

# **Horse Hill Nature Preserve**

## **Master Plan**



**August 27, 2003**

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**Prepared by the  
Horse Hill Nature Preserve Master Plan Committee**

*The Horse Hill Nature Preserve  
Master Plan Committee would like to thank  
Jay Minkarah  
and the entire Community Development staff, including  
Scott McPhie, Evelyn Gillis, and Carol Miner  
for their extensive support and assistance.*

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Dick Hinch, Nancy Gagnon, and Fran L'Heureux  
for their support as Selectmen's representatives to the Committee.*

This document is submitted for the town's consideration and implementation by the Horse Hill Nature Preserve Master Plan Committee. The following signatures signify that this plan is an accurate representation of the committee's research, discussions, and decisions.

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## Section 1 Executive Summary

*This section provides a brief synopsis of the information in this document.*

### 1.1 Purpose

This document is the master plan for the management and use of the Horse Hill Nature Preserve. It contains a history of the property, a description of its physical and cultural attributes, and recommendations for its future management and use.

The information in this document is intended to assist the Town in making planning choices that are appropriate for this unique and valuable asset.

### 1.2 Description of the Property

The 563± acres of the Horse Hill Nature Preserve consist of gently rolling to fairly steep terrain and two hills of approximately 400' elevation. The land was cleared for pasture in previous centuries, has been logged several times, and now consists primarily of a mixed hardwood forest with trees between 20 and 60 years of age. The property includes a series of streams, ponds, swamps, and numerous wetlands totaling approximately 60 acres. A power line easement traverses the property, creating a shrubland undergrowth area. A small sandpit was created by previous owners, but sand has not been removed for several years.

Logging roads formed the basis of what is today a trail network used by hikers, bikers, hunters, and motorized recreational vehicles. This trail network does not cover the majority of the property, however, leaving large areas without defined access.

The varied terrain, habitat, and large areas of undisturbed open space have encouraged a wide variety of wildlife to thrive on the property.

Due to its size, quantity of wetlands, and impact on wildlife and water resources, this property was listed as the top priority for conservation in the 2002 Town of Merrimack Master Plan (see *Introduction* on page 3-1).

### 1.3 Creation of the Master Plan

To ensure that the Town of Merrimack enjoys the maximum benefit from its investment in this property, the Board of Selectmen (BOS) determined that a master plan should be created for the property. They appointed the Horse Hill Nature Preserve (HHNP) Master Plan Committee to create the plan.

The committee members solicited information from a wide variety of experts. They evaluated the land from both a physical and cultural perspective and they considered the Town's needs and interests. They then developed a list of nine goals for the property (see *Goals and Objectives* on page 8-1) and evaluated current and potential uses for the land.

## 1.4 Summary of Recommendations

As a result of its evaluation, the committee makes the following recommendations. (Recommendations are listed alphabetically and do not imply a priority order.) Refer to *Recommended Uses* on page 8-2 for a detailed description of each recommendation.

- **Archery target shooting** - Archery shoots organized under the direction of the Watanic Bowmen club should be permitted on the property.
- **Athletic complex** - An athletic complex(es) not to exceed a total of 50 acres, including infrastructure, could be established on the property.
- **Conservation of Open Space** - To promote biodiversity and to ensure a quiet place for future generations to experience the natural world, a minimum of 500 acres should be maintained as open space.
- **Cross country skiing and snowshoeing** - The trail network should be open for these activities during the winter months.
- **Hiking** - Trails should be developed without negatively impacting the wildlife population, providing for a variety of hiking experiences.
- **Horseback riding** - Trails should be designed to provide a rewarding riding experience.
- **Hunting** - With a lack of natural predators, wildlife populations (particularly deer) may exceed numbers that can be healthfully maintained on the property. Hunters as part of an overall wildlife management program may be part of a balancing force.
- **Mountain biking** - Trails should be designed for varying levels of challenge.
- **Outdoor education programs** - The varied terrain, extensive wetlands, variety of wildlife, and connection with historical figures make this a good location for outdoor learning experiences.
- **Snowmobiling** - Snowmobile trails should be designed and monitored under the direction of the SnoBuds Snowmobile club.

The following activities are not recommended at this time. Refer to *Uses Not Recommended at this Time* on page 8-7 for a detailed discussion.

- **All-Terrain Vehicles** - Establishing an all-terrain vehicle (ATV) trail system should not be permitted unless a local club accepts responsibility to help design, monitor, and maintain the trails.
- **Camping** - There are several town-owned properties in the area that permit wilderness camping. Creating a camping area and appropriate sanitary facilities does not seem warranted by community interest at this time.
- **Firearm target shooting** - Continual shooting of firearms with minimal regulation creates a potential safety hazard and inhibits enjoyment of the property by other users.
- **Off-road vehicles** - Off-road vehicles have proven to be destructive to the trails and wetlands, and are incompatible with other open space goals.



## 1.5 Management

Implementation of a master plan for a property of this size will require a concentrated effort by a number of people with diverse skill sets. To ensure that appropriate resources are available for its management, the committee recommends that the Board of Selectmen (BOS) assign management responsibility for the HHNP to the Merrimack Conservation Commission (MCC).

The MCC should be charged to manage the parcel under the HHNP Master Plan guidelines as approved by the BOS. The BOS should authorize the MCC to form an HHNP subcommittee to assist in carrying out the management tasks of the HHNP under the direction of the MCC. One member of this subcommittee should be a representative nominated by the Parks & Recreation Department/Committee to ensure that a variety of perspectives are considered.

Refer to *Future Management* on page 9-1 for a detailed description of the committee's management recommendation.



## Section 2 Definitions

*This section contains definitions of abbreviations and phrases used in this document.*

**ADA** - Americans with Disabilities Act

**Athletic complex** - A developed area consisting of one or more athletic fields and support facilities.

**ATV** - All Terrain Vehicle. For the purposes of this document, an ATV is defined as a wheeled, motorized recreational vehicle, 50 inches or less in width, weighing less than 1000 pounds. This definition is meant to include, but is not limited to, 2-, 3- and 4-wheeled vehicles, including dirt bikes.

**Best Management Practices** - A set of recommendations developed by the State of New Hampshire for the most effective, practical means of preventing or reducing the likelihood of potential problems from a variety of land management practices.

**Biodiversity** - The diversity of living things at multiple scales, including genetic diversity within a population, species diversity, and the diversity of habitats across a landscape, interconnecting to create complex ecosystems.

**BOS** - Board of Selectmen

**DES** - New Hampshire Department of Environmental Services

**DPW** - Town of Merrimack Department of Public Works

**Ecosystem** - A biotic community, meaning all of the populations living in a designated area, functioning together with the nonliving environment.

**EPA** - United States Environmental Protection Agency

**Food web** - Relations in a community regarding feeding in which an organism obtains nutrients from another organism and in turn provides nutrients to yet another

**Granite** - A very hard natural igneous rock formation of visibly crystalline texture.

**Greens Pond** - The name by which the Horse Hill Nature Preserve was originally known. It is also the name of a road and a body of water located near the property.

**Habitat** - An identifiable region in which a particular kind of organism lives.

**HHNP** - Horse Hill Nature Preserve

**Igneous rock** - A rock formed by the crystallization of molten magma.

**Managing body** - The body authorized by the Merrimack Board of Selectmen to implement the Master Plan for the Horse Hill Nature Preserve.

**MCC** - Merrimack Conservation Commission

**Metamorphic rock** - A rock formed by the alteration of pre-existing rock deep within the earth (but still in the solid state) by heat, pressure, and/or chemically active fluids.

**MVD** - Merrimack Village District, the water utility regulating body in Merrimack

**MYA** - Merrimack Youth Association.

**Off-road vehicle** - A wheeled motorized vehicle more than 50 inches in width and weighing more than 1000 pounds. This definition includes, but is not limited to, four-wheel drive trucks, dune buggies, Jeeps, and other vehicles.

**Open space** - Land that is maintained in an undeveloped state, and may include trails and sustainable forestry and habitat management activities.

**Schist** - The foliated texture of mica crystals which gives the metamorphic rock a scaly or layered appearance. Schists are named according to their mineral constituents.

**Sill** - A tabular igneous body that has intruded parallel to the layering of pre-existing rock.

**Stratified drift aquifer** - A geologic formation with layered or sorted sediments of sand and gravel which fill a depression in the bedrock scoured by glaciers, capable of holding significant volumes of water.

**Surface till** - A mixture of glacial sediments composed of boulders, gravel, sand, silt, and clay.

**Swale** - A depression in wet, marshy ground.

**The committee** - The Horse Hill Nature Preserve Master Plan committee.

**Uplands** - Areas of land at a higher elevation than the abutting area.

**Vernal pool** - A seasonal pool, usually occurring as a result of spring rains or snow melts, which provides crucial habitat to some species of wildlife, such as amphibians and reptiles.

**Wetlands** - Lands where water saturation is the dominant factor determining the nature of soil development and the types of plant and animal communities.

## Section 3 Background

*This section describes the history of the Town's acquisition of the Horse Hill Nature Preserve and the creation of the Horse Hill Nature Preserve Master Plan Committee.*

### 3.1 Introduction

The Horse Hill Nature Preserve (HHNP) is a 563± acre parcel of land acquired by the Town of Merrimack in the year 2002. It is located in the south central portion of the Town, as shown on the location map in *Appendix A*. It is located in the R-1 residential zoning district.

The 2002 Town of Merrimack Master Plan identified this parcel as the Town's top priority for conservation. In *Chapter IV Natural Resources* of the Town's Master Plan, under the *Land Acquisition* heading, it states:

*The Master Plan Advisory Committee has placed a priority on land acquisition to provide for open space preservation, retention of rural character, access to and protection of surface waters (especially the Merrimack and Souhegan Rivers), preservation of wildlife habitats, protection of groundwater resources and recreation. ... For these reasons, a land acquisition strategy should be pursued that places the highest priority on the acquisition of lands that can, when managed for conservation purposes, accomplish the widest range of objectives. A recommended series of priority areas for acquisition are identified below:*

- *Undeveloped parcels within the large forest block generally located south of Amherst Road, west of Naticook Road and north of Peaslee Road. This area contains one of the largest remaining forest blocks in Merrimack. The area is partially located within the sensitive Naticook Basin and Wellhead Protection areas for MVD wells 1, 2 & 3. Town owned land abuts privately held undeveloped portions of the area. In addition, the area contains important wetlands including part of White Pine Swamp, scenic areas and remaining portions of the historic "Old Kings Highway". Extensive areas of undeveloped land and the prominence of Blodgett Hill help define the rural character of this portion of Merrimack. Further, the proximity of the forested land in this area to several existing residential neighborhoods enhances its recreational value. This area includes the top priority land acquisition parcels identified by the MCC during the 2000 REPP process....*

### 3.2 Acquisition of the Property

Before being purchased by the Town of Merrimack, this property was owned by the NasTam Development Corporation and in recent years was generally known as the Greens Pond parcel. Developers presented various plans for this parcel over the years. A

32-home subdivision was approved, but was not built, on the northeast portion of the land. A conceptual development plan for over 400 homes was presented during the late 1990's. In 2001, a plan for a 110 home development was proposed.

In the fall of 2001 a group of citizens called the Friends of Merrimack Open Space was formed. They believed it was a mistake to allow the Greens Pond parcel to be removed from the Town's open space. They worked with the Merrimack Conservation Commission, the Merrimack Community Development Department, and the Society for the Protection of New Hampshire Forests to secure the following:

- A pledge of \$150,000 from the Merrimack Conservation Commission toward the purchase of the land.
- \$250,000 in mitigation funds from the Environmental Protection Agency (EPA).
- A \$450,000 grant from the Department of Environmental Services (DES) in recognition of the property's importance to the region's water resources.
- A \$175,000 grant from the Land and Community Heritage Investment Program (LCHIP) in recognition of the property's importance to the open space available in the southern New Hampshire region.

The property was appraised at a market value of \$5,275,000 but the owners agreed to offer it to the Town for \$4,200,000. The remaining \$1,075,000 was considered to be a contribution by the owners toward the acquisition.

The Friends of Merrimack Open Space approached the Board of Selectmen (BOS) and asked for their support of a warrant article providing the voters the opportunity to purchase the property. The BOS agreed, and the following article appeared on the 2002 Town ballot:

*Article 10. Passage of this article shall override the 10 percent limitation imposed on this appropriation due to the non-recommendation of the Budget Committee. To see if the Town will vote to raise and appropriate the sum of \$4,225,000 for the purchase of approximately 563 acres of land to be used for conservation, open space, recreational facilities and other allowable municipal purposes, said land being located westerly of Naticook Road, southerly of Amherst Road, and northerly of Peaslee Road, including the unbuilt subdivision known as Woodside Estates; to finance said sum by the issuance of bonds or serial notes in accordance with the provisions of the Municipal Finance Act (RSA 33) and in an amount not to exceed \$4,075,000, by the withdrawal of \$150,000 from the Land Use Change Tax Conservation Fund, and by any federal, state, or private grants that may be made available in conjunction with said purpose; to authorize the Board of Selectmen to issue, negotiate, sell, and deliver said bonds and notes and to determine the rate of interest, the maturity, and other terms pertaining thereto; to authorize the Board of Selectmen to apply for and accept said grants of federal, state, and private aid; to authorize the Board of Selectmen to take any other action or to pass any other vote relative to said purpose and financing, including*

*subdividing the land and imposing separate and distinct conservation limitations on portions of the land if so required by any financing agency; and to raise and appropriate the sum of \$96,188 for the purpose of 2002-03 interest on said bonds or serial notes. (60% ballot vote required) (Recommended by the Board of Selectmen 4-0-0) (Not Recommended by the Budget Committee 9-0-1)*

On April 9<sup>th</sup>, 2002, 67% of the voters favored the purchase. After a public hearing the Board of Selectmen decided to accept the EPA mitigation funds but decided that it was not in the Town's best interest to accept the LCHIP and DES grants. A 15-year bond in the amount of \$4,075,000 was secured and the citizens of the Town of Merrimack became the owners of the Greens Pond parcel.

### 3.3 The HHNP Master Plan Committee

In June of 2002 the BOS formed the Greens Pond Master Plan Committee, later renamed the Horse Hill Nature Preserve Master Plan Committee. The following is the text of the charge given to this committee by the Merrimack Board of Selectmen:

*The Board of Selectmen established the Greenspond Master Plan Committee on June 27, 2002. This committee shall consist of not more than thirty (30) members and (2) two Selectmen representatives.*

*The charge of this committee shall be to research and develop plans and policies for this 563 acre site which will promote conservation, open space, recreational and other allowable municipal purposes as approved by the voters of this town at the Town Meeting held on April 9, 2002 (Warrant Article #10).*

*The plans shall include past history, current uses and proposals for the future that will encourage controlled development to its fullest potential as a benefit to the community now and in the future.*

The volunteers who stepped forward to accept this charge represented a broad spectrum of individuals with extensive experience in government, conservation, land management, and education. Among the thirty members of the master plan committee were the Chairman of the Conservation Commission, the Chairman of the Parks and Recreation Committee, the Chairman of the Planning Board, a state representative, a member of the Zoning Board of Adjustment, a Vice President of the Merrimack Youth Association, a Library Trustee, a Selectman's representative, a member of the Heritage Commission, an engineer with the Department of Environmental Services, an engineer with the Environmental Protection Agency, a civil engineer, two teachers with masters degrees in environmental education, abutters, and long-term residents.

The committee began its research in September 2002. Over the following twelve months, they met twice per month and invited guest speakers to educate the committee on a variety of topics. These guests included:

- Society for the Protection of New Hampshire Forests
- New Hampshire Fish and Game Department
- Bureau of Trails
- Beaver Brook Association
- Audubon Society
- UNH Cooperative Service Wildlife Diversity specialist
- Merrimack Village District
- Merrimack Police Department
- Granite State ATV Association
- Merrimack SnoBuds
- Merrimack Youth Association

The speakers engaged the committee in in-depth discussions of their respective areas of expertise and provided informative background materials.

The committee also received information from the Merrimack Community Development Department, the Merrimack Conservation Commission, the Merrimack Heritage Commission, the Up North Orienteers, the New England Mountain Biking Association, and the Merrimack School District.

The committee appointed a public input coordinator and actively solicited public comments, set up a link on the Town's web page ([www.ci.merrimack.nh.us](http://www.ci.merrimack.nh.us)) to allow the public to easily access committee documents, and conducted walks of the property.

The committee established a research task list and assigned subcommittees to accomplish each task (see *Appendix H*). They held a visioning session and created goals for the property (see *Goals and Objectives* on page 8-1). Finally, they assessed potential uses for the land, established a set of recommended uses, and made recommendations for future management of the property. This master plan is the result of their efforts.



## Section 4 Historical Significance of the Property

*This section describes the prehistory and known history of the Horse Hill Nature Preserve. Much of the information in this section was compiled by the Merrimack Historical Commission and by Merrimack Community Resources Planner Scott McPhie.*

### 4.1 Prehistory

Based on evidence uncovered during archeological digs on the Wasserman Park property and other nearby sites, we know that native Americans inhabited this area for as much as 5000 years. It is reasonable to presume that native Americans hunted here, although direct archeological evidence of habitation has yet to be reported.

State Archeologist Wes Stinson indicated that the alluvial sand deposits on the property make it a potential site for Paleo-Indian occupation or hunting activity. Its rich wetlands and proximity to Naticook Lake and the Merrimack River make it a likely location for Woodland and Contact period hunting activity.

### 4.2 Cultural Heritage

The Merrimack Heritage Commission prepared a preliminary report on the history of the families that settled the land now known as the Horse Hill Nature Preserve. Their research indicates that at least two prominent families were associated with the property: the Spauldings and the Blodgetts. Additional research will undoubtedly uncover additional information about the role this property and its inhabitants played in our community's heritage.

#### 4.2.1 The Spauldings

The Spaulding families were some of the original settlers of this property.

According to CHAPTER X of “MERRYMAC---The History of Merrimack, New Hampshire” published by the Merrimack Historical Society, over 100 members of the Spaulding family were born and/or died in Merrimack in its early years.

**Samuel Spaulding**—Born January 31, 1726 in Chelmsford, Mass; died on September 11, 1797; buried in the Turkey Hill Cemetery. Served Merrimack as Field Driver, Hog Reeve, Constable, Surveyor of Highways, Fence Viewer, Selectman.

Samuel Spaulding's father was one of the first “Subscribers” who requested by petition a tract of land for settlement in the “Province”. He was granted 80 acres. Samuel then purchased this land in January 1751 with “all the fencing and buildings on said premises.” He added several hundred acres and eventually built four houses for his sons. Today, the remains of one of the foundations can be seen on the HHNP along with evidence of an herb garden. (See *Appendix F.*)

Samuel Spaulding was described as “a large man with a strong voice.” He was an important contributor to the establishment of the Town of Merrimack. He, along with Samuel Coldwell, was chosen in 1751 to build the first meeting house. He was one of the first 13 members who formed the Congregational Church in 1771. He bought the first pews #14 and #15 on the lower floor of the meeting house. When in 1754 the Town was divided into four school districts, one of the schools was built on his property and named the Spaulding School House. His son, Samuel Jr., was in the Revolutionary War. Naticook Lake was once called Spaulding Pond.

