

PROCEDURE FOR CLASS I AND II GROUNDWATER RECLASSIFICATION

Approved by: _____ Date: _____
George Crombie, Secretary
Agency of Natural Resources

I. INTRODUCTION AND PURPOSE

Approximately 70% of the water we consume in the state of Vermont is groundwater. To protect this valuable resource, the legislature passed a groundwater protection law (10 V.S.A. Chapter 48) which became effective July 1, 1985. This law provides for four classes of groundwater. Classification of groundwater is based on existing and probable use for drinking water supply and exposure to risk of contamination.

Class I and II groundwaters are those with uniformly excellent character and which are used as, or have high probability for use as, public water supply sources. Class I groundwater is free from exposure to activities which pose a risk to its current or potential use as a public water supply, while Class II groundwater is exposed to such activities. Class III groundwater is suitable as a source of water for individual domestic water supplies, irrigation, agricultural use and general industrial and commercial use. Class IV groundwater is not suitable as a source of potable water.

By statute, all groundwater in Vermont is designated Class III unless specific areas are reclassified to Class I, II, or IV. The purpose of reclassification to Class I or II is to delineate areas of groundwater requiring extra protection for current or future public drinking water supplies. The purpose of reclassification to Class IV is to prevent people from accidentally drinking non-potable groundwater and to prevent spreading of subsurface contamination. A groundwater reclassification applies to all groundwater under a site, regardless of depth, in accordance with statutory language.

The purpose of this document is to describe the procedures by which groundwater may be reclassified as Class I or Class II. The document describes methods for delineating the geographical boundaries of proposed Class I and II Groundwater Areas. It also outlines the administrative process for petitioning the Agency of Natural Resources (ANR) to reclassify an area as Class I or Class II groundwater and describes how the ANR Secretary will involve the public in the reclassification decision.

This document has been prepared by the Vermont Groundwater Coordinating Committee and the Agency of Natural Resources. It supersedes the procedure entitled "Mapping Potential Class I and II Groundwater Areas" dated 9 July 1990.

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II. AUTHORITY

Authority to adopt Procedures for Groundwater Reclassification is given by Section 12-401 of the Groundwater Protection Rule and Strategy:

The Secretary, upon the advice of the Groundwater Coordinating Committee, may adopt technical and other procedures necessary to implement these reclassifications. These may include procedures detailing the scientific processes required to delineate the physical boundaries of Class I, II, or III or IV groundwater areas.

The statutory authority for groundwater classification comes from 10 V.S.A. Chapter 48, Groundwater Protection. Chapter 48 grants the Secretary of the Agency of Natural Resources (ANR) specific authority to map and classify areas of Class I and II groundwater as part of a comprehensive groundwater management program as follows:

10 V.S.A §1392(a)

The secretary shall develop a comprehensive groundwater management program to protect the quality of groundwater by:

- ...(4) identifying and mapping groundwater currently used as public water supply sources and groundwater determined by the secretary as potential future water supply sources;*
- ...(6) classifying groundwater resources according to the provisions of this chapter and adopting technical criteria and standards for the management of activities that may pose a risk to their beneficial uses;*

10 V.S.A. §1394(d)

Class I or II classification shall apply to aquifers in use as a public water supply source or which in the opinion of the secretary have a high probability for such use.

10 V.S.A §1394(g)

The secretary's classification shall be presumed correct if, in establishing the geographical limits of each class of groundwater, he or she uses generally accepted methods of determining aquifers based on existing knowledge of surficial and bedrock data and available hydrogeologic data.

III. WHEN TO RECLASSIFY

The main purpose of reclassifying groundwater to Class I or Class II is public drinking water protection. The Agency's goals and strategy for the management of Class I and II Groundwater Areas are outlined in the Groundwater Protection Rule and Strategy (see Attachments A and B). Protection goals are more rigorous for Class I groundwater than for Class II groundwater.

Class I groundwater reclassification should be considered for any groundwater that

1. is suitable for public water supply use;
2. has uniformly excellent character;
3. is in use as a public water supply source or has a high probability for such use; and
4. has no exposure to activities which pose a risk to its current or potential use as a public water supply source.

Class II groundwater reclassification should be considered for any groundwater that

1. is suitable for public water supply use;
2. has uniformly excellent character;
3. is in use as a public water supply source or has a high probability for such use; and
4. is exposed to activities which may pose a risk to its current or potential use as a public water supply source.

The Agency has several programs by which it assists municipalities to identify and protect public drinking water sources. These range from town-level mapping programs to Source Protection Area delineations for permitted public water supply sources. Applicability of Class I or II groundwater reclassification as a protection mechanism varies depending on the stage of groundwater mapping and water supply development.

For example, one major difference between a Class I or II Groundwater Area and a Source Protection Area is that the public water supply source need not be fully developed and permitted for a Class I or II Groundwater Area. Subchapter Four of the Groundwater Protection Rule and Strategy specifically states that “Groundwater not presently in use as public water supply source may be reclassified as Class I or II, if it has a high probability for use as a public water supply source.”

Therefore, a municipality or other entity can, with sufficient planning and forethought, use a Class I or II designation to protect the estimated zone of contribution for a future public water supply without incurring the immediate expense of full development of the supply. The applicability of groundwater reclassification at various stages of public water supply development is depicted in Figure 1.

A. Identifying and Mapping Potential Future Water Supplies

The Vermont Geological Survey, with funding from the federal Statemap program and other sources, maps framework geology on a town-wide, or sometimes region-wide, basis. Through this program, high yield, high quality aquifers that could serve as potential future water supplies are identified. Under an ANR Procedure entitled *Mapping Potential Future Water Supplies*, available online at www.vermontdrinkingwater.org, other entities may perform such mapping in consultation with the State Geologist.

This level of groundwater mapping is crucial for sound land use planning at the state, regional and municipal level. It is particularly important for identifying the recharge areas of deep, protected aquifer systems, for locating previously unknown water sources, and for understanding the maximum physical extent of aquifers (important for understanding aquifer safe yields). Once a potential future water supply has been identified, a municipality has several options:

- 1) Do nothing. This might be the choice if the current drinking water sources in the community are of high quality, provide sufficient quantity for projected future growth, and are not at risk of contamination.
- 2) Protect the potential future water supply using local controls such as land acquisition, municipal zoning or land use ordinances.

- 3) Invest in the potential future water supply sufficiently to establish it as having a “high probability for future use” and petition for Class I or II reclassification of groundwater.
- 4) Invest in the potential future water supply sufficiently to apply for a public water supply source permit and, if desired, concurrently petition for Class I or II groundwater reclassification.

