

Town of Candia Open Space Plan



**Prepared For the Town of Candia by the
Candia Open Space Task Force**

**Funding and Technical Assistance provided through the
CTAP and the Southern New Hampshire Planning
Commission**

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Candia Open Space Plan:

This Report has been prepared for the Town of Candia and was accepted by the Candia Planning Board on November 2, 2011

It is extremely important to note that landowners whose land falls within the green infrastructure identified by this plan are free to make use of their land as they see fit, consistent with applicable laws and regulations. Inclusion of land within the green infrastructure is NOT an indication that the Town of Candia has any legal interest in the land or has any intention of taking the land for a public purpose.

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Executive Summary

The Candia Open Space Plan was developed as a tool for future open space management planning. When the Town of Candia moves forward to make plans for existing open space within the town, buy or reviews parcels for future development, this plan will help determine the best parcels to be used for each situation. It will also act as a way to ensure that the open space within the town will be maintained so that the high quality of life for all residents is preserved.

Section 1, Introduction

Foreword

This Open Space Plan has been prepared by the Town of Candia's Open Space Task Force (OSTF) with funding and technical assistance provided through the I-93 Community Technical Assistance Program (CTAP)¹ and the Southern New Hampshire Planning Commission (SNHPC).

The last Open Space Plan was completed in 2001 with the assistance from the SNHPC. This plan is intended to update and supplement this information as the town looks to protect their open space. The Conservation Commission funded a Natural Resources Inventory, mentioned on page 8, which was completed in 2010 and was also helpful in completing this plan. This Open Space Plan should be considered for acceptance by the Planning Board as the Town of Candia's official updated Open Space Plan section of the Master Plan.

An Open Space Plan contains policies and actions that will assist the town with future development decisions, while also encouraging town leaders to promote open space protection. The plan is also an inventory of the environmental features in the community, including water, soil, habitat, forests, and a number of other elements. When these elements are layered over each other, the areas with the highest potential for open space protection become apparent. The plan helps identify and prioritize the Town's remaining open space and gives options in protecting these key areas.

The 2004 Master Plan reinforces the fact that residents place importance on the need for open space protection. The following is an excerpt from the Master Plan vision statement:

Through the support of local residents and an active planning program, the following characteristics define Candia for the future:

...A **healthy environment**, characterized by:

- intact and protected natural systems that maintain clean water and native wildlife populations; and clean, unpolluted air;
- preserved scenic features and open spaces that in combination sustain Candia's rural character and ecological well-being; and

¹ CTAP – The Community Technical Assistance Program (CTAP) is a New Hampshire Department of Transportation (NHDOT) 5 year initiative to assist 26 communities that will be affected by rebuilding and expansion of Interstate 93 by providing technical assistance and access to tools for innovative land-use planning. These 26 communities include Allenstown, Atkinson, Bedford, Bow, Candia, Chester, Concord, Danville, Deerfield, Dunbarton, Fremont, Goffstown, Hampstead, Hooksett, Hudson, Litchfield, Londonderry, Manchester, Pelham, Raymond, Salem, and Sandown. For more details, go to the CTAP website at www.nhctap.com.

- sustainable use and stewardship of natural resources...

The Town of Candia, town officials, along with the Planning Board and Conservation Commission and other Boards and Committees, should look to this Open Space Plan to guide future open space planning and protection actions of the town, particularly as various modes of protection, (voluntary, educational, regulatory or land acquisition) are implemented.

In the development of this Open Space Plan, the charge of the OSTF was:

The Candia Open Space Task Force shall identify and develop a prioritized list of agricultural, open, and undeveloped land that should be protected from residential, commercial and industrial growth to preserve the Town's natural and cultural resources and, agricultural character and quality of life. In subsequent efforts, the Task Force shall, in collaboration with other Town Boards, Commissions and staff, undertake other tasks identified in the Candia Master Plan aimed at implementing the protection of the lands identified.

By carrying out and implementing this plan, the Town of Candia will be able to protect the open space and natural resources that the town highly values.

Background

This open space plan can be viewed as a guide for the community to recognize the need for preservation of open lands. Open space planning in New Hampshire is an ongoing activity that is conducted mainly through the work of the Conservation Commission and Planning Board. The Candia Open Space Task Force (OSTF) is an integral part of this open space planning effort.

In preparing this plan, the OSTF met five times during 2010 on the following dates: February 24th, March 1st, March 29th, April 19th, and May 3rd.

The first effort of the OSTF was to identify the natural resources and important natural and cultural features of the Town's landscape and to assign relative values to these various resources through the Delphi Process as explained further in Section 2. Mapping these resources throughout the community provides a delineation of the Town's natural resource network or "green infrastructure". As key areas are identified from this network, the OSTF has suggested strategies and priorities to guide Candia's future open space protection efforts. The estimated cost associated with protecting these lands is also determined.

This report is organized into the following five sections including this Introduction, Plan Development, Priorities, Financial Planning, and Recommendations. Detailed information on the technical methods is contained in Appendix B, OSTF Technical Supplement, of this report.

The Need for Open Space

A green infrastructure open space network provides many benefits for Candia citizens, including:

- **Economic:** Cost of community services studies, completed by Phil Auger of the UNH Cooperative Extension (see page 22), show that towns that maintain open land and manage growth save hundreds of dollars per family in infrastructure costs for roads, safety services, and other municipal expenses. A similar study for the Town of Candia was conducted in 2009 by the Southern New Hampshire Planning Commission, which reinforced the findings of the original study (see page 22).
- **Health:** Open space lands, particularly in the form of forested areas and aquatic buffers, filter pollutants out of the air, and provide the water supply that allows for continued growth and development.
- **Rural character:** Candia, a town that prides itself on its rural qualities, adds aesthetic and social value through open space lands.
- **Recreation:** Candia residents can benefit from a host of recreational opportunities afforded through open space.
- **Ecology:** Open space lands support and preserve the unique biodiversity and wildlife habitats contained in Candia.

The open space priorities are determined through a social and environmental inventory, determining the needs of the town for health, affordability, recreation, aesthetic value, and wildlife habitats. The environmental inventory includes water, soils, habitat, forests, and a number of other elements. When these elements are layered on each other the areas with the highest value for open space protection become evident.

Candia Natural Resources Inventory

Concurrently with the development of this plan, a Natural Resources Inventory (NRI) was conducted in the Town of Candia by Moosewood Ecological, L.L.C. The purpose of this project was to provide baseline research, mapping and analyses on existing natural resources data to update the Natural Infrastructure section of the 2004 Master Plan and to provide basic guidance for open space planning. The NRI and this Open Space Plan Update complement each other in identifying critical natural resources in need of protection.

The NRI report provides detailed information on water, ecological, agricultural, and forest resources and conserved lands. It also has background information on the physical landscape of Candia.

There were two community forums conducted as part of the NRI in order to involve the Town's residents in the public planning process. The first forum was held on November 5, 2009, which introduced the project, including the goals for each component. A discussion was facilitated on growth and natural resource protection and identified the strengths and challenges of Candia's natural resources. Also, a list of Candia's most important natural resource areas was started.

The second forum was held on June 15, 2010 and continued the conversation on growth and natural resource protection. This included discussion on identifying what natural resources

are most important to the Town of Candia. This discussion was followed by an exercise that ranked natural resources for protection. The results of this exercise were used in a co-occurrence analysis with prioritizing areas for conservation.

The findings from this study identified critical areas for protection. They match the areas identified through the Delphi Process in this plan (see Section 2, Plan Development). Both the NRI and the OSP help reinforce the need to protect certain areas of town for open space. The plan is currently in draft form at the time of report but is expected to be released soon.

Existing Conditions

In developing an Open Space Plan, it is important to consider the existing conditions in the community to assess potential areas for conservation. Natural characteristics such as slope, soil type, topography, and availability of water resources may either encourage or limit development in a particular area. The following section is a narrative discussion of both the natural and cultural features of the Town of Candia.

Physical Setting

Candia covers approximately 30.6 square miles (19,557 acres) of mostly forested and hilly terrain. There are several hills and one mountain ranging from 600 feet to more than 900 feet. The hills include Patten Hill in the southwestern corner; Walnut Hill, in the north-central part of town, and an un-named hill, sometimes referred to as “Diamond Hill” in the center of town. Hall Mountain, located in Bear Brook State Park is in the northwestern corner of Candia.

Soil Types and Open Space

According to a study by the American Farmland Trust, 1 million acres of irreplaceable agricultural lands are lost to sprawl each year in this country. The house-building industry, however, doubts that a farmland crisis exists.

With the US population expected to grow 23 percent by 2020, some land currently being farmed will likely be needed for housing - but how much? Many times developers will purchase and build on farmland that often provides the “perfect” conditions for the development of housing: well-drained soils, low slopes, and ease of topsoil removal.

