules for water supply development are shown on Figures 7 and 8. An explanation of each schedule and critical dates follows. Completion of the project within these schedules is dependent upon rapid affirmative response by the regulatory agencies when requests are made.

North Truro Air Force Base Supply. Final approval for temporary use of this supply has been received by the Department of the Air Force (See Appendix E). Additional preliminary approvals are required of the National Park Service (NPS) to cross the Cape Cod National Seashore Park with the connecting main; the Massachusetts Department of Environmental Quality Engineering (DEQE) for the overall supply concept. These items must be submitted by May 5, 1978. Approvals by these agencies are required as soon as possible. Design and preselection of contractors would begin immediately. Design of the well pumping station and connecting main would be completed by May 29, 1978. Water supply well renovations would begin as soon as possible and would be completed by about June 1, 1978. Water main and booster pumping station construction would begin upon approval by the NPS and the DEQE, by approximately June 1, 1978. The facilities are to be completed and operational by June 30, 1978.

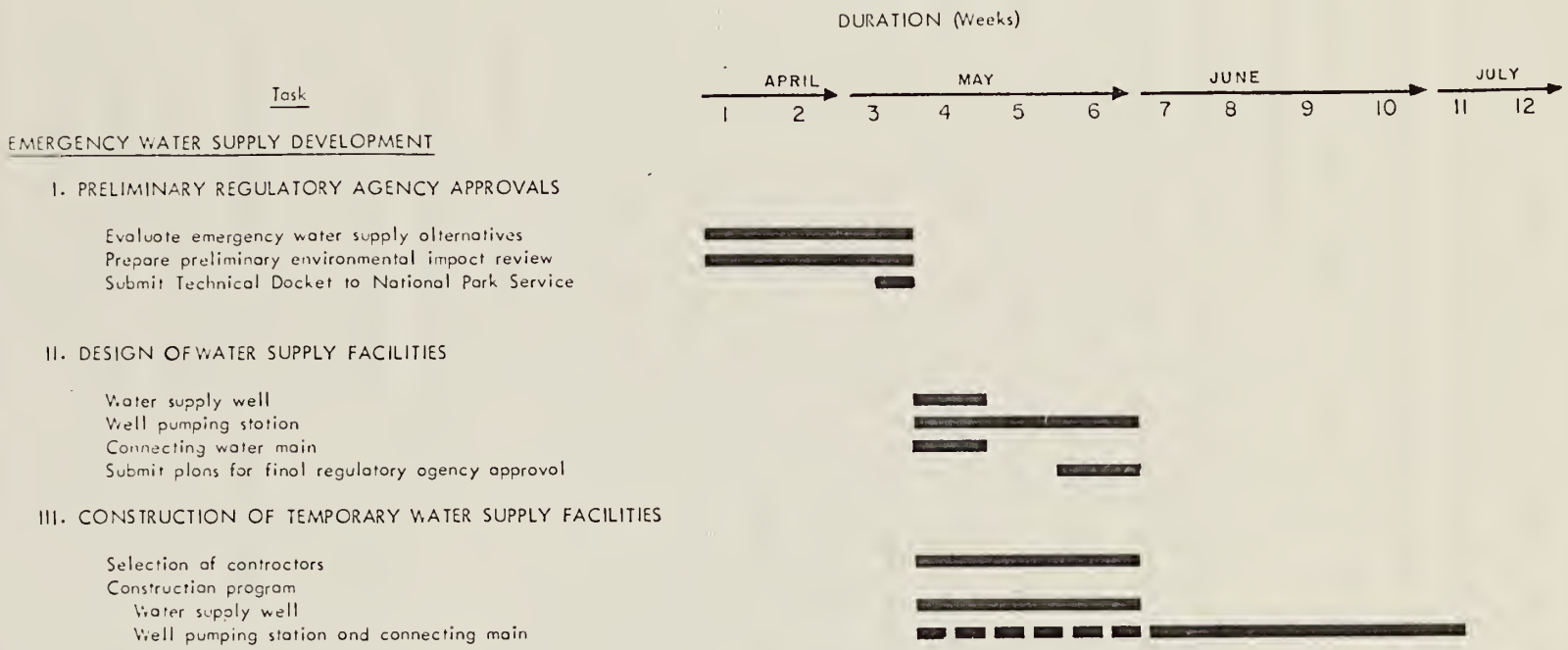


TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 7

NATIONAL PARK SERVICE TEST WELL SITE No. 4 — PROJECT SCHEDULING

MAY 1978



TOWN OF PROVINCETOWN, MASSACHUSETTS

FIGURE 8
NORTH TRURO AIR FORCE BASE — PROJECT SCHEDULING

MAY 1978

Test Well No. 4. The formal application for approval of use of this supply by the National Park Service is to be submitted by May 5, 1978. Permit applications are to be filed to the Massachusetts Department of Public Works for construction in State Highway Route 6 at the same time. Preliminary approvals have already been given by the DEQE in previous correspondence (See Appendix H).

Design and preselection of contractors shall begin one week after submittal of the formal application to the regulatory agencies. Due to the extensive construction that must be completed, this work must begin by May 15, 1978. It is expected that all design work can be completed within four weeks (by June 19, 1978); well design would be completed by May 22, 1978. Well construction would begin as soon as possible after design, possibly by May 22, 1978, and be completed by June 15, 1978. Construction of the well pumping station and connecting water main would begin by June 15, 1978 and be completed by July 7, 1978. To accelerate the construction program, material acquisition (shown as a dashed line on Figure 8) would begin as soon as possible during design phase to insure timely completion of the project.

Terms of Agreement for Development of Supplies

The Town must enter into agreements with respective agencies to stipulate legal items such as: payments for water use, liability for damages, rights of termination of use, rights of way provisions and requirements for construction and removal of facilities. Payments to the agencies can be made through a charge per 1000 gallons. The Town should bear all liability for damages or injuries that result from its water supply operations. The Town should require a termination date of

any contract after the expected emergency is expected to be over--say October 30. However, the right to renegotiate that provision should be provided in case an unforeseen difficulty arises. Permission to enter properties at all times must be granted to allow for periodic, but unscheduled, inspection and maintenance during operation of the facilities. The Town obviously should bear all costs for construction and renovation of any existing equipment and for the restoration of properties upon termination of the use of the supply. It is expected that the Town's legal committment must be binding to both parties through a written contract to insure availability of supply throughout the emergency situation.

VI. POTENTIAL LONG RANGE WATER SUPPLY SOURCES

VI. POTENTIAL LONG RANGE WATER SUPPLY SOURCES

Projected Future Water Demands

Based on past trends in water use, year 2000 maximum day consumption projections ranging from 2.9 to 4.0 mgd were made in an engineering report for Provincetown entitled "Report Relative to Investigation of Provincetown's Water System, Provincetown, Massachusetts, dated July 1976," as prepared by Whitman & Howard, Inc. The projected consumption estimate is based on anticipated future population growth and tourist activity.

Past trends in water consumption have been based on unmetered household and commercial services, which typically results in higher unnecessary and wasteful water usage. Water leakage from the distribution system, particularly in older mains and services, has also contributed to higher demand.

Recently, Provincetown enacted a metering program which is now being implemented. The intent of the program is to measure water usage to individual services and, therefore, have a basis for user charges in direct proportion to actual consumption. These programs typically reduce water usage in comparison to unmetered systems. Water demands resultant from water distribution system leakage is expected to be reduced by installation of new mains. As part of a comprehensive improvement program, the first phase of a water main construction program was recently completed. Water conservation programs, including programs for installation of water regulating devices, have also recently been implemented. These efforts on the part of local citizens and businessmen are expected to result in a significant reduction in per capita water consumption.

Despite these expected reductions in current water use, greater tourist usage (particularly during off-peak seasons) and increases in permanent population in Provincetown and areas in North Truro provided water service are expected to increase maximum day water consumption. Considering the range of anticipated demands previously reported, it is expected that demands might be approximately 3.0 mgd by the year 2000. Future study of the impact of water conservation and the metering program after 3 or 4 years of use under these conditions is required to more accurately assess their effective reductions in overall per capita water use.

Existing Water Supply

As previously discussed, Provincetown's existing water supplies are the Knowles Crossing Well Field and the South Hollow Well Field. Although the South Hollow Well Field is endangered by the recent gasoline leakage, treatment facilities can be constructed, if necessary, to provide potable water from the supply. The rated capacity of the existing supplies is 0.8 mgd and 1.2 mgd, respectively, for the Knowles Crossing and South Hollow Well Fields. Therefore, the total combined maximum pumping capacity is approximately 2.0 mgd.

Future Water Supply Requirements

Water supply planning is based upon well supply capacity equaling maximum day demands. This condition insures adequate water volumes in distribution storage tanks to fulfill peak water demands and fire flow requirements (see Chapter III). Comparison of the projected maximum day water demands (3.0 mgd) to the Town's existing maximum rated well supply capacity (2.0 mgd) indicates that a water supply deficit of 1 mgd would

exist by the year 2000. In addition, it must be noted that the Town's present maximum day demands are approximately 2.8 mgd and exceed the supply capacity. Therefore, development of additional well supply capacity is required immediately.

Potential Long Range Supplemental Water Supply Sources

Based on a review of previous engineering studies for Provincetown, there are three potential supplemental water supplies: (1) development of additional supply from the South Hollow Well Field; (2) development of the Provincetown Well Site, designated as the Atkins Mayo Road Site, and (3) development of the National Seashore Park-Test Well Site No. 4.

South Hollow Well Field. A previous report by the Layne-New England Company indicated a potential for additional pumping capacity. Although no specific additional yield estimates were stated, it appears possible to construct 2 additional wells at the site. Realizing that the existing wells of the well field each yield approximately 0.14 mgd, development of 0.28 mgd additional yield might be possible. On-site well testing and review of water level records is required to determine the actual potential additional capacity, if any.

Atkins Mayo Road Site. As previously discussed in Chapter IV, this site was previously located and tested in 1975. Pumping tests indicated an average yield of approximately 0.40 mgd, with pump rates to 0.75 mgd possible. From later quality analyses obtained during the pumping tests, it was determined that extensive water treatment was required prior to public consumption of a supply derived from this source.

In July, 1976, a second study entitled "Report Relative to Investigation of Provincetown Water System, Provincetown, Massachusetts," by Whitman & Howard, Inc., apparently evaluated the potential yield from this site. The report concluded the following: "A proposed Provincetown site, off Atkins Mayo Road, has already been determined capable of yielding 500 gpm (0.72 mgd), and it is thought probable that an additional 500 to 700 gpm can be developed in the immediate area." Thus, the total estimated yield from the area according to this report is from 1.44 to 1.73 mgd. Because of this large range of estimated potential supply capacity (0.75 to 1.73 mgd), additional investigations are required to determine the actual dependable yield of this site.

Test Well Site No. 4. Preliminary investigations of this well site, as reported in Chapter IV, indicate that this site has an estimated maximum capacity of approximately 0.75 mgd over a six month period. However, this estimate is based on limited knowledge of hydrogeologic characteristics at this location.

Previous estimates have indicated that well yields to 1.0 mgd are possible. In addition, water from this site is acceptable for consumption without treatment. Additional refined analyses are required to more accurately evaluate the maximum possible yield, the impacts of extended continuous withdrawals on regional groundwater levels and movement of the salt water/fresh water interface, and other key environmental concerns.

Development of Future Supplies

The greatest potential to fullfill the Town's projected future water demands is provided by the development of Test Well Site No. 4. In addition, it also appears to afford Provincetown a lower cost water supply source in comparison with the Atkins Mayo Road Site which is reported to

to have potential for greater yields, but requires extensive water treatment. Because of the numerous items which are not satisfactorily answered at this time, the final selection of a water supply development program requires additional hydrologic and environmental studies.

APPENDIX

APPENDIX A

Response to National Park Service

March 29, 1978 Correspondence

United States Department of the Interior

NATIONAL PARK SERVICE

NORTH ATLANTIC REGION
15 STATE STREET
BOSTON, MASSACHUSETTS 02109

IN REPLY REFER TO:

NAR(PS)

March 29, 1978

Mr. Charles Cobb, Town Manager
Town of Provincetown
Massachusetts 02657

Dear Mr. Cobb:

As agreed at our meeting at the Cape Cod National Seashore headquarters on March 24, 1978, we are herein providing additional information relating to Provincetown's formal application for a water supply from the Seashore during its water pressure emergency this summer. This information covers three major areas (Technical content of the application docket; NEPA compliance requirements; Application procedures) which are necessary under Public Law 91-383, the National Park Service Director's Guidelines for Implementation of this law (refer to Supt. Hadley's letter to the Town of February 14, 1978), and the enabling legislation which established this National Seashore.

Technical Content of the Application Docket

The application docket is a technical presentation of the Town's request. Certain information is obligatory from the point of our understanding of the Town's exact requirements, the environmental impacts which might accompany fulfillment of those requirements, and the compatibility of those requirements with the legal framework within which we must operate.

There are two points of over-riding importance which must be addressed in the docket. The first is the thorough documentation of the stated emergency. Since it is not an emergency in terms of drinking water, or public health, but one of inadequate water pressure for fire protection, it would seem to be one that could be solved by technical means (such as additional equipment, water distribution system modification, loan of state emergency fire equipment, salt water pumping apparatus, placement of fire wells, etc.). A description of the action which has been, or will be, taken by the Town under its emergency status (waiver of bidding/procurement procedures, water rationing, conservation programs, etc.), and the progress which has been made in determining the reality and extent of gasoline contamination of the South Hollow water table should also be included. Can the situation be corrected through removal of the overburden? By mounding or other changes in water table slopes?

A

B

C

D

Second, the determination that development of a short-term water supply within the Seashore is the only feasible alternative is the most important requirement under Public Law 91-383. Your consultants must document the rejection of all reasonable alternatives. Although we do not now know the full range of possible alternatives, your consultants should be able to assemble and evaluate possible solutions. Many have been suggested at recent meetings. One of these, the trucking of water from nearby towns, may well be feasible.

These technical items are also necessary and should be required of your consultant:

1) The expected duration of the water pressure emergency; will the Town sign an agreement which states that it will cease pumping at a specified date (e.g. less than one year)? Is the Town willing to bear all costs of constructing and dismantling the temporary well system?

2) The expected required daily volume of water; the method to be used to monitor pumpage; the means of payment to the Seashore, as required by P.L. 91-383;

3) The environmental impacts associated with withdrawal of this volume of water from North Truro; the extent to which the environmental concerns expressed in Supt. Hadley's letter of February 14 apply to this short-term request; the likely impact of simultaneous pumping from Well Site #4 on your Knowle's Crossing well field; the possibility of long-term damage to your Knowle's Crossing well field by using these two sources (Knowle's Crossing and Well Site #4) simultaneously this summer;

4) If the South Hollow well field is contaminated, can it be used this summer through installation of an activated charcoal filter or other treatment device?

5) A list of the necessary steps and their respective critical dates relative to the successful implementation of a temporary well field at Site #4; a plan map of the proposed temporary pipeline and well field;

6) The conservation or rationing program which will be implemented to relieve the present stress on Knowle's Crossing well field, and those scheduled for this summer (regardless of the availability of additional sources);

7) The results (as available) of preliminary coring to delineate the extent of potential contamination; the actions requested from the Commonwealth of Massachusetts, and those actions possible from State agencies;

8) The best estimate of the time required to achieve treatment of the water available at the potential Provincetown well site; (are there mobile water purification units available which can handle these volumes?);

9) The progress made to date in covering the site of the gasoline spill (to prevent water infiltration which will entrain the gasoline adsorbed on the sand to the water table);

10) The plans being made to cope with the recent trends in water use which have led to projections of 2.9-4.0 million gallons per day needed by the Town by the year 2000 (see Report Relative to Investigation of Provincetown's Water System, Whitman-Howard, Inc., 1976); the expected source of future water requirements.

We will brief our Washington Office in anticipation of the answers to these questions.

National Environmental Policy Act Compliance

Contingent upon, and following the approvals of the docket described below, NEPA compliance documentation can be treated as one of the stipulations in the Special Use Permit when issued. After Congressional Committee approval, work can begin immediately (after filing a brief report to CEQ) with the proviso that the Town furnish, at a specified later date, an Environmental Impact Report; the Park Service will retain responsibility for incorporating the report material into a full Environmental Impact Statement, which must then undergo public review. If the duration of the request is brief, a less extensive Environmental Impact Assessment would suffice, and would require less effort from the Town.

Application Procedure

The Town must submit a formal application docket, as described above. The information within this document will be reviewed by my Regional staff, and, based on the information in the docket and the staff evaluation, I will approve or disapprove your request. If approval is given, then the above material must then be reviewed by the Washington Staff of the National Park Service Directorate, and, if approved by them, the application will be forwarded to the appropriate Congressional Committee. Upon Committee approval, a Special Use Permit, which describes the conditions, the duration and the unit cost under which water may be withdrawn from the park, will be prepared by Park/Regional staff.

We understand the urgency of the situation. The town will be best served by providing solid answers in justification of its request. In the course of developing these justifications, it's possible that a better, less costly solution can be found for the summer.