The Hillsborough County map of 1858 indicates the presence of two Spaulding houses just north of Old Kings Highway. Many other Spaulding built houses still stand today, including one of the best preserved 1753 Georgian homes in the region, located near the intersection of Peaslee Road and Old Kings Highway. The Old Kings Highway was the most prominent road in town at the time and many of the Spauldings lived along its route.

The Spauldings would continue to grow in prominence into the 19<sup>th</sup> century, founding the first banks and insurance companies in Hillsborough County. The family would become wealthy grain merchants in Nashua and Isaac Spaulding, an early founder of the steel industry in America, would become New Hampshire's richest man of his time.

#### **4.2.2 The Blodgetts**

One of the prominent features of this property is Blodgett Hill, although it is not clear when and if the Blodgetts owned this land or why the hill was named for them.

The Blodgett families were original founders of Dunstable (which included present day Merrimack) and early victims of French led raids by Native American Indians. The Blodgetts and Blanchards were neighbors before 1700 and first lived in South Nashua and Dunstable, Massachusetts respectively. Members of both families were murdered, forcing these early settlers to move to southern Dunstable near the older and more populated settlements of Groton and Chelmsford, Massachusetts.

The Blodgett name in Merrimack is mentioned only once in the Town History as an administrator of the Fields estate on Naticook Road in 1824. The area is close to Blodgett Hill and it may have been named around that time. It is also possible that Colonel Joseph Blanchard, real estate agent and surveyor for the King, may have named the hill in honor of his murdered relatives.

The Blodgett's connection to prominent events and people in the surrounding area would also have been sufficient enough reason to name a prominent hill in Merrimack after this pioneering family.

#### **4.2.3 Old Kings Highway**

Before the American Revolution it was important for the Royal Governor and his staff to have easy and safe access to inland frontier settlements. Just as the United States Federal

Highway System was built to accommodate trade, military activities and future suburbs, so too were these stonewall-lined early highways essential for their time.

The most famous Old Kings Highway that many may be familiar with is US Route 1. Route 1 provided a connection from Portsmouth, New Hampshire to Boston and beyond making it possible to enforce laws, collect taxes, and conduct commerce.

Dunstable (which included present day Merrimack) was incorporated in 1673 and reference is made in 1680 of a Mr. Cummings, Mr. Temple and another early Dunstable pioneer to construct the Kings Highway. It appears to be logical that Mr. Cummings and Mr. Temple would be involved in this early enterprise, as both were owners of ferries crossing the Merrimack River. The best-preserved portion of this Provincial road passes through the Horse Hill Nature Preserve.

### **4.3 The History of Horse Hill**

The property now known as the Horse Hill Nature Preserve was used as pasture land as much as 200 years ago. In those days, roads that crossed pastures were subject to "gates and bars." According to local lore, one night a neighboring farmer crossed the pasture and did not secure the gate when he left. Horses were being pastured on the land at that time, and that night something caused the horses to panic. Due to the open gate, one or more of the horses were injured and had to be destroyed. The owner of the horse sued the farmer who left the gate open for the resulting damage. The case went to court and the court found that the negligent person was guilty and had to pay for the damages he caused. This judgment was an early landmark in Jurisprudence for this type of negligence in our newly independent state.

The episode was of enough significance to the local population that the hill near where the incident occurred became known as Horse Hill. Although the exact date of the incident has not yet been established, it predates 1816, at which time various deeds referred to it by that name and referred to a tract of land as the Horse Hill Pasture.

Due to its historical significance and the fact that Horse Hill is the approximate geographic center of the property, the committee recommended that the parcel be named the Horse Hill Nature Preserve. The BOS officially named the property on May 8, 2003.



## Section 5 Attributes of the Property

*This section describes the physical, biological, and other attributes of the Horse Hill Nature Preserve.*

### 5.1 Physical Attributes

This section describes the topography, wetlands, ground water, geology, and soil types found on the HHNP.

#### 5.1.1 Topography

The 563± acres of the HHNP consist predominantly of gently rolling to fairly steep terrain. The land varies in elevation from 225' to 423' and includes two significant hills (Horse Hill and Blodgett Hill). As illustrated in the topographic map in *Figure 1* on page 5-2, slopes generally vary from 8% to 25%, with very little flat land available on the property.

#### 5.1.2 Wetlands

The Horse Hill Nature Preserve includes several beaver ponds, streams, swamps, and areas of wetland soils. The map in *Figure 1* shows the wetlands on the Horse Hill Nature Preserve as defined by the Town of Merrimack Zoning Ordinance and as delineated in the field by a New Hampshire certified wetland soil scientist.

Local and state restrictions applying to these wetlands are outlined in *Wetland Restrictions* on page 7-3.

In May 1999 Jonathan Nute, UNH Cooperative Extension Forester for Hillsborough County, walked the property and wrote a report making forest management recommendations at the request of a prospective developer (see *Appendix G*). He described the property as having 60 acres of wetland, consisting of “Four large (6 acres to 17 acres) open water wetlands, with eight smaller wetlands/vernal pools” including “16 acres of the northern portion of the 60 acre White Pine Swamp.” He further illustrates the wetlands as:

*The extensive (60 acres) and varied (at least 12 locations) wetlands on the property are home to the full range of mammals, birds, reptiles, amphibians and insects expected to be found in this environment in southern NH. The larger wetlands have increased in size in the last 20 years because of damming by beavers, which are still present. The dead white pines used for nesting by great blue herons in the White Pine Swamp were killed by beavers raising the water level. As these trees deteriorate in the next 10 years, the herons will nest at other wetlands with recently killed trees. The southern half of the White Pine Swamp has been recognized for its wildlife value and belongs to the town.*

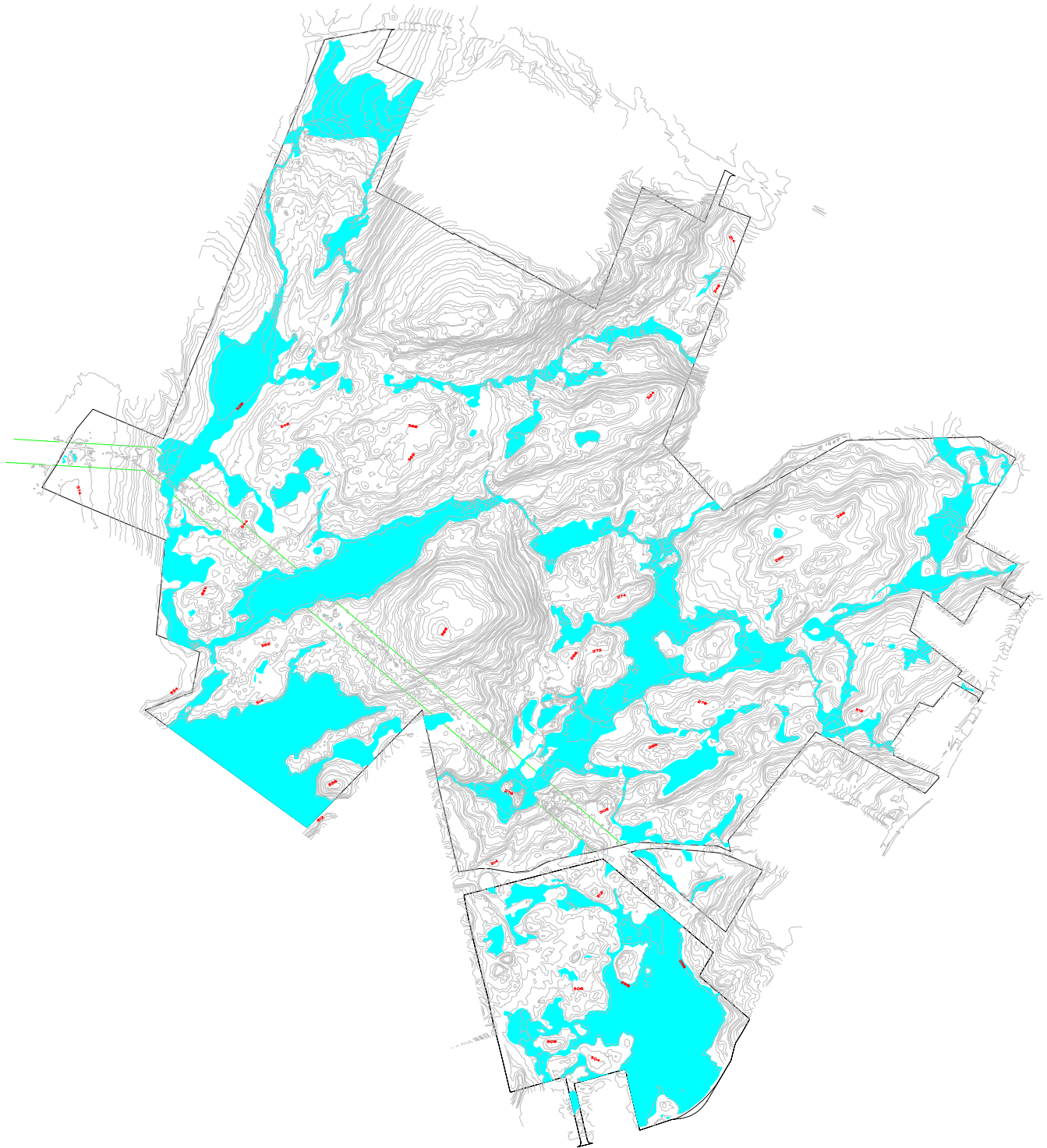


Figure 1 Topography (2' increments) and Wetlands (dark areas)

*Wet land buffers are protected by state law (RSA 227-J:9), suggesting that a natural woodland buffer shall be maintained within 150 feet of the wetland and that not more than 50% of the trees and shrubs can be removed from this area in a well distributed fashion. This buffer may also be appropriate for aesthetics or protecting water quality, but wider buffers may be appropriate to maintain different wildlife uses. For example, recent research of vernal pools in NE Massachusetts recommended 1,000 foot buffers. There was a 70% decline in spotted salamanders within one year when only a 125' buffer was provided during residential development, with a similar 90% decline in wood frogs in one year, leading to the population being extirpated within 4 years.*

Around 1990, the Merrimack Conservation Commission and volunteers worked to start the process of designating primary wetlands (RSA 482-A:15 Local Option; Prime Wetlands) which would provide further protection to those wetlands ranked high in environmental value to the Town. Three of the potential wetlands to be placed in the Primary Wetlands category were within the HHNP property. Specifically the wetlands ranked high in the following functions: ecological integrity, wildlife habitat, educational potential, visual/aesthetic quality, water based recreation, flood control potential, ground water use potential, sediment trapping, nutrient attenuation, shoreline anchoring and dissipation of erosive forces, noteworthiness, etc. Detailed information is available from the Merrimack Conservation Commission.

### **5.1.3 Ground Water**

On average, approximately 43 inches of rain (or the equivalent in snow) falls on the property each year. Some water evaporates, some runs off via streams and brooks, and the remainder soaks into the ground. This section describes the ground water situation on the Horse Hill Nature Preserve, and notes the effects of potential uses on ground water quality.

#### **5.1.3.1 Ground Water on the Horse Hill Nature Preserve**

Almost all of the Horse Hill Nature Preserve is located over bedrock, which is covered by a thin layer of surface till. (Surface till is a mixture of glacial sediments composed of boulders, gravel, sand, silt and clay.) Where the bedrock is substantially cracked or fractured, water seeps through the surface till, travels, and accumulates in the fractures creating a bedrock aquifer.

Water from a bedrock aquifer can be retrieved through the use of a deep drilled well. This type of aquifer is appropriate for individual family wells, but it is unsuitable for large-volume town wells such as those run by the Merrimack Village District because, depending on the size and nature of the fractures, water can take weeks to many months to percolate through a bedrock system.

Most of the runoff from the Horse Hill Nature Preserve flows north to the Souhegan River. This runoff does not directly affect the Merrimack Village District water supply, but it does have an effect on the quality of the Souhegan River water and the quality of life of people, animals and plants living in its flood plain.

Runoff from the southeast corner of the Horse Hill Nature Preserve flows southeast to Greens Pond and Naticook Brook. This part of the Horse Hill Nature Preserve, and the entire Naticook Brook area, are part of a Well Head Protection Area because they contribute to the recharge of the stratified drift aquifer known as the Naticook Aquifer. (A stratified drift aquifer is a geologic formation with layered or sorted sediments of sand and gravel which fill a depression in the bedrock scoured by glaciers, capable of holding significant volumes of water.) Since the MVD has three of its wells in the Naticook Aquifer, this flow does have a direct effect on the quality and volume of the water supply for the Merrimack Village District's water wells.

### **5.1.3.2 Effects of Land Use on Ground Water**

Almost every human action impacts the quality and quantity of the ground water. For example, a house with a roof and paved driveway reduces the absorption of water into the ground and increases the amount of runoff. One of the benefits of the Town's acquisition of the property is to significantly reduce the potential of development on the land.

Gasoline and oil from spills, fertilizers, pesticides, and other chemicals introduced by people can seep into the ground and ground water as contaminants, or they can be carried away with the runoff and join the local streams and rivers. If the streams and rivers help to recharge the stratified drift aquifers utilized by the MVD wells, then these contaminants could eventually find their way into the MVD wells. Contaminants that infiltrate the fractures in the bedrock could also affect the purity of the water in drilled wells which are near the property. Limiting activities and uses which may generate contamination will help to prevent this pollution.

### **5.1.3.3 Summary of Ground Water**

Ground water on the Horse Hill Nature Preserve has a distinct, but limited effect on the Merrimack Village District's water supply and an effect on the private wells adjacent to the property. Human activity on the property will affect the purity and volume of that ground water. Protecting the property from development and potential abuse will help to maintain the overall quality of the water situation on the property and in nearby areas. The ponds, wetlands, streams and ground water are a valuable resource within the Horse Hill Nature Preserve.

### **5.1.4 Geology**

The geology underlying the HHNP is described in the report in *Appendix C*. The report describes the structure of the bedrock found on the property.



To summarize, the HHNP is located within a geological transition zone that extends from northeastern Connecticut to southeastern Maine. The location of the HHNP within this transition zone accounts for its varied and dramatic topography. This transition zone consists of younger metamorphic rocks (formed 420 to 425 million years ago) at the eastern portion of the property, known as the Massabesic Gneiss Complex, and older igneous rocks (formed 620 million years ago) in the central and western part of the property, known as the Berwick Formation. The structure of the bedrock found in this transition zone is the result of an interlayering process between the metamorphic and igneous rocks, and is composed of calcareous granofels, biotite schists, and granite sills that are exposed at the surface and exist at depths of less than 25 feet. Refer to *Appendix C* for more detailed information.

### **5.1.5 Soil Survey**

When assessing potential uses for the Horse Hill Nature Preserve, it is important to understand the soils located on the property. The characteristics of the soil will impact the level of effort that would be required to prepare the site for various uses.

As shown on the map in *Appendix B*, there are 18 different soil types on the property. The most significant characteristics of these soil types pertain to their water handling capability, their slope, and their rockiness. Knowing these characteristics will improve the Town's ability to use the property appropriately and to anticipate site-specific difficulties.

A critical soil characteristic that influences site use is susceptibility to erosion. The Town should always be mindful of erosion issues when determining appropriate uses for this property, since loss of the surface layer exposes a generally inferior soil structure in the subsoil and substratum. When developing trails, for example, sensitivity to slope and drainage issues for each soil type will minimize erosion problems.

A thorough Soil Survey report was prepared by the committee and is available in the files of the Community Development Department. The report is based on information obtained from the United States Department of Agriculture, Soil Conservation Service. It describes the predominant soil types found on the HHNP and presents an evaluation of how these soil types impact various uses.

To summarize the report, slopes, stones, slow percolation, permeability, depth to water table, and depth to bedrock will affect the success of various activities on the HHNP. The wetlands and wetland soils also directly influence development. Trail construction, woodland management, and wildlife management should all be successful if applicable regulations and Best Management Practices are followed.

## **5.2 Biological Attributes**

The following sections describe the vegetation, wetland biology, biodiversity attributes, and wildlife found on the HHNP.

### **5.2.1 Vegetation**

The land was cleared for pasture in previous centuries, has been logged several times, and now consists primarily of a mixed hardwood forest with trees between 20 and 60 years of age. The northeast corner of the property was not included in the last logging and contains significantly older growth than the majority of the property.

A power line easement traverses the property, creating a shrubland undergrowth. A small sandpit was created by previous owners, but sand has not been removed for several years and the area is now slowly returning to a natural state.

### **5.2.2 Wetland Biology**

As noted in Section 5.1.2, the extensive and varied wetlands on the property are home to the full range of mammals, birds, reptiles, amphibians and insects expected to be found in this environment.

Wetlands provide a unique habitat for diverse but specific kinds of wildlife. Frequently these areas are associated with the reproductive portion of the life cycle of the organisms inhabiting the area. They are likely to be nesting sites and spawning sites. Most wetlands receive constant inputs of nutrients from the water that drains from the surrounding land. This land is highly productive and an excellent place for the rapid growth of aquatic species. (Source: *Enger, Eldon D., Kormelink, J. Richard, Smith, Bradley F., and Smith, Rodney J., Environmental Science: The Study of Interrelationships, 1989.*)

Vernal pools, several of which exist on the HHNP, are a unique type of wetland. The concentration of algae and other plant species found in vernal pools provide a rich supply of food sources for many organisms, including salamanders, frogs, toads, mosquitoes, fairy shrimp and microorganism. Some species, like fairy shrimp, are found primarily in temporary wetlands; however, other animals, such as migratory visitors, are transient residents, and relocate when the wetland disappears. In this way, vernal pools contribute to larger, permanent ecosystems, such as forests. (Source: *Project WET (Water Education for Teachers) Curriculum & Activity Guide, 1995.*)

### **5.2.3 Biodiversity**

With the explosive growth occurring in the southern part of New Hampshire, there is concern that species that require large blocks of unfragmented open space will not thrive. This is a concern not only to hunters and wildlife enthusiasts, but is also a threat to the integrity of the food web. Each species plays a different role in the food web, and when one species is removed it is difficult to know how that change might ultimately affect other species, including humans.

The variety of species in an area is referred to as biodiversity. There are two aspects to biodiversity - species diversity and genetic diversity.

Species diversity (supporting a wide variety of species) is important for the reasons listed above. Maintaining species diversity requires maintaining a variety of habitats and habitat continuity. For example, some species use vernal pools and small wetlands to breed, then travel upland to live most of their lives. Fragmented land often creates a "doughnut" around a wetland, but does not leave connecting corridors to upland.

Genetic diversity (supporting a large population within a species) is important to help each species withstand environmental changes. Minor genetic variations might allow some members of the species to survive changing conditions, thereby insuring the survival of the species. Maintaining genetic diversity requires maintaining a large enough habitat to support a sizable population of each species across the range in which they occur. Roads create habitat fragmentation, affecting the ability of species to breed. Fragmented forest blocks may support a few individuals of each species, but if they are unable to reproduce the habitat is not viable. According to Ellen Snyder, Biodiversity Specialist with the UNH Cooperative Extension Service, forest blocks of a minimum of 500 acres are required for many species to thrive.