B. Establishing a High Probability of Future Use

For petitioners wishing to establish a high probability for future use without applying for a public water supply source permit, Section 12-201 (19b) of the Groundwater Protection Rule and Strategy requires the following:

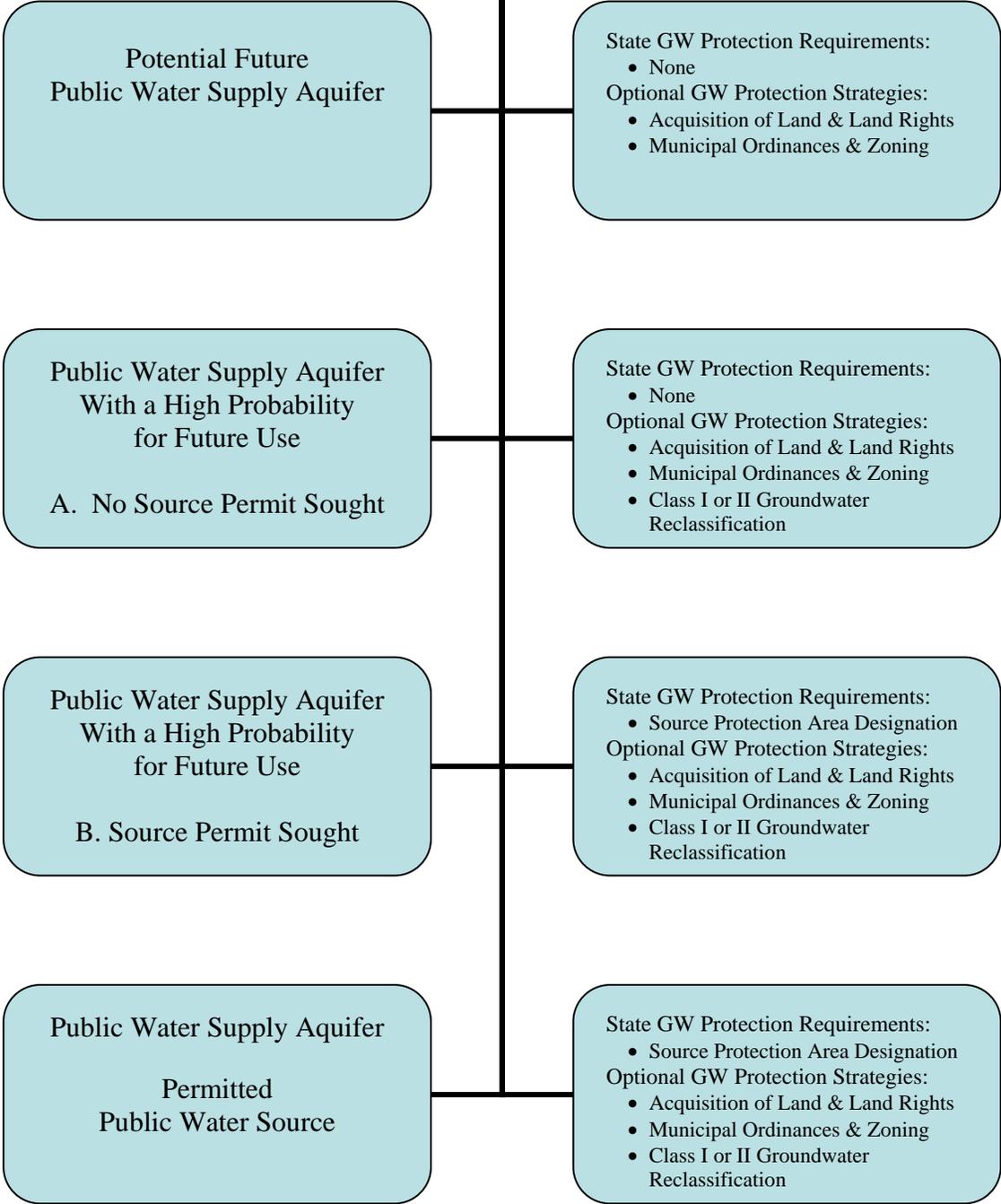
A written petition from a Vermont municipal government requesting Class I or II designation to protect one or more groundwater areas. The petition must contain the following information:

- copy of a duly adopted plan, bylaw, or ordinance providing local protection for the designated Class I or II area;
- map showing the general area or areas under the control of municipal government in which the government proposes to develop a future water supply source;
- projected maximum demand figure that would be needed from a future public water supply source;
- estimated date for the construction of a new public water supply source and the necessary appurtenances.
- hydrologic study indicating that the area under consideration could reasonably meet the projected public water supply demand;
- such other provisions that the Secretary deems necessary; or

A finding from the Secretary (on the basis of information available to him or her) that the need for a new municipal public water source will be necessary.

Public water source permits currently expire after two years. Petitioning for groundwater reclassification therefore makes sense for a municipality that is not yet ready to begin using an aquifer for public water supply but wishes to make a strong commitment to do so at a future date. Class I or II groundwater reclassification provides a state-level land use protection to bridge the time gap – sometimes on the order of decades -- between identification and testing of the probable source location and intended use of the source. A groundwater reclassification removes the uncertainty associated with having to constantly renew a two-year source permit, since the permit renewal is never guaranteed.

**Figure 1.
State Groundwater Protection
Requirements and Optional
Groundwater Protection
Strategies by Stage of Public
Water Supply Development**



C. Reclassifying New Source Protection Areas

For public water systems going through the source permitting process for proposed groundwater sources, concurrent petitioning for Class I or II reclassification can be an efficient drinking water protection technique. Hydrogeological and water quality testing requirements for public water supply source permits are similar to the data needed for Class I and II petitions. Concurrent mapping of new Source Protection Areas and proposed Class I or II areas makes sense from both an economic and a drinking water protection perspective.

D. Reclassifying Existing Source Protection Areas

For permitted public groundwater supply sources, Subchapter Four of the Groundwater Protection Rule and Strategy specifically states that “Scientifically delineated SPAs for public water supplies may be adopted as Class I or II, as appropriate.” While an existing Source Protection Area already serves as a helpful tool for focusing groundwater and drinking water protection efforts, it does not afford the same land use protections as a Class I or Class II groundwater designation. Class I and II designations provide the Agency added authority to evaluate and monitor land uses through its permitting programs and more responsibility to evaluate the groundwater risks from state-permitted land uses.

In determining whether or not to petition for Class I or II reclassification for an active water supply, municipalities, public water system managers, and citizen groups should also consider the benefits of heightened awareness and reinvigoration of local groundwater protection efforts likely to arise from the petition process. The public meetings and documentation of hydrogeological and water quality issues educate local residents about the importance of their drinking water source and its protection.

The reclassification process can also be used as a mechanism to update and refine source protection area boundaries that are based on old or inadequate technical information. Up-to-date information obtained through the Class I or II boundary mapping process serves as a solid basis for local planning, zoning, and land use decisions. Over time new hydrogeological studies within Source Protection Areas and Class I and II Groundwater Areas will often reveal refinements to boundary delineations. The Agency encourages ongoing study of drinking water recharge area boundaries, land use changes, contaminant travel paths, and groundwater quality.

IV. WHO MAY PETITION

As established in the Groundwater Protection Rule and Strategy, there are several ways to initiate a groundwater reclassification:

12-401(2)

The Secretary may on his or her own motion, or upon the submittal of a written petition from a state agency, a municipality, or twenty five or more potentially affected persons classify or reclassify any groundwater of the state. Reclassification to a Class I or Class II may be done in conjunction with the Secretary’s Source Approval [Permitting] of a Public Water System.