Sincerely yours,

Denis P. Galvin
Acting Regional Director

cc: Supt. Hadley, CACO NS

Items from National Park Service

March 29, 1978 Correspondence

Comments

A. See Chapter III, page 9 , also Table 1, page . On the contrary, an emergency, in terms of drinking water supply, does exist and may endanger public health as well as the Town's tourist economy. Estimated 1978 maximum daily demands are approximately 2.2 mgd, allowing for an estimated 20 percent reduction due to implementation of water conservation measures. Existing supply capacity is estimated to be 0.8 mgd. The deficit, during maximum day demands, is estimated to be 1.4 mgd.

B. See Chapter III, page 6 and Chapter V, page 2. Bidding procedures have been waived and water conservation measures have been implemented (see Appendix E). Water rationing is not considered a viable option because of the potential severe economic impact on the tourist economy.

C. The effectiveness of corrective measures is uncertain without the results of the gasoline spill investigation report. It is thought at this time that these measures may cause problems at nearby private wells.

D. See Chapter IV, page 1 . Seven alternatives were considered. Three potential temporary emergency supplies

Items from National Park Service

March 29, 1978 Correspondence

Comments

D Cont. were identified; North Truro Air Force Base Well, Massachusetts Department of Public Works site, and National Park Service Test Well Site No. 4. The estimated supply capacities are 0.5, 0.75, and 0.75 mgd, respectively. The Department of Public Works was petitioned for use of site, but no written official approval was received to date. Also, there is no guarantee of the well yield and/or water quality from this site unless field testing is performed. It is recommended that both the North Truro Air Force Base Well and National Park Service Test Well Site No. 4 be used for temporary use.

1. See Chapter IV , page 16 . Water supply emergency is estimated to end before November 1, 1978. The town is prepared to sign an agreement to cease pumping at this time. The town will bear all costs of constructing and dismantling the temporary water system.

2. See Chapter V , page 2 . Expected average daily flow rate required is approximately 0.5 mgd, while the estimated maximum daily rate is estimated to be 0.75 mgd. Pumpage will be monitored by a water meter located at the temporary pumping station. Payment will be at the

Items from National Park Service

March 29, 1978 Correspondence

Comments

2 Cont. same rate which is to be paid to the North Truro Air Force Base, (i.e., 17 cents per 1000 gallons), or at a reasonable rate as determined by the National Park Service.

3. See Chapter IV, page 17 . No long-term detrimental effects are foreseen at this time.

4. See Chapter IV, page 6. Insufficient time is available to construct an activated charcoal filtering system or other treatment methods. Treatment of this source, if required, is a viable long-term part of the solution.

5. See the Letter of Transmittal and Chapter V, page 3. Figure 7, page V-4, indicates proposed project scheduling. The critical dates are (1) Start of design (May 15, 1978); (2) Start of construction (May 22, 1978); and completion of construction (July 7, 1978). Figure 5, page IV-14, is the location map of the proposed temporary facilities.

6. See Chapter III, page 6-9 , and Appendix D. Emergency regulations have been implemented by the Town, including prohibiting the use of Town water to wash road vehicles and boats; the use of water hoses to clean the exterior of buildings; and serving water at restaurants unless

Items from National Park Service

March 29, 1978 Correspondence

Comments

6 Cont. specifically requested. The Town is issuing permits to fill swimming pools on a staggered basis to dampen maximum demands. Provincetown's by-laws include prohibition of the use of non-attended water hoses, lawn sprinklers and sprinkler hose for the watering of lawns and gardens, and the use of water-cooled air conditioning systems.

7. See Appendix C. Preliminary information indicates gasoline contamination of the water table, the extent of which is not known at this time. Further information concerning the extent of the gasoline contamination will be available as the study progresses.

8. See Chapter IV, page 2-6 . Estimated time required for treatment of Provincetown well site (Atkins Mayo Road Site) is approximately two years or more. Current mobile water purification units available are not adequate to treat the site's potential capacity. Also, indications of hydrogen sulfide in the groundwater at the site may require more extensive treatment than mobile units are capable of providing.

9. The site was covered by a plastic sheet after about six weeks of exposure to the elements. The cover has limited

Items from National Park Service

March 29, 1978 Correspondence

Comments

9 Cont. the amount of water percolating into the area in the immediate vicinity of the spill.

10. See Chapter VI. Use of the South Hollow Well Field in the future, and the Knowles Crossing well field, provides an estimated capacity of 2.0 mgd. Projections of future consumption range from 2.9 to 4.0 mgd. Water conservation and the Town's awareness of the limited potential for extensive groundwater development is expected to moderate future consumptions. The estimated future low-range deficit of 1.0 mgd may be met by development of the Provincetown well site (Atkins Mayo Road Site).

APPENDIX B

Response to National Park Service

February 14, 1978 Correspondence

United States Department of the Interior

NATIONAL PARK SERVICE

CAPE COD NATIONAL SEASHORE
SOUTH WELLFLEET, MASSACHUSETTS 02663

IN REPLY REFER TO:
L3035

February 14, 1978

Mr. William S. Fitts, Chairman
Water Commission
Provincetown, MA 02657

Dear Mr. Fitts:

As you know, your request for a special use permit to develop water production wells within Cape Cod National Seashore at the Truro test well site No. 4 was forwarded to our Regional Office and the United States Geological Survey for review and comment on the legal and hydrological implications. As explained more fully below, we are advised that permission may be granted to develop water resources within the Seashore subject to conditions specified in existing law and service policy.

The Seashore was authorized by Congress with the requirement that it "...shall be permanently preserved in its present state, no development or plan...shall be undertaken therein which would be incompatible with the preservation of the unique flora or fauna or the physiographic conditions now prevailing...". Accordingly, with respect to your request, evidence must be accumulated which demonstrates that the proposed water pumping withdraw rate will not be detrimental to the surrounding natural resources within Cape Cod National Seashore.

A

Owners of land or interests in land within or adjacent to parks may be granted by special use permit the privilege of developing and using water or sources of water owned by the Service only when it is determined that the use of such water facilitates the management programs of the Service. Such permits will not be issued if any other reasonable source of water is available.

B

Public Law 91-383 (84 Stat. 827) authorizes the Secretary of the Interior to enter into contracts for the sale or lease, to persons, States or their political subdivisions, of services, resources, or water available within an area of the National Park system if such person, State or political subdivision:

C (1) provides public accomodations or services within the immediate vicinity of an area of the National Park system to persons visiting the area; and

C (2) has demonstrated to the Secretary that there are no reasonable alternatives by which to perform the necessary services, or acquire the resources or water.

Pursuant to that authority the National Park Service has formulated a policy for implementing the purposes of Public Law 91-383. The salient features of the policy require that:

D (1) The services provided by the applicant directly benefit the park, or visitors to the park;

D (2) A determination be made that the applicant has no reasonable alternatives to the use of park resources or services;

D (3) The effects of the use of the resource or service on the park's environment, administration, management and protection have been examined, and that the effects have been determined to be acceptable;

D (4) The use of water resources will be in accordance with laws and regulations governing ownership and use of Federal water and rights;

D (5) Reasonable charges be levied based on prevailing rates for similar services or resource use;

D (6) An application docket containing a draft of the special use permit, background materials and recommendations be submitted for review and concurrence by the Washington Office and appropriate congressional committees prior to consummating any legally or morally binding commitments; and

D (7) The permitted use be revokable and terminable within a specified period of time, and that no permanent property rights are conveyed to the user for any resource or water within an area of the National Park Service.

E In addition, we have been advised that further development of the test well site will constitute a major Federal action within the meaning of the National Environmental Policy Act. This means that full environmental compliance documentation will be required including preparation of an environmental impact statement and the scheduling of appropriate public meetings.

The U.S. Geological Survey has indicated several areas of important concern:

F (1) <u>The impacts of lowering the water table</u>. The area surrounding the well site, especially those overlap

areas with the North Truro and South Hollow well fields which would be influenced by the withdrawal from two wells, will result in a lowering of the water table level. The effects of this on local kettle and bog fauna and flora would have to be examined closely. The possibility of adverse effects on the private wells of North Truro residents must also be critically examined.

F (2) The effects of reduction in natural discharge to the sea and bay and the concomitant landward migration of the freshwater lens. Reduction in the rate of groundwater recharge will cause contraction of the extent of the lens. Those private well owners near the edge of the present boundary area may be critically impacted.

F (3) The potential for upconing of salt water into the proposed well. Although well site #4 is placed more advantageously to the middle of the freshwater lens than the present North Truro #1 well field (which has experienced shutdowns because of salt water intrusion), the longterm potential for similar problems should not be taken lightly. The Longnook Road pump tests by Guswa and Londquist (1975) should not be regarded as indicating that this site is immune from upconing. The well at Longnook was situated over a localized, impermeable clay lens.

The foregoing comments specify the conditions and concerns which must be satisfied prior to the Service issuing a permit authorizing the development of a permanent well field at Truro test site No. 4. However, subsequent to receipt of your letter of November 4, 1977, circumstances surrounding the leakage of a substantial quantity of gasoline from a storage tank near the South Hollow well field in Truro have forced the closure of that well field. As a consequence, Provincetown is deprived now, and for an indeterminate future period, of its major water source. The National Park Service understands the predicament and is willing to work with the Water Commission in resolving the problem on a temporary basis as rapidly as possible. Please let us know your wishes with regard to this immediate need as soon as possible.

G In view of the pressing nature of the water problem there is an observation which may be helpful to you. The daily water per capita consumption for 1975 (estimated from the Whitman Howard Report, data from Figure 1 and Table 2) is 175 gallons per person per day. It would appear that

there is considerable opportunity to bring the consumption rate more closely in line with average consumption rates of 100 gallons per person per day. A water conservation program which would include system refitting as proposed by your consultant might afford sufficient time to develop appropriate new water sources.

A copy of this letter is being sent to Mr. Cobb who visited with us several weeks ago with regard to Provincetown's present water problem.

Sincerely yours,

Lawrence C. Hadley
Superintendent

cc: Provincetown Board of Selectmen
Provincetown Conservation Commission
Provincetown Planning Board
Provincetown Finance Committee
Provincetown Town Manager
Association for the Preservation of Cape Cod
Truro Board of Selectmen
Truro Conservation Commission
Truro Water Committee
Truro Neighborhood Association

Items from National Park Service

February 14, 1978 Correspondence

Comments

A. See Chapter IV, page 17 . An assessment of the surrounding natural resources within the Cape Cod National Seashore indicated that no long-term detrimental environmental impacts are expected to occur. Short-term impacts are limited to those effects which may occur during drought conditions.

B. See Chapter IV , page 1 . Seven alternatives were considered. The three potential temporary emergency alternatives were the North Truro Air Force Base Well, the Massachusetts Department of Public Works (DPW) Site, and the National Park Service Test Well Site No. 4, with estimated maximum daily supply rates of 0.5, 0.75, and 0.75 mgd, respectively. The Massachusetts DPW has been petitioned for use of the site but no approval has been received to date. No guarantee of well yield or water quality of the DPW site exists. Temporary use of both the North Truro Air Force Base Well and the National Park Service Test Well Site No. 4 is recommended.

C.1 The proposed well would serve thousands of residents and tourists in the Towns of Provincetown and Truro. The major attraction to the Towns' tourists is the Cape Cod National Seashore. Without the necessary water supply

Items from National Park Service

February 14, 1978 Correspondence

Comments

C.1 Cont. available, the number of tourists who visit the area will decrease significantly.

C.2 See Chapter IV . Also, see response to Item B, Page 1, of this appendix.

D.1 As stated in C.1, the proposed well would serve many tourists who visit the park through the Provincetown water system.

D.2 See Chapter IV . Also see response to Item B, page 1, of this appendix.

D.3 See Chapter IV, page 17 . The effects of the use of the proposed well on the park's environment, administration, management and protection have been determined to be acceptable.

D.4 The Town fully intends to use the water resource in accordance with laws and regulations governing ownership and use of Federal water and rights and is prepared to take the necessary measures for full compliance.

D.5 See Chapter V, page 6 . The proposed rate of payment to the Seashore is 17 cents per 1000 gallons of water. This rate has been suggested by the U. S. Air Force as

Items from National Park Service

February 14, 1978 Correspondence

Comments

D.5 Cont.	payment to them for temporary use of the North Truro Air Force Base Well.
D.6	This report was written for review and concurrence by the Boston and Washington offices of the National Park Service, along with the appropriate United States Congressional Committees. No legally or morally binding commitments will be obtained prior to approval.
D.7	The agreement for water supply will be temporary and the Town will agree to cease pumping on November 1, 1978. The agreement may also include a statement that no permanent water rights are conveyed to the Town.
E.	See Appendix E, March 29, 1978, correspondence from the National Park Services. Environmental Impact Report will be filed at a later date.
F.1 - F.3	See Chapter IV, page 17 .
G.	See Chapter II, page 2 . The 175 gallons per capita per day water consumption figure is inaccurate. It was obtained by dividing the average daily consumption of Provincetown by the estimated population of Provincetown. This measure, although applicable in most communities as

Items from National Park Service

February 14, 1978 Correspondence

Comments

G. Cont. as an indication of relative per capita water consumption, cannot be effectively applied in Provincetown. The water system also serves many residents in Truro, in addition to tourists who frequent the area year-round. Since the number of tourists is unknown, per capita water consumption estimates cannot be effectively applied.

H. See Chapter III, page 6 , and Appendix E. Emergency regulations have been implemented by the Town, including prohibiting the use of Town water to wash road vehicles and boats; the use of water hoses to clean the exterior of buildings; and serving water at restaurants unless specifically requested. The Town is issuing permits to fill swimming pools on a staggered basis to dampen maximum demands. Provincetown's by-laws include prohibition of the use of non-attended water hoses, lawn sprinklers and sprinkler hose for the watering of lawns and gardens, and the use of water-cooled air conditioning systems.

APPENDIX C

Preliminary Results of Gasoline Leakage Studies

Gasoline Spill Detection and Remedial Action

The extent of gasoline contamination may be determined by drilling observation wells and sampling groundwater and sediments recovered during drilling. The groundwater samples should be obtained from locations near the water table and at greater depths determined by hydrogeologic considerations. For proper investigation, certain analytical and sampling techniques are necessary. Other than the subjective taste and odor testing (which is relatively sensitive, but not quantitative), the only procedure sensitive enough for consideration is analysis with a gas chromatograph (GC). With this method, concentrations of a few parts per billion are easily detected.

Because gasoline is so volatile, precautions must be taken to minimize shaking or other means of aerating water samples during their collection. The water must be placed in containers with as little exposure to the atmosphere as possible. The containers must also be completely filled to prevent loss of vapor into the head space.

Remedial action to remove the hazard of gasoline contamination to the South Hollow well field could consist of one or more activities including: creation of hydraulic gradients in the aquifer away from the well field area, pumping from several shallow wells to remove the contaminated groundwater, or possibly cultivation or naturally existing soil bacteria activity to reduce the gasoline levels. Any action taken would need to be carefully considered to ensure that the results, while protecting municipal supply, would be detrimental to other users of groundwater in the general area, i.e., the injection of a water barrier to change the flow pattern

might protect the South Hollow supply, but could conceivably spread the problem to others not now affected.

Progress of Study of Gasoline Spill

Data collection in connection with the study of the gasoline spill problem in the area of the South Hollow Well Field was initiated on April 11, 1978 (Tuesday) after being notified of the intent of Provincetown to enter into a Contract with Camp Dresser & McKee (CDM) the previous Friday. In addition to originating a program of field investigations, the data collected by Whitman & Howard on April, 1978 water levels in certain walls was reviewed. Also, reviewed were various analysis for potential gasoline contamination in nearby wells sampled and analysed by the Massachusetts Department of Environmental Quality Engineering when the problem was originally discovered in December, 1977. Copies of the above mentioned historical data is attached to this Appendix. Other matters reviewed were general reports on the overall Provincetown water system and the establishment of general water needs and capabilities of the existing water system. The process of data collection and review continued through the week-end of April 15 and 16, 1978 and Camp Dresser & McKee personnel were joined by two hydrologists from the firm of Geraghty & Miller (G&M) on Monday April 17, 1978. Also, Clarence Walti Assoc., Inc., a subsurface boring contractor, had been contacted and started the work of installing additional observation wells in the South Hollow area on April 19, 1978.