The 2002 *Town of Merrimack Master Plan* recognized the importance of maintaining large forest blocks for biodiversity and other benefits. It states:

*According to the Forest Society's report "New Hampshire's Changing Landscape", forest blocks larger than 500 acres have a greater capacity of supporting a wider range of resource protection values such as economic forest management, wildlife habitat, outdoor recreation, and water supply protection than smaller forest tracts. It is for this reason that 500 acres is used as a threshold indicator of forest health and forest fragmentation. Several species, including squirrels, raccoons, skunks, crows, and blue jays, have been able to adapt to an environment consisting of relatively small "habitat islands". However, many species, including the pileated woodpecker, black bear, and numerous songbird species, require large areas of extensive forest or mixed habitat in order to maintain a stable population. Smaller forest tracts are also difficult to manage economically for sustainable timber harvesting and less desirable for hunting, hiking, camping and other forms of outdoor recreation.*

The southeastern and south central areas of the state have the greatest potential for species diversity because they include more wetlands, a large floodplain, and a warmer climate than other parts of the state. Loss of large blocks of unfragmented land in this area is, therefore, of great concern.

Some of the most significant aspects of the HHNP in terms of biodiversity are:

- It contains over 500 acres of unfragmented forest in the southeast section of the state.
- The scrubland under the power lines is a good habitat for diversity. Many birds and animals, such as rabbits and butterflies, like the scrubby mix, which includes fruit-bearing shrubs. Predators like to hunt along it.

- The alder swale provides an excellent habitat for many animals, such as the woodcock which, according to the NH Fish & Game department, is declining in the state.
- The wetlands, marshes, and open water embedded within the forested uplands provide incredible diversity.
- The diversity of tree species and maturity is important. Young forests provide food and habitat for many animals and birds, such as ruffed grouse and woodcock. Mature oaks and hickories provide acorns and nuts. Softwood clumps provide winter cover for deer, songbirds, and owls. A diverse tree population provides a good food crop throughout the year and, because trees have cycles of good and bad years, it ensures a food crop through bad years for any one species.
- Proximity to other protected lands provides connectivity, which is an additional benefit that increases the biologic value of each of the properties.

#### 5.2.4 Wildlife Survey

The following is a list of some of the wildlife known to live on or be transient visitors to the property. The list was compiled from observations made by committee members Harold Watson and Lynne Wenz, and by representatives of the Audubon Society, who conducted surveys on June 15, June 28, July 5, and July 13, 2003.

It is not expected that this list is comprehensive. As described in *Suggested Action Items* on page 9-2, the committee recommends that the managing body conduct thorough wildlife inventories in the coming years. Currently known species include:

<b>MAMMALS:</b>	White-tailed Deer	Brown Headed Cowbird
Bat	Woodchuck	Canada Geese
Beaver		Canvasback Duck
Coyote	<b>BIRDS:</b>	Cedar Waxwing
Eastern Chipmunk	American Crow	Chestnut-sided Warbler
Eastern Cottontail	American Gold Finch	Chipping Sparrow
Fisher	American Redstart	Cinnamon Teal Duck
Fox	American Robin	Common Merganser
Flying Squirrel	Bald Eagle	Common Yellowthroat
Gray Squirrel	Baltimore Oriole	Creeper
Meadow Vole	Barn Swallow	Downy Woodpecker
Mink	Barred Owl	Eastern Kingbird
Moose	Belted Kingfisher	Eastern Phoebe
Muskrat	Bittern	Eastern Towhee
Otter	Black Duck	Eastern Wood Peewee
Pine Vole	Black-billed Cuckoo	English Sparrow
Porcupine	Black-capped Chickadee	Evening Grosbeak
Raccoon	Blue Jay	Field Sparrow
Red Squirrel	Blue Wing Teal Duck	Finch
Skunk	Bluebird	Fox Sparrow
White-footed Mouse	Brant Geese	Grackle

Gray Catbird	Ringnecked Duck	Eastern Pondhawk
Great Blue Heron	Rock Dove	Emerald Spreadwing
Great Crested Flycatcher	Rose-breasted Grosbeak	Halloween Pennant
Great Horned Owl	Ruffed Grouse	Slaty Skimmers
Greater Scaup Duck	Rufus-sided Towhee	Spangled Skimmer
Green Wing Teal Duck	Scarlet Tanager	Spotted Spreadwing
Hairy Woodpecker	Snow Geese	Window Skimmer
Harris Sparrow	Song Sparrow	Woodcock
Hermit Thrush	Sparrow Hawk	Yellowleg Meadowhawk
Hooded Merganser (with 12 chicks on 6/15/03)	Starlings	<b>BUTTERFLIES:</b>
Hummingbird	Swallow	Great Spangled Fritillary
Junco	Tree Sparrow	Monarch
Least Bittern	Tree Swallow	Pearl Crescents
Lesser Scaup Duck	Tufted Titmouse	Wood Satyrs
Mallard Duck	Turkey	<b>FROGS and Toads:</b>
Martin	Turkey Vulture	American Toad
Mourning Dove	Veery	Bull Frog
Northern Cardinal	Whip-poor-will	Green Frog
Northern Flicker	White-breasted Nuthatch	Leopard Frog
Northern Mockingbird	White-throated Sparrow	Spring Peeper
Old Squaw Duck	Wood Duck	Tree Frog
Osprey	Wood Thrush	Wood Frog
Ovenbird	Woodcock	<b>TURTLES:</b>
Pileated Woodpecker	Wren	Common Snapper
Pine Grosbeak	<b>DRAGONFLIES and</b>	Painted
Prairie Warbler	<b>DAMSELFLIES:</b>	Spotted
Purple Finch	Black-tipped Darner	<b>OTHER:</b>
Red Breasted Merganser	Blue Dasher	Black Water Snake
Red-eyed Vireo	Common Green Darner	Hog Nose Snake
Redhead Duck	Common Spreadwing	Spotted Newt
Redpolls	Common Whitetail	
Red-tailed Hawk	Dot-tailed Whiteface	
Red-winged Blackbird	Eastern Forktail Damsel	

Note that it is unlikely that there are poisonous snakes in the area. There is only one known location of Timber Rattlers in the state and its location is unpublished. Other snakes rattle, like the Milk Snake or Hog Nose, but they are not poisonous.

### 5.3 Additional Attributes

The following sections describe access to the property, abutting properties, and interaction with other Town-owned parcels.

### 5.3.1 Access Points

There are seventeen currently available access points to the HHNP, as shown on the map and list in *Appendix D*. The appendix includes the reference map and listing of the seventeen sites, labeled A through Q, with a summary of comments on each. Included in the list are access points contained within the parcel boundaries, Town owned Class VI roads that abut or enter it, and several PSNH abutting parcels over which easements are negotiable.

The committee marked each of the access points with tape, physically examined them and arrived at an evaluation of each. The evaluations took into consideration the current condition and use of each access point, the potential for use as foot and/or vehicle traffic, impact on abutters and an estimation as to costs, if any, to improve the accessibility of the location.

The following conclusions were reached:

- There is an immediate need for some additional parking spaces so that people driving from outside of the immediate area have a place to safely park their vehicles other than on the shoulder of a Town road.
- The immediate need for parking should be moderate in size, approximately 10 spaces each, and located to permit access from two or more sides of the parcel, if possible. The parking areas should be constructed with gravel surfaces and maintained year round by the DPW.
- The construction of more access sites should be delayed until a later date, possibly in 1-2 years, in order to better determine the actual levels of use and the areas where people will need access.
- The Town should continue to consider and seek additional parking areas and access points if and when the opportunity or need arises.

Refer to *Recommendations to Improve Access* on page 9-1 for a specific action plan to improve the Town's ability to access the HHNP.

### 5.3.2 Abutting Properties

There are five residential subdivisions and approximately 35 individual residential properties that abut the HHNP property. Some of these individual properties are possible candidates for further residential subdivision under present zoning laws. Directly abutting developed subdivisions include High View to the south (Spaulding Drive, Regal Drive, Old King's Road, etc. – 82 units) and Midwood Acres (Palmeri Drive and Gerard Drive – 18 units). Across Amherst Road to the north is Riverview Park (Davidson Avenue, Riverside Drive, etc. – 63 units). Across Naticook Road to the east is Blodgett Heights (Danforth Avenue, Hutchinson Road, Cummings Road, etc. – 62 units). The Farmer Road and Fuller Mill Road areas include the Mason and Kambol subdivisions and include about 30 residential lots.

In total, approximately 260 residential lots abut or nearly abut this land. Most of the neighborhoods and residences have been established for a length of time with the High View development being built in the mid 1960's, and several others in the 1970s. Because of the close proximity of the private properties to the HHNP, consideration for the abutters was one of the goals used to evaluate each recommendation for uses of the land. In the past decades, the abutters have been the primary recreational users of this land. The larger of these are the Watanic Bowmen property and the former McLaughlin Stables on Peaslee Road.

In addition to residential abutters, several parcels of open space also abut the property. To maintain the long-term biological diversity of the HHNP and to enhance its recreational value, the Town should work with the owners of abutting open space parcels on land management issues. It is important that the HHNP not become an island. This may require additional easements or acquisitions to maintain wildlife corridors, preserve certain habitats, preserve existing trails and create additional trails. The Merrimack Village District land, the Horseshoe Fish and Game property, and the Watanic Bowman property are of notable significance in this regard, and combined with the Wasserman Park parcel provide for an extensive system of open space. The 35-acre White Pine Swamp area abutting the HHNP to the south is currently owned by the Town of Merrimack and is managed by the Conservation Commission.

### 5.3.3 Interaction with Other Town-Owned Properties

The HHNP site lies in an area of Town in close proximity to or abutting several Town-owned parcels that might play a part in the planning process. In addition to the sites in the area, planners should consider all other Town-owned sites that total approximately 1,000 acres, and their current and future potential for activities rather than considering the HHNP as a stand-alone parcel. Some activities may be more suitable for another site(s).

**Wasserman Park** is located on Naticook Road across from the southeast corner of the HHNP. It consists of two areas, one managed by Parks & Recreation and the other by the Conservation Commission. The MCC managed parcel (87-acres of open space with walking trails and camping activities) along Naticook Road is approximately 530 feet away from the southeastern corner of the HHNP. The Wasserman Heights subdivision lies on the most direct route between the two and the Town was granted an easement for a trail to connect the HHNP with Wasserman Park (see *Appendix J*).

**Gilmore Hill Memorial Forest** is located about 2,000 feet along Greens Pond Road. It is a 26-acre open space parcel. A PSNH power line also connects the two parcels across PSNH and privately owned land. It is currently used as a travel route by foot, bike and motorized vehicles.

**White Pine Swamp** is an abutting 34-acre parcel managed by the MCC. The swamp is located on this parcel and on the HHNP parcel. Regal Drive provides access to the water and access to the HHNP site can be made by boat or across the ice in the winter. A small abutting parcel is also owned by the Town and managed by the MCC.

Portions of **Old Kings Highway** are either owned by the Town or the Town holds easements and is managed by the MCC. A walking trail exists from Seaverns Bridge Road through a wooded area, across Dahl Road and ending on Kyle Road. By walking along the road through the housing area one can connect again off Peaslee Road and along the old roadway to the portion that is Town owned Class VI road and finally onto the HHNP site.

**Riverside Park** is located on the Souhegan River about 1700 feet north along Riverside Drive. This 27-acre parcel is available for hiking trail development. Across the river is a parcel owned by the Boy Scouts and used as a camping area.

The following is a brief listing of additional Town-owned parcels that should be considered when evaluating Town properties. A number of smaller sites are potentially available as connecting trails.

- 80 Acres along the Souhegan River and including Wildcat Falls and a portion of the Heritage Trail.
- Grater Woods Forest is south of Baboosic Lake. The 180-acre parcels offer hiking and biking trails. It abuts Amherst open space land and private undeveloped areas. This area, together with adjacent parcels, is one noted on the Merrimack Master Plan as having potential to develop into another 500-acre open space.
- The Town landfill property is a 137-acre parcel that offers several options for activities on most of the site.



## Section 6 Current Uses

*This section describes the activities that currently take place on the Horse Hill Nature Preserve.*

### 6.1 Extent of Activity

With the exception of hunting, human activities on the HHNP are limited to the areas directly surrounding the sandpit, the power lines, and the current trail network. The majority of the heavily forested land is not accessed by trail and therefore its primary use is as a safe refuge for wildlife.

### 6.2 Trail Network

Logging activities on the property have left behind a network of logging roads. Over the years, these roads have evolved into a trail network, as shown in *Appendix E*. Recreational activities on the HHNP generally center on use of this existing trail system. The trails have been informally maintained by users and most are in need of comprehensive maintenance.

Since their original intent was simply to permit access for logging trucks, the existing trails are not necessarily designed appropriately for continued use. The committee recommends that a formal Trail Master Plan and a Trail Maintenance program be developed, as described in *Suggested Action Items* on page 9-2.

### 6.3 Current Activities

The following activities currently take place on the HHNP property. Activities are presented in alphabetical order.

#### **ATV/dirt bike riding**

This activity has increased in recent years and takes place mostly in the sandpit, along the power lines, and along Old Kings Hwy.

#### **Blueberry picking**

Blueberries cover a large portion of the property and picking them provides a yearly activity for some local residents.

#### **Cross-country skiing**

This activity is fairly common on the property, depending on the snow cover. Most trails are wide enough to accommodate cross-country skiing.

#### **Hiking**

Local residents use the trails on a daily basis for casual hiking, walking, and walking their dogs.

**Horseback riding**

Horseback riding is a daily activity on the property. A horse farm abuts the property and several other local residents have horses.

**Hunting**

Hunting has been a common use of the property for many years, both archery and shotgun. Duck hunting is particularly popular.

**Ice Skating**

Local residents sometimes ice skate on the beaver ponds.

**Mountain biking (non-motorized)**

This activity has not been one of the more common uses in previous years, but the sport is becoming more popular and there has been a slight increase in this activity in recent years.

**Nature observation**

Various residents use this property for bird watching, as well as taking children to observe turtles, muskrats, pollywogs, salamanders, ducks, and geese, and teaching animal tracking.

**Off-road vehicles (trucks, jeeps, etc.)**

This activity takes place almost exclusively on the trail under the power lines.

**Power line maintenance**

Every few years Public Service of New Hampshire (PSNH) cuts the vegetation under the power lines, in accordance with their easement, as described in *PSNH Easement* on page 7-1.

**Sledding**

Local residents sometimes sled on the hills under the power lines.

**Snowmobiling**

Snowmobiling is a common activity on the property.

**Snowshoeing**

This activity is practiced by several local residents.

**Target shooting (archery)**

The abutting Watanic Bowman archery club uses the property (with the owner's permission) for a yearly charity target shoot. Proceeds benefit the St. James Food Pantry.

**Target shooting (firearms)**

The area around the sandpit is often used for target shooting.

**Underage Drinking**

Although one might question whether this is a legitimate use of the property, it is in fact a common use among local teenagers. Weekend drinking gatherings are fairly common in the warmer months.



## Section 7 Liabilities and Legal Issues

*This section addresses the question of the Town's potential liability for activities on the property, two easements existing on the property, and regulations regarding activities around wetlands.*

### 7.1 Liability

As a general rule, the Town has limited liability and land used for recreational purposes has additional statutory protections as well. RSA 508:14, 508:17, 212:34, and 231-A:8 protect the Town from liability for injuries suffered on recreational land, providing that there is no charge for the recreational use and that no willful or grossly negligent action occurred. Volunteers who may maintain the trails, as long as they are registered as volunteers with the Town, are also protected from liability. Outdoor educational purposes are also covered under these statutes.

There are no liability issues on this site that differ from any other Town-owned property (Wasserman Park, the Grater Woods Town Forest, Gilmore Hill Memorial Forest, Turkey Hill Road ballfields, etc.). Various parcels in Town include hiking, hunting, ATVs, athletic fields, skateboarding, swimming, and boating. No activities planned for the HHNP site would raise greater liability concerns than existing activities on other sites in Town.

### 7.2 PSNH Easement Requirements

The Public Service Company of New Hampshire (PSNH) owns two parcels of land that abut the HHNP: one situated on the eastern side of the property on Naticook Road and one on the western side on Peaslee Road. A transmission line easement running between these two parcels traverses the southerly portion of HHNP site from east to west. These abutting parcels and the transmission line easement area impose limitations on the way in which the HHNP property can be used. At the same time, they also provide opportunities.

As discussed previously, the two PSNH parcels that abut the HHNP property have the potential to provide for public access and parking. Utilizing these parcels would provide access to two opposite sides of the property as well as access from two of the three major abutting roads. In a letter to the committee, PSNH has shown a willingness in principal to enter into an agreement with the Town to allow for the development of access points, parking areas and other support facilities in these locations in accordance with their policies and procedures on transmission line right-of-way (ROW) encroachments.

Within the transmission line easement areas on the HHNP property, PSNH has the right to construct, operate and maintain power lines and all associated structures and support facilities. It also has the right to patrol the easement areas and to cut trees, clear brush and remove any obstacles. The Town has the right to use the land within the easement area so long as it is used in manner consistent with the easement agreement. In general,

any new facilities proposed or improvements that would require significant construction activity would require PSNH approval in accordance with the transmission line ROW encroachment polices referenced above.

Under its Transmission line ROW encroachment polices, PSNH categorizes uses as being of either major or moderate impact. Each category is accompanied by a set of submittal requirements of varying scope. A municipal parking lot, for example, would most likely be a major impact use requiring the submittal of plans prepared by a professional land surveyor or engineer depicting all utility structures, topography, parking areas, drainage, and other details. An unpaved pedestrian trail would most likely be considered to be a moderate impact use that would not necessarily require a professionally prepared plan. Uses that are generally prohibited or discouraged in PSNH transmission line ROWs include buildings or dwellings, septic systems, material storage (snow, logs, dirt, etc.) wells and other similar uses. It should be noted that PSNH's policies on ROW encroachments apply to both the parcels that they own as well as to areas within the transmission line easement.

Use of the two parcels owned by PSNH would require that either an easement or a long-term lease are entered into along with a joint use agreement that addresses the uses and improvements planned and any associated conditions, obligations or limitations. In addition to preparation of surveyed plans and legal documents, an appraisal would most likely be required and the Town would most likely be expected to pay fair market value for use of the land. For encroachments proposed within the PSNH easement area, a joint use agreement would be required but an easement or lease and the associated acquisition fees would not be necessary. A more detailed description of PSNH's policies and procedures for use of power-line land or easements can be found in a document entitled *Public Service of New Hampshire Survey Requirements for Transmission Line Right of Way Encroachments* available in the Community Development Department.