Generally a municipality or municipal water system will be the petitioner. This is because municipal officials and water systems have the best understanding of the current and projected future drinking water needs of the citizenry and are best equipped to understand the local development pressures and groundwater protection needs faced by local communities.

The Secretary may also initiate groundwater reclassifications. Chapter 48 and the Groundwater Protection Rule and Strategy particularly address the Secretary's role in proposing areas for Class I designation. For example, Section 12-501 (5) requires a report to the Legislature as follows:

Annually, the Secretary shall report to the General Assembly on the status of Class I groundwater. The report shall include data reflecting the quality of groundwater and land uses within existing Class I areas and shall propose, as necessary, new Class I areas for approval by the General Assembly.

The Secretary may prioritize reclassification actions based on such considerations as the regional or state-wide significance of the drinking water sources, the level of interest or need of the municipalities or other entities served by the supplies, the lack of alternative sources of supply, the high quality of the sources and their vulnerability to contamination, or various other factors.

Potential petitioners may wish to examine the Agency's files on Class I and II groundwater. These are available for review at the Agency's offices in Waterbury, Vermont.

V. PETITION INFORMATION

A. Required Information

The Petition to reclassify groundwater to Class I or II must include different information depending on the following four situations:

- Groundwater currently used by state-permitted Public Water Supply Source(s) with no proposed change in permitted use or source construction;
- Groundwater currently used by state-permitted Public Water Supply Source(s) with proposed increase in permitted withdrawal or proposed increase in source depth;
- Groundwater proposed for use by New Public Water Supply Source(s); or
- Groundwater with High Probability for Future Use by Public Water Supply Source(s).

Attachment C includes a table of required information for each category. The Secretary reserves the right to require additional information.

B. Written Report

The written report for all petitions must include the following:

1. Public Water System Information

This section should describe the public water system, current permitted yield, average day demand, maximum day demand, population served, demand projections, proposed new source (s) if applicable, vulnerability of the source(s), availability of alternative supplies, etc.

2. Hydrogeological Setting & Contaminant Transport Routes

This section should describe the bedrock and surficial geology (rock types, depositional environment, etc.), geological structure (fracture pattern, jointing, lineaments), soils (type, thickness, stratification, hydraulic properties), aquifer type and groundwater flow system, including recharge and discharge areas. It should identify major potential contaminant sources and transport routes. The discussion should incorporate field reconnaissance observations as well as information from published reports and other sources.

3. Boundary Delineation Methodology

This section should clearly state how the boundaries of the proposed Class I or II area were delineated, including the two-year time of travel zone. It should describe what methods were chosen and why. It should discuss the results of hydraulic testing and how aquifer parameters were derived, describe any groundwater flow modeling, discuss the overall conceptual model and outline assumptions regarding groundwater flow divides, contaminant transport, groundwater-surface water interaction, etc. This section should also identify any data gaps which could be filled through future testing.

4. Current Groundwater Quality and Potential Sources of Contamination

This section should describe all water quality testing performed in support of the petition and summarize any additional water quality information obtained during the data assembly phase. It should specifically address whether the proposed Class I or II area meets the definition of “uniformly excellent character” and discuss the overall vulnerability of the source to contamination. Potential sources of existing or future contamination, development pressures, and local land use controls should also be discussed in this section.

5. Statutory Criteria

Finally, the written report must address the site with respect to each of the following criteria from 10 VSA 1394 (e) for evaluating a proposed groundwater reclassification:

- a) The use or potential future use of the groundwater as a public water supply source
- b) The extent of activity which poses a risk to groundwater;
- c) The current water quality of the groundwater;
- d) The availability of the groundwater in quantities needed for beneficial use;
- e) The consequences of its potential contamination and the availability of alternate sources of water;
- f) The classification of adjacent surface waters; and
- g) Other factors relevant to determine the maximum beneficial use of the groundwater.

VI. RECLASSIFICATION PROCESS

A. Submittal of Petition

1. Two paper copies and one electronic copy of the petition should be submitted to the Chair of the Groundwater Coordinating Committee.
2. Appropriate staff within the Agency will complete an initial review of the petition. If the petition is considered administratively complete, it will be forwarded to the Groundwater Coordinating Committee to review.

B. Review and Comment by Groundwater Coordinating Committee

1. The Groundwater Coordinating Committee will review the petition. They may request additional information from the petitioner. This review and request process may occur multiple times. The Groundwater Coordinating Committee may request technical assistance in reviewing the petition from other appropriate parties.
2. Once the Committee has sufficient information to make a recommendation, it will recommend to the Secretary whether to continue with the reclassification process and provide a basis for the recommendation.
3. The Petitioner will be notified of the Groundwater Coordinating Committee decision at this stage.
4. The Groundwater Coordinating Committee is responsible for writing a Draft Findings of Fact and Reclassification Order for review during the public participation phase.

C. Public Comment Period

1. A minimum 30 day comment period starting on the date that the notice is published in the local newspaper will be provided.
2. The Secretary will provide notice of any proposed reclassification by:
 - a. advertisement in newspapers of general circulation in the area of the proposed classification or reclassification;
 - b. written notice with the appropriate town clerk;
 - c. written notice to all property owners of record within the proposed reclassification area;
 - d. written notice to the appropriate Regional Planning Commission; and
 - e. written notice to the Groundwater Coordinating Committee.

D. Public Meeting

1. Upon the request of an interested person or upon the Secretary's motion, the Secretary will hold a public information meeting on any proposed reclassification.
2. The public information meeting will be held in a location convenient to the users or potential users of the groundwater which is the subject of the public information meeting.
3. The Secretary will provide notice of the date, time, and location of the public information meeting. The petitioner or a designated representative must attend the public meeting. Agency staff will facilitate the meeting.

E. Response to Comments and Recommendation to Secretary

1. Prior to the issuance of any final classification or reclassification decision, the Groundwater Coordinating Committee and the Secretary shall consider all comments received during the public comment period and the public information meeting. As appropriate the Findings of Fact and Reclassification Order will be revised.
2. The Groundwater Coordinating Committee will make a recommendation to the Secretary to either deny the reclassification request or reclassify the groundwater.
3. If the Committee decides to recommend reclassification, the petitioner will be notified and is responsible for submitting a final GIS data file of the reclassified area boundaries to the Committee before the Committee forwards the recommendation to the Secretary. The GIS data must conform to the current technical standards of the Agency.

F. Class I or II Reclassification Denial and Public Notification

If the Secretary decides to deny the reclassification, or if a Class I reclassification is denied by the General Assembly, the Secretary will notify the following parties in writing with the reasons for the denial:

- a. the petitioner and all property owners of record within the reclassification area;
- b. the town clerk in the town or towns affected; and
- c. other interested parties as appropriate.