Although the remaining amount of active farmland in Candia has decreased over time, this section contains a brief discussion of prime farmlands and farmlands of statewide importance.

➤ ***Prime and Unique Farmland***

Prime farmland is land best suited for producing food, feed, forage, fiber and oilseed crops, and is available for these uses. The land could be cropland, pastureland, forestland, or other land but not urban built-up land or water. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality and/or high yields of a specific crop when treated and properly managed. Rockingham County examples of such crops are apple orchards and vegetable gardens.

There are 406 acres of prime and unique farmland in Candia, comprising about 2% of the Town's total area. Since most of these farmlands tend to be level and well drained, there is a concern that they may be considered prime targets for future land development projects.

➤ ***Farmland of Statewide Importance***

Farmland of statewide importance is needed for the production of food, feed, fiber, forage and oilseed crops. Criteria for defining and delineating this land were determined by state and local agencies in New Hampshire. The soils in this category are important to agriculture in New Hampshire, yet they exhibit some properties that exclude them from prime farmland, such as erodibility or susceptibility to drought. These soils can be farmed satisfactorily with good crop yields by greater use of fertilizer, soil amendments and erosion control practices.

Farmlands may include pastures, sheep and horse farms, and "pick your own" operations as well as dairy farms. The protection of agricultural land represents a substantial challenge--a balance must be achieved between the rights of landowners, the need for development, and the preference among many residents for a rural lifestyle.

As a farmland protection policy, the town could consider designating prime agricultural areas. Farmers within such areas might be encouraged to participate in New Hampshire's Natural Resource Protection Service Farmland Protection Program, which allows farmers to agree to keep their land in agricultural use in exchange for a payment from the state. Conservation easements and deed restrictions for farmland protection might also be considered, along with a Transfer of Development Rights (TDR) program.

So how do soil types affect the use and designation of open space? Wetlands are a great selection for open space, since they are a prime area to preserve for the community. Floodplains are another area to preserve, since they should not be considered a prime area for development. Other areas include steep slopes, woodlands, prime farmlands, aquifers, and other lands that support wildlife and their habitat.

➤ ***Steep Slopes***

Much of Candia is gently rolling land forming gradual ridges and lower wetland valleys. Limited areas having steep slopes, greater than 15%, are generally located in association with the hilly southeastern and western corners (Patten Hill, Tower Hill) of the town and the northwest corner (Hall Mountain). The steeper topography provides a visual background to views of the farm and village landscapes.

If cleared of vegetation, the steep slopes would be more prone to erosion, cause more rapid and deeper flooding of the runoff streams, jeopardize downstream water quality, and reduce the appeal of views throughout the community. Thus, the slope of the land has important implications for future land use choices. If development of steep slope areas is carried out without designing and installing adequate waste disposal systems and implementing erosion control measures, problems will likely result.

Areas with slopes in excess of 25% should be carefully monitored in order to prevent uses that would result in negative environmental impacts. Steep slopes should be protected from development and should be managed for wildlife habitat and sustainable timber production.

➤ ***Sand and Gravel Deposits***

The terms “sand” and “gravel” as used herein are defined by the Natural Resources Conservation Service (NRCS) as natural aggregates considered suitable for commercial use with a minimum of processing. The properties used by the NRCS to evaluate the soil as a probable source of sand or gravel are gradation of grain sizes, the thickness of the deposit, and the content of rock fragments. A soil rated as a “probable” source has a layer of clean sand or gravel that is up to 12% silty fines. The material must be at least three feet in depth and less than 50% large stones by weight. Each soil is evaluated to a depth of 5 to 6 feet. Soils not meeting these standards are rated as “improbable” sources. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand or gravel. In many instances, these sand and gravel deposits occur in naturally significant features such as floodplains, aquifers, NWI wetlands and hydric soils as well as water bodies.

The NRCS has identified approximately 490 acres (about 2.5% of the total land areas) as probable sources of sand and gravel in the Town of Candia. About 17 acres of this land is considered strictly sand. There have been no sites identified by the NRCS as strictly gravel. The areas in Candia where the soils are classified as probable source of sand and gravel are limited. The most significant concentration of a probable source of sand and gravel is found in the north-central part of the town, just south of the Deerfield line. Smaller sites are located in the northeastern part of Town, just east to Deerfield Road (NH Route 43) and off to the northern and southern sides of Raymond Road (NH Route 27) at the Raymond line. Relatively small sources of sand and gravel are also located south of NH Route 101 to the west of Brown Road and between Brown Road and Palmer Road. Other concentrations

of sand and gravel deposits can be found in the southwestern corner of the Town just under the Chester Turnpike, and to the west of Tower Hill Road.

Hydrological Features

Sites that protect surface and sub-surface water resources are an important aspect of any Open Space Plan. It is important to protect the water's edge for water quality as well as maintaining public access.

➤ ***Watershed Boundary***

Candia is part of two large drainage basins, the Piscataqua (Lamprey) River basin and the Merrimack River basin. The dividing line between these basins runs diagonally from the northwestern corner of the town to the southeastern corner. The Piscataqua (Lamprey) River basin directs surface water toward the coast of New Hampshire; the Merrimack River basin directs surface water inland.

Except for Hall Mountain, all of the area north of the dividing line between the two river basins drains to the Lamprey River, largely via the section of North Branch River that runs through Candia. All of the area south of dividing line, and the southern part of Hall Mountain, drains to the Merrimack River largely via Tower Hill Pond, which drains into Lake Massabesic, the water supply for the Manchester area.

Due to the number of hills in Candia, there are several smaller watersheds scattered throughout the town. The Lower Suncook watershed is located in northwest corner, the Lamprey River watershed is the northeastern and north-central portions of town, the Cohas Brook watershed is in the southwestern and south-central part of town, and Exeter River watershed is in the southeastern corner of town.

➤ ***Floodplains***

The frequency and chance of occurrence is the terminology used to describe a flood. For example a "100 year" flood is a flood that has a 1-in-100 chance of occurring in a given year.

Most state, federal and local agencies use the 100 year flood as the base for regulatory purposes. In 1975, the U.S. Department of Housing and Urban Development, Federal Insurance Administration, issued special flood hazard area maps of Candia, showing locations of 100 year flood areas. Such areas have been identified throughout the town in proximity to brooks, rivers and wetlands. The largest of the special flood hazard areas have been identified adjacent to the North Branch River and Moose Meadow Brook, and surrounding Kinnicum Pond and Tower Hill Pond.

Rather narrow floodplains are associated with the lowland streams, ponds and wetlands in Candia's major watersheds – the Lamprey River Basin (North Branch River) and the Lower Merrimack River Basin (tributaries running into Tower Pond). The valley floodplains generally are located north and south of Route 27 in an east – west alignment. The floodplains should remain in their natural condition

to accommodate runoff water during snowmelt and rainstorm periods and to provide wildlife habitat.

Candia's floodplain lands also contain a number of historic mill and dam sites. These lowland areas can become important greenway corridors for recreation trails linking historic sites, natural areas and recreation features in the community. Flood insurance regulations, which are administered by the town as a requirement for flood insurance availability, mandate that the central channel of the floodplain, called the floodway, be kept development free to allow the flow of flood waters without damage to man-made structures.

➤ ***Wetlands***

Wetlands are an extremely valuable natural resource. Wetlands act as flood control areas where water is stored during periods of peak runoff to avoid flooding and as settling basins for sediment generated by erosion. They also filter pollution, recharge the groundwater and streams and are habitats for wildlife.

Wetlands and hydric soils are found in valley areas throughout the Town of Candia. A large concentration of wet area is found in the western portion of the town in association with Maple Falls Brook, Moose Meadow Brook and the southern tributary of the North Branch River. In the east portion of Candia wetlands are associated with the Murray Hill Brook drainage. The streams carrying runoff from Patton Hill, Walnut Hill, Tower Hill and Hall Mountain frequently border wetland environments. Many small wetland areas are distributed throughout the town. A large wetland on the North Branch River straddles New Boston Road in the north section of town and abuts the former town dump. The dump has been capped and wells situated around the area are monitored for possible leaching into wetlands.

➤ ***Aquifers***

Aquifers, much like wetlands, serve as a storage place for water. An aquifer can consist of surficial geologic deposits, such as sand and gravel, or it can be fractured bedrock, but it must be able to store and allow the movement of water.

Aquifers are one of New Hampshire's most critical and important natural and economic resources. This is especially important in the Town of Candia because all of the Town's population relies upon groundwater (aquifers) as its primary source of drinking water. The main aquifers found in Candia are fractured bedrock or unconsolidated glacial deposits commonly referred to as stratified drift aquifers. Stratified drift aquifers are composed of coarse to fine consolidated glacial melt water deposits and are typically found adjacent to or within the basins of major streams and rivers.