### **7.3 EPA Grant Requirements**

As a part of the financing package that was put together to acquire the HHNP, \$254,000 in federal funds was received from the United States Environmental Protection Agency (EPA). The funds were originally set aside in 1998 as a part of wetlands mitigation required for dredge and fill activities proposed as a part of the cleanup of the New Hampshire Plating Superfund site on Wright Avenue in Merrimack. At that time, a significant wetland know as *Grassy Pond* was acquired in the Town of Litchfield to satisfy the mitigation requirement, however, due to concerns expressed by Merrimack, additional funds were set aside for acquisition of a significant wetland within Merrimack itself. The priority wetland area identified was a large unnamed wetland located on Naticook Road in the southeastern corner of what is today the HHNP.

The wetland area on Naticook Road, though a part of the HHNP, is situated on a 50-acre parcel (Tax Map Parcel 3B/260) that was owned in common with the balance of the HHNP land. Initial attempts to negotiate a sale of the parcel to the Town were unsuccessful. Upon approval of the acquisition of the entire HHNP site by Town

Meeting in 2002, however, the EPA and the NH DES agreed to release the funds as a contribution toward the acquisition of the Naticook Road wetland portion of the overall property. In exchange, the Town entered into a contract with the State, agreeing to accept the wetlands mitigation funds for acquisition and protection of Tax Map Parcel 3B/260. Although there are no deed restrictions, easements or covenants that specify how the property may or may not be used, it is generally understood that the property should be managed in a manner consistent with wetland conservation. In general, wildlife and forest management consistent with applicable best management practices would be consistent with wetlands conservation along with passive recreational activities that do not require the dredging or filling of wetlands, the erection of buildings or significant alterations of the terrain. The NH DES/Town of Merrimack contract and other materials related to the EPA mitigation funds are available at Town Hall.

## 7.4 Wetland Restrictions

This section summarizes the local and state regulations that apply to wetland areas of the Horse Hill Nature Preserve. Note that federal stormwater regulations also exist, but would not be pertinent unless buildings are erected on the property.

### 7.4.1 Summary

Local ordinance requires a 25-foot protective buffer and a 40-foot "no build" zone around all wetlands for new construction presented to the Planning Board for approval. (See *Section 7.4.2* for a detailed discussion.)

The New Hampshire Department of Environmental Services (NHDES) enforces regulations on development that involves wetlands, including motorized and non-motorized trail construction and use, recreational field development, and so on. These regulations must be adhered to for all development activities on the property.

### 7.4.2 Local Ordinances Pertaining to Wetlands

The *Town of Merrimack Zoning Ordinance and Building Code, 2.02.7 - District W, Wetlands Conservation District - Permitted Uses* describes what constitutes wetlands, buffer zones and permitted uses. These three major areas covered in this Ordinance are in the following sections: wetland soils (Section 2.02.7 A.1 (a)), wetlands (Section 2.02.7.A.1(b)) and buffer areas (Section 2.02.7.A.7).

To summarize local ordinances:

- Section 2.02.7 A.1 (a) describes wetlands soils in the Town as those areas delineated as poorly drained or very poorly drained soils identified by the U.S. Department of Agriculture, Soil Conservation Service, through field mapping surveys. These soils are shown on the "Town of Merrimack Wetland Conservation District Map" which is a supplement to the Zoning Map.
- Section 2.02.7 A 1(b) describes wetlands as those "areas inundated or saturated by

surface or ground water at a frequency or duration sufficient to support, and that under natural conditions, does support a prevalence of vegetation typically adapted for life in saturated soil conditions.” The existence of three technical criteria (hydric soils, hydrophytic vegetation and wetland hydrology) are required to identify a wetland area.

- Section 2.02.7.A.7 describes a required buffer zone of twenty-five (25) feet from all applicable wetland areas for all development proposals submitted to the Planning Board. Applicable wetland areas are those with a contiguous area of 3,000 feet or more and those adjacent to “any surface water body, river, or stream listed in Section 2.02.12C (Shoreland Protection District) of this Ordinance.” A buffer zone is a naturally vegetated upland area adjacent to a wetland and it becomes part of the Wetlands Conservation District. There is also a building setback of forty (40) feet from any wetland area defined in the ordinance.

Note that Town property is not required to adhere to local ordinances, including the 25' buffer requirement. It is the recommendation of this committee that buffers should apply to the wetlands on this property since preservation is a high priority. (Note that the Town cannot violate federal clean water regulations or state DES statutes, particularly septic setbacks.)

Permitted uses within the Wetlands Conservation District include forestry-tree farming; agriculture; water impoundments and well supplies; drainage ways, streams, creeks, or other paths of normal runoff water; wildlife refuge; parks and such recreation uses as are consistent with Section 2.02.7.2; conservation areas and nature trails; open space as permitted by subdivision regulations and other sections of this ordinance; streets, roads and other access ways if essential to the productive use of land not so zoned; utility rights of way easements including power lines and pipe lines; and Special Exceptions for the undertaking of use not otherwise permitted in the Wetland Conservation District, which may include the erection of a structure, dredging, filling, draining, or otherwise altering the surface configuration of the land, may be granted by the Board of Adjustment, if it can be shown that such proposed use will not conflict with the purpose and intentions of Section 2.02.7.2.

### **7.4.3 State Regulations Pertaining to Wetlands**

There are state regulations regarding wetlands managed by the New Hampshire Department of Environmental Services, Wetlands Bureau (NHDES). They can be reached at P.O. Box 95, Concord NH 03302 and at (603) 271-2147. A comprehensive website has the information needed to understand the state regulations: <http://www.des.state.nh.us/wetlands/>. At this website many categories of information are available including proposed rules, recent changes to the law, U.S. Army Corp of Engineers permitting rules, wetlands permits query, application information, effective policies, off-road vehicles and wetlands, Shoreland Protection Act, etc.

Wetlands and Surface Waters are protected under New Hampshire State Laws: RSA 482-



A and RSA 485-A. There is a guidebook for Wetlands Permits which should be consulted if any development is planned for the property. The State works with the Army Corps of Engineers and the Town of Merrimack will not have to deal directly with the Army Corps of Engineers unless it is a major project. Generally speaking, if a project meets the state regulations it meets the federal requirements too.

#### 7.4.4 Particular Uses and How they are Regulated

There are different variations to the state wetland regulations depending on the proposed use.

**Athletic fields:** According to the NHDES, Wetlands Bureau, athletic fields would have to meet the same wetland regulations as other lot developments.

**ATVs:** It is recommended that the guidelines in “Best Management Practices for Trails Programs” by the State of New Hampshire, Department of Resources and Economic Development, be adhered to. This explains the erosion control methodology which will be required in trail creation and maintenance. What will be important in ATV usage will be the rutting in wetlands resulting in dredging, which will require a permit. According to the Wetland Bureau information sheet, driving through water creates a water quality violation and violations of the law and administration rules are punishable by administrative fines (up to \$2,000 per violation and up to \$10,000 per violation for willful violations).

**Buildings:** A standard wetlands application will have to be filled out and submitted to the NHDES, Wetlands Bureau, to receive a permit. The new Environmental Protection Agency (EPA) stormwater regulations will have to be adhered to. This would include widening roads in an area adjacent to wetlands.

**Parking Lots:** According to the NHDES Wetlands Bureau, parking lots would have to meet the same wetland regulations as other lot developments.

**Trails:** Trails allow some impact because of the public interest and a form entitled “Notification of Trail Development Activities Having Minimum Wetland Impact” should be filled out and submitted to the NH Department of Environmental Services, Wetlands Bureau and the NH Division of Parks and Recreation (DRED), Bureau of Trails. Rule #Wt303.04(y) applies to the Construction of Trails with minimum impact. RSA 482.A:3 applies to persons constructing trails.

However, a standard wetlands application needs to be filled out if the wetland has been identified by the NH Natural Heritage Inventory program as being an area of concern or if it involves more than 3,000 total square feet of fill, corduroy, boardwalk or similar construction;

installing a culvert in a stream channel 10 feet or more wide; installing a bridge where work is done in the water and/or more than 3,000 square feet of fill for abutments is placed on the banks of a stream; or the activity/construction is NOT in accordance with the 1994 Best Management Practices for Erosion Control During Trail Maintenance and Construction.

Tree cutting: Tree cutting is regulated within 25' of wetlands.

## Section 8 A Plan for the Future

*This section describes the committee's recommendations for future use of the Horse Hill Nature Preserve.*

*Note: All votes referenced in this section represent votes of members present at the meeting and those who submitted votes in advance of the meeting. Members who did not attend the meeting and did not submit a vote are not represented in the tallies.*

### 8.1 Goals and Objectives

As part of its deliberations, the committee held a two-part visioning session. During the first session, the committee identified and ranked features, problems and potential uses for the property. The results of this session are included in *Appendix I*.

In the second session, the results of the first session were used to develop a list of goals for the future of the HHNP. The committee examined each goal statement in detail, modified wording where appropriate, and voted on acceptance of each goal. The vote in all cases was unanimous, with no dissenting votes or abstentions.

The following is the list of goals agreed upon by the committee with a brief description of important points discussed for each.

**1. Preserve and encourage the biological diversity of the property through the protection and careful management of existing, potential, and emergent plant and animal habitats and species.**

Inclusion of the word 'encourage' was intentional, implying potential management of habitat. For example, a dense alder grove next to a field is good woodcock habitat, but as alders mature the habitat is diminished. Management of the alder grove might be considered to preserve habitat diversity.

**2. Preserve and protect the property's surface and groundwater resources including wetlands, vernal pools and beaver ponds to provide for wildlife habitat conservation, groundwater recharge and watershed and aquifer protection.**

It was noted that some activities, such as development of trails, might occasionally impact surface water. Use of the word 'protect' was not intended to stop all such development, only to ensure that surface water is protected to the greatest extent practical.

**3. Develop and maintain a network of trails.**

It was noted that a trail network should be developed slowly to ensure that the Town is able to adequately maintain the trails.

**4. Build upon the proximity of the property to other public and private open space through the establishment of wildlife corridors, access easements, and other means.**

The intent of this goal is to improve and/or protect the corridors that currently exist and to establish new corridors when possible.

**5. Preserve and protect the historic features of the property.**

Extensive discussion clarified that the committee is creating goals, not regulations. In every case, the phrase "to the extent possible or practical" is assumed. For example, should an historic feature become a safety problem, preserving it may not be practical.

**6. Balance competing community interests and uses of the property.**

Some potential uses might not be compatible. It is a goal of this committee to attempt to balance the needs of various user groups where possible.

**7. Provide adequate public access and parking.**

**8. Minimize impacts to the property between different users and surrounding properties with regard to safety issues, trash, noise, erosion, and other potential impacts.**

Some uses generate more negative impact than others, and these impacts should be recognized when various uses are considered.

**9. Emphasize uses compatible with activities such as outdoor education, wildlife conservation, forestry, walking, hiking, biking, horseback riding, cross-country skiing, etc.**

During the visioning session, these uses were overwhelmingly supported. The committee would like that fact recognized when various uses are considered.

## **8.2 Recommended Uses**

The committee identified, researched, debated, and voted on a wide variety of uses for the property. The following sections contain the committee's recommendations for various uses that will allow the property to reach its fullest potential as a benefit to the Town now and in the future. (Recommendations are listed alphabetically and do not imply a priority order.)

The committee recognizes that as circumstances change over time, these and other uses might be reconsidered by the managing body. The volume of use should be monitored, as it will be a limiting factor for successful management of the property.

### 8.2.1 Archery Target Shooting

The committee recommends that archery target shooting be permitted under the supervision of the Watanic Bowmen club with a permit issued by the managing body.

The club has a 40-year history with the Town. They use a limited amount of the property two or three times per year for organized shoots. They have proven themselves to be respectful of the property, cleaning up all target material after each shoot and taking appropriate security measures. The Bowmen will be responsible for posting notice at the main entrances to the property alerting users that an archery shoot is in progress in the Old Kings Highway area.

Requiring a permit will allow the managing body to have advanced notice of archery weekends.

*(Approved 19-1-1)*

### 8.2.2 Athletic Complex

It is the opinion of the committee that the Horse Hill Nature Preserve would be an appropriate setting for Athletic Fields for the youth of Merrimack to enjoy outdoor recreational activities.

While acknowledging the sensitive nature of the land, abundance of wildlife, proximity to residential neighborhoods and extensive use of the land for passive recreational use, the Committee believes that set-aside areas nearing roads and parking could be available for the construction of athletic fields to correspond to the Parks and Recreation Master Plan and Merrimack Youth Association (or equivalent organization providing youth activities in the Town of Merrimack) field planning bodies.

The committee believes that any construction deemed necessary comply with the general consensus that the construction and use be managed in accordance with prevailing best practices and with the input and advice of the Planning Board, Conservation Commission, and Merrimack Village District for the construction phase.

The committee also recommends that any athletic field complex (es) be limited in space not to exceed a total of 50 acres. Further, any complex built must be made so that fields connect to the existing trail system and flow into the Horse Hill Nature Preserve. Every attempt possible should be made so those said complex (es) maintain the character of the Horse Hill Nature Preserve and its sensitive areas.

*(Approved 19-2-0)*

### 8.2.3 Conservation of Open Space

The committee recommends that a minimum of 500 acres of the property be managed following the Best Management Practices as recommend by the State of New Hampshire to maximize the biodiversity of the property. *(Approved 16-0-0)*

Through the visioning session and subsequent discussions, the committee recognized that the majority of the acreage of the HHNP would provide the greatest benefit to the Town as preserved open space.

Unfragmented forest blocks greater than 500 acres are rare in this area of New Hampshire, and the importance of maintaining this open space cannot be overstated. (Refer to *Biodiversity* on page 5-6 for a detailed discussion of this topic.) The opportunity for our community to foster a diverse population of animal life and plant life will have lasting benefits. As the southern New Hampshire region continues to be developed, forested parcels large enough to maintain healthy populations of a variety of species will become more scarce.

Not only does wildlife benefit from open space, but humans benefit as well. Open space protects the quality of our air and water resources. Our quality of life is enhanced by opportunities to remove ourselves from the hectic pace of modern life and enjoy the quiet and solitude that a walk in the forest can offer.

#### **8.2.4 Cross-country Skiing/Snowshoeing**

The committee recommends that cross-country skiing and snowshoeing be permitted. The following points should be considered:

- Cross-country skiing may require wider trails than other uses.
- Parking lots must be plowed for winter access, with care taken not to block trail heads.
- The User Courtesy Code (see *Suggested Action Items* on page 9-2) should include mention of the fact that walkers/snowshoers should attempt not to destroy cross-country ski tracks.
- Well designed hiking trails will automatically be good skiing trails, with the inclusion of a wider turning radius at corners.
- The trail system should include trails designated for non-motorized use only to allow skiers and snowshoers to enjoy their sport.

*(Approved 18-0-0)*

#### **8.2.5 Hiking**

The committee recommends that walking and hiking be a permitted use of the HHNP.

The Americans with Disabilities Act (ADA) requires that a new trail network include an ADA compatible trail. The trail leading in from Amherst Road is a likely candidate for an ADA compatible trail. It is relatively level, has easy access to a proposed parking area, and has attractive wildlife viewing potential. Requirements for handicapped parking could be an issue on a gravel surface and this issue will have to be researched.

*(Approved 18-0-0)*

### 8.2.6 Horseback Riding

The committee recommends that horseback riding be a permitted use of the property, with the understanding that certain areas might be inappropriate for equine use. Seasonal restrictions (e.g., mud season) may be required and, if volume of use increases dramatically, issues may arise due to manure on multi-use trails. It was noted that this issue may arise from any domesticated animal, including dogs.

As knowledge of the property spreads, there is a potential for horse owners to trailer to the property for trail rides. The adequacy of the parking areas should be monitored.  
*(Approved 18-0-0)*

### 8.2.7 Hunting

The committee recommends that hunting be permitted on the property for the following reasons:

- Hunting is a current activity on the property and is well regulated by state RSAs.
- Hunting is a popular sport for hundreds of Merrimack residents and hunting locations have been limited by growth.
- The size and terrain of the parcel make it ideal for a variety of wildlife, but with limited surrounding property to allow populations to spread and with limited natural predators certain populations will likely become overpopulated. Hunting will help maintain a healthy wildlife population. A wildlife management program is an important part of open space management, and keeping a healthy balance of wildlife will maximize biodiversity.
- Pursuant to RSA 210:11, trapping would require a license from the state of New Hampshire and written permission from the appropriate Town authority.

Safety information should be prominently posted at all entrances to the property to ensure that hikers are aware of hunting activity. The posting should include recommendations for wearing hunter orange and other safety measures.

*(Approved 17-0-0)*

### 8.2.8 Mountain Biking

The committee recommends that mountain biking be a permitted use of the property, with the understanding that certain areas might be inappropriate for wheeled use.

The New England Mountain Biking Association (NEMBA) has been recognized by the Environmental Protection Agency (EPA) for their trail work throughout New England. They are currently working with the MCC to design trails at the Grater Woods site. They can provide a large group of knowledgeable volunteers to assist in trail design, construction, and maintenance.

Interconnection of Town properties and open space might be of more interest to mountain bikers.

*(Approved 18-0-0)*

### **8.2.9 Outdoor Education Programs**

The committee enthusiastically recommends that the property be used for a variety of outdoor education programs. The varied terrain, extensive wetlands, and connection with historical figures make this an ideal location for a variety of learning experiences.

Programs can take several forms:

- Science programs. The Merrimack public school administration has expressed an interest in involving the property in the science curriculum. A representative from the Masticola Middle School science department has met with committee members to discuss potential projects, such as conducting wildlife inventories and bluebird monitoring.
- History programs. Connections with the Spaulding family, the Blodgett family, and Old Kings Highway provide a rich source of lessons on the early development of our community. Sites of historic interest should be identified with appropriate plaques or markers. A "history trail" could be developed that would encompass Old Kings Highway, the Spaulding foundation area, and various trails.
- Interpreted trails. The committee strongly suggests that one or more trails be designed as interpreted trails, with signs describing significant vegetation, wildlife habitat, geology, etc. The information could be designed for various age levels.

*(Approved 16-0-0)*

### **8.2.10 Snowmobiling**

The committee recommends that snowmobiling be permitted on some trails on the property, leaving other trails for non-motorized use only. Specific trails for snowmobile use will be defined in the Trail Master Plan (see *Suggested Action Items* on page 9-2).

The committee makes this recommendation for the following reasons:

1. Snowmobile interests are represented by the SnoBuds, a club with a 30-year history with the Town. The SnoBuds have offered to take responsibility for designing, maintaining, and monitoring snowmobile trails in accordance with best management practices as recommended by the Bureau of Trails. They have maintained the existing trails on the property for many years.
2. Snowmobiles use trails only when they are frozen, minimizing impact to the environment.
3. Snowmobiles have been used on the property for many years without evidence of unacceptable damage.

The committee acknowledges that the noise, odor, and fear of accidents that accompany snowmobile use can interfere with the enjoyment of passive users. For this reason, non-



motorized trails should be included in the Trail Master Plan. As with all uses, the level of use will determine whether this interference becomes unacceptable.

*(Approved 21-0-0)*

### **8.3 Uses Not Recommended at this Time**

The committee found that the following uses present complications that outweigh their benefits at this time. The committee recognizes that as circumstances change over time, these and other uses might be reconsidered by the managing body.