G. Secretary's Class I and II Reclassification Approval and Public Notification

If the Secretary decides to approve the reclassification and sign the Findings of Fact and Reclassification Order, the decision and a map of the reclassified area will be distributed by the Secretary to:

- a. the petitioner and all property owners of record within the reclassification area;
- b. the town clerk in the town or towns affected;
- c. the Agency regional office for the area affected;
- d. the owners and/or operators of any public water supplies affected;
- e. the Water Well Advisory Committee and all licensed well drillers;
- f. the Vermont Center for Geographic Information;
- g. the appropriate Regional Planning Commission; and
- h. other interested parties as appropriate.

H. Special Provisions for Class I Reclassification involving Privately-Owned Land

Pursuant to 10 V.S.A. 1394(f), any classification of Class I groundwater involving privately owned lands shall be submitted by the Secretary to the Natural Resources Committees of both houses of the General Assembly within 15 days of the issuance of the decision order. Any such reclassification must be approved by an act of the General Assembly prior to becoming effective.

I. Appeal of Reclassification Decisions

Any person seeking to appeal a reclassification decision of the Secretary should consult 10 V.S.A Chapter 220 governing appeals to the Environmental Court, and consult the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. For further information, please contact the Environmental Court at 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. #802-828-1660).

J. Policy of Permanent Protection for Class I Groundwater

Pursuant to statutory policy at 10 V.S.A. 1394(f), any Class I groundwater shall be permanently protected unless and until a reclassification is approved by an act of the Vermont General Assembly.

K. Modifying Existing Class II Boundaries

If new hydrogeologic information is obtained after a Class II groundwater area has been adopted, the boundaries may be changed to reflect the new information. Interested parties may petition the Groundwater Coordinating Committee with new hydrogeologic data which supports the position that the boundaries need to be changed. Each case will be reviewed within the constraints of available time and resources, and the petitioning party notified of the results of the review.

Changes to the boundaries of an existing Class II groundwater area shall not become effective until written notice and opportunity for comment has been provided to:

- a. the appropriate town clerk;
- b. all property owners of record within the proposed reclassification area;
- c. the appropriate Regional Planning Commission; and
- d. the Groundwater Coordinating Committee.

and the Secretary or his/her designee has signed a Reclassification Order reflecting the revision.

L. Changes in Class II Classification

Closure of public water supply sources due to connection to alternate systems, significant changes in groundwater quality conditions, unanticipated community growth patterns, or many other factors may render an existing Class II groundwater classification inappropriate. Class II groundwater areas that no longer meet established criteria may be reclassified in accordance with relevant rules and procedures.

VII. MAPPING PROPOSED CLASS I AND II AREAS

The Secretary and others are required to use *generally accepted methods* for determining the geographical boundaries of Class I and II groundwaters. *Generally accepted methods* are methods for determining aquifer and source characteristics and for mapping aquifer boundaries which are recognized by the U.S. Geological Survey, the U.S. Environmental Protection Agency, the National Ground Water Association, the Vermont Geological Survey, or the Department of Environmental Conservation, Water Supply Division, or innovative methods submitted for review and accepted by the Agency or published in a scientifically refereed journal.

In addition, all delineations of Class I and II groundwater areas must be performed by a qualified *hydrogeologist*. *Hydrogeologist* means a person with training or experience in bedrock geology, glacial geology, and groundwater hydrology sufficient to prepare adequately the hydrogeologic analyses required by this Procedure.

The ultimate goal of the mapping process is to delineate the areas of contribution and recharge that are important in protecting a current or proposed public water supply source. For permitted

public water supply sources, the Class I or II boundary is equivalent to the Source Protection Area boundary.

Petitioners or their hydrogeological consultants are advised to schedule a meeting and site visit with an ANR hydrogeologist early in the mapping process to ensure initial agreement on conceptual models and mapping methods and approaches.

A. Initial Data Assembly

The first step in the mapping process after identifying an existing or potential public water supply source aquifer is to gather all possible available geologic, hydrogeologic, water quality, and land use information in the area to be studied. This information can include but is not limited to the following:

Well driller's logs	Geophysical reports
Published geological literature	Pumping test reports
Surficial geologic maps	State water supply permit records
Bedrock geologic maps	Climatic data
Groundwater resources maps	Topographic data
Groundwater recharge area maps	Published soils data
Soil borings	Water quality data
Aerial photographs	Land use data
Remote sensing images	Surface water features and classification
Fracture trace studies	

The first places to go to collect much of this information are the public water system and the Agency of Natural Resources. Other sources of information include, but are not limited to the following: the Vermont Geological Survey, the Agencies of Agriculture, Food, and Markets, Transportation, and Health and Human Resources, the USDA Natural Resources Conservation Districts, college geology departments, solid waste districts, and local municipal governments.

B. Field Reconnaissance

Following the “desktop” review a field visit is made to the site to identify key landforms and surface water features and examine places where unconsolidated deposits or bedrock may be exposed, such as stream banks, road cuts, and quarries. For bedrock aquifers, the strike and dip of bedding and fracture sets are measured at outcrops. Use of geophysical reconnaissance equipment and other indirect methods for structural characterization of the geological setting can be very useful at this stage. Evidence of groundwater discharge, such as seeps and springs, and groundwater under pressure, such as flowing wells, are noted. Where applicable, water levels in wells and perennial water bodies representing water table conditions are measured.

Observations are also made regarding how the natural topography and flow system may have been altered by man-made features such as roads, culverts, berms, and ditches. Potential large groundwater users that could affect the groundwater flow regime, such as farms, country clubs, and quarries are also identified at this time. During the field reconnaissance, local land uses are also noted, particularly those that might pose a threat to an existing or future water source.

C. Development of Conceptual Model

From the collected data and field observations, a conceptual model of the aquifer structure and the ground water flow regime is defined. Flow boundaries, aquifer type, ground water recharge and discharge areas, surface waters, presence or absence of confining layers, geology, other recharge conditions, water levels, etc. are estimated or determined. These are used to conceptualize the groundwater flow regime.

The elements of the conceptual model include but are not limited to a description of the permeable area of an aquifer and the flow patterns into, through, and out of an aquifer. This conceptual flow model is used as a guide to direct the scientific analysis and mapping conducted during the classification process.

A key element of the thought process in developing the conceptual model is to anticipate potential contaminant transport routes to the existing or proposed source. For example, some types of contaminants, such as chlorinated solvents, do not travel with groundwater flow, but rather flow downward by gravity along structural geological features. Induced recharge from rivers can also represent a key avenue for contaminant transport. These transport routes must be understood along with traditional groundwater flow paths. Conversely, certain areas might have confining layers that provide a measure of protection from activities occurring at the land surface. Care is taken at this stage to insure that the best possible conceptual model is developed for protecting the drinking water source.

At this time, a preliminary assessment of land use, water availability and water quality is made in and around the area covered by the conceptual model of the aquifer. If available data indicate no compound's concentration exceeds Vermont's Groundwater Enforcement Standards, the ground water is considered a potential candidate for Class I or II designation.