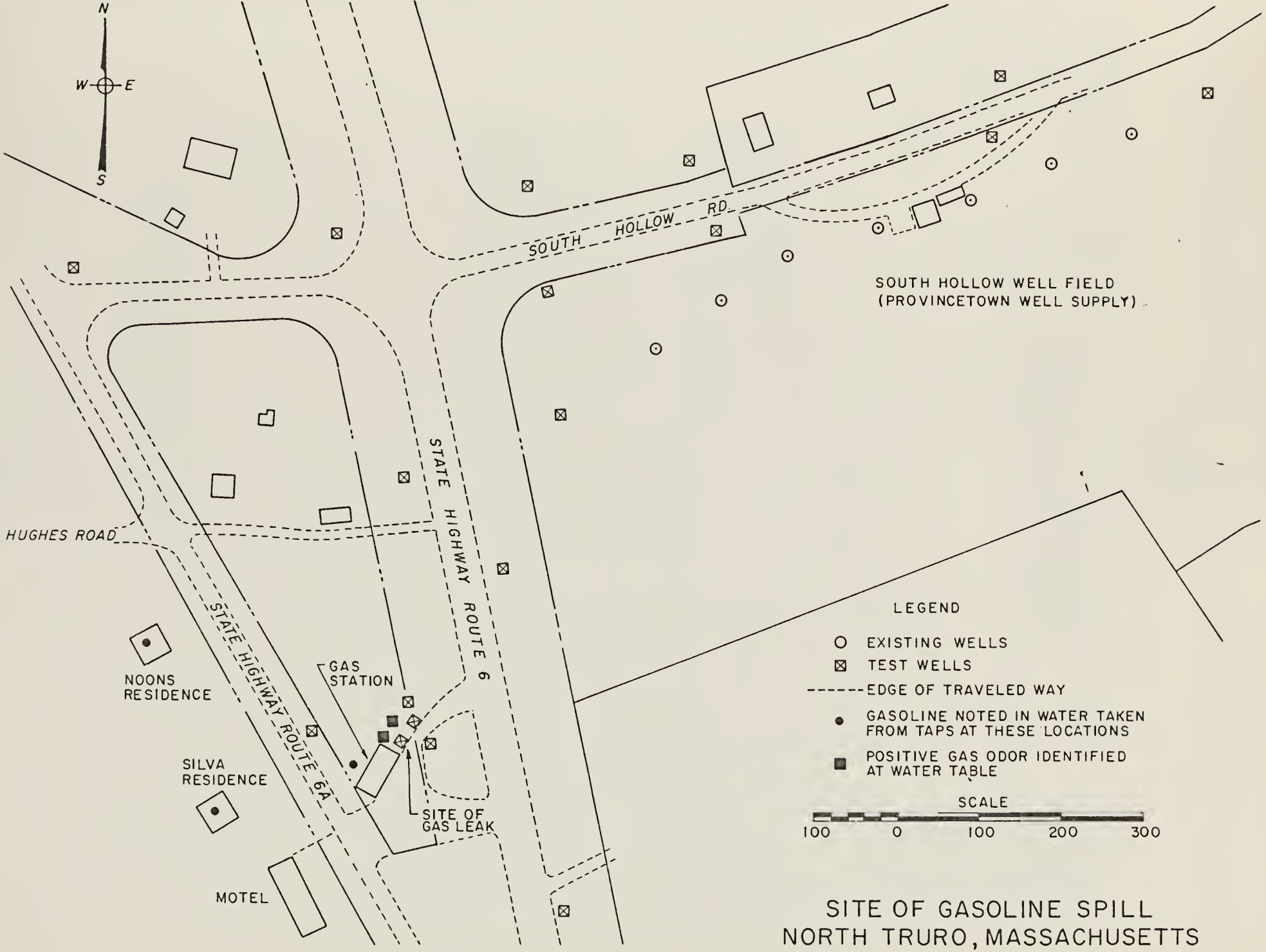
Previous to the engagement of CDM, 3 observation wells had been installed between the leaking gasoline tank location and the nearest production well of the South Hollow Well Field. Including these 3 wells, a total of 18 observation wells have now been placed in the area. Of the total number

of observation wells, 9 are not located in the area between the spill and the production wells. Those were installed in order to establish general groundwater gradients of the overall area and to be able to depict streamlines of flow throughout the area.

At the present time (week ending May 6, 1978), much of the field work in connection with the study of the spill has been accomplished. Analysis of events and of the future degree of hazard to the well field is ongoing. Initial conclusions show that we have experienced a general movement of gasoline in the ground to the northwest of the spill site. This movement appears representative of the major portion of the gasoline that is present. However, it appears likely that the gasoline plume has threaded out into a narrow thread following one of the streamlines mentioned previously. Present conclusions would lead us to believe that pumping from the South Hollow Well Field on any sustained basis would pose a hazard. It may be possible to initiate some reduced pumping for short term emergencies of a few days duration without fear of immediate contamination. However, even this could create problems related to clean-up action.

Final clean-up action has not yet been established, but we cannot envision that the removal of soil would be any part of a final answer. Evidence has shown that the gasoline has joined the groundwater and an attempt to excavate saturated soil would only create a wave of gasoline and water ahead of any excavation technique. Another form of clean-up action which could very well cause added difficulties would be any attempt to create a barrier mound between the South Hollow Well Field and the spill site. Such action would result in diverting and spreading the gasoline, now in the groundwater, to wider and unknown areas with the probability of causing widespread contamination of private wells in the area. Pumping and separation of the petroleum products from the pumped water, along with several

other remedial actions, are under consideration, but none appear to provide any degree of promise of diminishing the hazard for the immediate summer months.



SITE OF GASOLINE SPILL
NORTH TRURO, MASSACHUSETTS

APR 18 1978

EST. — 1869 INC. 1924

Robert T. Jones, *President*
Paul C. Bucknam, Jr., *Treasurer*
Howard R. Perkins, *Manager*

Anthony Chiaravelotti
Elias A. Cooney
Brewster W. Fuller
Robert E. Hickman
Myles F. Howard
Frederick D. A. King, Jr.
James T. McDonough
Steven J. Medlar

Arthur T. Lucchini, *Controller*
James A. S. Walker, *Arch. Officer*

WHITMAN & HOWARD, INC.

Engineers and Architects

45 WILLIAM STREET, WELLESLEY, MASS. 02181 • TEL: 617-237-5000

ASSOCIATES

Gerald T. Carey
T. T. Chiang Ph.D.
Edward R. Clemons
Robert E. Crawford
John L. Daniels
Donald F. Dargie
Charles G. Ellis
Ernest H. Fagerstrom
Curtis H. Flight
George D. Gustafson
Arthur Liatsos
James A. Little
Edward R. Mayer
James F. Murphy
Joseph A. Murphy
Robert L. Wyman

April 12, 1978

Mr. Charles Cobb,
Town Manager
Town Hall
Provincetown, MA 02657

Re: Hollow Observation Wells
Provincetown, MA

Dear Mr. Cobb:

We are herewith forwarding the water level readings and profiles for the week of April 3 through April 10, 1978. Also, included are revised profiles of the first three weeks showing observation well 4 levels and pumping rates and times not previously available.

Very truly yours,

WHITMAN & HOWARD, INC.

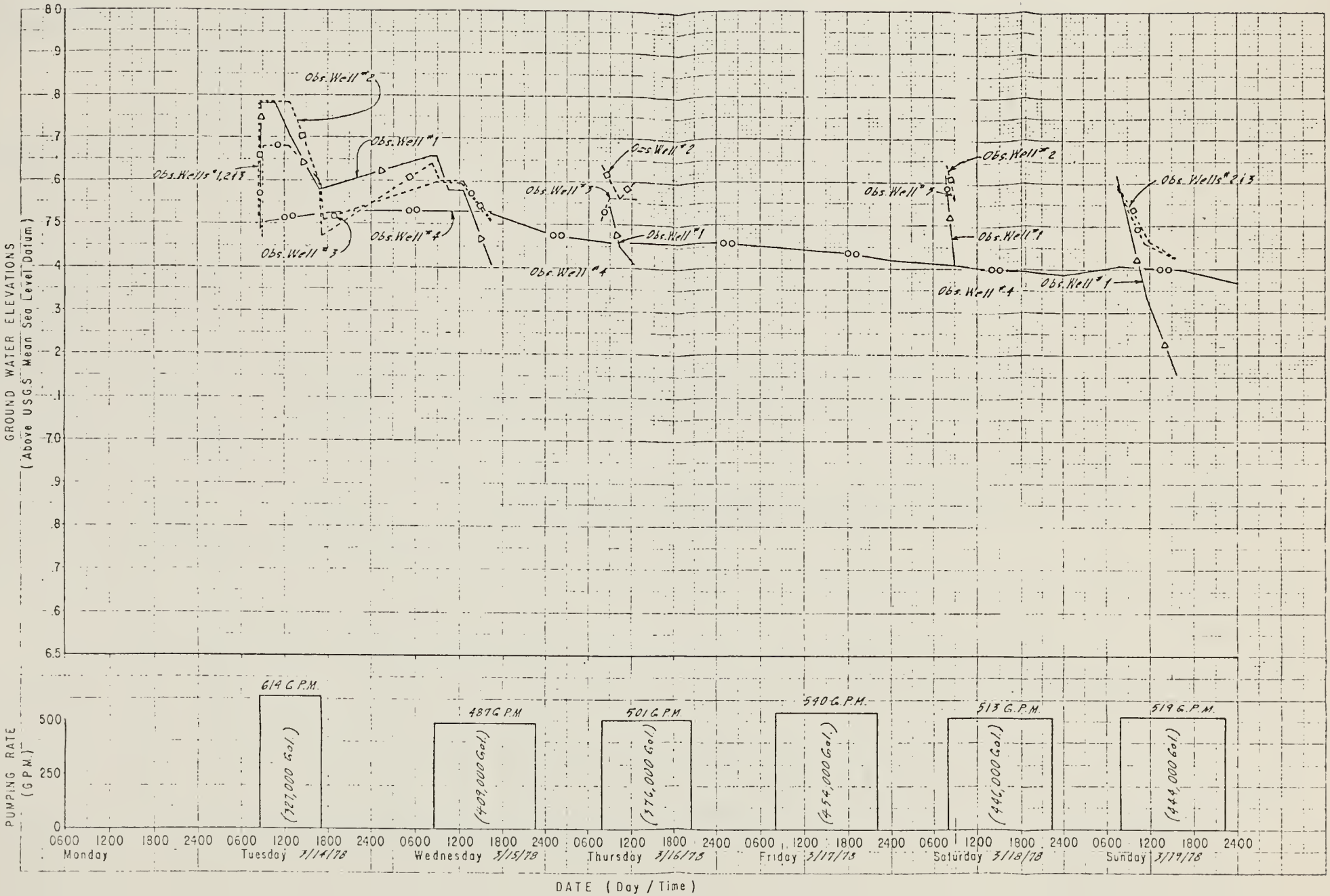
Arthur A. Stockus

AAS/cas

Encl.

cc: Board of Water Commissioners
Mr. Roland Dusseault, DEQE
Mr. John Guswa, U.S.G.A.

Our 109th Year of Continuous Service


GROUND WATER ELEVATIONS
(Above USGS Mean Sea Level Datum)
Obs. Well #2
Obs. Well #1
Obs. Wells #1,2,3
Obs. Well #3
Obs. Well #4
Obs. Well #2
Obs. Well #3
Obs. Well #1
Obs. Well #4
Obs. Well #2
Obs. Well #3
Obs. Well #1
Obs. Well #4
Obs. Wells #2,3
Obs. Well #1
PUMPING RATE
(G.P.M.)
614 G.P.M.
(327,000 Gal.)
487 G.P.M.
(409,000 Gal.)
501 G.P.M.
(376,000 Gal.)
540 G.P.M.
(454,000 Gal.)
513 G.P.M.
(446,000 Gal.)
519 G.P.M.
(444,000 Gal.)
Monday
Tuesday 3/14/78
Wednesday 3/15/78
Thursday 3/16/78
Friday 3/17/78
Saturday 3/18/78
Sunday 3/19/78
DATE (Day / Time)

Date 4/3/78 GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	17.41 Elev.	D.D. Ft/In.	25.68 Elev.	D.D. Ft/In.	41.68 Elev.	D.D. Ft/In.	54.16	
Static (Pump Off)														—
Start Pump		—		—		—		—		—		—		
1st Reading (Pump Running)														
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)	1230		10'10¾"		10'9⅓"	10'8½"	16.70	18'-10"	6.85	34'-9"	6.93			550
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)	1430		10'10¾"		10'9"	10'-8½"	6.70	18'-10⅛"	6.82	34'-9½"	6.89			550 GPM
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects

Date 4/4/78

GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.		
Static (Pump Off)	0730		10'6¼"		10'6¼"	10'-5¾'	6.93	18'-8"	7.01	34'-8¾'	6.95			—
Start Pump		—		—		—		—		—		—		
1st Reading (Pump Running)	0815		10'7¼"		10'6½"	10'-6½"	6.87	18'-8"	7.01	34'-8¾'	6.95			550
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)	1030		10'9"		10'7¼"	10'-6½"	6.87	18'-8"	7.01	34'-8½'	6.97			550
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)	1230		10'9¼"		10'7¼"	10'-6¾'	6.85	18'-8"	7.01	34'-8½"	6.97			550
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects

.. Date 4/5/78 GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.		
Static (Pump Off)	0715		10'6"		10'6	10'-6"	6.91	18'-7½"	7.06	34'-8½"	6.97			—
Start Pump		—		—		—		—		—		—		
1st Reading (Pump Running)	0815		10'7"		10'6¼	10'-6¼	6.89	18'-7½"	7.06	34'-8½"	6.97			550
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)	1030		10'8¾"		10'7½	10'-7½"	6.78	18'-8"	7.01	34'-8¾"	6.95			550
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)	1230		10'9½		10'7½	10'-7½"	6.78	18'-8"	7.01	34'-8¾"	6.95			550
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects

Date 4/6/78 GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.		
Static (Pump Off)	0700		10'6½"		10'6½"	10'-6½"	6.87	18'-8¼"	6.99	34'-9"	6.93			—
Start Pump		—		—		—		—		—		—		
1st Reading (Pump Running)	0800		10'7¾"		10'7"	10'-6¾"	6.85	18'-8¼"	6.99	34'-9"	6.93			550
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)	1030		10'8"		10'7¾"	10'-7½"	6.78	18'-8¾"	6.95	34'-9"	6.93			550
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)	1230		10'10"		10'8"	10'-7"	6.83	18'-8¾"	6.95	34'-9"	6.93			550
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects

.. Date 4/7/78

GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.		
Static (Pump Off)	0715					10'-6½"	6.87	18'-8¼"	6.99	34'-9"	6.93			—
Start Pump		—	10'7"	—	10'6¾"	—		—		—		—		
1st Reading (Pump Running)	0815		10'7¾"		10'7"	10'-6½"	6.87	18'-8¼"	6.99	34'-9"	6.93			550
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)	1030		10'8"		10'7¾"	10'-7½"	6.78	18'-8¾"	6.95	34'-9¼"	6.91			550
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)	1230		10'10"		10'8"	10'-7"	6.83	18'-8¼"	6.99	34'-9"	6.93			550
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects

Date 4/8/78

GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.		
Static (Pump Off)	0730					10'-6½"	6.87	18'-8"	7.01	34'-9"	6.93			—
Start Pump		—	10'7"	—	10'6½	—		—		—		—		
1st Reading (Pump Running)	10:00		10'8¾		10'7½	10'-7¼"	6.80	18'-8¼"	6.99	34'-9⅛"	6.92			500
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)														
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)														
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects

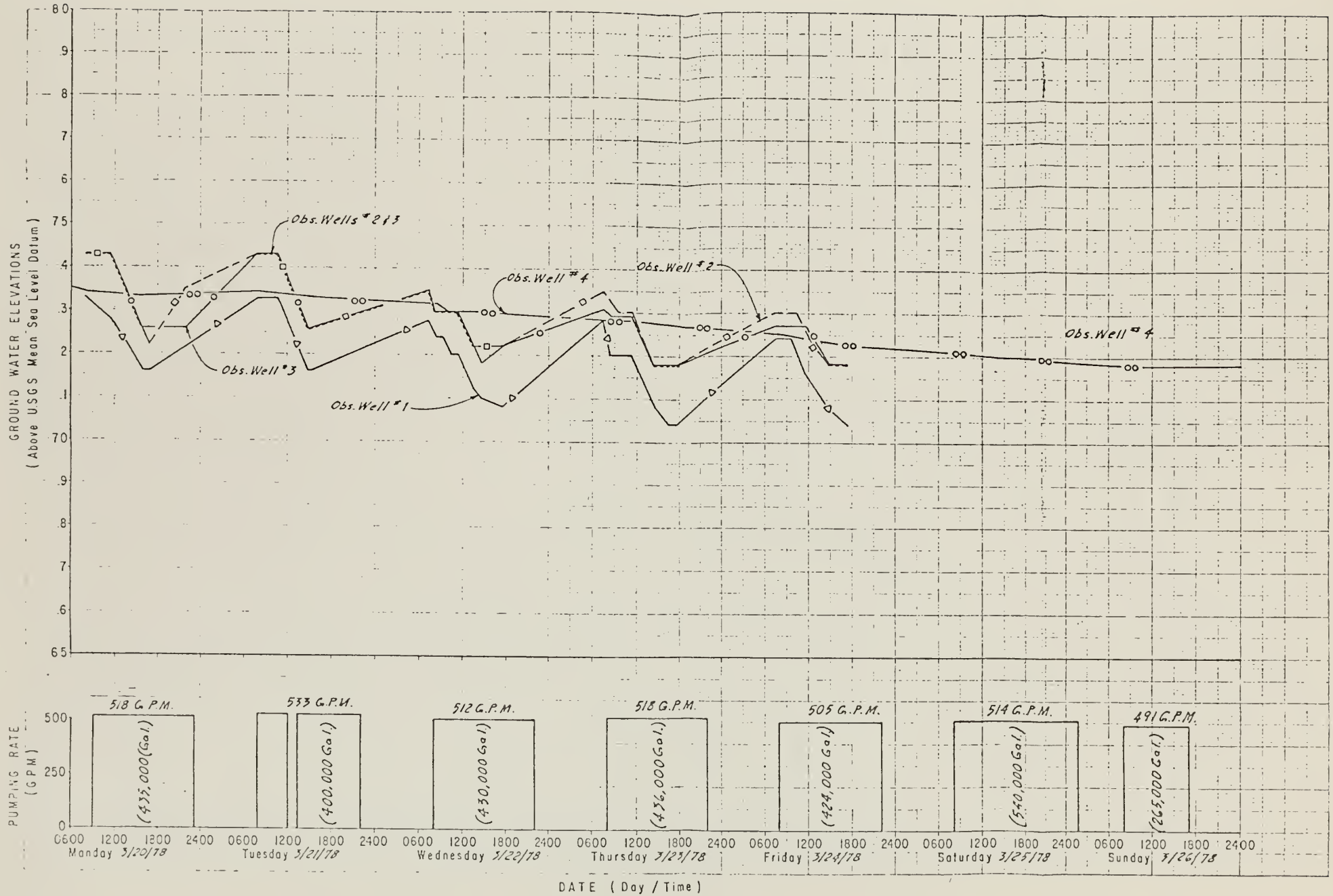
Date 4/9/78

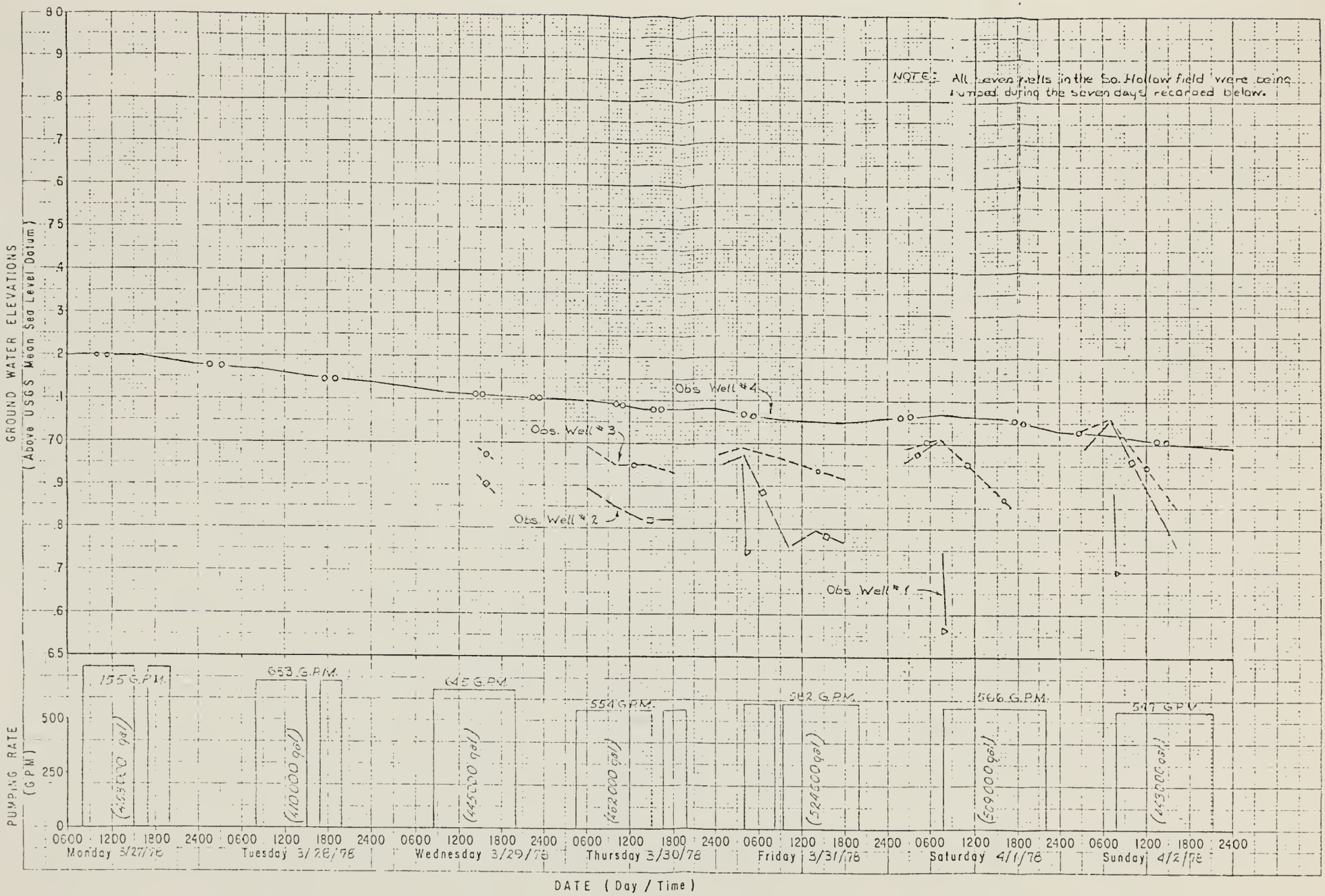
GROUND WATER LEVELS AT SO. HOLLOW WELL FIELD N. TRURO, MASS.

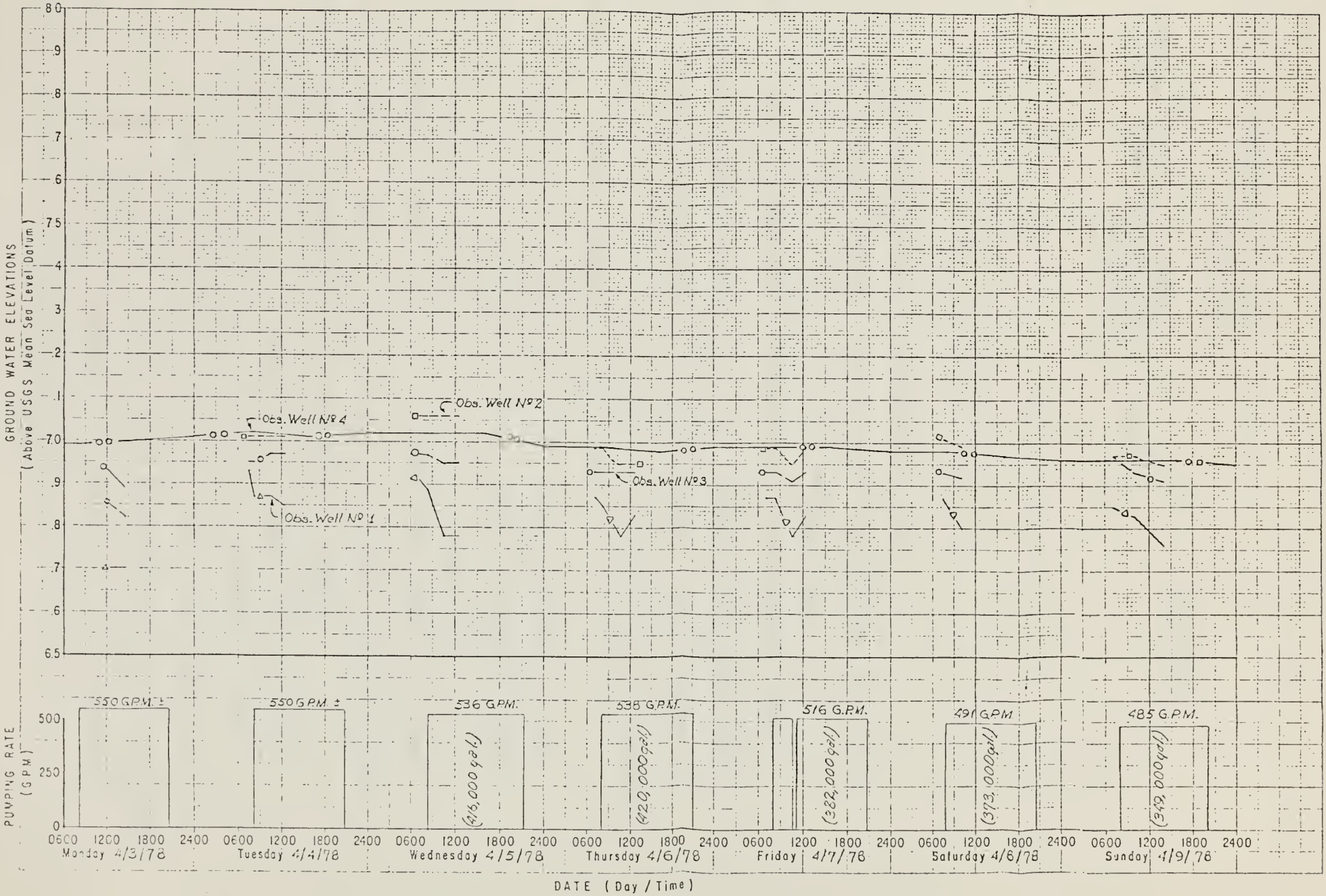
	Time	GPW NO. 3		GPW NO. 2		GPW NO. 1		OBS No. 2		OBS NO. 3		OBS NO. 4		Pump Rate G.P.M.
		Draw Down Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.	Elev.	D.D. Ft/In.		
Static (Pump Off)	7715		10'-7		10-7	10'-6 3/4"	6.85	18'-8 1/2"	6.97	34' 8 1/2"	6.97			—
Start Pump		—		—		—		—		—		—		
1st Reading (Pump Running)	10 AM		10-9		10-7 3/4	10'-7"	6.83	18'-8 1/2"	6.97	34'-9"	6.93			500
*2nd Reading (Start + 1 Hr.)														
3rd Reading (Start + 2 Hr.)	2 PM		10.9 3/4		10-8 1/2	10'-7 3/4"	6.76	18'-8 3/4"	6.95	34'-9 1/4"	6.91		47.20	500
*4th Reading (Start + 3 Hr.)														
5th Reading (Start + 4 Hr.)														
*6th Reading (Start + 6 Hr.)														
Stop Pump		—		—		—		—		—		—		
Static														—

* Readings to be taken only after a shutdown of 24 hours or longer

Whitman & Howard, Inc.
45 William Street
Wellesley, MA 02181
Engineers & Architects


GROUND WATER ELEVATIONS
(Above USGS Mean Sea Level Datum)
Obs. Wells # 2 & 3
Obs. Well # 4
Obs. Well # 2
Obs. Well # 4
Obs. Well # 3
Obs. Well # 1
PUMPING RATE
(G.P.M.)
518 G.P.M.
(435,000 Gal.)
533 G.P.M.
(400,000 Gal.)
512 G.P.M.
(430,000 Gal.)
518 G.P.M.
(456,000 Gal.)
505 G.P.M.
(424,000 Gal.)
514 G.P.M.
(540,000 Gal.)
491 G.P.M.
(265,000 Gal.)
Monday 3/20/78
Tuesday 3/21/78
Wednesday 3/22/78
Thursday 3/23/78
Friday 3/24/78
Saturday 3/25/78
Sunday 3/26/78
DATE (Day / Time)


NOTE: All seven wells in the So. Hollow field were being pumped during the seven days recorded below.
GROUND WATER ELEVATIONS
(Above USGS Mean Sea Level Datum)
8.0
9
.8
.7
.6
7.5
.4
.3
.2
.1
70
.9
.8
.7
.6
6.5
Obs. Well #4
Obs. Well #3
Obs. Well #2
Obs. Well #1
PUMPING RATE
(G.P.M.)
500
250
0
555 G.P.M.
(445000 gal)
653 G.P.M.
(410000 gal)
645 G.P.M.
(445000 gal)
554 G.P.M.
(422000 gal)
582 G.P.M.
(524600 gal)
566 G.P.M.
(509000 gal)
547 G.P.M.
(439000 gal)
0600 1200 1800 2400
Monday 3/27/78
Tuesday 3/28/78
Wednesday 3/29/78
Thursday 3/30/78
Friday 3/31/78
Saturday 4/1/78
Sunday 4/2/78
DATE (Day / Time)


GROUND WATER ELEVATIONS
(Above USGS Mean Sea Level Datum)
Obs. Well No 4
Obs. Well No 2
Obs. Well No 3
Obs. Well No 1
PUMPING RATE
(G.P.M.)
550 G.P.M. ±
550 G.P.M. ±
536 G.P.M.
(416,000 gal.)
538 G.P.M.
(420,000 gal.)
516 G.P.M.
(382,000 gal.)
491 G.P.M.
(373,000 gal.)
485 G.P.M.
(349,000 gal.)
Monday 4/3/78
Tuesday 4/4/78
Wednesday 4/5/78
Thursday 4/6/78
Friday 4/7/78
Saturday 4/8/78
Sunday 4/9/78
DATE (Day / Time)

COMMONWEALTH OF MASSACHUSETTS

BARNSTABLE, SS. SUPERIOR COURT NO. 37620

THE TOWN OF PROVINCETOWN, ET ALS Plaintiffs VS. JOHN F. NOONS, WILLIAM F. WATTS, HUBBARD OIL CO., INC. and AMOCO OIL COMPANY Defendants	AFFIDAVIT

Roland A. Dusseault, being duly sworn deposes and says:

(1) I am an Associate Sanitary Engineer presently assigned as Chief of the Water Supply Section, Southeast Region, Department of Environmental Quality Engineering. I have been employed by the Department of Environmental Quality Engineering and its predecessor agency since 1963 and have been assigned duties primarily in the areas of water supply and waste disposal. I hold a degree in Civil Engineering from the University of Massachusetts and have been registered by the Commonwealth to practice engineering since 1968.

(2) On December 9, 1977 I was advised by Mr. Richard Sturdevant of the Barnstable County Health Department that gasoline leakage was suspected at the Watts Service Center (Amoco Station) Route 6 in Truro, Massachusetts.

(3) On December 12, 1977 I directed two members of my staff (Mr. Joseph X. Conley and Mr. Robert P. Fagan) to visit the site of the Watts Service Center and the surrounding area to investigate the alleged gasoline leakage.

(4) On December 13, 1977, I discussed with Mr. Conley and Mr. Fagan the observations they had made during their investigation of December 12, 1977. Subsequent to said discussion I phoned Mr. Charles K. Cobb, Town Manager, Provincetown, and advised him to stop using the So. Hollow Road wells except in an emergency. My advise to Mr. Cobb was intended to reduce the possibility of drawing gasoline contamination toward the So. Hollow Road well field.

(5) On December 19, 1977, I received from the Lawrence Experiment Station the laboratory results of samples collected by my staff on December 12, 1977. The results showed that the samples collected from the following locations contained gasoline:

a. Bathroom sink tap, Watts Service Center, Route 6, N. Truro

b. Kitchen sink tap, Donald Noons residence, Route 6A, N. Truro

c. Second floor kitchen sink tap, Apartments A and B, Route 6A, N. Truro

d. Kitchen sink tap, Alfred Silva residence, Route 6A, N. Truro

The results further showed that the samples collected from the following locations did not contain gasoline:

a. Sample tap, South Hollow Road Pumping Station, N. Truro

b. Sink tap, Adams Pharmacy (Provincetown Public Water Supply) Commercial Street, Provincetown

Roland A. Dusseault

Roland A. Dusseault

COMMONWEALTH OF MASSACHUSETTS

January 27, 1978

Personally appeared before me the afore-mentioned ROLAND A. DUSSEAULT, who made oath that he has read the foregoing Affidavit and knows the contents thereof, and that the statements contained therein are true to the best of his knowledge and belief.

Before me,

Muriel E. Shepherd

Notary Public

My Commission Expires: 10/27/78.

The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

Department of Environmental Quality Engineering

Southeast Region

Lakeville Hospital, Lakeville, Massachusetts 02346

DAVID STANDLEY
Commissioner

PAUL T. ANDERSON
onal Environmental Engineer

COPY

January 12, 1978

Board of Health
Truro
Massachusetts 02666

RE: TRURO--Public Water Supply--Amoco Service Station Storage Tank Leak

ATTENTION: Mr. William Brown

Gentlemen:

The Department of Environmental Quality Engineering in cooperation with your Board has had samples collected and analyzed for the presence of gasoline in connection with the subject gasoline spill.

Enclosed for your information and guidance are copies of the results reported by this Department's laboratory.

Very truly yours,

For the Commissioner

Roland A. Dusseault, P.E., Chief
Water Supply Section

RAD/jt

cc: Board of Health
Provincetown, Mass. 02657

Board of Selectmen
Provincetown, Mass. 02657

Board of Water Commissioners
Provincetown, Mass. 02657

Barnstable County Health Department
Barnstable County Court House
Barnstable, Mass. 02630

Board of Selectmen
Truro, Mass. 02666

cc: Mr. William Marhoffer
Regional Engineer
Division of Water Pollution Control
P.O. Box 537
Pembroke, Mass. 02359

Attorney Richard Campbell
Nutter McClennen & Fish
75 Federal Street
Boston, Mass.