#### **8.3.1 All Terrain Vehicles**

Based on extensive discussion and research, it is the recommendation of this committee that in consideration of the extensive wetlands found on the property, proximity to residential neighborhoods, and extensive use of the property by passive users, the Horse Hill Nature Preserve is not an appropriate location for all-terrain vehicle (ATV) use.

The committee recognizes that there are residents who enjoy ATV use. It is therefore additionally recommended that the appropriate Town authorities revisit this recommendation if the following occurs.

1. A state recognized ATV club is formed by Merrimack residents to work with the Merrimack Conservation Commission to evaluate all Town land for suitability for ATV use.
2. Should the evaluation show that the Horse Hill Nature Preserve is suitable for ATV use, the club should present a plan to the appropriate Town authorities showing the location of proposed use and defining use parameters, such as hours or days of accessibility, parking accommodations, residency restrictions, etc.
3. ATV trails proposed by the club must conform to state regulations as described in RSA 215-A:43 and any other applicable RSA, and state restrictions for 'mud season' must be followed.
4. The club's proposal must include provisions for trail design, creation, monitoring, maintenance, and rule enforcement. Financial responsibility for trail construction and maintenance should be specified.
5. The club must remain active (the definition of which will be provided by the Town) and must perform all monitoring and maintenance duties on an ongoing basis. It is understood that failure of the club to remain active or failure to perform the duties defined in the proposal will constitute cause for terminating ATV access to the property(s).

*(Approved 24-0-0)*

Note that for the purposes of this document, an ATV is defined as a wheeled, motorized recreational vehicle, 50 inches or less in width, weighing less than 1000 pounds. This definition is meant to include, but is not limited to, 2-, 3- and 4-wheeled vehicles, including dirt bikes.

### **8.3.2 Camping**

The committee recommends that camping not be allowed on the property. Camping is permitted on several Town properties, specifically the Wasserman property. The expense and effort involved in setting up an area and sanitary facilities for campers when there has been no demonstrated desire or need for camping seems to this committee to be unnecessary. Should demand for camping increase, the committee recommends that the managing body reconsider this decision at that time.

*(Approved 15-5-1)*

### **8.3.3 Firearm Target Shooting**

The committee recommends that target shooting with firearms be prohibited. This recommendation is made for the following reasons:

1. The property is currently used for target shooting. Target shooters have left enormous quantities of trash in their shooting areas. Much of this trash consists of rusted metal objects, broken glass, and spent ammunition. Continuing the practice will continue to present a waste hazard.
2. Shooting of firearms presents a potential safety hazard for other users of the property.
3. The sound of firearms carries for a significant distance, which is disruptive to both passive users and to abutters. Target shooting generally involves shooting many rounds for an extended period of time.
4. Monitoring of the target shooting area will create an ongoing maintenance effort that would be beyond the scope of a volunteer organization, likely requiring Town staff assistance.

*(Approved 21-0-0)*

### **8.3.4 Off-Road Vehicles**

The committee recommends that off-road vehicles be prohibited from the HHNP. For the purposes of this document, an off-road vehicle is defined as a wheeled motorized vehicle more than 50 inches in width and weighing more than 1000 pounds. This definition includes, but is not limited to, four-wheel drive trucks, dune buggies, Jeeps, and other large off-road vehicles, but does not include dirt bikes and 4-wheeled and 3-wheeled all-terrain vehicles.

The committee offers the following reasons for this recommendation:

1. The property is currently used by off-road vehicles and they have proven to be destructive to the trails and wetlands.
2. The vast majority of trash on the property is brought in on off-road vehicles. Eliminating their access will minimize trash, unauthorized camping, and other unauthorized uses.

Town authorized maintenance activities are exempt from this restriction.

The committee recognizes that enforcing this restriction may be problematic, since two Class VI roads abut the property.

*(Approved 21-0-0)*

#### **8.4 Municipal Buildings**

There are currently no municipal buildings planned for this area of Town (reference the Town Master Plan and Capital Improvement Plan). For all municipal buildings anticipated in the Town Master Plan through build-out, other locations have been identified. The committee therefore did not feel it necessary to make a specific recommendation on the construction of municipal buildings.

As a general statement, the committee believes that the HHNP best benefits our community as a unique open space resource. The reader is reminded that this parcel was identified in the Town Maser Plan as the top priority in Town for conservation.

The committee believes that this property would not be suited for municipal facilities due to the following:

- Any use that reduces the amount of open space to under 500 acres reduces the value of the property as a unique habitat for biodiversity.
- The extensive wetlands would be negatively impacted.
- The property is not serviced by the municipal sewer system.
- The property is surrounded by residential neighborhoods, the impact on which would be prohibitive.
- Limited access points would require construction of a fairly long road to access a building, increasing construction and maintenance costs. Access roads required for a municipal building would fragment the forest.
- The acreage devoted to a municipal building would be removed from all other uses, thereby reducing the recreational value of the property to the community.

*(Approved 16-0-0)*

#### **8.5 Future Considerations**

When considering additional uses that may be proposed in the future, the managing body should consider the following:

- Whether the use will reduce the total amount of open space to less than 500 acres, impacting the unique value of the area for biodiversity in southern New Hampshire.
- Whether existing sanitary facilities will be sufficient.
- Whether existing parking and access points will be sufficient.
- Impact on abutting neighborhoods.
- The extent to which the use will detract from the enjoyment of the area by other users.

*(Approved 15-0-0)*

## **8.6 Activities Requiring Responsible Organizations**

Some activities require a separate trail system or area. Other activities are known to cause more than average trail maintenance or safety issues. Since it is anticipated that the trails on this property will be largely maintained by volunteers, the committee believes it is reasonable to request that users who enjoy these activities be willing to maintain the trails used for these activities.

As a general rule, the committee recommends that any activity that will require a separate trail system or area, or any activity that is expected to create unique maintenance issues, should be permitted on the HHNP only if an organization is willing and able to design, construct, monitor, and maintain trails or areas used for that activity. For example, the SnoBuds have offered to maintain trails that permit snowmobiling and the Watanic Bowmen have offered to monitor the area used for target shoots.

## **8.7 Non-Commercial Use**

The HHNP is intended for non-commercial use. Any use of the property is contingent on the volume of use not unduly degrading the property.

## Section 9 Future Management

*This section describes the committee's recommendations for future management of the Horse Hill Nature Preserve.*

### 9.1 A Managing Body

The committee recommends that the Board of Selectmen (BOS) should assign management responsibility for HHNP to the Merrimack Conservation Commission (MCC). The MCC would be charged to manage the parcel under the HHNP Master Plan guidelines as approved by the BOS. The BOS may choose to reserve the right to make determinations on issues such as athletic fields.

The BOS would authorize the MCC to form a HHNP committee to assist in carrying out the management tasks of the HHNP under the direction of the MCC. The HHNP committee may propose specific activities for review by the MCC. The MCC would review and in consultation with the BOS if necessary (for example, the creation and management of athletic fields), determine if the proposal is within the HHNP Management Plan guidelines.

The HHNP subcommittee would consist of a minimum of five and a maximum of seven members. One member would be designated by the MCC and would serve as the liaison with the MCC, one would be a representative nominated by the Parks & Recreation Department/Committee, and the others would be volunteer citizens. The chairperson would be elected annually.

The HHNP subcommittee would be encouraged to accept volunteers to handle specific tasks - building trails, maintenance, educational programs, and other tasks as needed. These individuals would not require BOS approval.

The HHNP subcommittee would meet quarterly in a public session, at a minimum, and report to the MCC at their next regularly scheduled meeting.

*(Approved 17-0-0)*

### 9.2 Recommendations to Improve Access

Any use of the property will require a parking area. (Refer to *Access Points* on page 5-10.) Since parking has already begun to be an issue, the committee recommends that the following actions take place as soon as possible:

- Locate a new parking area at access point C-1 (see the map in *Appendix D*). This is the point where Naticook Road is crossed by the PSNH power line. The parcel is owned by PSNH and is suitable for a small parking area with proper line of sight. Across the street, point C-2, is another parcel also owned by PSNH and suitable for additional parking spots and an area that appears to be large enough for busses, whereas the first is not. This is an active area for entry into the upper level of the

parcel. The committee has spoken with the DPW and they are ready to determine a feasibility and cost estimate.

- Locate another new parking area at point J. This point is on Amherst Road and offers entry on the far side of the parcel. The available land is fairly flat with the potential for expansion.
- All other access points should remain as they are except trail improvement should be considered. All should be clearly marked so that usage does not impact abutting private parcels.

This recommended plan of action would entail the following steps in the upcoming months:

- The Town should negotiate with PSNH for a lease or easement on their parcels identified as Tax map 3C/45 and 3C/67 following the process as outlined in their letter of November 26, 2002 addressed to Newton Coryell. A copy of the letter is included in the committee's files at the Community Development office. In essence, it states that the Town must submit to PSNH a plan for use, the plan will be reviewed, and access negotiations will take place. Note that an easement should be sought on parcel 3B/153-2 on Peaslee Road at the same time. If negotiations are not productive we would suggest shifting attention to Palmeri Drive as an alternative.
- The managing body should work with the Merrimack DPW to develop a plan for each site, prepare specifications and complete the work as soon as possible.

### 9.3 Suggested Action Items

The committee identified several issues that should be addressed and actions that should be taken in the near term by the managing body. The committee recommends that the BOS authorize the managing body to proceed with the following. The action items are presented in alphabetical order.

- **Adopt-a-Trail Program.** The committee recommends that the managing body consider instituting an Adopt-A-Trail program to facilitate trail maintenance.
- **Archeological inventory.** The committee recommends that State archeologist Wes Stinson be contacted to evaluate the property for sites that may prove interesting for an archeological investigation. Since the site includes historic features (e.g., the Spaulding foundation), both historic and prehistoric sites should be investigated.
- **Benches.** The committee recommends that benches or other resting structures be constructed at logical resting spots. The committee recommends that, wherever possible, natural materials such as strategically positioned rocks might be considered. Where construction is required, funding through sponsorship by local businesses could be considered.

- **Education plan.** The committee recommends that the management body develop a plan for educational use of the property.
- **Fish and Game programs.** If hunting is permitted on the property, the committee recommends that the managing body work with the New Hampshire Fish and Game Department to evaluate the property for habitat enhancement programs, such as pheasant stocking and alder grove improvement.
- **Forest Management Plan.** The committee recommends that the managing body work with a professional forester to develop a forest management plan for the HHNP. The plan should include an analysis of the existing forest, wetlands, animal populations, and plant populations, and should include marking of property boundaries. The plan should also assess various management practices, such as tree farming and selective clearing, and make specific recommendations for management of the natural resources of this property.
- **Funding.** Construction of parking areas, kiosks, and bridges and culverts on trails will require some funding. The committee recommends that the managing body develop a funding mechanism. Funding possibilities discussed by the committee were grants, establishment of a capital reserve fund, and inclusion of a line item in the Town budget.
- **History Trail.** The committee strongly recommends that a 'history trail' be included in the Trail Master Plan. This trail should be designed in consultation with the Merrimack Heritage Commission.
- **Hours of access.** The committee recommends that the managing body establish limited hours of public access. The committee recommends that the HHNP be open to the public from one hour before sunrise until one hour after sunset.
- **Improvement of the current trail system.** There are potential issues with the trails as they currently exist, including encroachment on environmentally sensitive areas, erosion problems, and areas of known wildlife impact (e.g., the turtle nests in the sand pit). The Trail Master Plan will address these issues, but in the near term the committee recommends that the managing body examine the current trail system and restrict specific uses in some areas.

The committee further recommends that the trail on the easement through the Wasserman Heights property be improved as soon as possible to clarify its location before home construction begins.

- **Kiosks.** The committee recommends that rules, maps, and other useful information be displayed on kiosks at the entrances to the property. As a safety consideration, the kiosks should note that cell phone coverage is unreliable on the property. Safety information should be prominently posted at all entrances to the property to ensure

that hikers are aware of hunting activity. The posting should include recommendations for wearing hunter orange and other safety measures.

- **Location assessment.** The committee recommends that the managing body assess the property to identify areas most suited to various recommended uses. Note that areas containing older forest growth should be left undeveloped whenever possible.
- **Orienteering.** The committee recommends that the managing body contact the Up North Orienteers, an orienteering club, to discuss mapping the property for orienteering activities.
- **Signs.** The committee recommends that a limited number of signs should be placed in sensitive areas or areas of repeated user abuse to remind users of appropriate activities.
- **Ski team.** The committee recommends that the managing body contact the Merrimack High School cross-country ski team to discuss whether the trails on the HHNP can be designed to accommodate their training needs.
- **Trail maintenance.** The committee recommends that a program of regular trail maintenance be developed and implemented by the managing body. Erosion and trail degradation caused by various user groups should be carefully monitored. Monitoring the volume of all uses is critical.
- **Trail Master Plan.** The committee recommends that a Trail Master Plan be created. This will be a design concept for a network of trails that will accommodate recommended uses in a safe, maintainable, and environmentally sensitive manner. This plan must be developed in consultation with trail management experts, such as the New Hampshire Bureau of Trails.

A variety of trails should be designed to accommodate different fitness and challenge levels for all approved uses, including relatively flat, wide trails for family use. Trails should be developed in accordance with generally accepted trail construction guidelines, including trail signs and identification, with consideration for all approved uses of each trail. The committee recommends that each trail in the system be evaluated individually, as not all activities will be appropriate on all trails.

- **Trail naming.** The committee recommends that the Town be involved in naming trails, ponds, and other areas of interest. The committee strongly suggests that some trails be named for historical persons or families.
- **User courtesy code.** The committee recommends that a user courtesy code be developed to assist in successful shared use of the property.
- **Volunteer registry.** The committee recommends that the managing body create a mechanism for registering trail maintenance volunteers. This registration ensures the



volunteer's protection from liability for damages resulting from accidents on the trails.

- **Wildlife inventory.** The committee recommends that in addition to the wildlife assessment that will be part of the forest management plan, a turtle survey be performed, looking specifically for Blanding and Spotted turtles, and looking for the Eastern Hog Nose snake. The committee further recommends that a survey for rabbit population should be conducted in the spring, as some are in decline.
- **Wildlife Management Plan.** The committee recommends that a Wildlife Management Plan be created. This may be created as part of the Forest Management Plan or may be an independent plan.



## **Section 10 Conclusion**

*This section presents concluding remarks from the committee.*

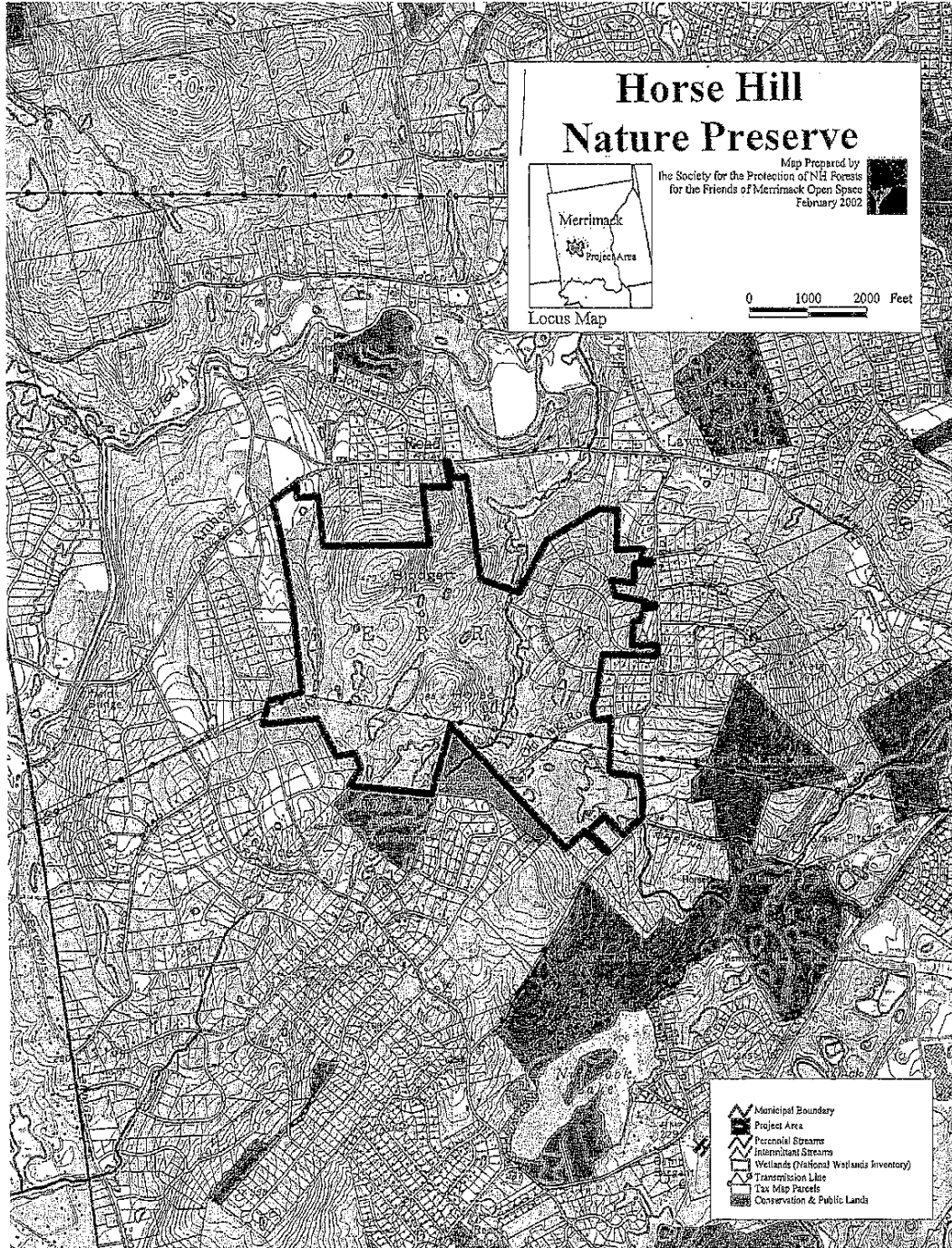
This Master Plan was developed after extensive research and deliberation by a wide cross-section of the population of Merrimack. The Master Plan Committee's members represented a variety of interests, including conservation, active recreation, passive recreation, hunting, wildlife management, motorized sports, and education. With such a large and diverse group, the fact that most of the conclusions in this report were reached unanimously speaks to the level of research and thought that went into the work.

These facts should be considered when weighing the value of the committee's recommendations. Future recommendations should be based on a comparable level of research and input from as broad a spectrum of citizens.

We cannot know what future generations may choose to do with this land. Its protection depends on the good will and intelligence of the citizens of Merrimack. We ask of future Town leaders only that you weigh your choices carefully.