D. Framework Geological Map Preparation

After data review and conceptual model development, the next step in delineating the Class I or II boundaries is to use the collected data and conceptual model to prepare a set of generalized geologic maps of the area. These maps include: bedrock and surficial geology maps, well yield maps, groundwater resource and recharge area maps, sand and gravel isopach maps, and depositional environment. Water well driller's logs and available well test reports are useful for map construction. Maps indicating the orientation of fractures and bedding, fracture traces where applicable, stereo pair aerial photographs, remote sensing, and published geophysical surveys are also valuable resources at this stage. Cross sections bisecting the general area of interest are also prepared at this stage.

E. Mapping the Groundwater Flow System

Once the basic geology of the site is understood, an analysis of the hydrogeology is conducted. The available data are used to determine or estimate ground water flow patterns. If enough data exist, it is important to consider the effects of confining layers, streams, and hydrologic boundaries on the ground water flow regime. Generalized groundwater flow maps and cross sections of the area are then created.

The accuracy of this mapping will depend largely on the type of aquifer, the amount of data available, and the complexity of the flow system. Flow directions in confined aquifer systems may be particularly difficult to map. Petitioners are encouraged to use dashed lines or other graphical methods of indicating areas of uncertainty in the information.

F. Maximum Projected Water Supply Demand

Petitioners requesting increased withdrawals or a new source of supply must provide a projected maximum day demand figure for a future design year, recommended at 20-50 years hence. This figure is generally estimated based on census data and growth projections.

Petitioners delineating a proposed Class I or II groundwater area for a probable future water supply must provide a projected maximum day demand figure for the estimated date of the construction of the new public water supply source and for a future design year, recommended as 20-50 years following the projected construction date. These figures are also estimated based on census data and growth projections.

G. Delineating Class I and II Areas for Pumped Sources

For pumped sources, delineating the boundaries involves establishing a withdrawal rate basis for the delineation and mapping the area of influence, area of contribution, and areas of primary and secondary recharge.

1. Withdrawal Rate Basis for Delineation

For pumped sources, the delineation is based on a permitted or permissible yield. Table 1 defines the withdrawal basis for various scenarios.

**Table 1
Withdrawal Rate Basis for Class I and II Groundwater Area Delineation
Pumped Sources**

Source Type	Situation	Withdrawal Rate	Units
Permitted public water source	Proposing no change	Permitted Yield	gpm
Permitted public water source	Requesting increased withdrawals. Has submitted source permit application.	Permissible Yield	gpm
Proposed public water source	Has submitted source permit application	Permissible Yield	gpm
Probable future public water source	No source permit application submitted	Estimated Permissible Yield	gpm

For permitted public water sources proposing no changes in withdrawal rates, the permitted yield serves as the withdrawal rate basis for the delineation. For the other three cases, permissible yields must be estimated in order to delineate the proposed boundary. Permissible yields are

estimated using a combination of demand projections and source safe yield information. If a pumped source cannot supply the maximum projected demand, then the permissible yield equals the safe yield of the pumped source. If a pumped source can supply much more water than the maximum projected demand, then the permissible yield equals the maximum projected demand.

Hydraulic testing is performed to determine the safe yield of the source and determine whether there is sufficient water available to consistently supply the desired demand. Many water supplies in active use will already have sufficient pumping test information for purposes of completing a reclassification petition. However, additional testing may be required if the petitioner wishes to determine whether an existing source could support a substantial increase in demand or if a petitioner wishes to evaluate a proposed new source. Pumping tests in accordance with the Water Supply Rule are also required for petitioners wishing to delineate groundwater areas with a high probability for future use. Pumping tests can be performed in existing water supply wells or in wells drilled for that purpose.

All pumping tests shall consist of and be conducted in the following order: a step drawdown test, a constant discharge test, and a recovery test. The constant discharge test shall be conducted after full recovery from the step test. The recovery test shall immediately follow the constant discharge test. Specific pumping test requirements are detailed in the Vermont Water Supply Rule.

The Water Supply Rule defines the safe yield for a pumped source as a capability to pump for 180 days at the average day demand rate followed by a peak of 3 days of pumping at the maximum day demand rate without dewatering the source (see the Water Supply Rule for definitions of average and maximum day demand). The safe yield determination must take into consideration seasonal low static water level and hydrogeologic boundaries affecting the aquifer. Petitioners are advised to refer to the Vermont Water Supply Rule for more details on hydraulic testing requirements for pumped water sources.

2. Estimating the Area of Influence

Recharge that enters the aquifer through the zone of influence of the pumped source will not necessarily travel to the pumped source, and recharge that enters the aquifer outside the zone of influence may travel to the pumped source. However, it is important to determine the area of influence of a pumped source in order to evaluate potential adverse impacts of the groundwater withdrawal such as interference with other water supplies or unacceptable lowering of water tables beneath wetlands, streams, or water bodies. Under the Water Supply Rule, Source Interference Testing for source permits is conducted within a specific monitoring radius for a given pumping test rate as follows:

Pumping Test Rate (gpm)	Monitoring Radius (feet)
0-19	1000
20-49	2000
50-99	2500
100+	3000

Groundwater sources and other observation points within the monitoring radius that are not in service are measured to the nearest 0.01 ft, while water supplies that are in service are measured to the nearest 0.10 ft. For groundwater reclassification delineations, water levels in perennial water bodies within the monitoring radius must also be measured to 0.01 ft during the interference testing process.

In most cases, the monitoring radius is expected to be sufficient to capture the extent of the area of influence for the proposed withdrawal. However, cases may arise where the pumping test data indicate the influence of the pumped source extends beyond the monitoring radius in certain directions. In such cases, the Petitioner must present a methodology or rationale for determining the remaining extent of the area of influence.

In cases where the Source Protection Area for a permitted source is proposed for reclassification, no increase in permitted yield is requested, and no pumping test data exist for the source, the pumping test requirement may be waived on a case-by-case basis. Petitioners may present alternative methods for estimating the area of influence and determining aquifer characteristics. Such methods could include, but are not limited to, water level mapping, groundwater flow equations, or groundwater flow modeling.

3. Determining the Area of Contribution

Mapping the area of contribution is critical for defining a Class I or II area and ultimately for protecting the public from ingesting groundwater contaminants. The area of contribution is defined as the land area that directly overlies that portion of an aquifer from which groundwater flow is diverted to a pumped source or flows to a gravity source. The size of an area of contribution is limited to the area around a pumped source or gravity source in which captured recharge equals source discharge.

Recharge that enters an aquifer through the zone of contribution will eventually be discharged by the pumped source or gravity source. One way to determine the area of contribution is to create a groundwater contour map of the area of influence and map the flow lines that lead directly to the source. This method works well for sources with a large number of data points within the area of influence. Other methods include use of groundwater flow equations and groundwater models.

a) Groundwater Flow Equations

Where data permit, groundwater flow equations appropriate to each site's particular geology are used to help determine aquifer characteristics, potential yield, and groundwater flow patterns. Two simple examples include the uniform flow and the volumetric flow equations. A discussion of the uses for these two equations can be found in the guidance document entitled *Protecting Public Water Sources in Vermont* (1997), available online at www.vermontdrinkingwater.org.