Stratified drift aquifers in many municipalities are the principal high yielding aquifers for community water system wells. The distribution and hydraulic characteristics of stratified-drift aquifers are related to the original environment in which the sediments were deposited. Stratified-drift aquifers also provide coarse aggregate material used for construction.

The lowland associated with North Branch River in the northwestern section of town, and the lands associated with Mill Brook in southern part of town contain the largest reserves of water. Most of the aquifers in Town are classified as glacial till which have moderate underground water resources.

➤ **Wetland Conservation District**

Current zoning includes a **Wetland Conservation District**. The purpose of this district is to protect wet areas, including wetlands, aquifers and potential water supplies, from incompatible development. Allowed uses in these areas are generally limited to farming, forestry, wildlife habitat development, outdoor recreation, and conservation. New structures, dredging or filling are generally prohibited. There are buffer provisions that require structures and septic systems to be set back specified distances, ranging from 50 to 100 feet, from delineated wetland boundaries. A 150 foot buffer has also been placed around the Lamprey River for commercial zoning purposes. Most development in these zones is subject to review by the Planning Board, Board of Adjustment and/or Conservation Commission.

Historical Sites

Lands and sites of cultural and historical importance should also be considered in the evaluating properties for open space protection. The National Register of Historic Places (NRHP) categorizes sites to be of historical significance in the region.

Historic Sites included in the NRHP in the Town of Candia are:

- Sam Walter Foss Homestead
- First Baptist Church
- Village Cemetery
- Marker
- Island Cemetery
- Candia Historical Society
- St. Paul's Catholic Church
- Moore Park
- Fitts Musuem
- Soldiers Monument
- Smyth Public Library
- Congregational Church
- Hill Cemetery
- Holbrook Cemetery
- East Candia Cemetery
- MacDonald's Mill Site

Recreational Opportunities

Lands that offer personal or socially interactive recreation, or active or passive recreation, are essential elements of the open space system. Universal access should be provided at a variety of appropriate places where development of such access will not compromise the character of the area.

The Town of Candia recognizes the opportunity to provide responsible recreation for all types - walkers, skiers, snowshoers, people with strollers or wheelchairs, horseback riders, mountain bikers, hunters, fishers, and ATVs. There are also numerous hiking trails. Also, 4 ½ miles of the Rail Trail from Manchester to Newfields runs through Candia. Further study is needed to evaluate trail use and to suggest a recreational network to serve the spectrum of trail users in this town. Not all open space land is appropriate for trail use and/or public access, but there remains potential to better connect and expand existing trails.

The town also maintains park facilities and fields for recreational use, many of which also highlight the natural surroundings. The recreation fields behind the school are available to residents. Moore Park provides formal and casual recreation through the playground, skate board park, fields, basketball courts and clubhouse. The Candia Youth Association, a non-profit organization, also has a 42 acre parcel of land that provides recreational opportunities for children and adults in Candia including baseball and soccer fields.

The advancement of recreational opportunities in Candia can also expand the social network of the town. Residents can meet neighbors while hiking a trail, hold town festivals in newly-established parks, and work together to construct improvements to public open spaces. The increased social benefits of open space again reinforce the rural character of the town.

Section 2, Plan Development

Step 1

The first step in the development of this Open Space Plan is the identification of “high value” natural resources within the town.² The SNHPC staff presented a series of Geographic Information Systems (GIS) maps of various natural and scenic resource data, including hydric soils and wetlands, aquifers, floodplains, prime agricultural soils, steep slopes, forested lands, wildlife habitats, scenic views, ridgelines and hilltops, and unfragmented lands over 50 acres in size. The data source of these maps is located in the Appendix B. The OSTF then reviewed these maps and selected as shown in Table 1 below the most important natural resources and features within Candia. These natural resources and features are grouped into the five broad categories as shown in yellow highlight in Table 1.

ROUND 2 TALLY SHEET	Round 1	Round 2
Enter # of Participants:	6	
Soil Conditions		
Important Forest Soil Group I & II	11.7	12.7
Local Agricultural Soils	11.2	0.0
Prime Agricultural Soils	7.5	0.0
State Agricultural Soils	4.2	0.0
Agricultural Soils	0.0	17.5
<i>Soil Condition Total Score</i>	34.5	30.2
Open Space Continuity		
Unfragmented Areas > 50 acres	2.5	2.0
Unfragmented Areas > 100 acres	5.3	6.7
Unfragmented Areas > 500 acres	14.2	14.2
NH WAP Highest Ranked Habitats	5.8	5.8
<i>Open Space Continuity Total Score</i>	27.8	28.7
Water Quality		
Aquifer Transmissivity 0 - 2,000 ft ³ /day	8.5	8.3
Aquifer Transmissivity > 2,000 ft ³ /day	0.0	0.0
Named wetlands and perennial streams & 250' Resource Area	6.7	4.5
Unnamed wetlands and intermittent streams & 100' Resource Area	7.5	9.5
<i>Water Quality Total Score</i>	22.7	22.3
Views / Quality of Life		
Scenic Views/Ridgelines & Hilltops	2.2	5.3
Riverway Paths/Old Railroad Beds	1.3	2.0
Old Farms/Vineyards	11.5	11.5
<i>Views / Quality of Life Total Score</i>	15.0	18.8
Slopes		
Slopes >25%	0.0	0.0
	100.0	100.0

Table 1, Resource Data and Weighting Scheme

² High value natural resources are defined by the town as the most important natural features to conserve.

Step 2

The second step was to assign relative weights to the various natural resources to establish their suitability for protection. Weights were assigned through a “Delphi”³ process during which each individual OSTF member suggested a weighting scheme by dividing 100 points up between each category. The members then compared each of their individual results to the group average, discussed differences and revised their schemes. It was decided after the first round to group all three agricultural soils (local, prime and state) together. In the second step of this process the members reached near consensus on how to divide the points within each category. Table 1 shows the relative weight, on a percentage basis, placed on each of the resources.

SNHPC staff then computed resource values across the entire town based on the weighting scheme shown in Table 1. Map 1 is a co-occurrence map that shows where multiple resources occur in the same area. The subsequent maps show, respectively, where areas of productive soils (Map 1A), water quality (Map 1B), open space continuity (Map 1C) and views/quality of life (Map 1D). Each map is graduated by standard deviation to highlight areas of exceptional resource value. These maps provide the basis for all subsequent work by locating, in a spatial context, the highest value natural resource areas and therefore those areas of town most in need of protection.

Step 3

The third step was to define a “green infrastructure”. The OSTF members worked on maps with clear overlays. The members collectively drew out open space corridors that they felt were important for the town to concentrate on protecting. The group then connected these corridors to create one open space corridor. This is the area that, if protected from disturbance, should ensure that the services provided by nature to the Town’s residents will continue indefinitely. These services include:

- Maintaining the quality of ground and surface water.
- Improving air quality.
- Providing sufficient habitat for plant and animal species now in Candia to remain in Candia, even in the face of a significant disturbance such as fire, flood, or insect infestation.
- Providing connected open space for all Candia residents to enjoy at a reasonable distance from their homes.
- Creating a pleasant and scenic environment in which to live.
- Creating interconnected green spaces that allow the movement of wildlife and trails connecting the various parts of town.

³ Delphi process is a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. One approach is to have a monitor team design a questionnaire to send to a larger respondent group. The questionnaires are returned and the monitor team summarizes the results and, based upon the results, develops a new questionnaire for the respondent group. The respondent group is given at least one opportunity to reevaluate its original answers based upon examination of the group response. (Linstone and Murray, ed.:*The Delphi Method: Techniques and Applications*, 2002)

In defining the green infrastructure (Map 2) the OSTF followed these general guidelines and constraints:

- Include areas of exceptionally high resource value for a particular category.
- Include areas where multiple resource values occur in the same place.
- Give added consideration to lands near existing conservation lands.
- Give added consideration to lands that allow each Candia resident reasonable access to open space.
- Avoid areas slated for industrial or commercial development, unless they contain exceptionally high quality resources.
- Include at least 25% of the Town's land area to ensure the sustainability of natural processes.

It is important to note that the green infrastructure map (Map 2) is intended to be used as a guideline only. Not all areas marked as green infrastructure are required to be preserved. Likewise, areas outside of the green infrastructure may still be preserved if the town wishes to do so.

Section 3, Priorities

Introduction

The OSTF is charged to evaluate areas of land suitable for protection. This is an ongoing process that involves the interests of many groups, including property owners. It should be noted that the Town of Candia is not using this open space plan as a vehicle to proactively acquire lands for conservation purposes. Rather, it seeks to work in partnership with others to maintain a network of open lands as additional parcels are developed. The goal is to promote sustainability and smart growth while preserving the viability and biodiversity of the Town's natural resources.

Qualities and Criteria

In recommending conservation lands worthy of protection, it is necessary preserve the community's green infrastructure and wildlife habitat, while also providing a network among the Town's resources.