## Appendix A. Location of the Horse Hill Nature Preserve











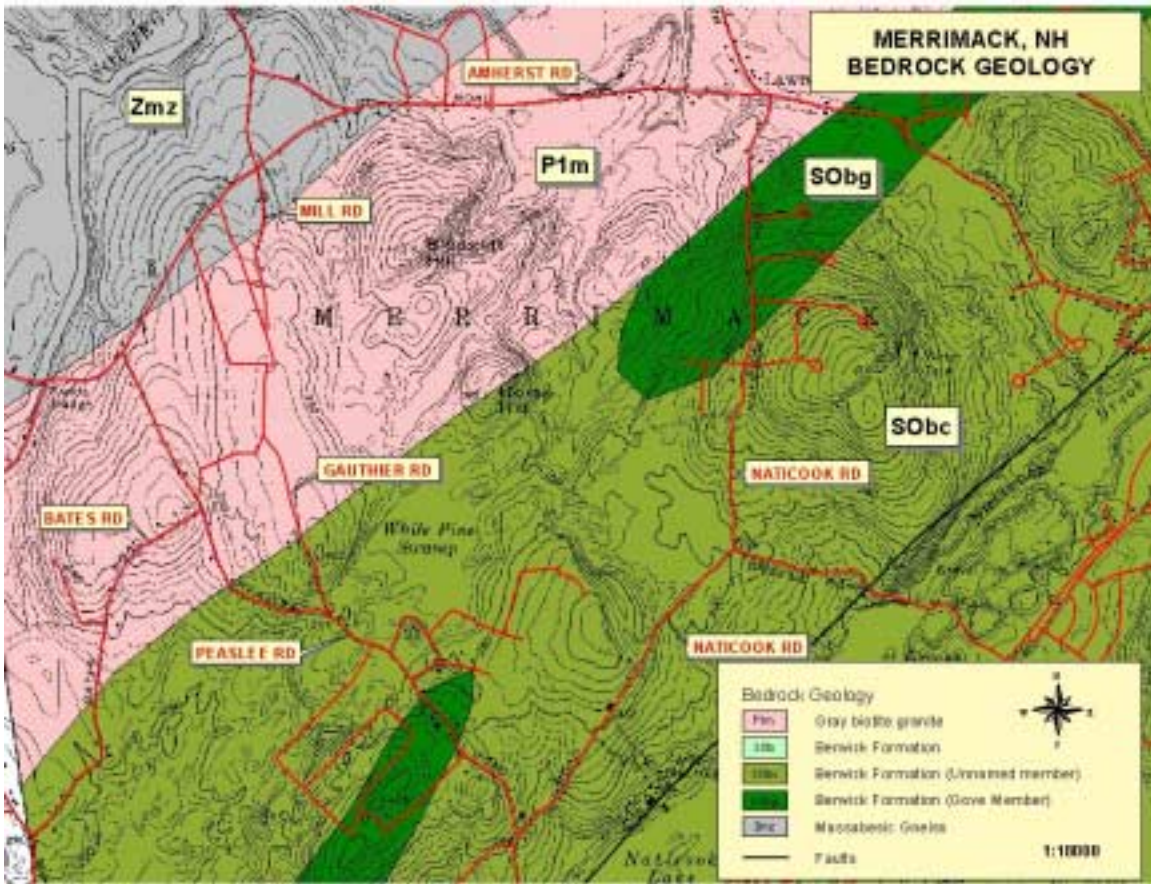
## **Appendix C. Bedrock Geology Report and Map**

The following summary describes the surficial and bedrock geological aspects of the Horse Hill Nature Preserve located in west-central Merrimack, New Hampshire. The work was compiled from fieldwork performed between June 1998 and October 2000.

Geologists have contested the nature of the contact between the Berwick Formation and Massabesic Gneiss Complex (see attached map) extends through the Horse Hill preserve. Mapped as the Massabesic Gneiss by Lyons and others (1997; Figure 1), this unit is characterized as a *mélange* of granitic and metamorphic rocks that trend northeast-southwest, and is thought to extend from northeastern Connecticut to southeastern Maine (Barosh, 1984).

The discontinuity of the bedrock can be attributed to 1) crosscutting by two-mica granite, 2) displacement along high-angle faults, namely the Silver Lake Fault due east of the property and 3) and localized depositional environments. Where recent work completed by Allard (1997) and Kerwin (2000) along the Berwick-MGC contact has enhanced the understanding of the western flank of this area, Walsh and Stewart (1999) have shown that a more complicated tectonic history at the southwestern border of the Merrimack trough has occurred.

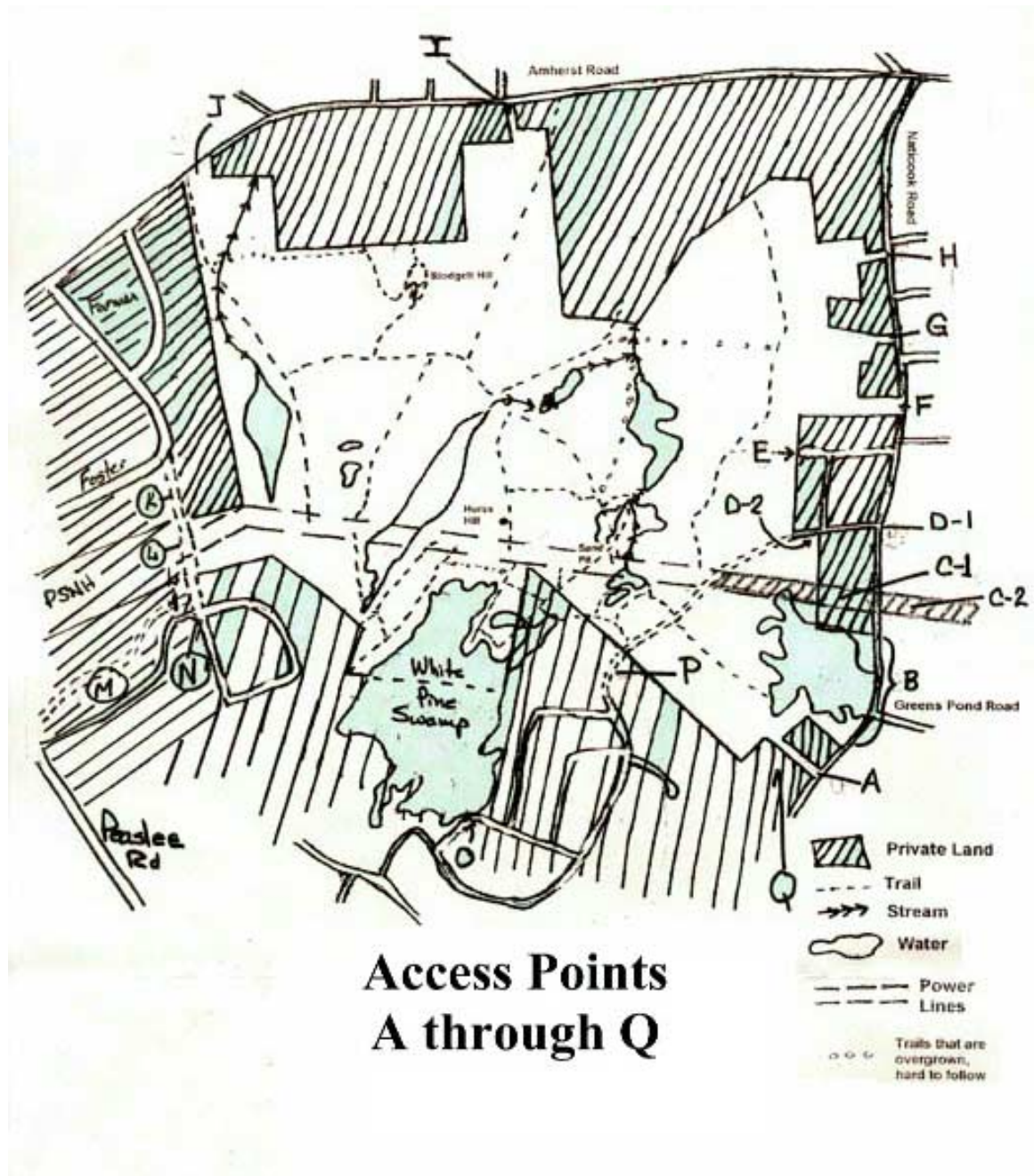
According to the available information, the preserve is located within a “Transition Zone” between the metamorphic rocks of the Berwick Formation and the granitized rocks of the Massabesic Gneiss Complex.. The bedrock consists of interlayered rock exhibiting both igneous and metamorphic rock characteristics (aka migmatite). It is composed of calcareous granofels, biotite schists, and granite sills that are exposed at the surface and exist at depths of less than 25 feet. For the purposes of this study, this metasedimentary unit has been correlated with the “Transition Zone” of Allard (1997) who first coined the term when alluding to a gradational contact between the Berwick Formation and the MGC. The Transition Zone is distinguished from Unit 3 by: 1) greater degree of rust weathering, 2) an increase in grain size, and 3) the high degree of partial melting. Within the study area, the Transition Zone has been mapped as a 0.5 km wide swath that is currently mapped as the Milford Granite (Lyons and others, 1997).



## Appendix D. Evaluation of Access Points

The access points referenced in the table are identified in the following Access Points map. The access points are considered in a counterclockwise direction starting in the southeastern corner nearest to Wasserman Park. For each access point, the committee reviewed and listed the current conditions and potential uses, and has given its opinion of future actions needed, if any, to improve it as an access point.

See *Access Points* on page 5-10 for discussion of guidelines and proposed actions.



No.	Location	Description and Comments
A	Naticook Road between private homes about half way (500 feet) between corner of Wasserman Park and Greens Pond Road.	<p><u>Description:</u> A 50-foot wide access running 420 feet back through treed and wet terrain. Parking on the shoulder of the road.</p> <p><u>Evaluation:</u> Limited to a foot trail at the most but potential wetlands impact would limit or prohibit usage. No parking area. Close to two houses. Opens into a portion of the site without current trails and many wet areas. Suggestion is to not consider it as an access point.</p>
B	Opposite the junction of Greens Pond Road and Naticook Road. About 1,000-foot of frontage on Naticook.	<p><u>Description:</u> Large flooded area with beaver dams, extensive pond and extensive wetlands. Drains into Greens Pond and the area of town wells.</p> <p><u>Evaluation:</u> Narrow areas on either side of the pond may be suitable for foot trails but very wet area limits usage. No parking except along the road with limited site view and road junction. Good area for wetlands study but limited parking and room for trails.</p>
C-1	PSNH power lines about 1,000 feet from Naticook and Greens Pond Road junction.	<p><u>Description:</u> Area under power lines is owned and maintained by PSNH.</p> <p><u>Evaluation:</u> Available for use as development into a parking lot without any buildings. Fairly level site near the road with direct access for motorized vehicles and foot traffic to many roads and trails now in use under the power lines in both directions. Good site lines for parking area that could hold maybe 10 cars without too much work. PSNH would negotiate for easement. Expansion into larger capacity lot would be difficult due to ledge.</p>
C-2	PSNH power lines parcel on the opposite of Naticook Road from #3	<p><u>Description:</u> Area under power lines similar to site across the road.</p> <p><u>Evaluation:</u> Potentially could be used for additional parking area for larger vehicles if needed. Construction of a parking lot appears to be easier than expansion of the site across the road. PSNH would negotiate for easement.</p>

D-1	Old Kings Road junction with Naticook Road	<p><u>Description:</u> Non-maintained Class VI road starts here and runs through the parcel, across power lines area (an easement has been granted to PSNH) and finally divides a private parcel before ending on a town maintained road within a housing development.</p> <p><u>Evaluation:</u> The road is too narrow to use, crosses rocky area and wetlands. Historical road is best used for walking than turning into a modern roadway. Close to private homes, divides one parcel and at access point N requires driving through a crowded development.</p>
D-2	Old Kings Road at point where Gerard ends.	<p><u>Description:</u> Junction is located in housing area with limited parking along side the road. Private homes close.</p> <p><u>Evaluation:</u> Limited parking on the dead end street. Old Kings Road is wide enough for foot traffic but has wet areas after passes rear boundary lines of the abutting residential parcel.</p>
E	Palmeri Drive cul de sac	<p><u>Description:</u> Palmeri comes in from Naticook Road and ends in a turn around area. There is parking for 5-10 cars in the circle during warm weather, during the winter snow piles will lessen the number.</p> <p><u>Evaluation:</u> Slope and wetlands restrict the extension of this road into the site. Access back onto Naticook is somewhat hazardous due to limited salting in the winter and restricted views. Trail leads off into the parcel and connects with others. It does remain a good means for foot traffic to enter the site and limited cars to be parked on the existing pavement.</p>
F	Off Naticook between and across from junctions with Cummings and Hutchinson.	<p><u>Description:</u> This was originally the planed route for a 50" wide entry road into the approved development. However, the slope is fairly steep, covered with woods and wetlands cross the entry area. Parking on Naticook is along the side of the road and very limited.</p> <p><u>Evaluation:</u> Not feasible for use as a parking area or motorized vehicle entrance. It is a good location for a trail entry primarily for residents of the housing area across Naticook Road.</p>
G	Off Naticook just north of junction with Hutchinson Road	<p><u>Description:</u> A narrow entry point with wetlands near the front. Wooded. Between residential lots.</p> <p><u>Evaluation:</u> Not feasible for use as a parking area or motorized vehicle entrance. It is a good location for a trail entry primarily for residents of the housing area across Naticook Road.</p>

*Horse Hill Nature Preserve Master Plan*

H	Off Naticook Road just south of junction with Danforth	<p><u>Description:</u> A 50 foot wide access point that leads to steep and wet terrain.</p> <p><u>Evaluation:</u> Difficult to determine even if a trail can be built around through the area. Limited parking on Naticook.</p>
I	Amherst Road close to junction with Riverside Drive	<p><u>Description:</u> A narrow area between houses leading to a fairly steep slope. Fully wooded. Parking available across the road on Riverside.</p> <p><u>Evaluation:</u> Limited to walking trail. Good site for trail connecting to Riverside Park conservation land along the river. Good entrance area for walking traffic from the housing area. Limited parking along the road, but not in winter.</p>
J	Amherst Road (next to #178)	<p><u>Description:</u> Over a 1,000 feet of frontage on Amherst. Small trees and shrubs along the road and wetlands behind. Flat area along road is dry. Existing woods road goes into site along western boundary.</p> <p><u>Evaluation:</u> A year round area suitable for a parking lot in the flat area. Access from parking area to the woods trail would be limited without crossing wetlands, which is practical. A good prospect for early development as a parking area as it is the only access point into this section of the lot and especially suited to drive-up traffic. Would require bridges, probably three, for foot traffic to get out of the wetlands into the upper forested area. Good area to develop habitat for Woodcock as the area is cleared for parking.</p>
K	Class VI road off Foster Road which is reached from Amherst through housing area	<p><u>Description:</u> An old rock wall bounded road site, probably Gauthier Road originally, that runs from Foster between houses into the southwestern area of the parcel. Enters under the power line easement and where PSNH owns land that runs out to Peaslee Road.</p> <p><u>Evaluation:</u> Bounds are unknown but the width appears to be quite narrow and not suitable for two vehicles to pass if developed into a road. Suitable for walking traffic with on street parking in the housing area. Possible use as a one-way road in/out of the site is also a consideration. Leads to a fairly large flat area suitable for development in playing fields possibly. Access under power lines leads to White Pine Swamp, Old Kings Road and finally Naticook Road area and nearby sites such as Wasserman Park.</p>

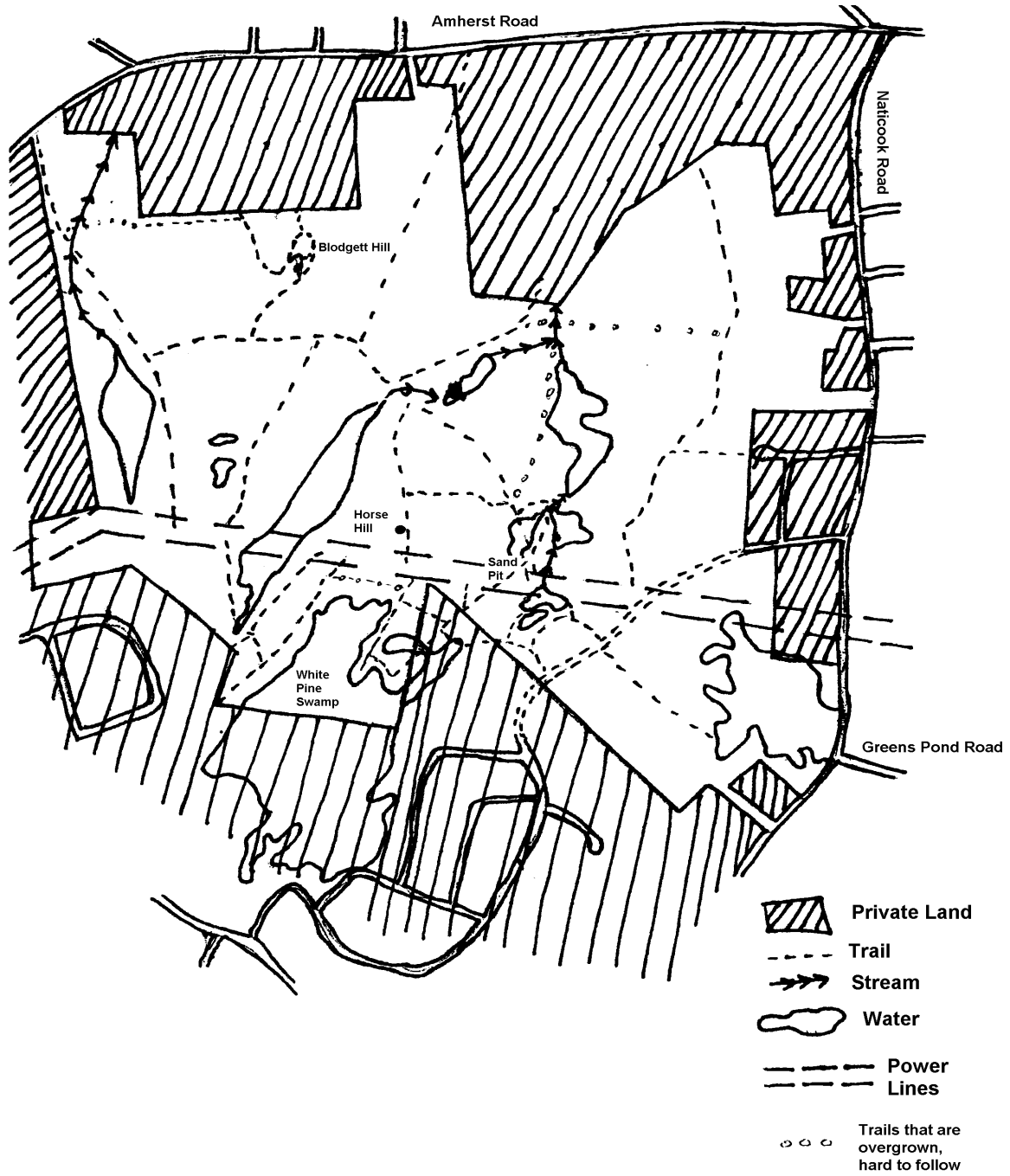
L	Peaslee Road, the PSNH owned parcel under the power lines	<p><u>Description:</u> Frontage of about 300 feet along Peaslee Road between a barn and house. Cleared area is fairly flat and then runs into roadway across wetlands and then meets parcel where above old road enters.</p> <p><u>Evaluation:</u> Good parking area along Peaslee except for close proximity of the houses Appears to be part of the house lots and has been used as such even though owned by PSNH. Unknown availability as may be easements already granted. Easy trail to the parcel as it is basically already there.</p>
M	Class VI road off Peaslee close to junction with Abbey Road	<p><u>Description:</u> Another class VI road that apparently was an extension of Bates Road over to the old Gauthier Road mention above in K and L. All three come together under the power lines in the flat area. See also the next listing. The town has granted a private residence permission to improve and develop a portion of the road as a driveway into their house. Beyond that it narrows down significantly and is overgrown.</p> <p><u>Evaluation:</u> Any parking would be on the improved driveway area or an area could be developed where it turns into the private property. Suitable for walking along the driveway but not many houses in the area to provide foot traffic. Would require work to extend and best for foot traffic only</p>
N	Junction of Abbey Road and Penny Lane.	<p><u>Description:</u> Abbey Road exists Peaslee across from Bates Road and about 70 feet away from the above Class VI road. Penny lane was the historical Gauthier Road and connects the old Class VI road mentioned above to the existing paved Gauthier Road in this subdivision. From Abbey Road a roadway was accepted by the town as part of the development. The roadway is about 50 feet wide, overgrown and with dirt mounds. It leads into the Class VI Gauthier Road just short of the power lines and enters the parcel in the flat area. If followed it would cross and exit onto Foster Road (K).</p> <p><u>Evaluation:</u> A broad enough roadway to develop as an entry point into this portion of the parcel with work. Could be part of a one-way road in conjunction with Foster Road. A walking trail is easier to develop with parking along the residential roads.</p>