Mrs. Flora Peters
Route 6A
North Truro, Mass. 02652

Mr. Donald Noons
Route 6A
North Truro, Mass. 02652

Mr. Alfred Silva
Route 6A
North Truro, Mass. 02652

Watts Amoco Service Center
Route 6A
North Truro, Mass. 02652
ATTENTION: Mr. William Watts

RECEIVED

The Commonwealth of Massachusetts JAN 9 1978

Department of Environmental Quality Engineering D.E.Q.E. SOUTHEAST REGION

Special Analysis

Truro

Collector: Ripa & Brown

urce A Outside Tap at Moon's Residence

urce B

urce C

urce D

urce E

urce F

	A	B	C	D	E	F
ample No.	544251					
ate of Collection	12/15/77					
ate of Receipt	12/15/77					
soline	Present*					

REMARKS: [illegible]

RECEIVED
JAN 9 1978
D.E.Q.E. SOUTHEAST REGION

The Commonwealth of Massachusetts
Department of Environmental Quality Engineering

Special Analysis

North Truro

Collector: Brown

urce A Tap at Flora Peters Home, Route 6A

urce B

urce C

urce D

urce E

urce F

	A	B	C	D	E	F
ample No.	544250					
ate of Collection	12/15/77					
ate of Receipt	12/16/77					
soline	None Detected					

REMARKS:

DEC 1 9 1977

The Commonwealth of Massachusetts D.E.Q.E. Northeast Region

Department of Environmental Quality Engineering

Special Analysis

Cape(Gasoline Spill)

Collector: Conley, Fagan & Ripa

ource A North Truro, Private Wells A&B, Apts. Rte. 6A, next to Noon's Residence

ource B Truro, Provicetown P.W.S. South Hollow Rd. Sta. Wells 4,5,6,7

ource C " " " " " Adams Pharmacy, Commercial St.

ource D " Amoco Gas Sta., Rte. 6A

ource E North Truro, Silva Residence, Rte. 6A

ource F Truro, Noon's Residence, Rte. 6A

	A	B	C	D	E	F
Sample No.	544183	184	185	186	187	188
Date of Collection	12/12/77	12/12	12/12	12/12	12/12	12/9
Date of Receipt	12/14/77	12/14	12/14	12/14	12/14	12/15
Gasoline by Odor Test	present	None Detected	None Detected	Present	Present	None Detected
Gasoline verified by G.C.	None Detected	None Detected	None Detected	Present	Present	Present

REMARKS: G.C - Gas Chromatography (Head Space Vapor Analysis)

Bd. of Health
Selectmen

The Commonwealth of Massachusetts

Department of Environmental Quality Engineering

Special Analysis

Provincetown (M.D.)

Collector: Whitman & Howard

Source A Monitoring Well #1

Source B " " #2

Source C " " #3

Source D 2 1/2" Obs. Well #3

Source E

Source F

	A	B	C	D	E	F
Sample No.	544424	425	426	427		
Date of Collection	2/10/78					
Date of Receipt	2/15/78					
Gasoline	None Detected	None Detected	None Detected	None Detected		

REMARKS:

APPENDIX D

Town-Enacted Conservation Measures

ATTENTION WATER CONSUMERS

WATER USE REGULATIONS

Section 29. No person shall use lawn sprinklers or Town Water for outdoor purposes in violation of Water Department Regulations

1. The use of lawn sprinklers and sprinkler hose for the watering of lawns and gardens is hereby prohibited during the period of May 1 through September 30 inclusive, unless specific authorization is granted by the Board of Water Commissioners after a public hearing

2. The use of nonattended water hoses is prohibited unless specific exemption is granted by the Board of Water Commissioners after a public hearing

3. No water shall be used from a fire hydrant except by the Fire Department without first obtaining a written permit from the Board of Water Commissioners

4. The use of Town water supply for the purpose of driving piling is prohibited unless a permit is obtained therefor from the Board of Water Commissioners

5. It shall be unlawful to use the town water supply to fill or cure any swimming pool unless a written permit is obtained therefor from the Board of Water Commissioners

6. It shall be unlawful to use the town water supply for use as a coolant in a Central Station Air Conditioning and/or refrigerating and/or open circuit type system, utilizing, evaporating, and/or water-cooled condensers or cooling-tower utilizing chilled water, and/or Unit Air Conditioners and/or refrigerators which are water cooled of the open circuit type without the express written consent of the Board of Water Commissioners

The Board of Water Commissioners is empowered to make other rules and regulations pertaining to the use of the municipal water supply after public hearing. Such regulations shall take effect when promulgated by publication in a newspaper of general circulation in the Town of Provincetown and by posting the same on the bulletin board at the Town Hall

A violation of the aforementioned articles shall be punished by a fine not to exceed Fifty ($50.00) Dollars per day, each day constituting a separate offense

THE FOLLOWING EMERGENCY REGULATIONS WERE PROMULGATED BY THE WATER COMMISSION AT A MEETING HELD MONDAY, APRIL 24, 1978. THESE REGULATIONS WILL GO INTO EFFECT FRIDAY, APRIL 28, 1978, AND WILL CONTINUE IN EFFECT FOR A PERIOD OF NO LONGER THAN 90 DAYS, OR UNTIL FURTHER NOTICE, AT WHICH TIME THEIR CONTINUED NECESSITY WILL AGAIN BE REVIEWED BY THE WATER COMMISSION.

1. No town water shall be used to wash road vehicles.
2. No town water shall be used to wash down any boats.
3. The use of water hoses to clean the exterior of buildings shall be prohibited.
4. No water shall be served at restaurants unless requested by patrons.
5. Permits for the filling of pools in Provincetown and the Truro Beach Point Area may be obtained from the water commission on Monday, May 1, 1978, between 10 a.m. and 5 p.m. in Town Hall, at which time a staggered two-month schedule will have been developed by the Town for the filling of said pools.
6. All citizens with private wells must display medallions readily visible from the street: Failure to do so will subject them to the same fines as non-well owners. Medallions may be obtained from Town Hall and must be displayed no later than May 5, 1978.

A VIOLATION OF THE ABOVE REGULATIONS SHALL BE PUNISHED BY A FINE NOT TO EXCEED FIFTY ($50.00) DOLLARS A DAY; EACH DAY CONSTITUTING A SEPARATE OFFENSE.

THE BOARD OF WATER COMMISSIONERS, THE BOARD OF HEALTH AND THE BOARD OF SELECTMEN WILL BE ENFORCING AGENTS FOR THE ABOVE BYLAW AND EMERGENCY WATER USE REGULATIONS.

THE BOARD OF WATER COMMISSIONERS ALSO STRONGLY ENCOURAGES THE FOLLOWING WATER CONSERVATION METHODS:

1. The use of stickers or signs in restaurant and hotel restrooms encouraging tourists to conserve water.
2. The adjustment of valves below sinks to cut maximum volume by one-half.
3. The use of water saving devices in homes and business. These will be made available at cost through a citizens' steering committee working with the water commission and will be on display at Town Hall as of Monday, May 1, 1978.

Thank you for your cooperation.

PROVINCETOWN BOARD OF WATER COMMISSIONERS
Charles A. Mayo III, Chairman
C. Page McMahan
Valerie Martin
John Nunes
Provincetown Advocate
April 27, 1978

Board imposes strict water use restrictions

By Gregory Katz

Facing a water shortage this summer and an uphill battle to win National Seashore permission to drill a new well, the water commission unanimously adopted strict water conservation measures Monday, including a ban on washing cars and boats with town water.

In addition to enforcing existing bylaws, the commissioners banned the use of unattended outside hoses and cleaning building exteriors. It prohibited restaurants from serving water unless it is requested and suggested water users adjust the valve below their sinks to cut the maximum flow of water in half.

The commission is investigating the possibility of deputizing its members, the selectmen and the board of health to help the police enforce conservation measures. Maximum fines of up to $50 a day will be given to violators.

In an effort to educate the community about ways to save water and money, water-saving devices for showers and toilets will be displayed in Town Hall. Stickers encouraging tourists to save water will be placed in bathrooms of hotels and restaurants.

Homeowners with private wells who do not use town water are encouraged to display medallions on their homes indicating that private wells are being used.

The commission rejected a suggestion from Selectman Munro Moore to add a surcharge to water bills for people who increased their consumption. It was believed that this would not have an immediate effect because bills will not be sent out for several months and many go unpaid because of confusion surrounding the town's water meter and billing process.

The strict measures are necessary because of the uncertainty surrounding the town's South Hollow well field in North Truro, which is threatened with gasoline contamination. No one knows if the town can pump water from it this summer.

To supply more water, the town will draw water from a well at North Truro Air Force Base and also ask permission to drill a new well in the National Seashore. This requires Congressional approval. The town must show it has a strong conservation program before permission would be granted.

Robert Weimar, project engineer for Camp, Dresser and McKee, the Boston firm hired to combat the water shortage, painted a grim picture during a joint selectmen-water commission meeting Thursday.

Weimar said there are periods of peak demand during the summer when the town uses 2.7 million gallons of water daily. These periods of peak demand may last for a week to 10 days. Average consumption during the summer is between 1.5 and 1.7 million gallons a day.

Weimar said during a 10-day period where 2.7 million gallons are used daily, the town would need 27 million gallons of water. If the town uses the five million gallons of water in its atorage, which is not advisable, the town would only need 22 million gallons, or 2.2 million gallons a day.

The Knowles Crossing station can supply 800,000 gallons daily if it doesn't have problems with saltwater intrusion. This means the town would need an additional 1.4 million gallons a day to meet peak demand.

Weimar said the well at the Air Force station can supply a maximum of 500,000 gallons, leaving the town 900,000 gallons short. If South Hollow cannot be used, the town desperately needs to drill a well in the Seashore to avoid a full-fledged crisis this summer.

Even if South Hollow can be pumped at half its normal capacity, the town would still fall short during peak periods. The situation is further complicated by uncertainties surrounding the Knowles Crossing station, which has been showing high salt counts lately.

If salt counts at Knowles Crossing rise too high the state will shut down the pumping station. If the town is forced to use the water in its storage tanks, fire-fighting capacity would be hurt because water pressure would be lowered.

Given the potential for disaster this summer, a citizen's group has formed to help coordinate water conservation efforts. Called the water conservation steering committee, the group is a voluntary, nongovernmental organization chaired by Nancy McNulty.

Water board bans filling swimming pools

By Gregory Katz

Unless the water crisis eases a lot of swimming pools will be empty in Provincetown and North Truro this summer.

The water commission voted unanimously Thursday to ban filling swimming pools. It will hold a hearing next Thursday at 5 p.m. to gather information about pools to determine if permits should be issued this summer.

The commission is worried that Provincetown may by short of water this summer until a new emergency pumping station is completed. The target date for completion of the new well is the middle of June. Until then, Provincetown will be relying on its Knowles Crossing pumping station and the crippled South Hollow station.

The South Hollow station is not pumping full time because of the threat of gasoline contamination. The Knowles Crossing station, which is erratic when overpumped, has been showing extremely high salt counts lately. If salt level get too high, the state would shut the station down.

Faced with this potential for disaster, the commission wants to implement a strong water conservation program. A town-wide conservation program is also necessary to convince the National Seashore to give the town permission to install a permanent well field on Seashore property in North Truro. The well field being developed now is temporary.

The pool ban will hurt motel owners. It will extend to businessmen in North Truro on Beach Point who use Provincetown water.

The water commission at the suggestion of Town Manager Charles Cobb voted Wednesday to prohibit filling pools. Cobb said it was important to convince the Seashore that the town is trying to conserve water.

"It's difficult to make a case that we're trying to conserve water if you permit pools to be filled," Cobb said.

But the water commission had second thoughts about its ban and rescinded it at a Thursday meeting. Chairman Stormy Mayo said the commission had taken a heavy-handed approach to the problem without gathering factual data about the actual amounts of water used by pools.

Instead of issuing a ban on pools, the commission voted to enforce a bylaw requiring the water commission to sign a permit before any pool is filled with town water. Mayo said the commission will not sign any permits until after next Thursday's meeting, if at all. Cobb said anyone who violates the bylaw and fills a pool without permission will be fined.

In past years the bylaw has been routinely ignored by some pool owners, who have filled their pools without water commission approval.

Cobb said he is prepared to issue an administrative order prohibiting pools from being filled. He said he had authority to do so as head of the water department.

"It's a power that should be used sparingly," Cobb said. "It would restrict unnecessary use of water during this emergency.

After the water commission's vote to enforce the bylaw, Cobb said he would not issue an administrative order because it would be superfluous in light of the commission's action.

Nancy McNulty, chairman of the water conservation steering committee, said the water commission's approach to the problem was ignorant. She said the Wednesday vote banning pools from being filled was unnecessary and would grab headlines. She said it would draw attention to the water problem again. The commission simply had to decide to enforce town bylaws, a course it eventually decided to follow, she said.

John Nunes, water commission member, said he doesn't think a hearing is necessary on the matter. He said people should go without pools until the new pumping station is working. He voted against scheduling a public hearing on the pool issue.

Cobb and Mayo both said a meeting was important to allow the commission to gather data.

After if businessmen hurt by the ban could apply for tax abatements, Cobb said the board of assessors would have to decide on whether to grant abatements.

Cobb said businessmen whose properties are assessed on capitalized income could make a strong case for tax abatements if they could prove that the absense of swimming pools caused a loss of income.

Conserving water

The water conservation steering committee, a local group formed after the water commission decided not to hire an outside consulting firm to develop a water management program here, has met with the chamber of commerce and other groups.

Nancy McNulty, temporary chairman of the group, said Thursday that the committee is trying to educate residents about how they can save money by installing water-saving devices. She said chamber of commerce members reacted enthusiastically to the group presentation.

She said the committee plans to buy water-saving devices, which can be easily installed in showers and toilets, for wholesale prices and make them available in Provincetown.

The steering committee is not directly affiliated with the Provincetown Water Commission. Stormy Mayo, water commission chairman, said the conservation program is very encouraging and should help ease water problems here.

APPENDIX E

Correspondence Relative to the Potential Temporary Use of the North Truro Air Force Base Well

Town of Provincetown
MASSACHUSETTS 02657
(617) 487-3900

April 14, 1978

Lieutenant Colonel Franklin D. Hall
Base Commander
762nd Radar Squadron
North Truro Air Force Station
North Truro, Mass. 02652

Re: Emergency Water Supply
Provincetown, Mass.

Dear Colonel Hall:

As you are probably aware, the Town of Provincetown is presently experiencing a municipal water supply emergency. A gasoline leak from a nearby filling station (discovered in December 1977) has endangered use of the South Hollow wellfield, our largest water supply source. On advice from our consultants, we have limited withdrawals from this sytem to reduce the potential for gasoline contamination of this source.

The Town's other wellfield system (located at Knowles Crossing) is currently supplying the Town's water demands, supplemented by limited withdrawals from the South Hollow supply. However, the Knowles Crossing wellfield is experiencing the effects of salt water encroachment because of the long sustained high-rate pumping. Chloride concentrations are reportedly higher (up to 185 ppm) than any other previous year of record for this time. (Public Health standards limit chloride concentrations to 250 parts per million.)

The Town's economy depends to a large extent on the tourist industry during the summer months. Since the number of people in Town increases from about 4000 permanent residents to an estimated 18,900 at this time, it is evident that water demand will increase significantly. As water consumption increases with tourist influx, more pumpage required at the Knowles Crossing wellfield may lead to dangerously high levels of chlorides.

The 1977 average daily consumption during June, July and August was about 1.5 million gallons per day (MGD), while during the other nine months of the year average daily consumption was approximately 0.8 MGD. A previous study of our water system indicated that the maximum amount of water consumed over a 24-hour period, or maximum daily consumption, has averaged 1.8 times the average daily consumption during the summer months. Using this estimate, the 1977 maximum daily consumption would be approximately 2.7 MGD.

In recent years our two wellfields have been unable to produce enough water for adequate storage in our two storage tanks to maintain pressure needed for fire fighting. With the South Hollow and Knowles Crossing wellfields at limited capacity, a serious deficit will result, endangering the tourist industry which is vital to the Town's economy. Therefore, as the summer tourist season approaches, the Town finds itself in need of supplemental water supplies by early summer.

The Town has recently engaged the services of Camp, Dresser & McKee, Inc., consulting engineers of Boston, Massachusetts to:

1) assist the Town in the development of emergency temporary water supplies to meet the summer tourist water demands; and

2) evaluate the gasoline spill and possible remedial actions.

These studies are now being conducted.

Our consulting engineers are evaluating all water supply alternatives in an attempt to develop an emergency supply by early summer. These alternatives include development of a well at a well site previously tested by the Town which is located within the National Seashore Park; development of a tested well site which requires treatment for iron and manganese contamination; use of existing water supply wells which are privately owned and operated; and, finally, development of other less desirable alternatives such as barging or trucking water from a remote source.

The most desirable temporary water supply alternative is development of the previously tested well supply at a site within the National Seashore Park. The supply has an estimated yield potential of 1.0 MGD. The land is controlled by the Department of the Interior, National Park Service (NPS). The NPS operates under strict regulations, as established by Federal legislation, which do not permit indiscriminate use of resources within the park. Ground water is considered one of those resources. Because of the legislated concern to protect the integrity of the resource, extensive evaluation by the NPS and also by Congressional committees is required to obtain approvals. It appears that approvals, if granted, may not be forthcoming in time to permit construction of the required temporary water supply facilities by early summer.