In order to achieve this goal, a number of qualities are important to consider. They include;

1.) **Connectivity:** Maintaining connections among various types of habitat throughout the town helps assure the viability and ecological balance of the natural infrastructure. Many animals and birds require different habitats during their life spans, for mating, feeding and for nesting. We rely on wildlife to regulate and/or reseed natural areas, which in turn serve to cleanse and regulate our water supply and provide clean air to breathe, among other benefits. These connections need to be "natural" for the wildlife using them if they are to be viable.

2.) **Flexibility:** The network can be flexible to some extent. If one connection is blocked off by development, the corridor can be "rerouted" so to speak, as long as the remaining connection is natural to the wildlife using it.

3.) ***Efficient use:*** It is more important to preserve the natural corridor than to protect a whole parcel of land. If a landowner wants to develop land that lies within the green infrastructure, it is more cost effective and environmentally efficient if s/he develops the area closer to the town infrastructure and leaves untouched the backlands used by wildlife.

4.) ***Accessibility:*** Part of the importance of open space is its accessibility to humans. The more accessible it is, the more we will use it for recreation, renewal, hunting, fishing, alternative routes to and from destinations, etc. Candia currently has a natural infrastructure that is accessible from almost every residence within a short walking distance.

5.) ***Use for agricultural purposes:*** With the increasing focus on sustainability and locally produced commodities, lands containing agricultural soils need to be given high priority. Even if they are not currently used for agricultural purposes, their protection is important because Candia does not have a lot of such acreage and preservation would ensure their availability for future agricultural activities.

Keeping these five qualities in mind, the OSTF believes that protection priorities should be based on three broad criteria:

1. The ***threshold*** criterion of being within the green infrastructure.
2. The ***competitive*** criterion of cost per resource value, computed at the time a purchase is considered.
3. The ***qualitative*** set of criteria that include: geography (key links, abutting land); threat of development; ability to get outside money; sales price; possible bargain sale; cost avoidance if no development (self-paying).

The ***threshold*** criterion acts as a broad filter that identifies special areas for conservation and parcels that are best dedicated to further development. The ***competitive*** criterion is a strictly computational criterion that *assumes that all other factors are equal*. The OSTF has recommended this competitive criterion over total parcel resource value, because financial resources are the limiting constraint in executing the open space plan. This criterion promotes the greatest amount of conservation value for the least amount of dollars. In addition, this criterion can be used to evaluate specific offers from willing sellers of land or conservation easements, and these offers can then be compared to the cost effectiveness of other open space purchases made in the past and adjusted for inflation. The ***qualitative*** factors provide for the intervention of human judgment on a case-by-case basis. This judgment must be exercised by the Conservation Commission, as they recommend parcels for protection, and the Board of Selectmen, as they consider the Conservation Commission's recommendations. All recommendations are subject to input from the public.

In reality, it is the ***qualitative*** criteria that will play the most important role, for the simple reason that the town can only acquire interests in open space from willing sellers/donors. At any given time, the number of willing sellers or donors is likely to be few in number.

Section 4, Financial Planning

Current Situation

The SNHPC recently completed process of creating a build-out analysis for the Town of Candia. The build-out is another product from the CTAP program which was developed in conjunction with the expansion of I-93 (see footnote on page 4). It is predicted that towns along the I-93 corridor will significantly grow and develop due to easier travel and frequent use of the newly expanded highway. The build-outs are conducted by SNHPC along with other regional planning commissions in New Hampshire in order to determine the effects of allowing a town to reach its maximum allowable capacity for structures and residents. This maximum allowable capacity is called the “Base Build-out” scenario.

The key findings from Candia’s recent build-out project are summarized below. It is important to note that the figures presented do not represent a *prediction* for the Town of Candia, but rather illustrate the demographic and land-use implications of a given “Base Build-out” scenario.

Base Build-out Scenario for the Town of Candia:

- Population increase of 220% (from 3,750 to 12,050)
- Residential Dwelling Units increase of 220% (from 1,470 units to 4,230 units)
- Developed land increase of 631% (from 1,827 acres to 13,360 acres)
- “Walkable land” decrease of 30% (from 3.48% of total area to 2.44% of total area)
- Open space supply decrease of 40% (from 32,400 acres to 19,500 acres)

Open Space Supply in Candia (Current levels vs. 4 different build-out scenarios)



Even with a build-out analysis, however, it is difficult to determine if and when Candia will ever be considered built-out. Factors such as the rate of inflation and the level of real estate values, even as little as ten years into the future, would be highly speculative.

Cost of Growth

It is important to consider the financial cost of growth and development in terms of impacts on natural resources and loss of open space. In addition, the financial costs associated with the development of regional impacts must to be accounted for. This needs to be addressed as a priority in the Town’s Master Plan.

Funding

A percentage of the Land Use Change Tax (LUCT) is used to fund conservation funding. The LUCT is a state-mandated tax that is assessed when a property owner takes land that is enrolled in Current Use for uses other than open space, agriculture, or forestry. The owner pays 10% of the fair market value of the land at the time it is removed from Current Use. That income is reserved for the municipality where the land is located. Many communities choose to allocate a certain percentage of that penalty money to fund open space conservation. Candia currently allocates 25% of LUCT to the Conservation Trust Account in Candia as voted on at the 2009 town meeting. Prior to 2009, 100% of LUCT went to conservation.

Year	Conservation Funding (from LUCT)
2005	\$93,007.87
2006	\$97,609.16
2007	\$140,611.68
2008	\$35,277.09
2009	\$0.00
2010	\$7,837.50
Total	\$374,343.30
Average	\$62,390.55

Table 2, Conservation Trust Account Funding from years 2004 to 2008

By actively pursuing grant opportunities and partnering with land trust organizations, funds can be further leveraged to acquire more open space (see the Derry case study below). Potential funding sources have been reviewed by the OSTF are listed in Appendix C.

Case Study: Corneliusen Farm in Derry and the Trust for Public Land

In 2002, the Town of Derry worked with the Trust for Public Land to conserve 130 farmland acres. Eighty-six of these acres were part of the Corneliusen Farm while the remaining 30 acres were adjacent to the farm and owned by the Ferdinando Family. In the first phase of this creative project; the Town purchased the majority of the Corneliusen farm, approximately 76 acres, for just under \$784,000. Sources of funding for this purchase included \$125,000 from New Hampshire's Land and Community Heritage Investment Program, \$100,000 from the federal Land and Water Conservation Fund, \$95,000 from the USDA Natural Resource Conservation Service's Farmland Protection Program, \$150,000 from the Town of Derry, just under \$189,000 from the Derry Conservation Commission's Land Fund, and \$125,000 from close to 50 private contributors. Adjoining landowners purchased the remainder of the Corneliusen farm, just over 10 acres, for roughly \$111,000.

This land is permanently protected from development by restrictions held by the Derry Conservation Commission. In phase two, the town acquired an agricultural preservation easement over 30 acres of land that lie adjacent to the Corneliusen farm and are owned by Philip and Diane Ferdinando, whose family operates J&F Farm. In exchange for this easement, the Town deeded a 38-acre portion of the former Corneliusen farm to the Ferdinando family. Before transferring ownership of this land to the Ferdinando family, the Town placed an agricultural preservation easement over the property. The easement guarantees that the property will never be developed and will continue to be managed as active farmland. By partnering with land owners and land trusts, and securing funding from outside sources, the town was able to not only conserve open space but also protect active farming in town.

Financial Strategy

As inferred above, the amount of LUCT received has a direct correlation with open space lands being converted to development of some kind. The Town of Candia should, from a conservation standpoint, allocate 100 percent of its LUCT for conservation purposes within the community. The cost of land protection and conservation easements is not predictable and is based on market conditions. Thus, it is necessary to maintain an adequate balance of funds available for use as needs arise. This allows the town to take advantage of land protection opportunities on short notice without asking taxpayers to approve bonds or levy additional taxes.

Success Story in Candia: Rand Property

The town of Candia has recently purchased a conservation easement for 27 acres of land between High Street and Baker Road for \$70,000. The property is owned by the Walter and Patricia Rand who owned the land since the 1970's. While the restrictions of the easement will limit development of the land, farming is still allowed as long as it follows best management practices.

The land is within the green infrastructure identified by the Task Force in this report.

The easement is being held by the Southeast Land Trust of New Hampshire who will be responsible for annual monitoring of the land to make sure the terms of the easement are upheld.

The town has spent more than \$500,000 in the past ten years, including an easement of 82 acres of land off of Deerfield Rd. for open space protection. This continued effort showing the commitment of the Town to continue its' open space protection efforts.