Other examples of acceptable groundwater equations include but are not limited to the Theis (1935) and Cooper, Jacob (1946) equations for confined aquifers, the Walton (1962) equation for semi-confined aquifers, the Boulton (1963) equation for semi-unconfined with delayed yield, and the Neuman (1975) equation for unconfined aquifers. This list is not

comprehensive. These are only several examples of the many acceptable methods. It is important however, that the appropriate equations for the local geologic environment are used. Use of inappropriate equations could or will invalidate the results.

b) Groundwater Flow Models

When the geologic and hydrologic characteristics of the aquifer are known, these values can be used to refine the conceptual model and create a flow model detailing the area of contribution. If enough data exist, this model is created using numerical groundwater flow models which overlay the geologic maps of the site.

Examples of acceptable numerical flow models are the USGS Finite Difference Flow Model (Trescott, Pinder, and Larson; 1976) and the USGS Modular Flow Model (McDonald and Harbaugh, 1984) and its successors (Visual MODFLOW and others). If the available data are not enough to allow the use of numerical models, the boundaries of the area of contribution may be delineated using the geologic maps and analytical flow models such as described by Bear (1972, 1979), Todd (1980), Ferris et al (1962) or others. Considerable care should be taken as always when using this type of methodology to insure that the most appropriate model for the geologic and hydrogeologic environment is used. For example, it is inappropriate to use a steady state flow model for an unsteady state hydrogeologic environment.

4. Mapping Primary and Secondary Recharge Areas

Identifying the key land areas where precipitation enters the subsurface and recharges the area of contribution is crucial in establishing a basis for protecting a public water supply. The degree of importance of the recharge area depends on the permeability of the materials through which the infiltration of precipitation occurs. For purposes of mapping Class I and II areas, the following distinctions are made:

Primary Recharge Area means the estimated land surface area which provides direct recharge from precipitation to permeable materials which contribute water to a public water source when operated at the permitted yield or to a proposed groundwater withdrawal site when assumed to operate at the estimated permissible yield. For truly confined aquifers, the recharge area may be located upgradient of the actual withdrawal site.

Secondary Recharge Area means the land surface area which is directly hydraulically upgradient of the primary recharge area and provides significant recharge to the primary recharge area. The secondary recharge area may be of lower permeability and may not be suitable for development of high yield wells.

The Class I or II area ultimately includes both the primary and the secondary recharge areas, but the former must be mapped in order to delineate the latter.

H. Delineating Class I and II Areas for Gravity Sources

The approach for delineating a reclassification area for a gravity source involves two basic steps:

1. Determining whether the natural gravity flow of the source can yield a sufficient quantity of water under 20-year drought conditions while maintaining any applicable downstream low flow requirements; and
2. Mapping the areas of contribution and recharge for the source under high flow conditions

Both of these determinations are made using flow measurements. According to the Water Supply Rule, detailed hydrologic analyses for gravity sources must include at least the following:

1. Monitoring of flows on a weekly basis from July 1 to October 15 and from December 15 to March 15. The lowest flow during either period is used to determine whether the source has sufficient capacity to meet the maximum projected demand.
2. Monitoring of flows on a weekly basis from March 15 to July 1 and from October 15 to December 15. The highest flow during either period is used in the calculation and delineation of the Class II Groundwater Area.

Petitioners are advised to refer to the Vermont Water Supply Rule for more details on acceptable methods for hydrologic analyses for gravity sources.

VIII. TWO-YEAR TIME-OF-TRAVEL ZONE DELINEATION

The two-year time of travel zone is the estimated land area through which a pathogen could enter groundwater (for example, via onsite disposal of sewage) and migrate to a public water supply source within two years. Since most viruses in groundwater are expected to die off or become non-infectious within two years, this area is defined to assist land use regulators with waterborne disease prevention efforts. Methods for delineating this zone can be found in the document entitled *Protecting Public Water Sources in Vermont*, available online at <http://www.vermontdrinkingwater.org>. Delineation of this Zone is required for all Class I and II Petitions, in order to assess whether groundwater within a proposed Class I or II area meets the definition of “uniformly excellent character” with respect to pathogens.

IX. “UNIFORMLY EXCELLENT CHARACTER” DETERMINATION

The specific definition of “Uniformly Excellent Character,” as established by these Procedures, is as follows:

“a water quality condition in which no constituent exceeds a primary or secondary enforcement standard listed in the Groundwater Protection Rule and Strategy. In certain cases, this term may be extended to include a water quality condition in which constituents exceed secondary groundwater enforcement standards, provided that the ANR Secretary has permitted or will permit use of the water for public water supply (with or without treatment).”

Three key steps are necessary in making an assessment of whether the groundwater quality meets the above definition.

A. Testing for Drinking Water Standards

1. Testing of the current or proposed drinking water source for all Drinking Water Contaminants listed in Table 6-1 Sections 1, 3, 6, 7, and 8 and Table 6-2 of the Vermont Water Supply Rule. Testing is required for all parameters with a “yes” in the *Initial Source Testing Required?* column of each table.
2. A minimum of one set of samples shall be collected for laboratory analysis.
3. Samples to be analyzed for this determination shall be unfiltered and untreated.
4. For water sources in active use, the samples shall be collected during a period of peak demand. For proposed sources, the sample collection shall be performed at the end of a pumping test for pumping wells or at peak flow for springs, and shall be in accordance with standard industry practices.
5. The analysis shall be for total (unfiltered) concentrations, and shall be performed by a laboratory with current certification for those analyses by the Vermont Department of Health.

B. Land Use Assessment and Additional Water Quality Testing

1. Assessment of known or potential sources of contamination within the proposed Class I or II Area to determine whether additional parameters should be tested.
2. Additional water quality analyses may be necessary if there are known or suspected potential risks to groundwater quality in the proposed reclassification area. For example, if the proposed reclassification area includes a golf course, analysis for any pesticides used at the golf course that are listed in the Groundwater Protection Rule and Strategy table of Primary Groundwater Enforcement Standards but not listed in the Water Supply Rule would be required.
3. If a known release of any chemical with a Vermont Drinking Water Health Advisory has occurred in the proposed Class I or Class II area, that chemical must be included in the list of analytes.
4. Drinking water analysis methods approved by the Vermont Department of Health or equivalent methods approved by the Secretary shall be used.

C. Assessment of Septic System Effluent Releases

1. Assessment of septic system wastewater releases to groundwater within the two-year time of travel zone for the existing or proposed public water source is made to determine the risk of viral contamination.
2. For purposes of Class I or Class II designation, the presence of septic systems within the two-year time-of-travel zone for a public water source is considered to indicate a lack of “uniformly excellent character” unless the following can be demonstrated:
 - no hydraulic connection between the septic system and the public water source; or
 - soil conditions, impeding layers, or other factors creating a localized condition of greater than a two-year time of travel between the septic system and the public water source.
3. Permitted sources with septic systems within the two-year time of travel zone may also propose other methods to demonstrate a low probability of viral contamination.