Preliminary studies by our consulting engineers indicate that the North Truro Air Force Station is supplied water from a well located at the station. They recently visited with your Colonel Thomas A. Henderson to examine the water supply system and assess the feasibility of acquiring water from the source. The results of these preliminary studies and evaluations are presented below.

The existing water supply system is comprised of a single eight-inch diameter well which was originally pump tested at a rate of approximately 800,000 gallons per day. The well pump is a vertical turbine unit which is powered by a 25-HP electric motor. The pump has a maximum discharge rating of 400-450 gpm at a discharge head of approximately 180 feet. The well and pump are housed in a concrete block building located at the eastern side of the air station. In general, these facilities, including valves and piping appurtenances, are reported to be in good operating condition. It is noted,

however, that the well pump is expected to require two maintenance overhauls within a short time.

The pump station is connected directly to the air base water storage tank via a six-inch diameter cast iron water pipe. The distribution system is basically comprised of a looped eight-inch diameter water main network. A 110,000-gallon water storage tank is connected to the water system at the highest site elevations (approximately 150-160 feet above MSL). A booster pumping system which drafts water from the storage tank maintains the water service pressures at the base. A schematic of the water system is shown on the attached figure.

According to Colonel Henderson, the air base presently consumes approximately 30,000 gpd. The demand stypically increase to 40,000 gpd during the summer months. As previously mentioned, the well pump is capable of producing up to 580,000-650,000 gpd, based on the maximum discharge rating given above (400-450 gpm).

Our consulting engineers have conducted preliminary analyses of the groundwater aquifer system at the site to determine the impacts of operating the water supply system at its maximum capacity. In particular, the impact of continuous withdrawals on the aquifer and the potential for salt water intrusion or "coning" was evaluated. In performing these analyses, our engineers utilized techniques which were outlined by a recent United States Geological Survey report (open file report 76-614) entitled "Potential For Development of Groundwater at a Test Site Near Truro, Massachusetts, " authored by John H. Guswa and C.J. Longquist. Based on these analyses, the well at the air force station is estimated to be capable of producing 500,000-600,000 gpd continuously without resulting in salt water contamination of the fresh water supply at the well. Limited inward migration of the sea water may occur along the coast; however, is it not expected to cause any adverse impact on the groundwater system or any present uses of the groundwater. Our consultants indicate that any inward migration of salt water would be reversed upon reduction of maximum well pumping rates to present levels.

The Town's use of the supply would require construction of a watermain connection to our distribution system at the South Hollow wellfield. Our consulting engineers have proposed the temporary system which is illustrated on the attached site plan. The watermain connection would basically be constructed of steel pipe joined by mechanical couplings. The watermain would be constructed above ground along the shoulder of existing roadways (inside and outside the air base) except for the short crosscountry section as shown. The water main would be buried for the roadway crossing at Highland Road. The watermain connection to the air base system could be made via a connection to the hydrant located at the well pumping station site.

Our consulting engineers have proposed that a gate valve be permanently installed in the air base transmission main to isolate the pumping station

to each system as required. This piping connection arrangement would minimize alterations to the existing air base system. Connection to the Town's system would be made through the hydrant located at the South Hollow wellfield. A portable booster pumping system located at the South Hollow wellfield would be utilized to provide adequate pressure to the Town's water system.

Our consulting engineers have proposed a scheme of operation for these water systems. The air base distribution system would operate as is now done: the distribution storage tank would fulfill water demands during most of the day. The tank would be refilled daily from the well pump, and thereafter the well pump would be discharged to the temporary system. The gate valves installed during the program would be used to direct discharge to each system. An operator from the Town could be responsible for this operation.

To insure that the existing air base well and pumping system is not damaged by the proposed operations, our consulting engineers propose that a monitoring well system and an automatic pump shut-off system be installed at the well pumping station. The monitoring wells would be installed to indicate any possible salt water "coning" which may result from the increased withdrawals. These observation wells would be constructed to depths of approximately 200 feet or 55 feet below the bottom of the existing well screen. Water samples would be taken periodically to detect any changes in chloride levels, even though no significant change is expected to occur from the proposed pumping. If chlorides did begin to rise significantly, the pumping rate would be reduced to a level which would prevent any further increases. The water sampling and analysis would be the Town's responsibility.

Our consulting engineers also propose that a pump protective device be installed to prevent operation beyond its capacity. A pressure sensor or flow sensor would be installed at the pumping station such that overpumping or low pressures would shut off the pumping unit. Manual restart of the system would be required to insure that the problem was located and repaired prior to resuming pump operation.

Therefore, based on the foregoing, we hereby seek your consideration of our proposed temporary use of the North Truro Air Force Station well supply as a municipal supply. The well is proposed to fulfill an immediate need for supplemental water supply for the coming summer months. The duration of its use is dependent upon evaluations of the gasoline spill at the South Hollow wellfield and the estimated duration of time our wellfield must remain shut down. In addition, it is dependent upon development of other alternative water sources previously mentioned. If possible, use of this supply is expected to be needed for a period of approximately six months.

Although the North Truro Air Force Station water supply system cannot produce sufficient water to equal our projected supply deficit, it may be able to provide Provincetown with sufficient water (with water from the Town's Knowles Crossing wellfield) to meet a suppressed water demand. The Town is considering strict water conservation measures to reduce the system demands.

We trust that you will consider our dilemma and can permit the Town temporary use of your excess supply. If you desire additional detail of our proposed temporary system, or specific engineering evaluation, please contact me immediately.

Very truly yours,

Charles K. Cobb

Charles K. Cobb
Town Manager

cc: Board of Selectmen
Water Commission
Town Counsel

/ap

Air Force to loan water well

By Gregory Katz

Facing the virtually impossible task of obtaining permission to drill a new well in the National Seashore in time to supply water this summer, Provincetown changed its course and will draw water instead from an existing well at North Truro Air Force Base.

Although administration officials maintained publicly that Seashore approval of the project would take just two or three weeks, it would actually take much longer. Congressional approval is needed before a new well can be drilled in federally owned land in a national park. The town also would have to submit an environmental analysis of the impact of a new well on the Seashore.

To avoid the permit process, the town entered secret negotiations with Lt. Col. Frank Hall, Air Force station commander, to see if Provincetown could use the Air Force well. Hall received permission yesterday from Aerospace Defense Command in Colorado Springs, Colo. to allow Provincetown to pump water from the military installation.

The Air Force well is used two hours a day to supply the base's water needs, but Provincetown can expand the well to 24-hour use without getting a permit from the National Seashore.

The interim solution was suggested by Robert Weimar, project engineer for Camp, Dresser and McKee, the firm hired to handle the water emergency. He said the well will probably supply about 500,000 gallons a day.

This will not completely solve the crunch caused by the crippling of the South Hollow pumping station, but assures that a new source of water will be available soon. Cobb said the town still plans to seek permission to drill a temporary well in the Seashore.

Before the gasoline spill threatened South Hollow, it could supply roughly one million gallons a day. If the town can't use South Hollow at all and the Air Force well supplies 500,000 gallons a day, Provincetown will still need another water source sometime this summer. But the Air Force well should reduce fears that Provincetown will run dry this season, causing economic chaos.

Camp, Dresser and McKee has been working on the problem for 10 days, and is expected to sign a contract with the selectmen today.

Weimar said pipes will be laid overland from the well at the Air Force station and connected to equipment at the South

(Continued to Page 19)

(Continued from Page 1)

Hollow pumping station. It would then be pumped to Provincetown and North Truro.

Pipe will have to be laid for a distance of roughly one-and-a-quarter miles, and will have to be buried under Highland Road in Truro, according to Lt. Col. Hall.

The Air Force well will provide water much sooner than if the town waded through the permit process for the Seashore well. It will mean the town does not have to drill a new well before getting more water.

Speed is essential, since Memorial Day is five weeks away. Water demand rises dramatically with the start of the tourist season.

Weimar said the town still must seek permission to drill in the Seashore because two crucial questions face the town. He said it is not clear if the South Hollow pumping station can be relied on to supply any water this summer without fear of gasoline contamination. And he said Knowles Crossing, the town's only other source of water, may not be able to be pumped at its maximum capacity all summer because of the burden placed on it this winter, when it was used more than usual because South Hollow was shut down.

Knowles Crossing, which has a history of being erratic when pushed to its maximum capacity, has been showing extremely high salt counts lately. If salt counts rise too high, the state has said it would shut the station down despite the emergency situation. Weimar said recent rains should help keep salt counts down at Knowles Crossing.

The town stopped test pumping South Hollow this week. Weimar said the firm wants to create static conditions there so the water table can be accurately mapped. This means the Knowles Crossing station has been the town's sole source of water this week, as it was for most of the winter.

Weimar said the major portion of the work will be evaluating the existing equipment at the pumphouse at the Air Force base and determining the best way to connect it to Provincetown's distribution system. He said he has started to mobilize equipment for the task. Hall said the connections could be made by June 1.

Hall said yesterday the Air Force and Provincetown still must work out particulars concerning use of the well. He said the Air Force sees its offer as a six-month emergency measure.

Hall said the town will have to monitor the situation carefully to be sure too much water isn't drawn from the well, which would cause saltwater intrusion. He said the town would have to pay for the cost of running the station around the clock, and for modifying existing equipment.

UTILITY SALES AGREEMENT

CIVIL ENGINEER OFFICE	Agreement No. NTR 81150001
Name and Location of Installation: 762 Radar Sq, North Truro AFS MA 02652.	Estimated Annual Cost to Purchaser: 20,400.00

This AGREEMENT, entered into this day of , 19 by and between the Department of the Air Force, an agency of the United States Government (hereinafter called the Air Force), represented by the North Truro AFS Commander executing this agreement and ~~City~~ Town of Provincetown whose address is Town Hall, Provincetown, Mass. 02657 (hereinafter called the Purchaser),

WITNESSETH THAT:

WHEREAS, the Air Force has established ~~an~~ water well , ~~near~~ on , ~~known as~~ North Truro AFS , and owns, maintains and operates facilities for furnishing ~~of~~ potable water service; and

WHEREAS, the Purchaser desires to obtain potable water service from the Air Force, as required for supply to the ~~City~~ Town of Provincetown , and which cannot be readily obtained from other sources; and

WHEREAS, the Air Force is authorized to supply the services under applicable provisions of Air Force Regulation 91-5, Utility Services.

NOW THEREFORE, in consideration of the premises and of the mutual agreements herein contained, to be performed by the parties hereto respectively, it is agreed as follows:

1. SERVICES TO BE RENDERED.

From and after 7 6/15 , the effective date of this agreement, the Air Force will furnish, subject to the limitations hereinafter provided, and the Purchaser will receive and pay for, such utility services as described in service specifications B attached hereto and made a part hereof.

2. PAYMENTS.

a. The Purchaser shall pay the Air Force for utility service or services described herein at the rates and under the terms and conditions set forth in the attached service specifications. The Air Force will render monthly bills to the Purchaser ~~and all bills~~ payment for utility services will be due and payable by the 15th of each month. ~~15 days after billing date. The bills shall be mailed to~~

b. The Purchaser shall make payment by check or money order payable to Treasurer of the United States. Checks shall be mailed to the Accounting and Finance Officer, ~~Hanscom AFB MA~~ Bldg 1600 Hanscom AFB MA 01731

3. CHANGE OF RATES.

If, during the period of the agreement, the cost to the Air Force of furnishing the utility services should change appreciably, the rates herein will be adjusted as required to conform with the change in cost.

4. LIABILITY.

The Air Force may not be held liable for failure to provide continuous service and it does not guarantee the quality or quantity of service to be supplied.

5. TERMINATION.

The Air Force reserves the right to terminate the service after giving 30 days notification.

6. RECAPTURE.

In the event of a national emergency, the Air Force reserves the right of immediate recapture of any utility facility furnished, as well as immediate termination of utility services.

7. SUSPENSION.

The Air Force reserves the right to suspend or terminate the service in whole or in part if base utility service is curtailed or stopped or if similar service becomes available from a local private or public source. The Air Force may not be held liable for such suspension or termination and may not be required to continue the service for the necessity of the Purchaser.

8. DISPUTES.

Except as otherwise specifically provided, the installation commander or his designated representative will decide all disputes concerning questions of fact that arise under the agreement and are not disposed of by mutual agreement. The commander will put his decision in writing and mail a copy to the Purchaser who, within 30 days after mailing, may appeal to the Secretary of the Air Force. The Secretary's decision, or that of his designated representative or representatives, will be final and conclusive upon both parties. Pending decision of such dispute, the Purchaser will proceed diligently with the performance of the agreement.

9. RIGHT-OF-WAY.

No permanent right-of-way will be granted for any facilities the Purchaser may install on Air Force property; however, the agreement may grant the Purchaser a license to enter and use specified sites in order to operate and maintain his facilities until the agreement is terminated.

10. ADDITIONAL FACILITIES.

Any additional facilities required to furnish service under this agreement will be constructed and maintained by and at the expense of the Purchaser. Such construction and maintenance work will be subject to the approval and supervision of the installation commander.

11. REMOVAL OF FACILITIES.

All utility facilities installed by the Purchaser under the terms of this agreement must be promptly removed at the Purchaser's expense when the service is terminated, and the Air Force land and facilities must be restored to their original condition at the Purchaser's expense. If the Purchaser fails to remove such facilities promptly (usually within 90 days), they are considered abandoned and become Air Force property.

12. REVIEW.

This agreement is subject to the annual review by Headquarters, Aerospace Defense Command, United States Air Force.

13. APPROVAL.

This agreement shall be subject to the written approval of the Commander, Aerospace Defense Command or his duly authorized representative and shall not be binding until so approved.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the day and year first above written.

THE UNITED STATES AIR FORCE

PURCHASER Town of Provincetown MA.		SIGNATURE	DATE
SIGNATURE	DATE	TITLE OF AUTHORIZED OFFICIAL Thomas A Henderson NS-12 DAFC Civil Engineering Foreman	
REPRESENTATIVE'S TITLE Town Manager		APPROVED	
		SIGNATURE	DATE
		TYPED NAME AND GRADE OF INSTALLATION COMMANDER Franklin D Hall Lt Col 775HF Commander	

SERVICE SPECIFICATIONS B	WATER
ATTACHED TO AND MADE A PART OF AGREEMENT NO.	DATE

1. ESTIMATED REQUIREMENTS:

Estimated daily maximum demand 500,000gpd Estimated annual consumption N/A

(The parties hereto are not obligated to deliver or receive, nor are they restricted to, the above amounts.)

2. POINT OF DELIVERY.

The point of delivery of water shall be the point of connection with the Air Force water main and located fire hydrant adjacent to well

3. QUALITY OF WATER.

The Air Force will supply the same quality of potable water as supplied to North TRURO AFS

4. RATES.

The rates to be charged the Purchaser by the Air Force for water service described herein are as follows: Flat monthly rate of $1700 or portion thereof for the first and last month.

5. METERING AND BILLING. N/A

Water will be measured by inch meter(s) to be furnished, installed and maintained by the Purchaser. The meter(s) will be read by the Civil Engineer or his authorized representative.

6. OTHER TERMS OF AGREEMENT:

a. The purchaser shall install two observation wells within 150 ft of the supply well. These observation wells shall be monitored by the purchaser no less than once every two weeks for water table drawdown and salt water intrusion. Water table drawdown will be measured by determining the distance to the top of water in the observation wells. Salt water intrusion will be determined by collecting representative samples and analyzing them for either chloride concentration or total dissolved solids.

b. Prior to start of service, the purchaser shall have the well pump pulled and overhauled to return to near new condition. Any pump or motor failure during the time this agreement is in effect shall be repaired by the purchaser. Further, the purchaser shall install a pump protective device to prevent pump damage by not allowing it to exceed its capacity. At the termination of this agreement the purchaser shall pull the pump and inspect for any excessive wear and shall repair it if necessary.

APPENDIX F

Correspondence Relative to the Potential
Temporary Use of a Site Located Opposite the
National Park Service Test Well Site No. 4
on the Department of Public Works' Right-of-Way

The Commonwealth of Massachusetts

Department of Public Works

DISTRICT #7 OFFICE
151 PIERCE STREET, MIDDLEBORO 02346
P. O. BOX 111

CENTRAL FILE

May 1, 1978

Camp Dresser & McKee, Inc.
One Center Plaza
Boston, Massachusetts 02108

Attention of Robert A. Weimar

Gentlemen:

This letter is in answer to your correspondence with this office, of April 24, 1978, concerning your request for approval for the Town of Provincetown to construct an emergency water supply on Route 6 in the Town of Truro.

Please be advised that the proposed well within the State Layout of Route 6 in the Town of Truro, could possibly be contaminated by run-off of winter salt from the State highway.

This office could be setting a precedent by recommending the installation of such a well within the State highway layout.

I, therefore, could not recommend to our Boston office that a temporary well be constructed within the State highway layout, as explained by you to Mr. McMahon of this office.