Maintaining Rural Character

It is a high priority of this plan as well as the Town's Master Plan to maintain and protect the Town's rural character. Candia has always had a strong sense of its cultural heritage, defined in part by its traditional settlement patterns, including compact, walkable villages surrounded by rural countryside. The Town's open spaces have helped to provide a sense of community and interconnectivity among its residents, fostering social capital and improving quality of life. Thus, maintaining and protecting open space is a key part of ensuring that Candia retains its unique rural character and strong sense of place.

Does Open Space Pay?

A study conducted during the mid 1990s by Philip A. Auger, Extension Educator, Forest Resources, University of New Hampshire Cooperative Extension, looked at the cost of community service for residential, commercial, industrial, and open space land uses within the communities of Stratham, Dover, Fremont, and Deerfield. In each community, residential land use expenditures *exceeded* revenues by an average of approximately 12 percent. Conversely, for open space land use, revenues *exceeded* expenditures. The results of this study, published in 1996, still ring true today as evidenced by a similar study for the Town of Candia, NH conducted in 2009 by the Southern New Hampshire Planning Commission.

The results of the study show that, in Candia, based upon the town's financial data from 2008 for every \$1.00 in revenue collected by the Town for the particular land use:

- \$1.03 was spent in services to residential properties
- \$0.69 was spent in services to commercial/industrial properties
- **\$0.19 was spent in services to open space lands.**

While each town in New Hampshire has a unique blend of land uses, revenues and expenditures, these studies point out some fiscal consistencies that are likely to apply in most circumstances. One of these is that *residential land use very often costs communities more than they generate in revenues*. Traditional residential housing brings with it a tremendous cost load for community services, roads, landfills and schools. Open space lands contribute to the stability of community tax rates. This has been supported by other well-documented fiscal impact studies in New Hampshire communities, including Milford and Londonderry.

The publication, *Managing Growth in NH*², notes that, on average, taxes on the median value home in New Hampshire communities are:

- Higher in more developed towns,
- Higher in towns with more year-round residents, and
- Higher in towns with more buildings (more value of buildings)

Brentwood Open Space Task Force. *Does Open Space Pay in Brentwood? Part 1: Housing Growth and Taxes.*

Section 5, Recommendations

Summary of Recommendations

The Candia Open Space Task Force recommends:

1. The green infrastructure identified in this plan should be adopted as the Town's goal for open space preservation.
2. The town should work expeditiously and cooperatively with owners of developed parcels within the recommended green infrastructure to ensure their appropriate management.
3. The town should re-examine the recommendations of this OSTF at no more than three year intervals and review the open space financing plan annually, as part of the Capital Improvement Plan process.
4. The town should look at opportunities to enhance recreational opportunities offered in town, such as implementing a trail network.
5. The Town Planning Board, in review of development proposals, should aim to protect and maintain at least 40 percent of the land area within the development, as suggested in the Town of Candia Zoning Ordinance under "Conditional Use Permit Statutes," Section 26 (Conservation Land / Open Space).

Implementation

There are several approaches to protect open space. Regulatory controls, voluntary options and purchase agreements all need to be examined to find what would be the best way for Candia to protect its most highly valued natural resources. By using a variety of these protection methods, Candia will be able to achieve its conservation goals.

1. Regulatory Land Protection

One approach to land protection involves the use of zoning or municipal regulations to prohibit unnatural disturbance or total development of each parcel. Regulatory measures are perhaps the most cost-efficient means of land preservation, and if implemented according to the open space priorities of the town, can be extremely effective in curbing sprawl and protecting land. A couple methods of regulatory land preservation are Conservation Subdivisions and Growth Management Ordinances. Additionally, other subdivision ordinances may be added to zoning regulations in order to reflect priorities on smaller scales.

➤ *Conservation Subdivision*

A Conservation Subdivision *requirement* has the same result as conservation subdivision option but the requirement regulates that qualified development *must* be in conservation subdivisions. This ordinance would lower the lot size of houses built in new subdivision developments in Candia. However, it would also significantly increase the amount of conserved open space. The next page shows how an open space/conservation subdivision has been implemented in the Town of Sandown.

Sandown's First Open Space Development: Twelve Lots, 34 Acres Preserved

In the 2008 town election, Sandown residents adopted an innovative land use ordinance. If the one subdivision that has been designed under the new ordinance is an indication of things to come, Sandown can look forward to the preservation of more green space and a more ecologically-friendly and creative use of our remaining undeveloped land.

Steven Keach has been Sandown's consulting land use engineer since 1995. He drafted the Open Space Development (OSD) ordinance under the direction of Sandown's Planning Board then led by Chairman Fred Daley. The need for a new ordinance arose from the shortcomings of a long-standing cluster ordinance, and the town's renewed focus on preserving open space, a major goal of Sandown's Master Plan of 2005. Under the new ordinance, which replaces the former cluster ordinance, the number of single family homes in the innovative plan cannot exceed the number of homes that would have resulted with a conventional plan.

The Innovative Subdivision

Sandown's first development under the OSD ordinance is a subdivision on Wells Village Road designed by Rob Hoover, a landscape architect with HBLA Inc. of Portsmouth, NH. His plan, which was enthusiastically received by Sandown's Planning Board and Conservation Commission, preserves 34 acres of the 54-acre site as open space and protects the banks of the Exeter River which runs through the site.

In traditional developments, Hoover explained, a developer builds the longest road possible into the site and then divides the lots based on the town's road frontage requirements. This practice, he said, "chews up a big chunk of land." Since all the land on the site is parceled, it is possible that all the land would get cleared by individual lot owners. Deed restrictions on the land are hard to enforce and often make the lots harder to sell. By having smaller frontage requirements of just 150 feet, the OSD ordinance allows houses to be built closer together, "minimizing the roads and disturbance to the land and still getting the same number of lots," he said, "and ... the space is forever preserved."

Sandown's Future

Keach believes the majority of major subdivisions in Sandown's future will be advanced as OSD designs. "There are financial incentives for the developer community by creating efficiencies in reducing infrastructure costs per dwelling," he noted.

Apart from savings on infrastructure, developers can also command premium prices for lots adjacent to protected open space, making the total financial incentives for an OSD development very attractive.

Keach said he would also like Sandown to "rethink the wetlands conservation ordinance and possibly augment it with a prime wetlands ordinance." Additionally, he would like to see multi-use zoning which mixes residential, commercial and light industrial uses together, something he thinks encourages greater community integration, diminishes sprawl and enhances energy and transportation efficiency.

New Hampshire Town and City, March 2009, Donna Green and Matt Russell

➤ ***Growth Management Ordinances***

Growth Management Ordinances are often used by municipalities experiencing population growth at a rapid pace whose public facilities and services cannot keep up. They function by placing short or long-term caps on new residences or population numbers. Under certain circumstances, a town can adopt regulations to control the rate of development. In New Hampshire, a town must have both a Master Plan and a Capital Improvement Plan before it can adopt any ordinances controlling the timing of development. In certain rapid growth situations, slowing the rate of development can give a community time to update its Master Plan, develop infrastructure, and consider ways to conserve open space. Methods include limiting the number of building permits, or an interim growth moratorium allowing the planning board to halt or severely limit development for up to one year. Examples of both local ordinances on limiting building permits and interim growth moratoriums are available from the NH OEP website at: <http://www.nh.gov/oep/resources.htm>

➤ ***Applying Open Space Priorities to Zoning Ordinances***

Regulatory measures are perhaps the most cost-efficient means of land preservation, and if implemented according to the open space priorities of the town, can be extremely effective in curbing sprawl and protecting land. The two primary methods of regulatory land preservation are the above-mentioned conservation subdivisions and growth management ordinances. Additionally other subdivision ordinances may be added to zoning regulations in order to reflect priorities on smaller scales.

Semi-mandated conservation subdivision options are another route that some communities take to proactively encourage open space developments without requiring them. Some rural towns require all developers to submit an alternative conservation plan along with conventional patterns of development. These conservation plans take open space, environmentally sensitive parcels, lot size, and profitability into consideration. Most regulations for alternative conservation plans require that certified landscape architects or similarly qualified experts help to craft the plan based on soil type, drainage, and environmental features. These towns have found that once developers create an alternative plan, a great number carry through with the conservation design due to the many advantages it offers.

While communities could achieve the greatest degree of open space protection for the lowest cost by mandating Open Space Developments, they may also choose to offer incentives to encourage developers to build according to Open Space Regulations. The following are some of the most effective incentives:

- **Density bonuses:** Subdivisions that use innovative protection can receive density bonuses allowing them to build more houses on the existing developable land. This bonus would come in addition to the density credit from the open space land. The density bonuses should not exceed 15% of the yield plan nor should they exceed the soil-based carrying capacity for the entire parcel.
- **Reduction of minimum lot standards:** Reducing requirements for elements of the subdivision allows the builder to have more flexibility in design and ultimately save

money. The incentives could allow for exceptions in frontage, yard area, height, setback, and landscaping.