O	Regal Drive where it abuts White Pine Swamp	<p><u>Description:</u> Regal Drive can be reached from Peaslee by following Spaulding. It closely abuts White Pine Swamp for about 150 feet. The 50-acre swamp is partially on the new parcel, 20 acres, and is MCC managed land. This area is used for canoe launching or access in the winter for tending the duck boxes across the ice. Across the street is a town owned parcel that is unsuitable as a house building lot.</p> <p><u>Evaluation:</u> An excellent area for enjoying the wetlands area year round. Parking is limited but the neighboring parcel has limited possibilities for several spaces.</p>
P	Southern end of Old Kings Road where it exists the parcel and becomes paved Road under the same name	<p><u>Description:</u> Continue into the housing area past White Pine Swamp, along Queens Way to Old Kings Road. The Class VI roadway is used for access to the Watonic Bowman parcel and crosses it where it joins with the roadway as mentioned in D-1 and D-2.</p> <p><u>Evaluation:</u> Although an excellent means to enter the parcel on the south side and suitable for a roadway, it cuts directly across the archery areas and could pose safety concerns or disrupt their activities at times. Parking is available and usable most times except when special events are being held. Access for walking traffic is good. Parking off Naticook in area B would be less disruptive and would grant access to the same area of the parcel. It is currently the preferred entry area for existing traffic.</p>
Q	Easement on Wasserman heights development	<p><u>Description:</u> A walking trail easement has been proposed by the developer along the northern boundary. A trail could be constructed within the 100-foot no-disturb buffer area.</p> <p><u>Evaluation:</u> The trail will permit access to/from the northwest corner of Wasserman Park section administered by the MCC. Although there is no parking it could be a key trail junction for other trails in Wasserman, Gilmore Hill Forest and connecting lands.</p>



## Appendix E. Trail Network Map

The following map depicts the current trail system. Refer to *Trail Network* on page 6-1 for a discussion of the trails.





## Appendix F. Spaulding Foundation and Old Kings Highway

The following pictures illustrate historical features of the property. Refer to *Cultural Heritage* on page 4-1 for more information.



Spaulding Foundation



Old Kings Highway



## Appendix G. Forester's Report

*The following report was prepared for a potential developer in 1999. The forest compartments referenced are identified on the map following the report.*

**FOREST MANAGEMENT RECOMMENDATIONS FOR  
609± ACRE GREENS POND DEVELOPMENT PROPERTY  
MERRIMACK, NH  
May, 1999 – J.W. Nute, UNH Coop. Extension Forester  
in Hillsborough County**

The Greens Pond Development property consists of 524 acres of forestland, 60 acres of wetland and 25 acres of open land (under the power line). The property is located within the triangle of Amherst Rd., Peaslee Rd. and Naticook Rd. The elevation ranges from 423' at the top of Blodgett Hill on the NW side of property to 225' where the stream draining White Pine Swamp leaves the property on the northern boundary line.

The forest cover is predominantly sapling size mixed hardwood regeneration resulting from heavy harvesting between 1980 and 1985. Forest compartments #1, 2 & 3, around the edge of the property, comprising 62 acres, were not as heavily cut and are predominantly 10"-24" trunk diameter white pine, red oak and red maple, with good white pine and hardwood regeneration.

In 1860, at the height of agriculture in NH, the entire property would have been cleared for pasture and crops. The present forest reflects the successive regrowth, timber harvesting and environmental influences that have occurred since that time.

### **ACCESS**

The property is surrounded by residential housing and only has minor frontage on Amherst Rd. and Naticook Rd. A discontinued town road, Old Kings Rd., crosses the SE corner of the property. Additionally, a power line and associated maintenance road crosses the south half of the property. A small amount of gravel had been excavated using this access in the late 1970's.

The terrain is gently rolling, with few surface rocks and is conducive to road building or operation of timber harvesting equipment. There is a small area of ledge on Blodgett Hill. The extensive wetlands can be easily avoided, with only minor stream crossings needing to be improved at present locations.

Most of the property boundaries are the back lines of urban house lots. They all need to be located, flagged, blazed and painted.

**FOREST DESCRIPTION**

**COMPARTMENT #1**, 20 acres

FOREST TYPE: White pine, 10"-24" trunk diameter, with similar red oak and red maple, remaining from selective harvest in early 1980's. Good white pine and mixed hardwood regeneration.

SOILS: Canton stony fine sandy loam, 15-25% slopes.

**COMPARTMENT #2**, 36 acres

FOREST TYPE: Same as # 1.

SOILS: Canton stony fine sandy loam, 8-15% slopes.

**COMPARTMENT #3**, 6 acres

FOREST TYPE: Red maple, red oak and white pine with trunk diameters of 10"-24", remaining from early 1990's selective harvest. Good white pine and mixed hardwood regeneration.

SOILS: Canton stony fine sandy loam, 8-15% slopes.

**COMPARTMENT #4**, 462 acres

FOREST TYPE: Sapling size red maple, red oak, white oak, aspen grey birch, black birch, white birch, cherry, hickory, beech, chestnut, white pine, hemlock, and sassafras. Logged heavily in early 1980's. Occasional widely scattered sawlog size white pine, red maples and oaks. Low bush blueberry groundcover.

SOILS: Variety of Canton types.

**OPEN LAND**, 25 acres

Under the power line, mixed hardwood and softwood seedlings and sprouts, with shrubs and grasses.

**WETLAND**, 60 acres

Four large (6 acres to 17 acres) open water wetlands, with 8 smaller wetlands/vernal pools. Includes 16 acres of the northern portion of 60 acre White Pine Swamp. The wetland acreage has increased (compared to 20 years ago) because of beaver activity.

## **FOREST HARVESTING RECOMMENDATIONS**

The forest is still recovering from the heavy early 1980's harvest and there is little of commercial value to harvest at this time. When the saplings and seedlings reach a pole size (6-12" trunk diameter) in 15 years, selective thinning would release the better quality stems so that they grow faster, as well as let sunlight reach the forest floor to spur regeneration. This treatment would pay big dividends in the long run with the eventual harvest of high quality sawlogs in 40-60 years, but is rarely done because of the small initial return (if any) through firewood sales and reality of short length of land ownership relative to forest management.

## **WILDLIFE**

What the property lacks in timber value, it more than makes up for in wildlife habitat value. The large size of the property is unusual for Merrimack. Larger properties greater than 100 acres in size have better attributes for wildlife, recreation, timber management, water quality and air quality than do smaller properties. The land is also adjacent to other protected properties; 87 acre Wasserman Park owned by the town on the SE and 44 acres of White Pine Swamp owned by the town on the south.

Although the dense growth of sapling regeneration does not look very appealing, it is a great habitat for a wide variety of wildlife. Also, such a large acreage of early successional forest habitat probably does not exist anywhere else in town. Wildlife, ranging from deer and moose to white footed mice and chipmunks use this habitat, but it is particularly well suited to ruffed grouse, woodcock, flycatchers, wrens, thrushes, vireos and warblers. Many of these birds have been in decline because of regional habitat loss.

The brush and low ground cover of the 25 acres under the power line provides a permanent open space or "old field" habitat for non-forest dwellers. Agricultural open areas in the county are being replaced with urban or industrial development. With NH being 83% forest, these open areas are becoming more important for wildlife. Power line clearings, although not a perfect substitute, are rapidly becoming the de facto "old field" habitat in the county. Power lines also serve as travel corridors for wildlife to migrate from one habitat to another. The power company is doing a good job of maintaining the low shrubby cover by occasional mowing of the tree species saplings and seedlings. The only suggested improvement to this habitat would be to plant fruiting small trees, such as flowering crabapples or flowering cherries, along the edges of the clearing, to increase the variety of food for wildlife.

The extensive (60 acres) and varied (at least 12 locations) wetlands on the property are home to the full range of mammals, birds, reptiles, amphibians and insects expected to be found in this environment in southern NH. The larger wetlands have increased in size in the last 20 years because of damming by beavers, which are still present. The dead white pines used for nesting by great blue herons in the White Pine Swamp were killed by beavers raising the water level. As these trees deteriorate in the next 10 years, the herons

will nest at other wetlands with recently killed trees. The southern half of the white pine swamp has been recognized for its wildlife value and belongs to the town.

Wetland buffers are protected by state law (RSA 227-J:9), suggesting that a natural woodland buffer shall be maintained within 150 feet of the wetland and that not more than 50% of the trees and shrubs can be removed from this area in a well distributed fashion. This buffer may be appropriate for aesthetics or protecting water quality, but wider buffers may be appropriate to maintain different wildlife uses. For example, recent research of vernal pools in NE Massachusetts recommended 1,000' buffers. There was a 70% decline in spotted salamanders within one year when only a 125' buffer was provided during residential development, with a similar 90% decline in wood frogs in one year, leading to the population being extirpated within 4 years.

## **RECREATION**

With such a large piece of "wild" forestland having so many urban neighbors, recreational use is bound to happen, whether approved by the landowners or not. Old logging roads, the power line maintenance road and Old Kings Road are used by 4 wheel drive automobiles (SUVs), all terrain vehicles (ATVs), motorcycles, snowmobiles, bicycles, horses and pedestrians. There are many foot trails to these roads from the surrounding urban homes. Unfortunately, there has been some abuse, with burned vehicles, road and trail erosion, refuse dumping, camp fires and target shooting.

There are two ways to go on this issue. Either the owner can limit trespassing on the property, or else he can allow recreation and strive to guide appropriate uses in appropriate places. If trespassing is barred, all boundary lines will need to be blazed and painted, with signs posted every 300', access roads will need to be gated, and the property patrolled to monitor enforcement. If recreation is allowed, the above restrictions may be needed, but signage can set limits on use and guide activities to appropriate areas. Neighboring residents can be organized to care for trails and help limit unauthorized uses.

There are presently 2.5 miles of logging roads on the property with an additional 2 miles of walking trails. Creating a walking trail around the perimeter of the property would provide more than 3.5 mile of hiking enjoyment through an interesting variety of terrain.

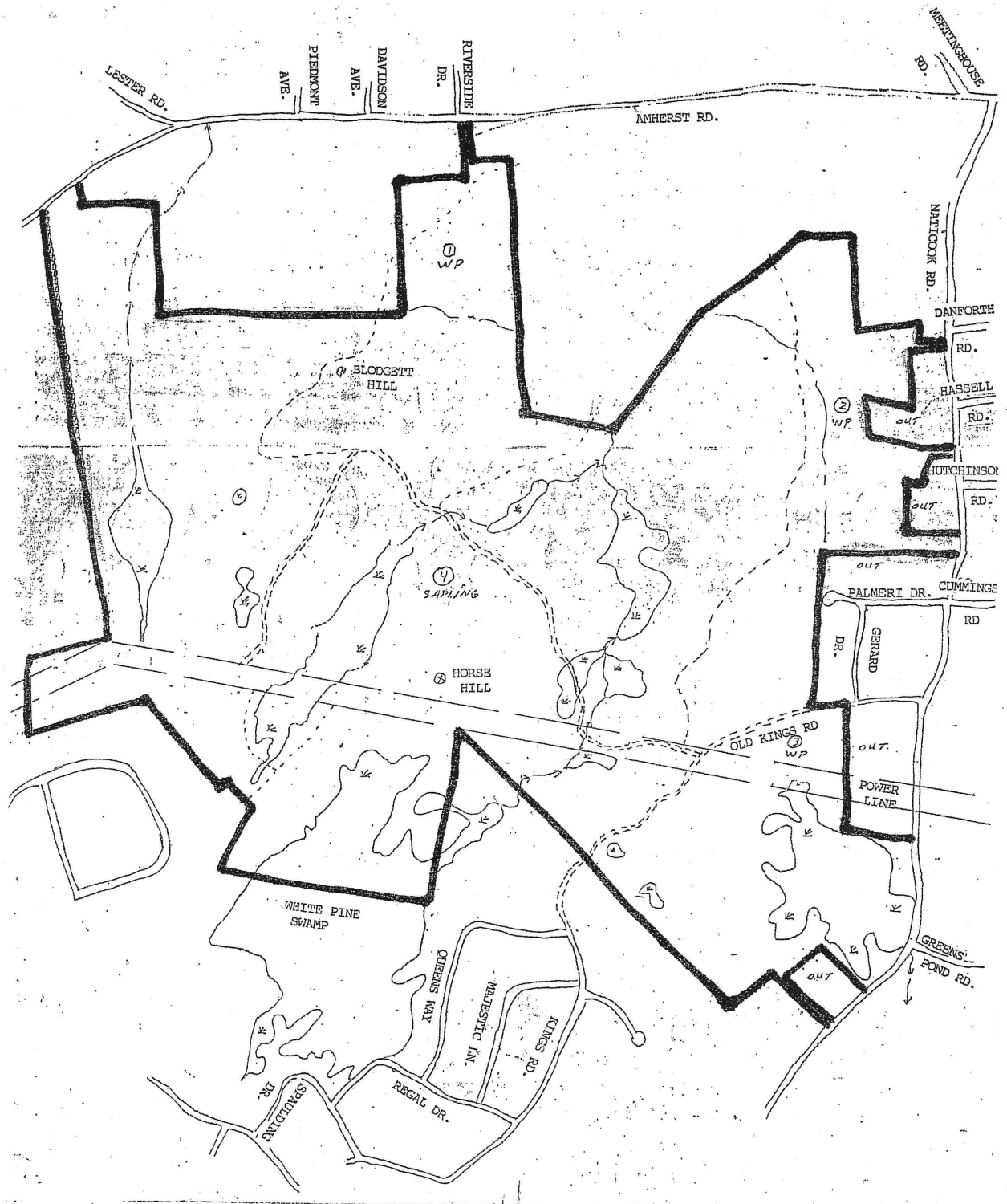
Low bush blueberries are the principal groundcover throughout the property. In sunny areas, particularly along the power line and the top of Blodgett Hill, summer berry picking could be a major recreational use. Controlled burns by state Fish and Game or Forest and Lands personnel on the hill would maintain this blueberry environment.

If a 15' observation platform were erected on Blodgett Hill, a view of the whole town and surrounding area would be possible.

Trails crossing streams and wetlands need to be rerouted or upgraded to meet current wetland crossing regulations, but this will not be difficult.



Horse Hill Nature Preserve Master Plan





## Appendix H. Subcommittee Member List

Many of the research tasks performed by the Master Plan committee were accomplished by subcommittees. The following table lists the members of each subcommittee and the tasks assigned to each. Subcommittee chairmen are identified in bold.

Readers desiring more information about specific areas of research are encouraged to contact a member of the subcommittee assigned that task.

Subcommittee Members	Task
Charles Buker <b>Debra Huffman</b> Peter Kahn Greg Kirby Karen Mattor Jim Taylor Harold Watson	Natural resource inventory. <i>a) Gather all material provided by the previous owners, such as topographical maps, soil type data, etc.</i> <i>b) Determine what further studies should be conducted to fully understand the land (e.g., botanic, biological, hydrogeologic assessments) and obtain these studies.</i> <i>c) Prepare a written summary of all data.</i>
Tim Dutton Debra Huffman <b>Karen Mattor</b>	Wetland restrictions. <i>Research state and local restrictions on wetlands and other applicable soil types.</i>
<b>Newton Coryell</b>	PSNH issues. <i>Research the PSNH easement requirements and restrictions and PSNH-owned abutting land.</i>
Roger Blais Amanda Boerner Nelson Disco Steve Keach Bill Keating Connie Kreider <b>Andy Powell</b>	Access points. <i>Research all potential access points and the status and requirements of the two Class VI roads on and adjacent to the property.</i>
John Buckley Tim Dutton <b>Andy Powell</b>	Broader context. <i>Research the broader context in which the property exists - other town-owned properties, regional properties, aquifer protection land, etc.</i>
<b>Charles Buker</b> Debra Huffman	Walks. <i>Conduct walks of the property for committee members.</i>
Chris Christensen <b>Tim Tenhave</b> Denise O'Dwyer Cathy Provencher Sue Siena	Template. <i>Study existing town plans to both locate references to this property and to develop a template to be followed for our master plan.</i>

<p>Newton Coryell Nancy Gagnon <b>Debra Huffman</b> Greg Kirby Mike Ruggiero Lynne Wenz</p>	<p>Current uses. <i>Determine current uses of the property and map existing trails.</i></p>
<p>Debra Huffman <b>Steve Keach</b></p>	<p>Trail through Wasserman Heights. <i>Contact the developers to discuss a trail through the proposed Wasserman Heights development, map the access trail and following through with any legal and liability issues.</i></p>
<p><b>Ruth Roulx</b> David Rutzke</p>	<p>Historical uses. <i>Research historical uses of the property.</i></p>
<p>Nancy Gagnon <b>Andy Powell</b></p>	<p>Liability and legal issues. <i>Work with town staff and counsel to gain an understanding of the town's foreseeable liability and legal issues involved with various uses.</i></p>
<p><b>Shannon Barnes</b></p>	<p>Community input coordinator. <i>Point person for community input.</i></p>
<p><b>Charles Buker</b> Tim Tenhave Greg Kirby Ed Carballo</p>	<p>Trash clean-up. <i>Create and execute a plan to remove existing trash from the property. Execution of the plan will require BOS approval.</i></p>
<p>Greg Kirby Lynne Wenz Ed Carballo Connie Kreider <b>Denise O'Dwyer</b> Sue Siena Janet Cormier David Rutzke Ruth Roulx Shannon Barnes Harold Watson</p>	<p>Name the property. <i>Create and execute a plan to name the property. Execution of this plan will require BOS approval.</i></p>
<p>All</p>	<p>Future uses. <i>Determine various uses for which the property should be considered. For each use identified, assess the feasibility and desirability of each based on the data gathered in previous tasks and on an assessment of community benefit.</i></p>
<p>Input from all; preparation by Debra Huffman</p>	<p>Master plan. <i>Prepare a written master plan for the property including data from all reports and discussions.</i></p>

## Appendix I. Results of Visioning Session

For the visioning session, the committee was divided into four groups. Each group created a list of the features, problems, and uses of the property. Each group then selected the top five items from each list. The results were displayed for the entire committee to discuss. The committee then developed a list of constraints that would apply to use of the property. Finally, each committee member was asked to identify their top individual selection under each of the categories (“features”, “problems” and “uses”). The following is the results of the visioning session.