I would suggest that you pursue other means of supplying water to the Town of Provincetown.

Very truly yours,

V. M. Cassese, P. E.
Act. Dist. Hwy. Engineer

WJM/rfd

CDM
environmental engineers, scientists
planners & management consultants

CAMP DRESSER & McKEE INC.
One Center Plaza
Boston, Massachusetts 02108
617 742 5151

April 24, 1978

Mr. Veto Cassese, P.E.
Act. District Highway Engineer
Commonwealth of Massachusetts
Department of Public Works
151 Pierce Street
Middleboro, MA 02346

Construction of Temporary
Well Supply in State Route 6
Right-of-Way
CDM: 728-1-RT

Dear Mr. Cassese;

On behalf of the Town of Provincetown, Massachusetts, we are requesting preliminary approval for the Town to construct a temporary emergency water supply in the State Route 6 right-of-way in Truro, Massachusetts.

The town requires temporary emergency water supply to replace its existing South Hollow well field. This supply may have to be removed from service because of a nearby gasoline spill which has the potential to contaminate the well field. Studies are underway to determine the extent of the gasoline spill and its potential total impact on the South Hollow Well Field. However, for planning purposes, it must be assumed that the total capacity is not available for the upcoming summer.

Several alternative emergency water supplies are currently under consideration, including the possibility of developing a well supply along the route 6 right of way. The proposed alternative supply would be constructed in the vacinity of Route 6 Sta 340+00, or approximately 500 feet North of the intersection of Standish Way (a town roadway) and Route 6. The site of the proposed temporary well supply is a large kettle hole at the base of the highway embankment fill approximately 30' from the edge of pavement. The site is located on the attached figure. Although actual test wells and pumping tests have not been conducted at the site, it is estimated that a supply could possibly be established at the site because of previous well testing in adjacent areas.

Development of a 0.50-0.75 million gallon per day well supply is needed at this site to meet the emergency water supply requirements. The supply would be temporary - it would be required to fulfill the Town's extreme water demands during its summer tourist season. The supply might possibly be required until some time in October.

The temporary supply facilities would consist of a water supply well and a temporary metal or wood frame building to house the pump and valving appurtenances. The water supply would be connected to the Town's distribution system via an overland 8-inch diameter water main, constructed in the shoulder of Route 6 and Standish Way (a town roadway).

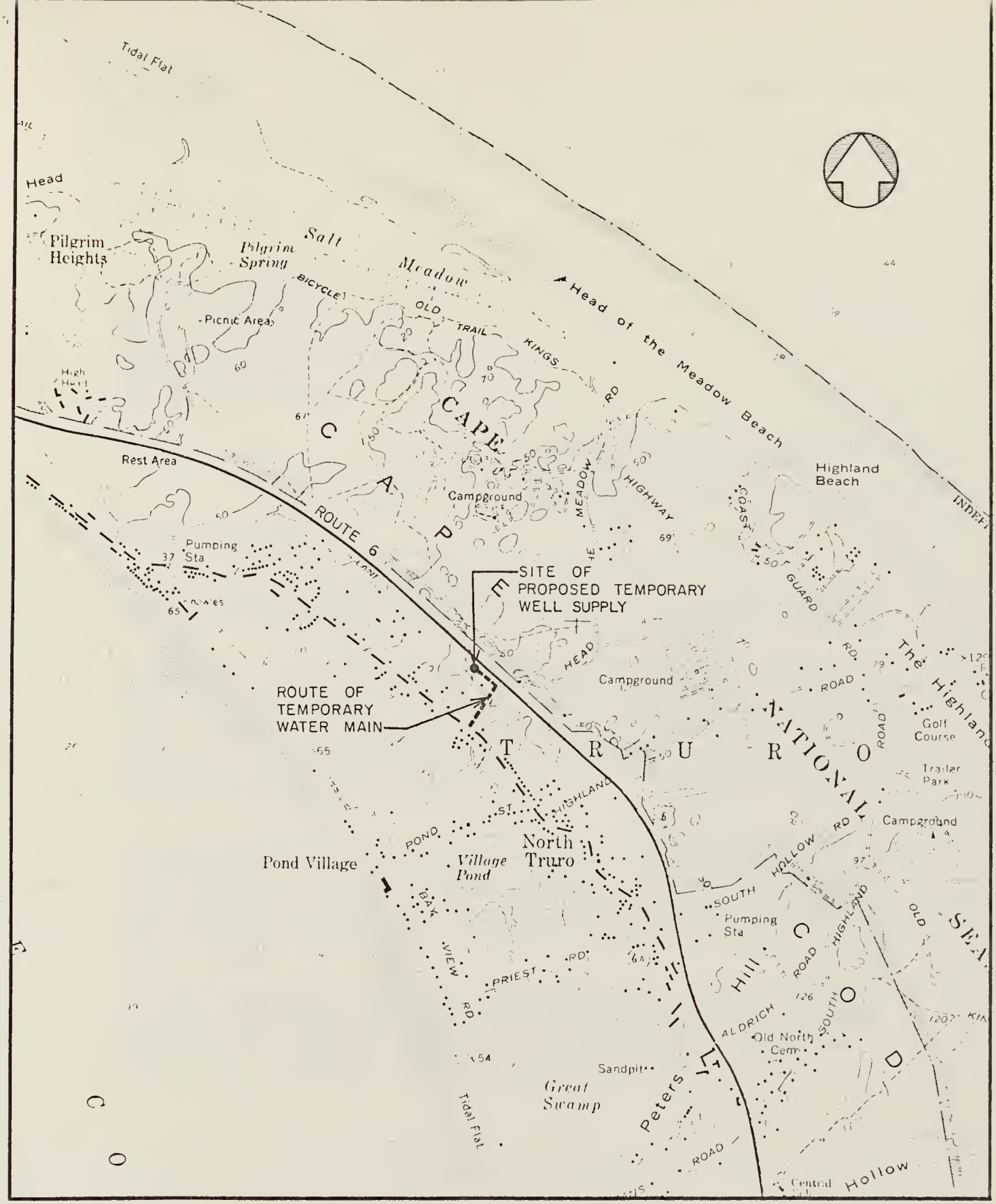
It is imperative that an emergency water supply be developed by this summer for Provincetown. Your prompt attention to this matter would be appreciated.

If you have any questions or comments regarding this matter, please contact me.

Very truly yours,

CAMP DRESSER & McKEE INC.

Robert A. Weimar
RAW/mc
cc: Mr. Charles K. Cobb, Town Manager, Provincetown
Mr. William McMahon, Permits Engineer, DPW



TOWN OF PROVINCETOWN, MASSACHUSETTS

PROPOSED TEMPORARY WELL SUPPLY IN NORTH TRURO, MASSACHUSETTS

Scale: 1" = 2000'

APRIL 1978

CDM
environmental engineers, scientists
planners & management consultants

CAMP DRESSER & McKEE INC.

One Center Plaza
Boston, Massachusetts 02108
617 742-5151

April 24, 1978

Mr. William McMahon
Permits Engineer
Commonwealth of Massachusetts
Department of Public Works
151 Pierce Street
Middlwboro, MA 02346

Installation of Observation Wells
No. Truro, Massachusetts
CDM: 728-1-RT

Dear Mr. McMahon;

On behalf of the Town of Provincetown, Massachusetts, we are submitting the attached "Application for Permit" to install observation wells within the right of way of Route 6 in No. Truro, Massachusetts.

The purpose of these test wells is to determine the potential for development of a temporary water supply well to provide an emergency water supply for the Town. Use of the Town's largest supply - the South Hollow Well Field has been endangered by a gasoline leak recently detected at a nearby filling station. Withdrawals from this supply may need to be limited to reduce the potential for gasoline contamination of this source.

To provide additional water supply to replace the unusable capacity (temporarily), the Town is pursuing several alternatives including use of existing well supplies presently owned and operated by others, construction of a temporary well supply within the National Seashore Park, and construction of a well supply in the right-of-way of existing state highways.

A primary consideration for the development of the temporary supplemental supply is that the supply be operable by early summer to meet the Town's peak demands. Therefore, it is important that these test wells be installed at the earliest possible time.

We are ready to meet with you at the site to review the proposed location at your earliest convenience. A location plan is attached.

Very truly yours,

CAMP DRESSER & McKEE INC.

Robert A. Weimar

RAW/mc
Enclosure

cc: Mr. Charles K. Cobb, Town Manager
Board of Water Commissioner
Board of Selectmen

#170

APPLICATION FOR PERMIT

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
100 NASHUA STREET
BOSTON, MASSACHUSETTS 02114

April 19 1978

To Vito Cassese
District Highway Engineer
151 Pierce Street
Middleboro, Mass. 02346

Dear Sir:

The undersigned, Town Manager of Provincetown, Massachusetts, hereby makes application for permission to install and monitor observation wells within the Commonwealth of Massachusetts right-of-way on its east border at approximate Sta 340+00.

on the State Highway in the City/Town of North Truro, Mass. Auto Route No. 6

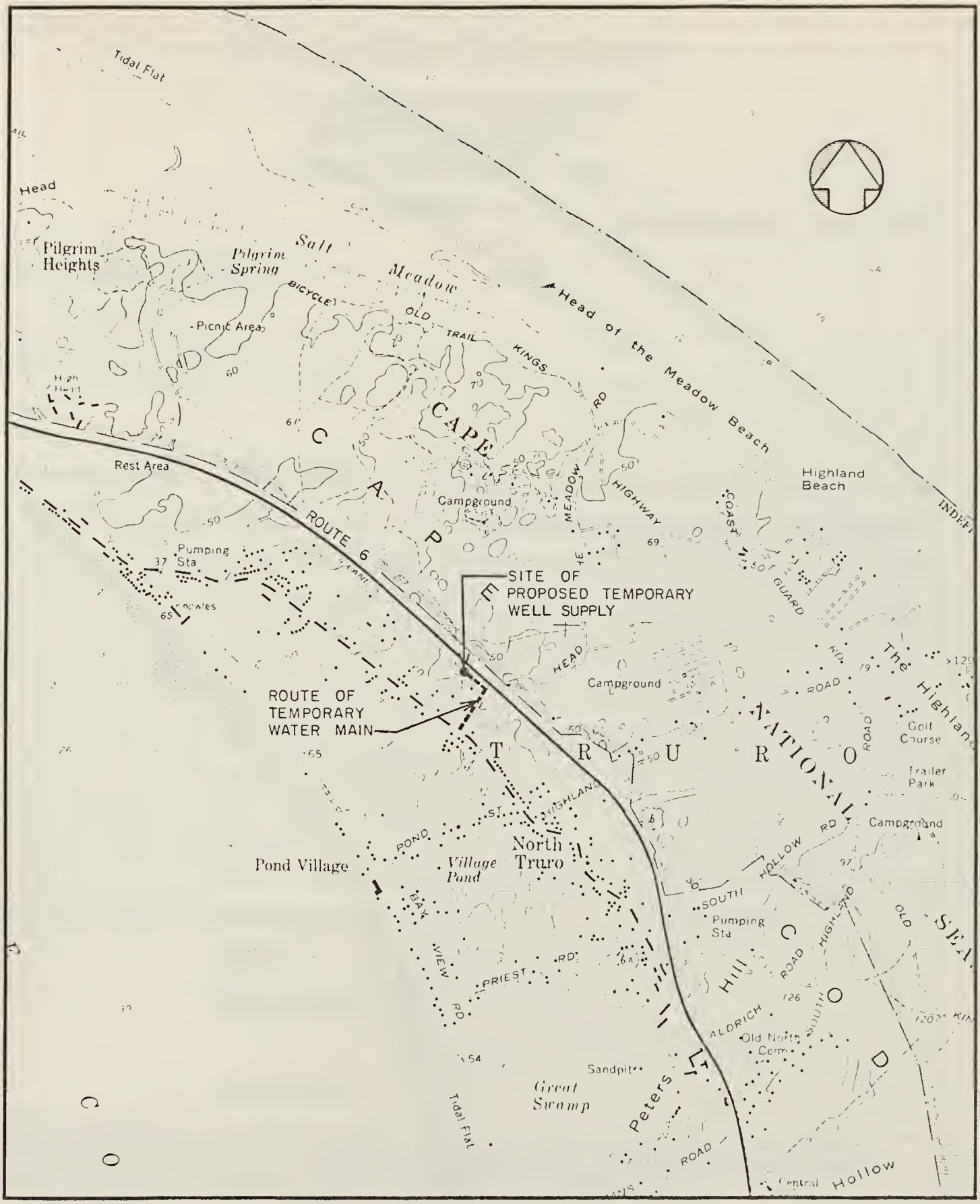
Sign here Charles K. Cobb
(Charles K. Cobb)

Mailing Address Town Hall
Provincetown, Mass. 02657

Telephone No. 487-3900

If this Permit is to be issued to any one other than a municipality or utility company, the application must be signed by the owner of the abutting property or said owner must indicate his approval of this application by signing below.

This application, in duplicate, is to be forwarded to the District Highway Engineer in your area.
See reverse side for addresses of District Offices



TOWN OF PROVINCETOWN, MASSACHUSETTS

PROPOSED TEMPORARY WELL SUPPLY IN NORTH TRURO, MASSACHUSETTS

Scale: 1" = 2000'

APRIL 1978

#170

APPLICATION FOR PERMIT

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
100 NASHUA STREET
BOSTON, MASSACHUSETTS 02114

May 2 1978

To Mr. Vito Cassese, P.E.
District Highway Engineer
151 Pierce Street
Middleboro, MA 02346

Dear Sir:

The undersigned, Town Manager of Provincetown, Massachusetts, hereby makes application for permission to construct a temporary water supply well and pumping station along the west side of the State Route 6 right of way at approximate station 340+00, for use as an emergency municipal water supply for the Town of Provincetown, Massachusetts. The need for this supply arises from a gasoline spill which may contaminate the Town's largest well supply - the South Hollow Well Field. At present the facilities are required to fulfull water demands for a duration of approximately 5 months (to approximately Oct. 30, 1978, beginning June 1). The required temporary water supply facilities include: a water supply well, a metal or wood frame pumping station building and an 8-inch diameter -(continued in Appendix A)

on the State Highway in the City/Town of North Truro Auto Route No. 6

Sign here Charles K. Cobb

Mailing Address Charles K. Cobb
Town Hall
Provincetown, Massachusetts 02657

Telephone No. 487-3900

If this Permit is to be issued to any one other than a municipality or utility company, the application must be signed by the owner of the abutting property or said owner must indicate his approval of this application by signing below.

This application, in duplicate, is to be forwarded to the District Highway Engineer in your area.
See reverse side for addresses of District Offices

APPENDIX A
APPLICATION FOR PERMIT

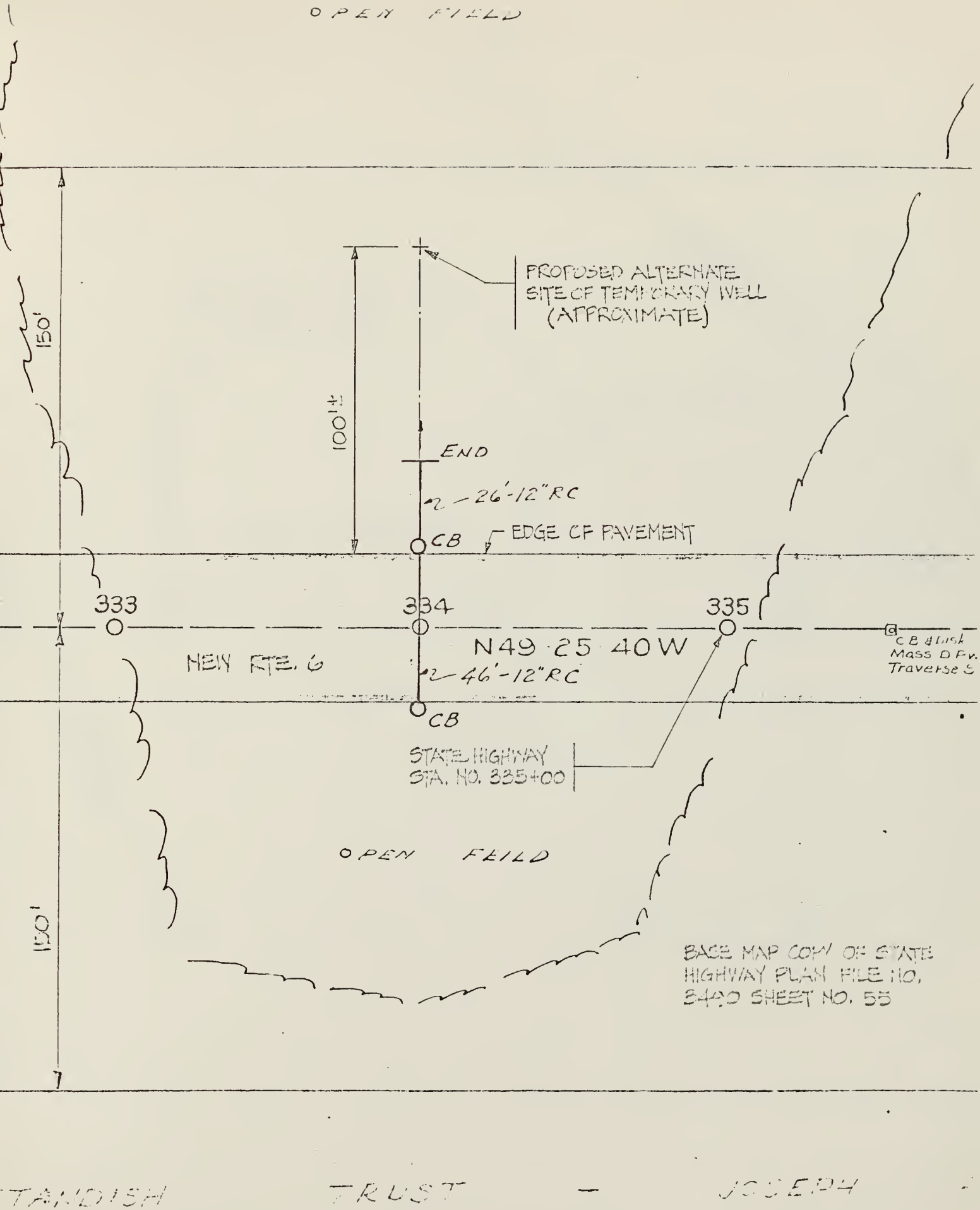
connecting water main laid above ground. The temporary connecting water main shall be constructed outside existing pavement limits, except for a permanent water main connection (including a tapping sleeve and gate valve) to the Town's existing 12-inch diameter water main located in State Route 6A. The temporary pipe shall terminate approximately 10-feet east of the existing pavement limits of Route 6A. The pumping station shall house a diesel-powered pump water meter, valves and appurtenances. A plan of the proposed facilities is shown on the attached figure.