- **Reduction in road design standards:** As another incentive to save money and increase flexibility, the town could allow for reductions in road width, parking, and signage standards. In a subdivision with more compact development, driving speeds would be reduced, allowing for safe road variations. Federal standards exist for low volume rural roads, and have been successfully used in at least one 2005 subdivision in a neighboring town. Given that success, reduction in road dimensions should be considered for any future subdivision that meets the low volume criteria.
- **Streamlined application process:** The town could implement a priority zoning or building permit process for conservation subdivisions to allow developers to save time (and money) in getting their developments approved.

While conservation subdivisions are the ideal way to ensure that all future development will maintain the rural character of the town, other ordinances can be effective at smaller scales. These reflect the ideal characteristics of the conservation subdivision ordinance but can be implemented piece by piece.

- **Density requirements for new developments:** Ordinances for house lots in Candia currently have a minimum density of 1 to 3 acres per dwelling unit, depending on the distance from the “Four Corners” area (See Candia Zoning Ordinance, Section 5.06: Conditional Use and Permit Standards, Sections 7 A and B). Reducing the minimum lot size alone could reduce the amount of land subdivided into residential areas, but reducing the minimum lot size while increasing the allowable density for residential districts *and* mandating open space areas within new developments could achieve similar effects as a conservation subdivision.
- **Mandatory percentage of open space:** Zoning ordinances can require that all subdivided lots maintain at least 50% of the original area as undeveloped, open space. The Town’s zoning ordinance could be amended to utilize this OSP as a guide in determining these open space areas..
- **Maximum setbacks and street widths:** By regulating that streets be made slightly narrower and that houses be built within a certain distance from the road, the town can maximize the amount of open space contained contiguously behind each lot rather than leaving disjointed green space between the road and the building.
- **Expanded buffer zones for wetlands, riparian corridors, and special wildlife habitat on all new developments:** This plan expresses certain criteria for land protection due to their economic, health, social, and environmental benefits. By requiring developers to consider and protect particularly sensitive and valuable areas, the town can preserve its resources at little or no cost.

Frequently Asked Questions about Regulatory Measures

Do conservation subdivisions involve a taking without compensation?

No, for two reasons. The first is that no density is taken away. Developers can still build at full permitted density for the municipality's current zoning, but houses are condensed onto smaller lots such that at least half of the land is left as open space. Second, no land is taken for public use, since the neighborhood or the developer owns and manages the open space land (except in rare cases that are negotiated with the town).

What are the ownership, maintenance, and tax issues?

In the case of a conservation subdivision, the land most commonly belongs either to the original landowner (who can pass the land to heirs and keep it under conservation easement) or the Homeowner's Association (which consists of all residents in the neighborhood and minimizes facilities to keep dues low). In some cases the municipality or a private land trust maintains the land or an easement on the land. The landowner or Homeowner's Association is responsible for taxation, generally the same as a normal subdivision, and maintenance.

How can on-site sewage work with conservation subdivisions?

Contrary to popular belief, conservation subdivisions lend themselves well to sewage disposal. One option is to situate houses on the best-drained soils to ease efficiency of septic systems. Another option is to provide central water and sewage disposal, or leach fields, which can be located under playing fields or conservation meadows. Conservation subdivisions can also utilize spray irrigation in which wastewater is heavily aerated in deep lagoons and nutrients are taken up by the forests or fields in the surrounding open space. Creative design can allow residents to enjoy the benefits of environmentally sensitive sewage treatment without unpleasant olfactory or visual side effects.

How do conservation subdivisions differ from clustering?

Clustering uses the same principle of decreasing lot size in exchange for more open space. However, clustering requires less land be set aside for conservation and makes no specifications as to what land be conserved. Conservation subdivisions are planned to preserve the most strategic features and create networks of green space throughout the community.

2. Non Regulatory Strategies

There are other approaches to land protection that do not involve regulation. This includes landowner education, Transfer of Development Rights (TDR) and voluntary land protection.

➤ Landowner Education

By educating landowners about the benefits of open space, the economic implications and potential tax advantages, they are more likely to want to conserve their open space. Therefore, by offering this information and making it readily available can be one of the most effective ways to conserve open space. Establishing a good working relationship between the landowner and the Conservation

Examples of Transfer of Development Rights in New Hampshire

Lee, New Hampshire has a TDR ordinance to preserve farmland, open space, forests, watershed and other significant natural resources as well as the Town's rural character. The sending sites and receiving sites must be contiguous. The amount of density that can be transferred from a sending site is equal to the development rights allowed to that site under baseline zoning, a one-to-one transfer ratio. The amount of development allowed on the receiving site through TDR is the total density permitted on both the sending and receiving sites under the baseline zoning. The Planning Board has the right to decide transfer applications on a case-by-case basis taking into consideration the specific natural characteristics and resource values of the two sites.

Dover, New Hampshire includes in its zoning ordinance the ability to transfer development rights within overlay districts. The purpose of TDR in Dover is to allow receiving areas to be certain business and industrial zones since the amount of land within these areas is limited. Sending areas include all wetlands and wetland buffers. At the discretion of the Planning Board, an applicant for development approval within the receiving area of the defined TDR district may apply the performance standards specified in the zoning ordinance in return for the acquisition of land or development rights from the sending area within the same TDR district.

TDR has been used across the country for many years, but is still not in widespread use in New Hampshire. As communities gain additional experience with this open space-zoning tool, it may become an important way to preserve open space in this state.

Commission is essential step in protecting open space. Much information on open space protection is readily available from such resources as the Society for Protection of New Hampshire Forests (SPNHF) and University of New Hampshire Cooperative Extension.

➤ *Transfer of Development Rights*

Transfer of development rights (TDR) is a market based technique that encourages the voluntary transfer of growth from places where a community would like to see less development (called *sending areas*) to places where a community would like to see more development (called *receiving areas*). The *sending areas* can be environmentally-sensitive properties, open space, agricultural land, wildlife habitat, historic landmarks or any other places that are important to a community. The *receiving areas* should be places that the general public has agreed are appropriate for extra development because they are close to jobs, shopping, schools, transportation and other urban services.

TDR is driven by the profit motive. The *sending area* site owners permanently deed-restrict their properties because the TDR program makes it more profitable for them to sell their unused development rights than develop their land. Developers buy the development rights and use them to increase the density of *receiving area* site projects; they do that because these larger projects are more profitable than the smaller projects allowed when development rights are not transferred. In addition to pleasing both property owners and developers, TDR solves a seemingly intractable dilemma for communities: it gives them away to achieve critical land use goals using little or no public funding⁴.

⁴ 1999 "Transfer of Development Rights Update", APA National Planning Conference, <http://design.asu.edu/apa/proceedings99/PRUETZ/PRUETZ.HTM>

3. Purchase

Another method of open space protection is through the purchase of the land or acquisition of development rights to that land. Depending on the needs of the landowner and sources of available funding, land and development rights can be purchased at varying cost to the town.

➤ ***Fee Simple Purchase***

The town buys the property at market value from the current landowner. There are no tax benefits or exceptions for either party, and the town no longer receives taxes on the land. This is the most costly method of land protection but requires no special arrangements with the landowner and leaves future use of the land completely in control of the town. However, it is recommended that a conservation easement is placed on the property to ensure that the town conserves the property as open space in perpetuity.

➤ ***Bargain Sale***

A bargain sale is an agreement of discounted sale of property to the town. The landowner agrees to sell his/her land below market value, and the difference between fair market value and the sale price becomes a tax-deductible charitable donation. Bargain sales are also useful for the landowner in minimizing the liability of a long-term capital gains tax associated with selling a large estate. After the sale, the town retains all rights and responsibilities over the land.

Protection Strategies	
Examples of High Cost Purchase Strategies	Examples of Low/No Cost Strategies
Purchase by the town to be held as town-owned conservation.	Protection by regulation, such as state wetland regulations and the shoreline protection act.
Purchase of a conservation easement by the town over part or all of the property	Establishment of a management agreement that would ensure the land was managed in a way compatible with maintaining the green infrastructure.
	Landowner education by partnering with organizations such as UNH Cooperative Extension and Society for the Protection of NH Forests.
	Voluntary landowner donation of development rights
	Voluntary landowner donation of property
	Bargain sale of development rights
	Bargain sale of property

4. Land Conservation Easements (donation or sale)

A voluntary conservation easement involves the donation or sale of the property or development rights over the land. The landowner makes the decision that they wish to prohibit development on their land and preserve the natural state. They donate or sell the development rights to the town or a land trust as the easement holder. The owners continue to use their land and pay property taxes on it. However, some or all of the value of any donation can be deducted from federal income taxes.

A conservation easement permanently restricts development rights on open space or agricultural land. A landowner can donate or sell a conservation easement to the easement holder (usually a non-profit land trust or municipality). The easement holder does not hold development rights (the rights are extinguished). Rather, they are responsible for monitoring and enforcement of the conditions of the easement.