Refer to *Goals and Objectives* on page 8-1 for a list of the goals that were derived from the results of these sessions.

### FEATURES

#### Group 1

1. **Size/ecological diversity**
2. **Wetlands/vernal pools/hydrology and geology**
3. **Proximity to other open space**
4. Sand pit
5. Spaulding foundation/historical features
6. Variety of wildlife
7. Bedrock
8. Trail Network
9. Limited potential access points
10. Changes in elevation
11. Power lines
12. Trail erosion
13. Hunting potential
14. Potential learning experiences
15. Aquifer recharge area
16. Fault zones/structural lineaments

#### Group 2

1. **Wetlands**
2. **Hiking/Walking/Riding Trails**
3. **Possibility of creating/connecting a wildlife corridor**
4. Aquifer watershed
5. Wildlife habitat
6. Powerline easement
7. Large tract of undeveloped land
8. Two elevated scenic views – Horse Hill and Blodgett Hill
9. Heron rookery
10. Historic foundations
11. Logging trails
12. Old Kings Road
13. Central open space

## FEATURES

### Group 3

1. **Very boney/fragile; large expanse of land; recharge area for aquifer**
2. **Diversity of wildlife vegetation; potential for wildlife conservation**
3. **Existing hiking trails**
4. Highlands and wetlands
5. Springs
6. Relatively landlocked
7. Power lines
8. Historical landmark – foundations
9. Old Kings Highway
10. Two hills – Horse Hill and Blodgett Hill
11. Sand pit
12. Beaver pond
13. Open space and forest
14. Abuts White Pond and Wasserman
15. Some trails eroded by ATVs
16. Existing trash on site

### Group 4

1. **Aquifer recharge area – watersheds**
2. **Biodiversity**
3. **Community involvement opportunities**
4. Beaver dams – turtles
5. Belongs to Merrimack’s citizens
6. Varied topography
7. Wildlife habitats
8. Cultural significance – stone walls (foundations)
9. Historical and Native American significance
10. Natural noises and ambiance
11. Blodgett Hill and Horse Hill – geologic significance
12. Hiking trails
13. Water fowl – geese and ducks
14. Potential for varied uses
15. Accessibility

**COMPOSITE OF GROUP 1 – GROUP 4**

(top three for all groups)

	# of Groups
1. <b>Ecological diversity and size</b>	3
2. <b>Wetlands/vernal pools/hydrology and geology</b>	2
3. <b>Hiking/Walking/Riding Trails</b>	2
4. <b>Aquifer recharge area – watersheds</b>	2
5. <b>Proximity to other open space</b>	1
6. <b>Possibility of creating/connecting a wildlife corridor</b>	1
7. <b>Community involvement opportunities</b>	1

**AGGREGATE RANKING**

(Ranking by # of dots)

	Dots
1. Diversity of ecology (wildlife and vegetation)	17
2. Aquifer Recharge Area - watershed	13
3. Hiking/Walking trails	12
4. Potential for wildlife conservation	7
5. Possibility of creating/connecting a wildlife corridor	6
6. Wetlands (hydrology and geology)	5
7. Historical Landmark – foundations	5
8. Central Open Space	2
9. Beaver pond	1
10. Community involvement opportunities	1
11. Limited access points	1
12. Bedrock	1

## PROBLEMS

### Group 1

1. **Limited parking**
2. **Safety concerns due to conflicting multiple uses**
3. **Noise from recreational usage and lack of enforcement**
4. Trail erosion
5. Trash (existing and future)
6. Lack of wildlife habitat plan
7. Residual lead from shooting and batteries

### Group 2

1. **Trash**
2. **Limited access**
3. **Indiscriminant target practice areas**
4. Power lines
5. Trail improvement for handicapped/physically limited people
6. Limited parking
7. Potential for overuse of trails by motorized vehicles
8. Trails crossing wetlands
9. Teenage gathering place
10. Access by emergency vehicles
11. Hunting caution

### Group 3

1. **ATV usage (fuel spills, trail erosion, hiker safety, negative impact on wetlands, impact of turtle nesting, liability, overlap of trail uses)**
2. **Unmarked and unmaintained trails (including Old Kings Highway)**
3. **Lack of access and parking**
4. Target shooting
5. Trash
6. Party
7. No rules or regulations on usage
8. Bridges needed over wetland areas



## PROBLEMS

- Group 4
1. **Parking accessibility**
  2. **Erosion**
  3. **Competing agendas for property and resources**
  4. Board of Selectman
  5. Motorized vehicles
  6. Trash – hunting shells
  7. Encroaching development
  8. Lack of education regarding the property
  9. Money
  10. Inappropriate uses
  11. Public access outside Merrimack residents

## COMPOSITE OF GROUP 1 – GROUP 4

(top 3 of all groups)

	# of Groups
1. <b>Limited parking and access</b>	4
2. <b>Safety concerns due to conflicting multiple uses</b>	1
3. <b>Noise from recreational usage and lack of enforcement</b>	1
4. <b>Trash</b>	1
5. <b>Indiscriminant target practice areas</b>	1
6. <b>ATV usage</b>	1
7. <b>Unmarked and unmaintained trails</b>	1
8. <b>Erosion</b>	1
9. <b>Competing agendas for property and resources</b>	1

**AGGREGATE RANKING**

(ranking by # of dots)

	Dots
Competing agendas for property and resources	10
ATV usage (fuel spills, trail erosion, safety, liability, negative impact to wetlands and turtle nests, overlap of trail use)	8
Trash	8
Limited parking	8
Limited parking and limited access	7
Safety concerns/conflicting multiple uses	7
Money	4
Limited access	4
Unmarked and unmaintained trails	3
Trail erosion	3
Lack of police/enforcement	2
Noise from recreational uses	2
Board of Selectmen	2
No rules and regulations on use	1
Encroaching development	1
Trails crossing wetlands	1

## USES

### Group 1

1. **Hunting**
2. **Non-Motorized Trail Use (hiking, walking, x-country ski, track)**
3. **Field Classrooms, Nature Observation, Forestry/Wildlife Management**
4. **Multiple Use Recreational Fields**
5. Playgrounds
6. Camping
7. Skateboard/BMX Park
8. Performing arts center
9. Dog park (fencing in)
10. Community Center
11. Municipal Uses (i.e. police, fire, schools, library)

### Group 2

1. **Hiking**
2. **Nature center for education**
3. **OHRV**
4. **Playgrounds**
5. **Observation Tower**
6. **Handicap trail**
7. Cross-country skiing
8. Hunting
9. Ballfields
10. Horseback riding
11. Mountain biking
12. Nature walks
13. Birdwatching
14. Community garden
15. Skateboard park
16. Camping
17. Scout jamborees
18. Bike racing
19. Cross-country racing
20. Fitness trail
21. Volleyball court
22. Multi-use trail

## USES

### Group 3

1. **Walking and Hiking – all abilities, all seasons**
2. **Hunting**
3. **Mountain Biking**
4. **Nature observation/education**
5. **Wildlife conservation**
6. Horseback riding
7. Cross-country skiing
8. Snowshoeing
9. Target shooting – archery/guns
10. ATV/Dirt Bikes
11. 4 wheeling
12. Blueberry picking
13. Ice skating
14. Sledding
15. Power line maintenance
16. Partying
17. Camping
18. Snowmobiling

### Group 4

1. **Sporting Activities (snowmobiles, hunting, fishing, x-c skiing, sledding, snowshoeing, equestrian activities, hiking)**
2. **Outdoor education**
3. **Town water supply**
4. **Wildlife Refuge**
5. **Sustainable Forestry**
6. Target practice
7. ATVs and dirt bikes
8. Photography
9. Scout projects
10. Partying
11. Wildlife corridor
12. Bird watching
13. Wildlife and cultural trails
14. Athletic fields
15. Wheelchair and walking trails
16. Dog park
17. School
18. Wildlife viewing areas
19. Habitat improvements
20. PSNH easement
21. Selling gravel
22. Transfer station
23. No usage

**COMPOSITES OF GROUP 1 – GROUP 4**

(top of all groups)

	# of Groups
1. <b>Field Classrooms, Nature Observation, Observation Tower</b>	5
2. <b>Non-Motorized Trail Use (hiking, walking, x-country ski, mountain biking, horseback riding, snowshoeing)</b>	4
3. <b>Forestry (sustainable)/Wildlife Management and conservation</b>	3
4. <b>Hunting</b>	2
5. <b>Multiple Use Recreational Fields</b>	1
6. <b>OHRV</b>	1
7. <b>Playgrounds</b>	1
8. <b>Handicap trail</b>	1
9. <b>Town water supply</b>	1
10. <b>Wildlife Refuge</b>	1

**AGREGATE RANKING**

(ranking by # of dots)

	Dots
1. Non-motorized trail use (walking, hiking, biking, x-country skiing)	19
2. Outdoor education – nature observation, education	15
3. Sporting activities	5
4. Wildlife Conservation	5
5. Hunting	4
6. Forestry and wildlife management	4
7. Multiple use recreational fields	3
8. Nature center – education center	2
9. Nature walks	2
10. OHRV – ATVs, dirt bikes	2
11. Wheelchair/handicap trails	2
12. Town Water Supply	2
13. Observation Tower	1
14. Snowmobiling	1
15. Volleyball court	1
16. Sustainable Forestry	1
17. Dog Park	1

## **CONSTRAINTS**

1. Wetland regulation – state and local
2. Money
3. Local vs. regional use
4. Management/maintenance on a continual basis
5. Neighborhood impact
6. Accessibility
7. Wildlife
8. Ecological impact
9. Impact to water
10. Board of Selectmen
11. Bedrock/ledge
12. Ability to get equipment on site
13. Area
14. Zoning
15. Sewer and water availability
16. Electricity
17. Public support
18. PSNH easement
19. Aquifer protection district
20. Weather/climate
21. Topography
22. Soils

The following is a worksheet developed from the results of the visioning session. This worksheet was used to assist the committee in evaluating how various uses for the property supported the goals developed during the visioning session.

**USE AND FACILITY EVALUATION SUMMARY FORM**

Proposed Use/Facility: \_\_\_\_\_.

**I. General Considerations:**

- 1) Is the use an existing use of the property?    \_\_\_Yes    \_\_\_No
- 2) If the answer to Question #1, above, is no, is there a demonstrated or documented need for the proposed use or facility?    \_\_\_Yes    \_\_\_No
- 3) If the answer to Question 2, above, is yes, does the use of the Property for the proposed use or facility satisfy that need in whole or in part? \_\_\_Yes    \_\_\_No
- 4) Is there currently a budget line item, capital reserve fund, or other dedicated town-funding source for the proposed use or facility?    \_\_\_Yes    \_\_\_No    \_\_\_NA

**II. Consistency with Goals: (note that the impact of any use can be direct or indirect)**

Goal 1	Contributes to Biological Diversity?	Significantly	Somewhat	Neutral	Detracts	Degrades
Goal 2	Protects Water Resources?					
Goal 3	Contributes to Trail Network?					
Goal 4	Fosters connections to other open space?					
Goal 5	Preserves/Protects Historic Features					
Goal 6	Balances Competing Interests?					
Goal 7	Impacts to Access & Parking:	None	Minimal	Moderate	Substantial	Prohibitive
Goal 8	Impacts to abutting properties/other uses	Beneficial	None	Minimal	Significant	Severe
Goal 9	Is Compatible with Target Uses?	Substantially	Somewhat	Neutral	Detracts	Disrupts

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**III. Physical Considerations: How might the proposed use/facility be limited by the following?**

	Severely	Significantly	Moderately	Minimally	Not at All
Topography					
Soils					
Wetlands					
Utilities					
Regulatory Approvals					
Funding					
Public Support					

**IV. Other Considerations:**

List any facilities or improvements that may be needed to support the use or facility such as parking, signage, etc:

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Describe any special Maintenance or Management issues that should be considered:

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Comments:

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## Appendix J. Wasserman Heights Trail Easement

*The following easement is included in the deed for the Wasserman Heights subdivision.*

### PEDESTRIAN ACCESS EASEMENT

Michael J. Clare, Sr. as Trustee of Lilac Realty Trust, with a principle place of business at 24 Lawrence Road, Salem, New Hampshire 03079 (the "Grantor"), for consideration paid grants to the Town of Merrimack, a municipal corporation, with a mailing address of 6 Baboosic Lake Road, Merrimack, New Hampshire 03054, a permanent pedestrian access easement upon certain tracts of land situated in the Town of Merrimack, Hillsborough County, New Hampshire. This pedestrian easement is shown on the plan entitled "Subdivision Plan Prepared for: Wasserman Heights, Map 3B, Lot 259, Naticook Road, Merrimack New Hampshire," by Keach-Nordstrom Associates, Inc., dated January, 2003, last revised 5-19-02, recorded with the Hillsborough County Registry of Deeds as Plan No. \_\_\_\_\_.

Said pedestrian access easement is permitted over all portions of the 100 foot No-Cut Buffer situated on Lots 3B-259-6 and 3B-259-14, as shown on the Plan. The Town of Merrimack and its authorized agents shall enjoy the right to construct, maintain, and permit public access over unpaved pedestrian access trails for the purpose affording access to Town owned land at Map 3B-Lot 260 from Naticook Road and Wasserman Heights Road. Use of such access shall be limited to pedestrians. No motorized vehicles shall be authorized to use such trails.

The Pedestrian Access Easement shall prohibit the Grantor it successor and assigns from planting trees, shrubs, bushes or constructing any fence or other obstructions within the easement area in order to allow non-vehicular, pedestrian travel across said easement area.

The Town, its employees and agents shall have the right to enter and leave the easement area with workers, equipment, and material in order to survey and inspect the easement, to maintain the easement, and to carry out the easement purposes. By accepting and recording this easement the Town covenants and agrees to repair or replace in a workmanlike manner all areas within the easement damaged or destroyed by its employees or agents.

The rights, conditions, restrictions and duties created by this deed shall run with the land and shall accrue to and be binding on the successors in interest, heirs, and assigns of the Grantor and the Town.



## Appendix K. References

- Hydrogeology of Stratified-Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire, United States Geological Survey, Water-Resources Investigations Report 86-4358.
- Ground-Water Resources In New Hampshire: Stratified-Drift Aquifers, United States Geological Survey, Water-Resources Investigations Report 95-4100.
- Water Quality Assessment of the New England Coastal Basins in Maine, Massachusetts, New Hampshire, and Rhode Island: Environmental Settings and Implications for Water Quality and Aquatic Biota. United States Geological Survey, Water-Resources Investigations Report 98-4249.
- New Hampshire Ground Water Conditions. Ground Water Protection Council.
- Discussions with Fred Bickford, Hydrologist, Sandwich NH.
- Discussions with Brian Wilson, Merrimack Village District Director.
- Soil Survey of Hillsborough County New Hampshire, Eastern Part. United States Department of Agriculture, Soil Conservation Service.
- Plan of Land, Merrimack Tax Maps 3B, 3C, 4B, 4C. Hayner Swanson, Inc., Civil Engineers/Land Surveyors, October 25, 2002.
- Town of Merrimack Zoning Ordinance and Building Code, 2.02.7 - District W, Wetlands Conservation District - Permitted Uses
- Merrimack Land Use Map, developed in 2001
- Merrimack Conservation Commission managed land listing
- Bedrock Geologic Map of New Hampshire. U. S. Geological Survey. Lyons, J. B., Bothner, W. A., Moench, R. H., and Thompson, J. B. (1997)
- Structure and Bedrock Geology of the Massabesic Gneiss Complex in Southern New Hampshire, Kerwin, Charles M. (2000) Unpublished Master's Thesis
- Metamorphic Petrology, Structure and Bedrock Geology of the Berwick Formation within the Mt. Pawtuckaway 7.5-minute quadrangle, Raymond and Nottingham, NH, Allard, S. T. (1998) Unpublished Master's Thesis
- Bedrock Geologic Map of the Windham Quadrangle, Rockingham and Hillsborough Counties, New Hampshire: Walsh, G. J. and Stewart, F. C., Jr. (1999) *US Geologic Survey Open File Report OF-98-8*

### **Documents from the Town of Merrimack:**

Town of Merrimack Master Plan  
Town of Merrimack Capital Improvement Plan  
Town of Merrimack Buildout Study  
A Master Plan for Wasserman Park  
Town of Merrimack Recreational Survey  
Town of Merrimack Sewer Master Plan  
Town of Merrimack Playing Field Assessment

## **HHNP Reference Library**

- I. Agendas and Minutes**
- II. Background Information**
  - a. CD of original maps by Haynor-Swanson, Inc.
  - b. BOS Charge
  - c. Committee Member List
  - d. Maps of Property
  - e. Local priorities for Town of Merrimack by NRPC as of 1/2000
  - f. 1998 town wide survey
  - g. 1972 proposed development map
- III. Subcommittees Reports**
  - a. Members list
  - b. Access points
  - c. Liabilities and Legal Issues
  - d. Natural Resources
    - i. Forest Management
    - ii. Ground Water
    - iii. Soils types and Assessment
  - e. Open Spaces in Merrimack
  - f. PSNH
  - g. Renaming
  - h. Template
  - i. Wasserman Heights
  - j. Wetlands restriction
- IV. Presentations and Seminars**
  - a. ATV
  - b. Audubon
  - c. Beaver Brook Association
    - i. Trail Development, Construction, and Maintenance Seminar.
  - d. NH Bureau of Trails
    - i. Best Management Practice - Soils Erosion Control during Trail Construction and Maintenance
  - e. NH Fish and Game
  - f. MYA
  - g. SnoBuds
  - h. Society for the Protection of NH Forest
- V. Visioning Session**
  - a. Process
  - b. Results
  - c. Goals
- VI. Uses**
  - a. Current
  - b. Historical
  - c. Recommended
    - i. Pros / Cons position statements

**VII. Communications**

- a. Committee emails
- b. Community emails
- c. Community ATV emails
- d. Newspapers
  - i. Articles
  - ii. Editorials
  - iii. Letters to the editors
  - iv. Press Releases

**VIII. Management Recommendations**

**IX. Master Plan**

- a. First Draft
- b. Second Draft
- c. Additional Revisions
- d. Final Draft

**X. Clean-up Day**

- a. Donors
- b. Photographs
- c. Sub-Committee Reports