TOWN OF PROVINCETOWN, MASSACHUSETTS

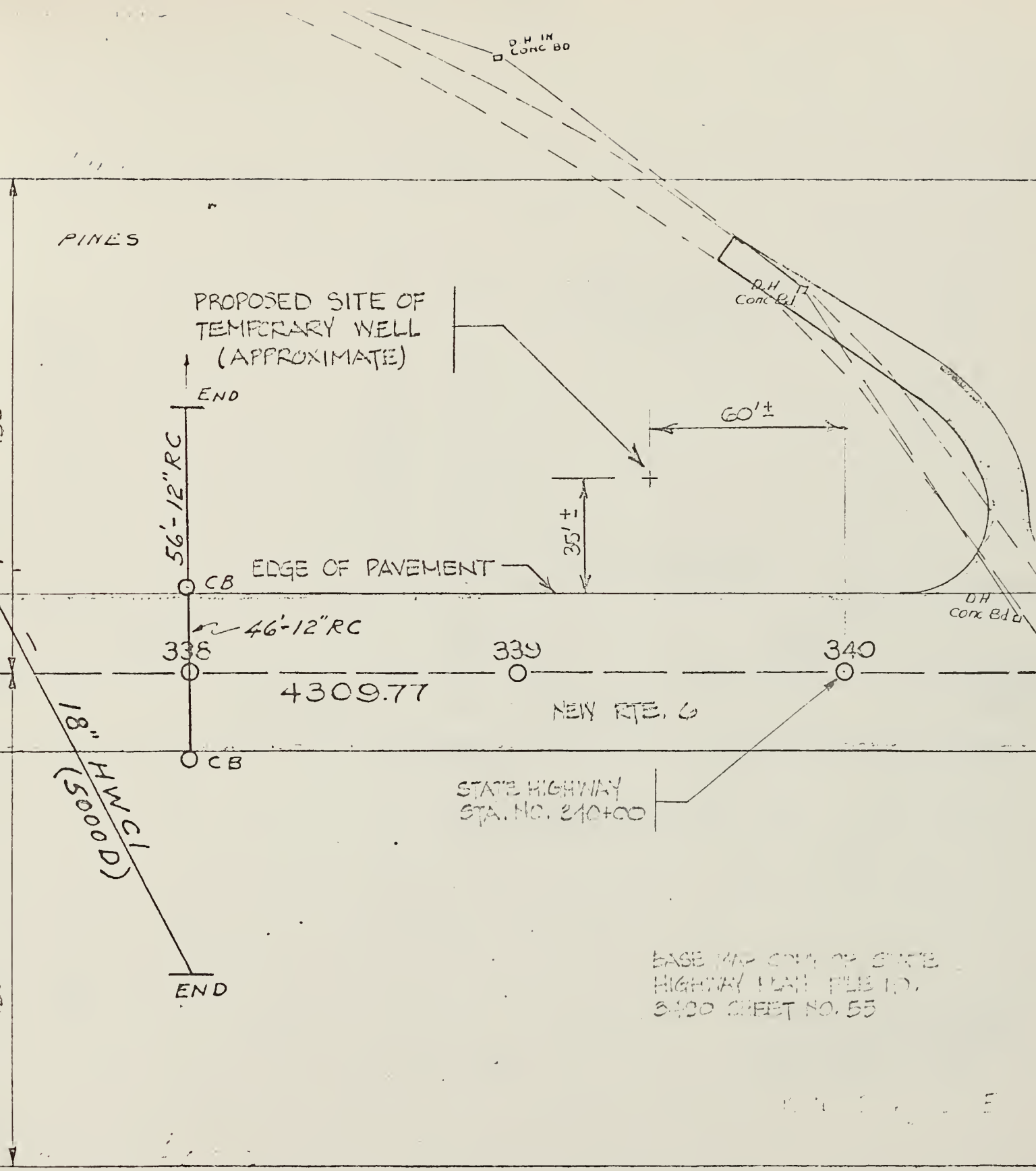
PROPOSED TEMPORARY WELL SUPPLY IN NORTH TRURO, MASSACHUSETTS

Scale: 1" = 2000'

APRIL 1978

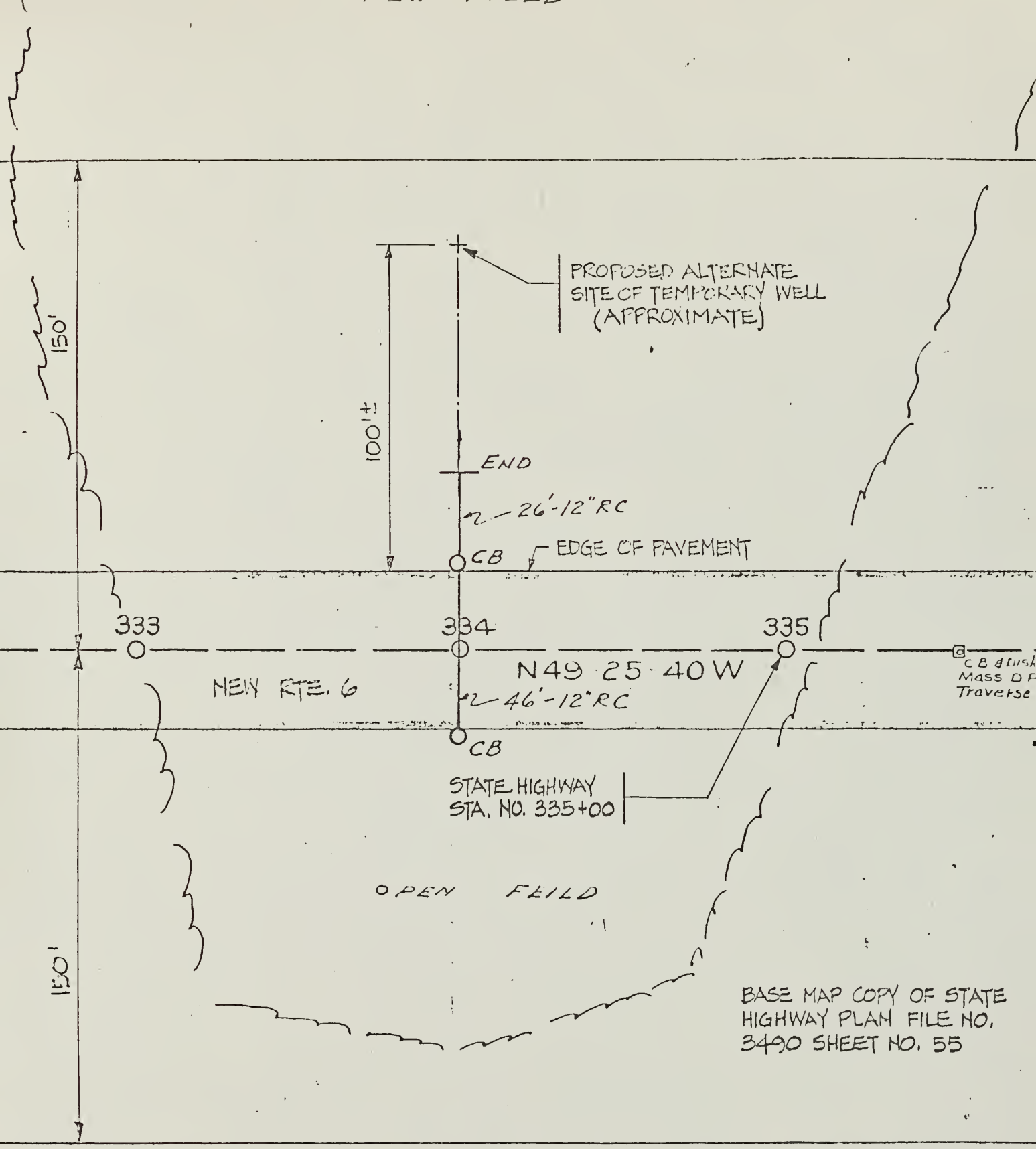


PROPOSED ALTERNATE LOCATION FOR TEMPORARY WELL FACILITY FOR PROVINCETOWN MASS. ALONG RTE. 6 RIGHT-OF-WAY IN NORTH TRURO MASS.



BASE MAP COPY OF STATE
HIGHWAY PLAN FILE NO.
3430 SHEET NO. 55

PROPOSED LOCATION FOR TEMPORARY WELL FACILITY
FOR PROVINCETOWN MASS. ALONG RTE. 6 RIGHT-OF-WAY
IN NORTH TRURO MASS.



STANDISH TRUST — JOSEPH

PROPOSED ALTERNATE LOCATION FOR TEMPORARY WELL FACILITY FOR PROVINCETOWN MASS. ALONG RTE. 6 RIGHT-OF-WAY IN NORTH TRURO MASS.

APPENDIX G

Correspondence from the Provincetown Chamber of Commerce

MAR 10 1978

MAR 16 1978

PROVINCETOWN CHAMBER OF COMMERCE

Provincetown, Massachusetts 02657 Telephone: (617) 487-3424

March 15, 1978

Dear Mr. Cobb:

We face a crisis that could bankrupt the town, ruin the business community, and put much of our population on welfare.

As you are aware, the newspapers, television, and radio stations have finally started to tell the world about the potential water shortage that has been threatening the town for the last several months. Coverage by the media started in depth yesterday. It will start hurting summer bookings today. The phones have already begun to ring -- "Are you sure we'll have water when we visit this summer?"... "With a water threat maybe we should book elsewhere."... "Please cancel my booking."

From past experiences with the gasoline shortage and the Argo Merchant spill we know that the Chamber of Commerce office will be besieged by questions. The more than 200 member businesses will also be receiving call after call... and without a doubt other newspapers, magazines, and broadcast media will be asking questions. It is essential that all of us be fully informed with positive answers... that a public relations campaign begin at once to let the media and the public know that Provincetown will indeed be open for business this summer. If as few as 10% of our potential visitors stay away this summer, many of our businesses will be in serious trouble.

I am writing this letter after a unanimous vote of Chamber members at last night's meeting. We request answers to the following questions immediately:

1. Is there really a water problem... and exactly how serious is it? There have been conflicting reports and rumors since December.

2. What steps are being taken to avert a crisis? New well fields... purification... etc.?

3. What contingency plans are being prepared in case there is no drinkable running water from our taps this summer? Will there be a tanker in the harbor? -- Will we be able to use tap water for all purposes but drinking, and will the town supply bottled water to residents? -- or what?

4. Is a strong water conservation program being prepared to force townspeople to install water-saver toilets, showerheads, signs... to tell residents and visitors how to save water?

more...

file for NPS permit

We must have answers now... we can not wait while committees meet... while talk goes round and round for another two or three months. We are in a crisis situation. It is time to forget politics... and act in a unified way to solve this problem.

March is decision time for many of our tourist visitors. Their phone calls have already started. The answer is certainly not closing motels and restaurants as reported in the Cape Cod Times.

The Provincetown Chamber of Commerce can not give the town the answers. We can, however, effectively help disseminate them. We will assist you in every way we can to answer individual tourist questions... contact the media with strong positive information... formulate a water-saving plan and educate both members and non-members in ways to save precious water.

Please meet with our executive committee informally as quickly as possible with answers to our questions.

Urgently,

HAROLD S. GOODSTEIN
President,
Provincetown Chamber
of Commerce

CC: Bryant
Mayo
Henrique
Avellar
Moore
Cobb

APPENDIX H

Correspondence from the Massachusetts

Department of Environmental Quality Engineering

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
600 Washington Street, Boston 02111
~~100 Cambridge Street, Boston 02202~~

DAVID STANDLEY
COMMISSIONER

March 15, 1978

Honorable Edward W. Brooke
2003 F JFK Federal Building
Boston, Massachusetts 02202

RE: PROVINCETOWN - Public Water Supply
Gasoline Leakage Near So. Hollow Road
Wells, Truro

Dear Senator Brooke:

Reference is hereby made to the attached letter dated January 17, 1978 from the Provincetown Board of Selectmen which requests your assistance in obtaining emergency piping, pumping equipment, and permission to install wells on property under the control of the Cape Cod National Seashore.

Please be advised that the Town of Provincetown obtains all of its domestic water supply from the So. Hollow Road well field and the Knowles Crossing well field, neither of which is individually able to satisfy summer water demand. In December 1977, it was discovered that an estimated 3500 gallons of gasoline had leaked into the ground from a Service Station located approximately 600' from the So. Hollow Road well field. In order to avoid pulling contamination by pumping toward a source of public water supply, the So. Hollow Road wells were removed from service and the entire water demand has since been met by the Knowles Crossing well field. Observation wells have been installed in an attempt to more accurately predict direction of ground water flow and to delineate the limits of gasoline contamination; however, it remains uncertain that the So. Hollow Road wells can be returned to full service prior to this coming summer. Test pumping of the SouthHollow Road wells, while monitoring the affect of groundwater withdrawal, is now being contemplated. The success or failure such test pumping will not necessarily be known for several months and contingency preparations must be initiated immediately.

The Provincetown Selectmen's proposal to construct a well or wells on the Cape Cod National Seashore property and to connect same with temporary piping to their existing water mains in Route 6A appears to be the most feasible method of averting a serious crisis this summer. In 1969 this Department approved two potential well sites on the National Seashore propertyafter prolonged pumping tests indicated a safe yield in excess of 1 MGD from each site and that water quality was suitable for all domestic uses. A gravel packed well at either site could easily replace the estimated 1 MGD capacity of the So. Hollow Road wells.

Board of Selectmen

Town of Provincetown
Massachusetts 02657.

January 17,1978

Hon Edward Brooke
2003 JFK Building
Boston, Mass. 02203

Attention Mrs. Martha King

Dear Senator Brooke;

Just before Christmas it was discovered that over 3000 gallons of automotive gasoline had leaked into the ground within 1000 feet of one of our two municipal well fields located at South Hollow in North Truro. Since then we have closed down that area and have drawn water from our older and less ample well field at Knowles Crossing, North Truro, which luckily is located more than a mile from the gasoline contamination. One of the problems at Knowles Crossing is that we get chloride contamination when we pump too hard there Knowles Crossing can easily supply our mid-winter needs, but beginning in April it will not with a margin of safety. We are not only concerned with the need for potable water but also for fire danger in this old town with many frame houses closely built. Our system supplies water to almost one-half of the dwelling units in Truro (the section of camps and motel known as Beach Point) as well as the fire hydrants adjacent to them. So the problem concerns more than one town.

We have proceeded to arrange for test wells to be driven between the gasoline leak and our well fields at South Hollow, but with laws governing municipal expenditures even in an emergency such as this it all takes so much time.

We are afraid that we will have a tragedy on our hands when all the information about ground contamination is in that we will not be able to deal with, both financially and in terms of the time available for solution. We need standby reassurances that several miles of pressure pipe and several pumps are available and can be installed before the end of April. We also need the permission of the Cape Cod National Seashore to sink the wells in an area that they own in North Truro that has already been tested by us.

Very truly yours,

George D. Bryant

George D. Bryant

1620

This Department is of the opinion that there is a possibility that the So. Hollow Road wells will not be useable this summer and that immediate steps should be taken toward the establishment of a well at one of the approved sites on the National Seashore property.

Your assistance in obtaining permission to utilize the Cape Cod National Seashore property will be greatly appreciated.

Very truly yours,
For the Commissioner

George J. Coogan, P.E.
Director
Division of Water Supply

C/E/rad/sk
Enclosure

cc: Board of Selectmen
Provincetown, MA

Board of Water Commissioners
Provincetown, MA