An easement should be tailored to the specific parcel of land and the values of the landowner, meaning existing structures may remain and appropriate activities may continue to take place. This could include agriculture, forestry, archaeological excavations, and public events.

An easement *does not automatically* signify public use. If it does not involve the expenditure of public funds, the landowner can determine the best use of the land, including granting permission for community recreation and use. In Candia, easements that involve an expenditure of public funds typically require public access and allow activities (including hunting and fishing) that agree with the purposes and conditions of the easement

Appendix A - Maps

Appendix B

OSTF Technical Supplement

Step 1: Base Map Production

A series of 16 datalayers describing natural resource conditions and organized into four thematic groups were considered the base layers for this analysis. If possible, local information from the Candia GIS was applied in order to secure the highest accuracy. The 16 datalayers (see table below) were identified by the GIS Analyst and the OSTF and were selected due to the relevancy and availability of data. A critical point was the ability to characterize ground features as positively in or out of the mapped data and to identify features that were separate and distinct from each other so as to permit tabulation of the number of co-occurrences between features with minimal double counting.

Soil Conditions	Source
Important Forest Soil Groups I and II	USDA NRCS Soil Survey of Hillsborough County. Downloaded from GRANIT. Query: FORSOILGRP = {IA, IB, IC, IIA or IIB}
Local Important Agricultural Soils	USDA NRCS Soil Survey of Hillsborough County. Downloaded from GRANIT. Query: FARMCLASS = {Farmland of local importance}
Prime Important Agricultural Soils	USDA NRCS Soil Survey of Hillsborough County. Downloaded from GRANIT. Query: FARMCLASS = {All areas are prime farmland}
State Important Agricultural Soils	USDA NRCS Soil Survey of Hillsborough County. Downloaded from GRANIT. Query: FARMCLASS = {Farmland of statewide importance}
Open Space Continuity	
Unfragmented Forest Areas > 50 Acres	SNHPC CTAP Land Use digitized from 2005 one foot imagery. Data derived from Land Use Category as described below.
Unfragmented Forest Areas > 100 Acres	SNHPC CTAP Land Use digitized from 2005 one foot imagery. Data derived from Land Use Category as described below.
Unfragmented Forest Areas > 500 Acres	SNHPC CTAP Land Use digitized from 2005 one foot imagery. Data derived from Land Use Category as described below.
NH WAP Highest Ranked Habitat	New Hampshire Fish and Game Department, Wildlife Action Plan, Highest Ranked Wildlife Habitat by Ecological Condition. Selection where Value = 1 or Value = 2 (Tier 1 and Tier 2)
Water Quality	
Aquifer Transmissivity 0 – 2,000 ft ³ /day	Selection from GRANIT Aquifer Transmissivity dataset where field TMAX < 2000
Aquifer Transmissivity > 2,000 ft ³ /day	Selection from GRANIT Aquifer Transmissivity dataset where TMAX > 2000
250' Resource Area of named wetlands and perennial streams	250' Resource Area applied to selection set of named wetlands and streams from NHHD data from GRANIT
100' Resource Area of unnamed wetlands and intermittent streams	100' Resource Area applied to remaining water features

Views/Quality of Life	
Scenic Views/Ridgelines/Hilltops	Selected by the OSTF of scenic locations and viewshed (Spatial Analyst) analysis from said point.
Farms/Vineyards	Selected by the OSTF and interpreted by the GIS Analyst
Riverway Paths/Old Railroad Beds	Selected by the OSTF and interpreted by the GIS Analyst
Slopes > 25%	SNHPC GIS. Slope determination was calculated in Spatial Analyst from local DEM database.

Unfragmented Forest Areas were mapped by the GIS Analyst. This was done using 2005 aerial imagery at a 1-ft scale. The land use category was interpreted from this imagery. Land that was categorized as agricultural land, brush or transitional between open and forest, forest land, outdoor recreation, and wetlands were selected. The next step involved a dissolve operation in ArcGIS by where adjacent polygons were merged into larger polygons. A selection of those polygons was done for each of the three forest sizes 50 to 100 acres, 100 to 500 acres and 500+ acres.

Step 2: Delphi Process

The Delphi Process represents a consensus building model that was applied to assign value scores to each of the natural resource classes. At the first meeting, following a review of the geography, sources and strengths/weaknesses of each mapped resource, Task Force members were asked to distribute 100 points between each resource type. The distribution represented each individual’s opinion on the types of resources of value to the Town of Candia. Each individual response was tallied and a group average for each data type was presented to the group. Individuals whose own scores deviated significantly from the mean were offered a chance to describe their reasoning. Following discussion, a second round of scoring, with members reconsidering their initial scoring based on feedback from the group. Individual scores were again tallied and compared to the group mean. When the group felt that there were few significant deviations, it was determined that a consensus had been reached. The mean score for each resource type was considered the “natural resource score”. This score was carried on into each of the remaining steps of the Task Force Analysis.

Step 3: 10:10 Analysis

Open Space Task Force members support the goal of providing 10 acres of open space within a ten-minute walk of all Candia residents, thereby assuring equal access across town. This principle is referred to as “10:10”. For the GIS analysis, a selection set of conservation areas in total excess of 10 acres was identified. A buffer of ¼ mile (assumed 10 minute walk distance) was carried out. This new polygon represented the accessible areas and those in agreement with the 10:10 principle. The inverse was considered underserved areas.

Step 4: Transfer of Delphi Scores to GIS Layers and Co-Occurrence Calculation

Following the Delphi process, each feature in each natural resource polygon layer was coded with its' appropriate score. Unique field names were added that allowed the 15 layers to be unioned into one layer that would carry the complete set of attributes. Following the union operation, a total natural resource score was summarized for each feature in the dataset. Maps were generated displaying this total score in both an ordinal range and in standard deviations. Areas with the highest score or the highest standard deviation represented the areas of with the most overlapping resources ad thus the richest resource environments. A second map displaying the “best of the best” was prepared that illustrated the areas of Candia with the highest total resource score in each of the four thematic groups.

Step 5: Interpretation of datalayers to generate Green Infrastructure area

The results of steps 1 through 5 were presented to Task Force members to facilitate a detailed interpretation of the local green infrastructure. A series of maps, including (1) regional context, (2) total resource score, (3) highest scoring specialist resources and 4) 10:10 underserved areas. The members used markers and acetate to review the various layers and synthesize the resources into areas of contiguous green infrastructure. This work was undertaken with the understanding that there needed to be a balance between future conservation areas and future economic development areas. Features such as water bodies, contiguous forest, utility corridors and protected lands served as key connectors. The infrastructure areas were sketched in with an attempt to include both specialist and generalist resources and to provide for town-wide connectivity and town-wide access. Task Force members formed two groups who each created an independent map. Following each group's completion, the two maps were combined, differences were discussed, and a final sketch representing the group consensus was finalized.

Step 6: Digitizing Green Infrastructure area

A refinement of the committee's work from step 6 was completed using GIS software to map the green infrastructure at a 1:100 scale. The hand drawn delineation was digitized. From this digitization, the delineation was edited to improve accuracy and agreement with shared features using those features' boundaries and aerial photo interpretation as edge guides. For the most part, the feature edges from the unfragmented forest areas polygons were traced. In this way, the green infrastructure was able to extend as close as possible to the actual edge of use. Where possible, corridors were digitized to be 1,000 feet wide. The final product, a contiguous polygon, represented the green infrastructure and was used to identify the area of interest for conservation protection.

Following completion of the Green Infrastructure layer, the Natural Resource Co-Occurrence layer was clipped to its boundaries.

Appendix C

Funding Sources

There are numerous State and Federal grant programs available that can be used to promote open space protection. The status of grant programs is subject to change. However, the following include some current programs that could be used by the town to further the open space plan goal, objectives and recommendations.

State Programs:

Community Conservation Assistance Program. UNH Cooperative Extension. Assistance for project guidance and training for community projects through municipalities and non-profit conservation groups. Contact Amanda Stone at (603) 364-5324 or amanda.stone@unh.edu

Community Impact and Express Grants Program. The New Hampshire Charitable Foundation. Provides funding to non-profit and public agencies in the fields of environment, arts and humanities, education, and health and social and community services. Contact www.nhcf.org or call (603) 430-9182.

Conservation License Plate Grant Program. NH State Conservation Committee. To promote natural resource related programs throughout NH. Conservation districts, Cooperative Extension, conservation commissions, schools, groups, and other non-profits can apply for funding. Contact Michele L. Tremblay, Executive Director, (603) 271-1092 or visit www.SCC.nh.gov

Fisheries Habitat Conservation Program. NH Fish and Game Department. To conserve fisheries habitat through a watershed approach. Landowners wishing to protect/enhance fisheries habitat can apply for funding. Contact Scott Decker, (603) 271-2744 or sdecker@wildlife.state.nh.us

Forest Legacy Program. Provides up to 75% of the purchase price for development rights to forestlands from willing sellers. Streamside land is among program priorities. Rights are held by the state in perpetuity, while the landowner retains all other rights, including the right to harvest timber. Contact NH DRED at (603) 271-2411.