D. Groundwater Under the Direct Influence of Surface Water Determination

1. For permitted sources or systems in the source permitting process, petitioners must demonstrate that the sources proposed for groundwater reclassification are not *Groundwater Under the Direct Influence of Surface Water* (GWUDI). The procedures for demonstrating this condition are established in the Water Supply Rule.
2. For petitions in the “high probability for future use” category, petitioners must demonstrate that, when the source is ultimately developed and permitted, it will not be GWUDI. Such a demonstration could include distance from surface water, nature of the hydrogeological setting, microscopic particulate analysis testing of a test well, etc.

X. LIST OF REFERENCES

- Agency of Environmental Conservation, 1997: “Protecting Public Water Sources in Vermont” Waterbury, Vermont, 121 pp.
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- Boulton, N.S., 1963; “Analysis of data from nonequilibrium pumping tests allowing for delayed yield from storage”. Proc. Inst. Civ. Eng., 26 (6693).
- Cooper, H.S., and Jacob, C.E., 1946; “A generalized graphical method for evaluating formation constants and summarizing well field history”; in Trans. Am. Geophys. Union, Vol. 27, No. 4.
- Ferris, J.G., et. al., 1962; “Theory of aquifer tests”. USGS Water Supply Paper 1536-E.
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- Trescott, P.C., Pinder, C.F., and Larson, S.P., 1976; “Finite difference model for aquifer simulation in two dimensions with results of numerical experiments:.. USGS Techniques of Water Resour. Invest. Book 7, Chapter C1.
- Theis, C.V., 1935; “The relationship between the lowering of piezometric surface and the rate and duration of discharge of a well using ground-water storage”; in Trans. Am. Geophys. Union, 16th Ann Meeting, Part 2.
- Todd, D.T., 1976; Groundwater Hydrology. John Wiley & Sons, New York; 535 pp.
- Walton, W.C., 1970; Ground Water Resource Evaluation. McGraw Hill Book Company, New York; 644 pp.

Attachment A

Goals and Management of Class I & II Groundwater *Excerpts from the Groundwater Protection Rule and Strategy*

12-304 Class I Goals:

- (1) To identify and classify Class I groundwater.
- (2) To implement a coordinated protection program including the inventorying and assessment of potentially contaminating activities.
- (3) To prohibit all human activities that presents a risk to groundwater quality.

12-501 Management of Class I Groundwater

- (1) All Class I groundwater will be managed to assure compliance with the groundwater quality standards established in Appendix One of this Rule.
- (2) Coordination
For activities that are not regulated by the Secretary, the Secretary will cooperate with federal, state, and local authorities to limit activities that may pose a risk to the groundwater.
- (3) Permit Oversight
The Secretary will monitor proposed new construction and development within Class I groundwater areas by reviewing Act 250 and other appropriate permit applications to determine the level of risk to the groundwater.
- (4) Management, Abatement, and Restoration
 - (a) The Secretary will cooperate in and encourage the management of land use activities within Class I areas to ensure no exposure to risk. When monitoring of water quality or other information demonstrates that deterioration has occurred, or that risk is imminent or increasing, the Secretary will cooperate in appropriate investigations to determine the probable cause or causes and act, as appropriate under his or her authority, to abate the deterioration and restore the groundwater to its previous uniformly excellent quality.
 - (b) When the Secretary finds that a regulated activity causes or allows deterioration of the groundwater quality or poses unacceptable risk, the Secretary will take appropriate actions to reduce the risk up to and including cessation of discharges and remedial action. For activities not regulated by the Secretary, the Secretary will cooperate with the appropriate authority to reduce the risk.
- (5) Report to the Legislature
Annually, the Secretary shall report to the General Assembly on the status of Class I groundwater. The report shall include data reflecting the quality of groundwater and land uses within existing Class I areas and shall propose, as necessary, new Class I areas for approval by the General Assembly.

12-305 Class II Goals:

- (1) To identify and classify Class II groundwater.
- (2) To maintain minimum risk for Class II groundwater.
- (3) To manage Class II groundwater by issuing permits for activities regulated under existing authorities, monitoring groundwater quality and human activities, and taking appropriate actions as authorized by law to reduce or stabilize the risk when required.

12-502 Management of Class II Groundwater

- (1) Prior to issuing any permits or approving any regulated activity in a Class II groundwater area:
 - (a) the applicant shall provide evidence, and the Secretary will make a finding that the activity:
 - (i) will not cause the groundwater quality to reach or exceed the primary enforcement standards at a compliance point;
 - (ii) will not cause the groundwater quality to reach or exceed the secondary enforcement standards or 110% of the secondary background groundwater quality established under 12-704, whichever is greater, at a compliance point; and
 - (iii) is not an Unacceptable Activity in Class II Groundwater (see 12-201(29)); or
 - (b) the activity is an Acceptable Activity in a Class II area (see Section 2 of Appendix Two).
- (2) The Secretary will not issue permits for activities in a Class II area that are an Unacceptable Activity in a Class II area (see Section 2 of Appendix Two).
- (3) Coordination
For activities which are not regulated by the Secretary, the Secretary will cooperate with federal, state, and local authorities to limit activities that may cause the groundwater quality to reach or exceed the groundwater standards at any compliance points.
- (4) Permit Oversight
 - (a) The Secretary will monitor proposed new construction and development within Class II groundwater areas by reviewing Act 250 and other appropriate permit applications to determine the level of risk to the groundwater.
 - (b) The Secretary may require groundwater quality monitoring for any permitted or regulated activity in a Class II groundwater area.
- (5) Corrective and Restorative Actions
When the Secretary finds that a regulated activity poses an unacceptable risk, the Secretary will take or require appropriate actions to reduce the risk up to and including cessation of discharges and remedial action. For activities not regulated by the Secretary, the Secretary will cooperate with the appropriate authority to reduce the risk

Attachment B

Excerpt from the Groundwater Protection Rule and Strategy

APPENDIX TWO

Acceptable and Unacceptable Activities

The following activities are those which the Secretary has determined are acceptable or unacceptable activities in specific groundwater classes. The Secretary may identify specific activities which are acceptable activities in a reclassification decision.

(1) Class I Groundwater Areas

All human activities in Class I groundwater areas are unacceptable activities except:

- (a) Any activities approved or permitted by the Secretary which are necessary to operate and maintain a public water supply system;
- (b) When consistent with Accepted Agricultural Practices (AAP), the low density pasturing of livestock, at a density not to exceed that approved by the Vermont Agency of Agriculture, the liming, mowing or clipping of pastures and maple sap collection;
- (c) When consistent with Acceptable Management Practices (AMP), the harvesting of trees by the selection method for lumber, fiber, or fuel, and Christmas tree production from wild uncultivated stands; and
- (d) Other activities identified by the Secretary in the classification decision.

(2) Class II Groundwater Areas

a) Unacceptable Activities

- (i) the construction of new or expanded use of unpermitted injection wells; unsewered floor drains; construction and demolition debris disposal facilities; municipal solid waste disposal facilities; hazardous waste disposal facilities;
- (ii) new improperly constructed or protected wells;
- (iii) the installation of new underground storage tanks not meeting the Agency's underground storage tank criteria pursuant to Chapter 8 of the Environmental Protection Rules;
- (iv) any activity which results in discharges to the groundwater of any hazardous or radioactive waste.
- (v) new subsurface groundwater discharges of sewage from individual residences which do not meet the Secretary's sewage disposal rule criteria;
- (vi) new stockpiles of highway deicing salt or salted sand piles;
- (vii) new pit privies;
- (viii) new junkyards; and
- (ix) new commercial storage or mixing facilities for fertilizers, pesticides or other hazardous materials.

(b) Acceptable Activities

- (i) Accepted Agricultural Practices insofar as they give due consideration to protecting groundwater quality, unless the Secretary, with the consent of the Commissioner of Agriculture, Food and Markets, finds that a specific practice has exceeded or threatens to exceed the groundwater quality enforcement standards in Appendix One;
- (ii) Acceptable Management Practices (AMP) for forestry insofar as they give due consideration to protecting groundwater quality, unless the Secretary, in consultation with the Commissioner of Forests, Parks and Recreation, finds that a specific practice has exceeded or threatens to exceed the groundwater quality enforcement standards in Appendix One;
- (iii) Activities which are permissible in Class I groundwater areas as provided in Section 1 of Appendix Two; and
- (iv) Treatment/disposal systems for sanitary wastewater that are 1000 gallons per day or less, when design, location, and construction standards meet the Secretary's sewage disposal rules.
- (v) Replacement treatment/disposal systems for sanitary wastewater when permitted by the Secretary when design, location and construction standards meet the Secretary's sewage disposal rules.

Attachment C
SUMMARY OF REQUIRED PETITION INFORMATION

Administrative and Regulatory Information

Required Information	Permitted Public Water Supply Source (No Change in Current Use)	Permitted Public Water Supply Source (Request for Increased Withdrawal Amt or Depth)	Proposed New Public Water Supply Source	Groundwater with High Probability for Future Use as a Public Water Supply
A signed petition requesting reclassification	X	X	X	X
Names and addresses of all adjoining landowners to the parcel(s) proposed for reclassification	X	X	X	X
Map of approved <i>Source Protection Area(s)</i>	X	X		
Copy of Source Permit application		X	X	
Map showing land under control of municipal government where source will be developed			X	X
Copy of duly adopted plan, by-law, or ordinance providing local protection for the designated Class II area				X
Estimated Date for Source Construction				X

Water Supply Source and Groundwater Data

Required Information	Permitted Public Water Supply Source (No Change in Current Use)	Permitted Public Water Supply Source (Request for Increased Withdrawal Amt or Depth)	Proposed New Public Water Supply Source	Groundwater with High Probability for Future Use as a Public Water Supply
All Source Types				
Maximum Projected Demand		X	X	X
Source Safe Yield	X	X	X	X
Permitted Yield	X			
Estimated Permissible Yield		X	X	X
Source Protection Area Delineation	X	X	X	
GW Quality Test Results	X	X	X	X
GWUDI Status	X	X	X	

Water Supply Source and Groundwater Data (continued)

Required Information	Permitted Public Water Supply Source (No Change in Current Use)	Permitted Public Water Supply Source (Request for Increased Withdrawal Amt or Depth)	Proposed New Public Water Supply Source	Groundwater with High Probability for Future Use as a Public Water Supply
Pumped Sources Only				
Source Hydraulic Testing Results	X	X	X	X
Gravity Sources Only				
Flow monitoring data	If available	X	X	X
Minimum downstream flow maintenance requirements	X	X	X	X

Maps and Cross Sections

Required Information	Permitted Public Water Supply Source (No Change in Current Use)	Permitted Public Water Supply Source (Request for Increased Withdrawal Amt or Depth)	Proposed New Public Water Supply Source	Groundwater with High Probability for Future Use as a Public Water Supply
Site Location				
USGS topographic map showing regional location of proposed reclassification area.	X	X	X	X
Framework Geology				
Maps of surficial and bedrock geology showing major contacts between geological units, major fracture patterns, bedding orientation, faults, lineaments and landforms.	X	X	X	X
Locations of all wells, outcrops, and other data points used to understand framework geology	X	X	X	X
Cross sections showing surficial and bedrock geology, including two that transect the proposed reclassification area.	X	X	X	X

Maps and Cross Sections (continued)

Required Information	Permitted Public Water Supply Source (No Change in Current Use)	Permitted Public Water Supply Source (Request for Increased Withdrawal Amt or Depth)	Proposed New Public Water Supply Source	Groundwater with High Probability for Future Use as a Public Water Supply
General Groundwater Flow System				
Location of existing public water supply sources(s), proposed public water supply sources, or approximate site of future public water supply well	X	X	X	X
Locations of industrial, commercial and agricultural wells pumping >50,000 gpd	X	X	X	X
Map of streams, surface water bodies, and wetlands, and notations as to whether these are recharge or discharge locations for groundwater, and whether any represent hydraulic boundaries.	X	X	X	X
Contour map of water table or piezometric surface within monitoring radius of current or proposed withdrawal under current use conditions	X	X	X	X
Cross section(s) of estimated groundwater flow paths along geological transects	X	X	X	X
Areas of Influence, Contribution, and Recharge for Pumped Sources				
Locations of observation wells, private water supply sources, and monitoring wells within monitoring radius	X	X	X	X
Contour map of water table or piezometric surface in monitoring radius under proposed withdrawal conditions	X	X	X	X
Outline of estimated <i>Area of Influence</i> for permitted or proposed public water source	X	X	X	X
Outline of estimated <i>Area of Contribution</i> under permitted or proposed withdrawal conditions	X	X	X	X
Outline of estimated <i>Primary Recharge Area</i> and <i>Secondary Recharge Area</i> under permitted or proposed withdrawal conditions	X	X	X	X

Maps and Cross Sections (continued)

Required Information	Permitted Public Water Supply Source (No Change in Current Use)	Permitted Public Water Supply Source (Request for Increased Withdrawal Amt or Depth)	Proposed New Public Water Supply Source	Groundwater with High Probability for Future Use as a Public Water Supply
Proposed Reclassification Area Boundaries				
Outline of proposed <i>reclassification area</i> on base map showing topography, surface water bodies, streams, and wetlands	X	X	X	X
Outline of proposed <i>reclassification area</i> showing roads, buildings, property lines and parcel owners.	X	X	X	X
Outline of <i>Two-year Time of Travel Zone</i> for permitted or proposed public water source showing location of all septic systems within this zone.	X	X	X	X
Soil Types, Land Use, Regulatory Controls, and Potential Sources of Contamination within the Proposed Reclassification Area				
Soils map of the proposed reclassification Area	X	X	X	X
Map of potential sources of contamination within and around the proposed reclassification area	X	X	X	X
Inventory of “Unacceptable Activities” within the proposed reclassification area	X	X	X	X
Map of current zoning within and around the proposed reclassification area	X	X	X	X