Land and Community Heritage Investment Program. This is a grant program for conserving and preserving New Hampshire's most valuable natural, cultural, and historical resources. Grant applications for the purchase of land/buildings or restoration of structures are accepted from tax-exempt organizations, municipalities, or other political subdivisions of the State. Contact the SNHPC or visit www.lchip.org.

Land and Water Conservation Fund Program. The LWCF is a federal 50/50 matching grant program targeted at enhancing New Hampshire's outdoor recreational opportunities. Contact NH DRED Division of Parks and Recreation at (603) 271-3556.

Local Water Protection Grants (Drinking Water Source Protection). To protect public drinking water sources. Protection projects funded through this program have included

delineation of wellhead protection areas, inventorying potential contamination sources, development of local protection ordinances, performing land surveys as a precursor to land acquisitions, groundwater reclassification, shoreline surveys, drinking water education and outreach activities, and controlling access to source. For more information, contact Johnna McKenna at (603) 271-7017 or johnna.mckenna@des.nh.gov.

Watershed Restoration Grants for Impaired Waters and High Quality Waters. For watershed based projects to address water quality issues. Grants are given to associations, organizations, and agencies. This grant program helps to fund all aspects of watershed management including organization, building, planning and assessment. Contact Eric Williams at (603) 271-2358 or www.des.nh.gov/wmb/swqa

Transportation Enhancement Program. New Hampshire Department of Transportation provides funding for Environmental mitigation to address and reduce water pollution due to a highway runoff, and vehicle-caused wildlife mortality while maintaining connectivity. Cities, towns, state agencies, private industry and special interest groups may apply for Transportation Enhancement funding for their project. Federal funds will pay up to 80% of the cost of the project, with the applicant being responsible to provide matching funds. Contact SNHPC at (603) 669-4664.

Small Grants Program for Wildlife Habitat Restoration and Enhancement. NH Fish and Game Department. The Small Grants Program helps landowners with a minimum of 25 acres restore or enhance habitat for wildlife. Funding of up to \$2,000 per year (no more than \$6,000 over a ten-year period) is available for the creation and/or maintenance of wildlife habitat within the property. Examples of projects that may qualify for funding include: brush clearing or mowing to maintain grasslands and shrub-lands; release of old apple trees; and maintenance of woodland openings. In exchange for the grant, landowners agree that their land will remain open for non-motorized public access activities, including hunting. For more information, contact the Wildlife Division at (603) 271-2461, or wildlife@wildlife.nh.gov.

Federal Sources:

Coastal America Corporate Wetlands Restoration Partnership. U.S. Army Corps of Engineers. Voluntary public-private partnership in which corporations join forces with federal and state agencies to restore wetlands and other aquatic habitats. Contact (978) 318-8238.

Conservation Reserve Program (CRP) . USDA Farm Service Agency. For converting highly erodible land to vegetative cover. Annual rental or other incentive payments for certain activities are offered. Cropland owners and operators who have owned or leased the land for at least 1 year can apply for funds. Contact your local USDA Service Center or www.fsa.usda.gov for more information.

Conservation Stewardship Program (CStP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). CStP is a voluntary conservation program that rewards good land stewards and encourages producers to address resource concerns in a comprehensive manner by undertaking additional conservation activities and improving,

maintaining and managing existing conservation activities. Contact the state office at (603) 868-9931 for information

Cooperative Conservation Partnership Initiative (CCPI). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). The Cooperative Conservation Partnership Initiative (CCPI) is a voluntary conservation initiative that enables the use of certain conservation programs with resources of eligible partners to provide financial and technical assistance to owners and operators of agricultural and nonindustrial private forest lands. Contact the state office at (603) 868-9931 for information

Conservation Innovation Grants (CIG). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program funds are used to award competitive grants to non-Federal governmental or non-governmental organizations, Tribes, or individuals. Contact the state office at (603) 868-9931 for information.

Environmental Quality Incentives Program (EQIP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). EQIP is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. Through EQIP, NRCS provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental requirements. Visit <http://www.nh.nrcs.usda.gov/gettingconservation.html> for more information.

Farmland and Ranchland Protection Program (FRPP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). This program provides matching funds to help slow the conversion of farmland to non-agricultural uses. An entity holds the conservation easement deed, and land must contain important farmland soils, and a conservation plan. The easements are for 30 years, but priority is given to perpetual easements. The Farmland Protection Program is a voluntary program implemented by the United States Department of Agriculture (USDA) and the Natural Resources Conservation Service (NRCS), and provides funding to State or local governments with existing farmland protection programs to purchase conservation easements. To be eligible for the FPP, the land must be: part of a pending offer from a non-governmental organization, state tribe, or local farm protection program; on prime, unique, or other important farmland soil; covered by a conservation plan developed with/through the Natural Resources Conservation Service; privately owned; large enough to sustain agricultural production; accessible to markets for what the land produces and surrounded by parcels of land that can support long-term agricultural production. Contact Jody Walker at (603) 868-9931 ext. 103 or jody.walker@nh.usda.gov

Healthy Forests Reserve Program (HFRP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). HFRP is a voluntary program established for the

purpose of restoring and enhancing forest ecosystems to: 1) promote the recovery of threatened and endangered species, 2) improve biodiversity; and 3) enhance carbon sequestration. Contact the state office at (603) 868-9931 for information.

Grassland Reserve Program (GRP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). The Grassland Reserve Program (GRP) is a voluntary program offering landowners the opportunity to protect, restore, and enhance grasslands and shrubland on their property. The Natural Resources Conservation Service and Farm Service Agency coordinate implementation of GRP. The program will conserve vulnerable grasslands from conversion to other uses and valuable grasslands for wildlife uses in New Hampshire. GRP offers producers several enrollment options: permanent easements, 30-year easements, rental agreements (10, 15, 20, or 30-year duration) and restoration agreements. For permanent easements, USDA makes a payment based on the fair market value of the property less the grazing value. For 30-year easements, USDA pays 30 percent of what would be paid for a permanent easement. For rental agreements, USDA pays 75 percent of the grazing value in annual payments for the length of the agreement. Contact Betty Anderson at 603-868-5301 or betty.anderson@nh.usda.gov .

North American Wetlands Conservation Fund. The North American Wetlands Conservation Act (NAWCA) of 1989 provides matching grants to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife. There is a Standard and a Small Grants Program. Both are competitive grants programs and require that grant requests be matched by partner contributions at no less than a 1-to-1 ratio. Funds from U.S. Federal sources may contribute towards a project, but are not eligible as match. Contact Division of Bird Habitat Conservation at (703) 358-1784 or dbhc@fws.gov.

Partners For Fish and Wildlife. U.S. Fish and Wildlife Service. The Partners Program provides technical and financial assistance to private landowners and Tribes who are willing to work with us and other partners on a voluntary basis to help meet the habitat needs of our Federal Trust Species. The Partners Program can assist with projects in all habitat types which conserve or restore native vegetation, hydrology, and soils associated with imperiled ecosystems such as longleaf pine, bottomland hardwoods, tropical forests, native prairies, marshes, rivers and streams, or otherwise provide an important habitat requisite for a rare, declining or protected species. Locally-based field biologists work one-on-one with private landowners and other partners to plan, implement, and monitor their projects. Partners Program field staff help landowners find other sources of funding and help them through the permitting process, as necessary. Contact the Eric Derleth or Greg Mannesto at (603) 223-2541 or Eric_Derleth@fws.gov or Greg_Mannesto@fws.gov

Scenic and Cultural Byways Program. Federal Highway Administration (FHWA). Roads designated under the New Hampshire Scenic and Cultural Byways Program may be eligible for federal grant money for purchase of conservation easements for scenic values along designated byways. Such funds may be used to ensure the long-term protection of open spaces along the byways. Contact Dean Eastman at (603) 271-3914 or deastman@dot.state.nh.us

Wetlands Reserve Program (WRP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). The Wetlands Reserve Program is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The USDA Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. Jody Walker at (603) 868-9931 ext. 103 or jody.walker@nh.usda.gov.

Wildlife Habitat Incentives Program(WHIP). U.S. Department of Agriculture Natural Resources Conservation Service (NRCS). The Food, Conservation, and Energy Act of 2008 reauthorized WHIP as a voluntary approach to improving wildlife habitat in our Nation. The Natural Resources Conservation Service administers WHIP to provide both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP cost-share agreements between NRCS and the participant generally last from one year after the last conservation practice is implemented but not more than 10 years from the date the agreement is signed. Contact Jim Spielman at (603) 868-7581 or james.spielman@nh.usda.gov.